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# Rescue Packages and Output Losses Following Crises

Michael P. Dooley and Sujata Verma

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## 5.1 Introduction

Beginning with the financial crisis in Mexico in 1992, rescue packages consisting of loan commitments from industrial countries and international organizations have become an important ingredient in crisis management. Rescue packages are designed to limit the damage that follows financial crises by reassuring private investors, stopping runs, and limiting contagion to other countries. The motivation for rescue packages is the belief that the real costs of crises can be reduced by quick and decisive action. Although there are plausible theoretical models of crises that suggest this is an effective policy reaction,<sup>1</sup> there are, in our view, equally plausible models that suggest such intervention is effective only under very stringent conditions.

The intuition behind doubts about the effectiveness of rescue packages is the possibility that output losses are built into international credit arrangements in order to preclude strategic default by debtor governments (Dooley 2000a). In our view, the mechanism that generates the loss in output is the inability of residents of the debtor to engage in domestic financial in-

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1. Among many others, see Sachs (1995); Miller and Zhang (1998); Bhattacharya and Miller (1999); Chari and Kehoe (1999); Fischer (1999); Giannini (1999); Rogoff (1999); Chui, Ghai, and Haldane (2000); Gavin and Powell (2000); and Ghai, Hayes, and Shin (2001).

intermediation while foreign debt is renegotiated. Moreover, international credits are *designed* so that creditors will find it difficult to coordinate debt restructuring following default.<sup>2</sup> The important implication is that coordination problems among creditors are the *feature* of the international monetary system that makes international lending possible.<sup>3</sup>

In a first best world, creditors would be happy to “switch off” the coordination problem if it was clear that default was unavoidable and independent of the debtor’s behavior. Following a “bad luck” default, a long recession in the debtor country is clearly not in creditors’ collective interest. However, we cannot imagine a contractual mechanism that would accomplish this that does not also eliminate the credibility of creditors’ threats to impose the penalty following a strategic default. Following strategic default, a long recession in the debtor country is also not in creditors’ interests. If creditors could switch off the coordination problem they would be left, following strategic default, with the threat of shooting themselves in the foot. The unhappy result is that creditors need to commit to punish even though the punishment benefits no one.

Can official lending mitigate this market failure? In the next section we show that this depends on the official sector’s ability to act predictably and to commit not to rescue following strategic default. Although it is quite easy to set out a regime for official intervention that moves us toward a first best equilibrium, we have serious doubts that official lenders can, in practice, establish such a regime.

In the final section we evaluate rescue packages in the context of an explicit model of crises. We argue that the insurance model developed in Dooley (2000b) is an attractive vehicle for the analysis because it provides an explanation for surges in capital inflows followed by sudden stops. The model also provides a useful distinction between *crisis* and *default*. A *crisis* in this model is an anticipated asset exchange that generates a transfer from the official sector to the private sector. A *default* is a transfer that is smaller than expected.

As in all first-generation crisis models, a perfect-foresight assumption implies that default would never be observed because the crisis occurs at the point when the official sector’s assets are just exhausted. Clearly there is no need to restructure remaining debt.

Uncertainty about the size of the insurance pool (bad luck) or the debtor’s willingness to draw on and exhaust the pool (strategy) introduces the possibility of default. Default occurs when the expected value of the transfer exceeds the realized value at the time of crisis. In this event, some creditors that expect to be rescued are not, and debt must be renegotiated.

2. For an excellent analysis of the legal constraints on debt restructuring see Buchhiet and Lee (2001).

3. Diamond and Rajan (2000) use a similar argument to explain the role of short-term debt in sovereign crises.

The intriguing implication is that bad luck includes not only events such as crop failures that reduce the debtor country's ability to pay but also political events that affect the debtor country's access to, or willingness to draw upon, official rescue packages. Larger rescue packages almost certainly imply larger forecast errors for rescue packages and, in turn, larger average output losses following crises. Moreover, because output losses are related to forecast errors, losses should be unrelated to fundamentals prior to the crisis. Predictable crises generate unpredictable costs.

### 5.2.1 Sovereign Debt Models, Output Loss, and Third-Party Intervention

Bolten and Scharfstein (1996) develop a model of bargaining between the debtors and the creditors in the context of domestic credit markets. They distinguish between two kinds of defaults: liquidity defaults, in which the debtor is unable to pay, and strategic defaults, in which the borrower is able but unwilling to pay. Unless there is some penalty for default, like seizure of the borrower's assets, the lenders will not lend, fearing strategic defaults. The distortion in this model is the inability to condition penalties for nonpayment on the reason for nonpayment. Bad luck defaults are observable but not verifiable.

In a trivial sense, all sovereign defaults are strategic, because, unlike a corporate debtor, countries are always solvent. However, we assume that a sovereign's power to tax is limited, so a solvent country can have an insolvent government. In this environment, bad luck and strategic defaults are possible. Moreover, creditors' fear of cheating on the part of the sovereign determines the design of contracts.

The domestic credit markets differ from the international credit markets in that the lenders cannot seize the assets of the sovereign debtor. However, by making contracts costly to renegotiate, lenders can discourage strategic default.

Consider a three-period model with the periods being denoted by 0, 1, and 2. For simplicity, it is assumed that the (risk-neutral) debtor's wealth is zero (the results hold true even if positive initial wealth is assumed) and it needs to borrow amount  $K$  to finance an investment project. The returns on the investment are uncertain in period 0 but are realized in period 1. In the first period, investment gives a return of  $x$  in a good state and a return of 0 in the bad state. The respective probability of the two states' occurring is given by  $\theta$  and  $(1 - \theta)$ . After the return is realized, the debtor has to choose between repaying the debt and defaulting. In the bad state, the debtor will be forced to default (liquidity default), because the initial wealth is assumed to be zero. In the good state, the debtor may pay out zero (strategic default) or repay the amount specified in the contract denoted by  $R_x$ .

The return in period 2 depends on what happens in the first period. The return in period 2 is  $y$  if the debtor continues with the project after paying

back the debt. As soon as the debtor declares default, negotiations between the creditors and the debtor begin. We assume that structure of the debt determines the expected outcome of this negotiation. A rigid debt structure means that negotiations fail with a high probability,  $\beta$ . A flexible debt structure means that negotiation succeeds with a high probability and the debtor agrees to pay to the creditor  $\alpha y$ . For simplicity it is assumed that  $\alpha = 1/2$ .<sup>4</sup>

### 5.2.2 Design of Contracts

An optimal debt contract is defined as one that balances two effects—detering strategic defaults while at the same time minimizing the costs associated with liquidity defaults. A complete contract specifies payments contingent on all possible states of the world. We first outline such a contract. It is assumed that both borrower and lender have complete information about the state of the world, so the lender can distinguish between liquidity and strategic defaults. The contract is specified as follows:

Debtor has to pay  $R_x$  ( $R_x < x$ ) when the return is  $x$  in period 1; otherwise, there is renegotiation. These renegotiations are successful with probability  $(1 - \beta)$  and result in the creditor's allowing a partial rollover of debt into the second period. When the return is 0 in period 1, the probability of a successful renegotiation is given by  $1 - \beta_0$ .

In period 1, the state of the world is determined. With probability  $\theta$ , good state occurs and the project return is  $x$ . With possibility  $1 - \theta$ , bad state occurs and 0 return is realized. The debtor moves next by deciding whether to repay or to default. In the case of a bad return, liquidity default is certain (because we have assumed zero initial wealth). In the case of a good return, the debtor may repay  $R_x$  out of the return  $x$  or may default and repay nothing, keeping the entire return for itself.

Next, there is renegotiation. If it is successful, both parties agree to share the third-period output. If it is unsuccessful, third-period output is zero. The probability that renegotiation will fail can differ for the strategic default branch of the game and the liquidity default branch if there is full information.

Given this contract, the debtors' expected payoff is given by

$$(1) \quad \theta(x + y - R_x) + (1 - \theta)(1 - \beta_0)\frac{y}{2}$$

The lenders' expected profits must be nonnegative (assume the market interest rate is zero):

$$(2) \quad \theta R_x + (1 - \theta)(1 - \beta_0)\frac{y}{2} - K \geq 0$$

4. Endogenizing  $\alpha$  does not significantly alter the results of the model. The important issue is how the second-period output sharing will be enforced rather than the relative shares of the debtor and creditors.

The payments must satisfy an incentive constraint to rule out strategic defaults:

$$(3) \quad \beta \frac{y}{2} \geq R_x.$$

The optimal contract maximizes equation (1) subject to equations (2) and (3). The results can be summarized as follows:

$$(4) \quad \beta_0 = 0 \quad \text{or} \quad 1 - \beta_0 = 1$$

It can be shown that optimal value of  $\beta_0$  is zero. This implies that renegotiation is always successful in the bad state of nature.

The debtor's expected payoff could be written as

$$(5) \quad \theta(x + y) - K$$

This represents the first best solution in terms of net present value of the project.

### 5.2.3 Incomplete Contracts

Because of incomplete information, lenders may not be able to distinguish between a strategic default and a liquidity default.

The contract may be specified as

Debtor has to pay  $R_x$  in period 1; otherwise, there is renegotiation. These renegotiations are successful with probability  $(1 - \beta)$  and result in the creditors' allowing a partial rollover of debt into the second period. Alternatively, the renegotiations fail with probability  $\beta$ , and third-period output is reduced to zero.

Given this contract, the debtor's expected payoff is given by

$$(1b) \quad \theta(x + y + R_x) + (1 - \theta)(1 - \beta) \frac{y}{2}$$

The lenders' expected profits should be nonnegative:

$$(2b) \quad \theta R_x + (1 - \theta)(1 - \beta) \frac{y}{2} - K \geq 0$$

The payments must satisfy an incentive constraint to rule out strategic defaults:

$$(3b) \quad x + y - R_x \geq x + (1 - \beta) \frac{y}{2}$$

The optimal debt contract maximizes equation (1b) subject to equations (2b) and (3b):

The results may be summarized as follows: Value of optimum  $\beta$  is given by

$$(4b) \quad \beta = \frac{K - \frac{y}{2}}{\theta y - \frac{y}{2}},$$

which will be a feasible solution as long as  $\beta \leq 1$ .

The debtor's expected payoff could be written as

$$(5b) \quad \theta x + y - K - (1 - \theta)\beta y$$

The first three terms represent the net present value of the project, and the last term is the expected efficiency loss due to sanctions arising due to contractual incompleteness.

As pointed out by Bolton and Scharfstein (1996), from equation (5b) it can be seen that an arbitrary probability of a failed renegotiation,  $\beta$ , is preferable over designing a contract for which renegotiation always fails. The higher the probability of success of renegotiation, the lower are the expected efficiency losses.

Can rescue packages ensure a first best equilibrium? This is the question we explore in the next section.

#### 5.2.4 A Model of Bargaining with Three Players:

##### Debtors, Creditors, and the International Monetary Fund

In terms of the model outlined above, in the presence of informational asymmetries, there will be a bias of the debtor to default strategically. The lenders may still lend if they can design a contract that imposes an incentive constraint on the debtor's behavior so that the debtor would not prefer to default strategically. Any such contract will have a bias toward unnecessary losses. As pointed out by Diamond (1993), the reason for this is that the lenders ignore the part of the future return of a project that accrues only to the debtor. This results in efficiency losses. Third-party intervention can be welfare improving if it can help facilitate renegotiations regarding the sharing of the third-period output while at the same time allowing the debtor to reap these returns.

The debtor is assumed to have no initial wealth and borrows  $K$  for investment. The return in period 1 is  $x$  with a probability  $\theta$  and 0 with probability  $(1 - \theta)$ . The debtor decides whether it will repay the creditor or default. In a bad state there is a liquidity default. If there is repayment, the debtor earns a return of  $y$  in the second period. If there is default, the borrower and lender may approach the IMF for resolution, which succeeds with probability  $\pi$ . It is assumed that the International Monetary Fund (IMF) also cannot distinguish between strategic and liquidity defaults.<sup>5</sup> When the

5. Ghai, Hayes, and Shin (2001) assume that the IMF has a signal (not necessarily correct) about the nature of default, but not the lender.

debtor is a sovereign nation, there are political problems in obtaining the correct information about the returns. The creditor as well as the IMF faces this problem of verification of returns. The IMF imposes a successful restructuring by buying the debt for  $y/2$  and allows the debtor to retain  $y/2$ . Thus it has enforced a fair distribution of third-period output. If the IMF does not intervene, or if its intervention is unsuccessful, with the probability  $1 - \pi$ , then the renegotiation, as usual, fails with probability  $\beta$ .

Given this contract, the debtor's expected payoff is given by

$$(1c) \quad \theta(x + y - R_x) + (1 - \theta) \left[ \pi \frac{y}{2} + (1 - \pi)(1 - \beta) \frac{y}{2} \right]$$

The lenders' expected profits should be nonnegative:

$$(2c) \quad \theta R_x + (1 - \theta) \left[ \pi \frac{y}{2} + (1 - \pi)(1 - \beta) \frac{y}{2} \right] - K \geq 0$$

The payments must satisfy an incentive constraint to rule out strategic defaults:

$$(3c) \quad x + y - R_x \geq x + \pi \frac{y}{2} + (1 - \pi) \left[ (1 - \beta) \frac{y}{2} \right]$$

The optimal contract maximizes equation (1c) subject to equations (2c) and (3c).

It can be shown that the optimum value of  $\pi$  is

$$(4c) \quad \pi = \frac{\theta \beta y + (1 - \beta) \frac{y}{2} - K}{\theta \beta y - \beta \frac{y}{2}},$$

which will be a feasible solution as long as  $\pi \leq 1$ .

The debtor's expected payoff is

$$(5c) \quad \theta(x + y) - K - (1 - \theta)(y\beta) + (1 - \theta)\beta\pi y$$

The first three terms represent the net present value of the project. The fourth term is the expected efficiency loss due to contractual incompleteness. The intervention of the IMF can reduce the inefficiencies only if  $\beta$  was not set at its optimal level.

If the IMF has information about the state of nature superior to that of the creditor, rescue packages are always welfare improving. It is easy to demonstrate in terms of the first model that if the IMF could distinguish between strategic and liquidity defaults then the first best solution could be easily reached. The incentive to default strategically would be reduced if the true nature of the debtor were revealed. There would be no sanctions in the bad state and the output loss would be eliminated.

### 5.3.1 Output Losses and Rescue Packages

We start our analysis of output losses with our understanding of the conventional wisdom. In a series of important papers, Calvo (1998) and Calvo and Reinhart (2000) have argued that recent crises have generated relatively large output losses for two reasons. First, they argue that for emerging markets the magnitude of capital flow reversals has increased over time. Sudden stops of capital inflows require sudden improvements in the current account balance. They argue persuasively that it is difficult to imagine how such a dramatic change in real transfers can be accomplished without a short-run decline in output. These effects are more severe if the country faces quantitative restrictions on borrowing following the crisis. Moreover, they argue that emerging markets have become more vulnerable to reversals of capital flows and associated changes in relative prices (nominal exchange rate depreciation), because of dollarization of liabilities.

Calvo and Reinhart, and many others, argue that financial crises in the 1990s are best understood in the context of second-generation models of crises that focus on multiple equilibria. Such models suggest that crises are triggered by shifts in private expectations that are unpredictable. It follows that an unanticipated shock to financial markets can have economically important real effects. In this section we develop quite a different model of crises.

In the context of multiple equilibria models, it is quite sensible to evaluate government intervention as a way to reduce or eliminate the coordination failures among creditors that generate unnecessary output losses. For example, using an open economy version of a Diamond-Dybvig bank run model, Chui, Ghai, and Haldane (2000) provide a framework for evaluating crisis avoidance policies. In particular, increasing liquidity (including rescue packages) relative to debt reduces the probability of both fundamentals and belief-driven crises and significantly improves welfare.

The insurance model presented in Dooley (2000b) suggests that the timing of crises and the scale of capital inflows leading up to a crisis are the anticipated outcome of private investors' incentives to exploit a pool of government insurance. The insurance model defines the crisis as a reversal of private capital flows, what Calvo and Reinhart call a sudden stop. However, the reversal is not triggered by a change in expectations. Observed crises are anticipated asset exchanges designed to exploit government insurance.

The insurance/sovereign risk framework has two potential advantages over second-generation models in accounting for output losses. In any consistent accounting framework, the impact effect on output of a crisis is related to the size of the swing in private capital inflows and the associated swing in the current account balance. However, although alternative models that we are aware of take the initial vulnerability of the country as exogenous, the insurance model suggests that the increase in the scale of cap-

ital inflows and anticipated reversals is related to growth in the availability of insurance. Even if residents of the emerging market know that a crisis is likely in the future, they will be willing to borrow at rates that are subsidized by the expected insurance. Moreover, they will be tempted to consume now, when real interest rates are low, so that part of the capital inflow supports a current account deficit.

It follows that capital inflows generated by insurance will distort real consumption and production decisions before the crisis and that these distortions will have to be reversed following the crisis. In this regard, our explanation for the initial output loss is identical to that suggested by Calvo and Reinhart. However, it also follows that the initial output losses following crises have grown as bailout packages have grown.

The insurance/sovereign risk analysis offers an explanation for the very different patterns and intensities of output losses that have followed crises. The initial downturns in economic activity following recent crises in Asia have been quite similar. However, the cumulative loss in output has been, and is projected to be, much larger in Indonesia than in Korea. Moreover, the duration and cumulative size of output losses following the 1982 debt crisis were much larger than those of recent crises in Asia.

In our model the duration of recession depends on whether or not the anticipated *crisis* was also an unanticipated *default*. An insurance crisis is simply an asset exchange between the government and private investors. A default occurs when the government is unwilling or unable to provide the expected insurance payments. Because the IMF and creditor governments are important sources of insurance, forecast errors for their intervention at the time of crisis are crucial in determining whether default occurs and, in turn, the real effects of the crisis.

Thus, liquidity and rescue packages are important, a result consistent with a variety of econometric work. However, the empirical measure of default is the difference between the expected and realized demand for and supply of insurance at the time of the crisis. Because this is a forecast error, it is unpredictable and is likely to have unpredictable real effects.

### 5.3.2 The Initial Decline in Output

The loss in output following default reflects several factors. Clearly the model suggests that, following any crisis, private capital inflows will fall to zero, and, if the debtor country was using capital inflows to finance net imports, there will have to be an immediate and probably costly real transfer to nonresidents. Because the government will often decide to devalue in order to help facilitate the needed real transfer, several other channels for contraction of output will also come into play. If the government does not devalue, the same transfer must be made, but now it will have to be accomplished by changes in domestic incomes and prices (Cespédes, Chang, and Velasco 2000). Table 5.1 shows a simple regression of the loss in output

**Table 5.1** OLS Regression for Initial Severity of Crisis

Variable	Coefficient
Constant	-7.12*** (-2.92)
1980s crises dummy	1.13 (0.50)
Reversal of current account	-52.55** (2.69)
<i>N</i>	20
Adjusted <i>R</i> <sup>2</sup>	0.19
<i>F</i> -test for combined significance (probability)	0.07

*Note:* Dependent variable: output cost for the first year following crisis (difference from potential output). Numbers in parentheses are standard deviations.

\*\*\*Significant at the 1 percent level.

\*\*Significant at the 5 percent level.

in the year following the crisis and the swing in the current account in the year before the crisis and the year following the crisis. The results provide a solid baseline in that the real adjustment in the external balance generates a severe initial downturn in economic activity. From here we can evaluate the additional effects that might be associated with financial variables and default.

### 5.3.3 Output and Default

To test the idea that output losses are related to default we must first measure the gap between expected and realized values for the insurance pool and for claims on that pool at points in time at which crises have been observed. We have quite a small set of observations of crises that might be useful in evaluating these conjectures. Unlike other empirical work on crises, ours has a single variable, a quite clear measure of when a crisis occurs, and a less clear measure of how long it lasts. The onset of a crisis is the point in time at which private investors begin to exchange claims on residents of the debtor country for international assets. The exchange, however, might stretch over several years as liabilities mature.

The primary source of uncertainty concerning the stock of insured assets, that is, the demand for insurance, is that the government will determine which assets are to be protected at the time of the exchange. This will, in turn, reflect the ability of different classes of creditors to disrupt output in the event of default. Because the government will determine relative places in line, information from one crisis is of limited help in anticipating the outcome in the next crisis. The model suggests that *ex ante* rates of return should be systematically related to the expected seniority for exchange.

Different types of external liabilities have had clearly different returns preceding crises, and this makes our story plausible. If crises are antici-

**Table 5.2** OLS Regression for Demand for Insurance

Variable	Coefficient
Constant	-894.50 (-0.12)
1980s crises dummy	3,605.46 (0.44)
Bond stocks outstanding at time of crisis	2.07* (2.15)
Equity	0.95 (-1.50)
Foreign direct investment	0.09 (0.23)
Private loans	0.11 (0.27)
Short-term debt	-0.17 (-0.37)
<i>N</i>	19
Adjusted <i>R</i> <sup>2</sup>	0.75
<i>F</i> -test for combined significance (probability)	0.00

Note: Dependent variable: rescue package following crisis.

\*Significant at the 10 percent level.

pated, the anticipated stock of insurance at the time of crisis should be related to the stock *and structure* of private claims on the country at the time of crisis. To test this idea we regress the stock of insurance observed at the beginning of nineteen crises against the stock and composition of external debt outstanding at that time. The results, reported in table 5.2, provide some support for the model. Each category of external debt can be interpreted as a demand for insurance. As anticipated, portfolio investment seems to be insured relative to equity and direct investment. However, the negative relationship between short-term claims and the demand for insurance is clearly inconsistent with the model.

### 5.3.4 Supply of Insurance

The anticipated stock of insurance, however, is quite difficult to measure directly. Although the stocks of international reserves seem to be a predictable source of insurance, investors can never be sure that the government will exchange all these assets. The usual assumption that the government will exhaust its reserves is not consistent with the data. Moreover, published reserve stocks have often turned out to be much larger than net reserves because of forward exchange and other derivative commitments undertaken before the crisis.

Another important source of uncertainty about the stock of insurance is that, in many cases, a quantitatively important share of the anticipated insurance pool comes from new loans by creditor governments and interna-

tional organizations. At the time of crisis it is likely that a rescue package is assembled that consists of loans from several sources. It follows that investors must evaluate the expected net increase in credit from all official sources for several years into the future. Put another way, they must guess whether the debtor government will be willing and able to borrow from the IMF and other official lenders to pay them off when their claims mature.

For crises after 1990, we assume that announced rescue packages are an unbiased estimate of the resources investors expect to receive from the government. A problem with this interpretation is that rescue packages are seldom followed by official credits of similar magnitude. This has led many observers to doubt the importance of insurance for creditor behavior. Our view is that announced rescue packages are important because they oblige the official sector to lend if alternative adjustment measures do not provide the funds needed to liquidate private debt as it matures. In practice, the single largest alternative source of funds has been the current account surplus that has followed most crises. Thus, we view the package as creditor governments' commitment to underwrite an adjustment effort.

The 1982 crises present a more difficult conceptual problem. Rescue packages announced in 1982 were limited to bridge loans that were very small and very short-term. Dooley (1995) argues that commercial banks expected their own governments to bail them out and that the bailout eventually came, but much more slowly than expected. If we consider the whole crisis period from 1982 to 1989 we see that official credits were eventually quite substantial. One hypothesis is that in 1982 private investors had the amount of the bailout right but were surprised by the very slow disbursement. Our working hypothesis is that the expected package in 1982 was equal to the present value of the official capital flows actually observed through 1989. It follows that at the time of the crises in the early 1980s it was likely that investors were surprised by the announcement that the present value of the rescue package was almost nil. As time passed and governments provided loans to debtor countries, the initial default was reversed.

Investors must guess about the ability and willingness of the government to use its assets and lines of credit at the time of crisis. Table 5.3 reports the results of a regression of measured insurance pools previously discussed against easily observed characteristics of the debtor country. By using the whole sample we are assuming investors used information they did not have, but with only twenty-six observations, alternative approaches are not feasible. The results reported in table 5.3 suggest that the gross domestic product (GDP) of the debtor country is by far the dominant determinant of the size of rescue packages.

### 5.3.5 Measuring the Forecast Error

The model suggests that a crisis observation occurs when the expected demand for insurance is just equal to the expected supply. It follows that we can

**Table 5.3** OLS Regression for Supply of Insurance

Variable	Coefficient
Constant	15,879.69* (1.90)
1980s crises dummy	-14,662.71 (-1.94)
GDP at year of crisis	0.07*** (2.69)
Foreign exchange reserves ( $t - 1$ )	-0.02 (-0.50)
Openness (ratio of imports and exports to GDP)	-67.03 (-0.48)
$N$	26
Adjusted $R^2$	0.73
$F$ -test for combined significance (probability)	0.00

Note: Dependent variable: rescue package following crisis (RESCUE2).

\*\*\*Significant at the 1 percent level.

\*Significant at the 10 percent level.

examine the forecast error associated with the demand and supply for insurance for each crisis. Suppose we observe a crisis at time  $t_0$ . Our theory suggests that at  $t_0$  the expected demand for reserves was equal to the expected supply. However, because both demand and supply are estimated with error, it is quite possible that our estimates of demand and supply will not be equal when crises are observed. There are many potential sources for such errors. If the demand curve was correct, an insurance pool less than the estimated demand would imply a positive default. If the supply curve was correct, an insurance pool greater than estimated supply would imply no default. Because we do not know which relationship is more likely to be correct, we take the sum of the supply and demand error as our measure of default.

Our model suggests that, other things being equal, the *default* generated by the shortfall of insurance will interfere with financial intermediation as long as the default persists. We should expect to see a larger initial decline in output and a relatively slow recovery following a crisis that involves default relative to a crisis in which insurance is equal to or greater than its expected value.

The regression in table 5.4 is the same as in table 5.1 except that the insurance forecast error is added. As discussed above, the swing in the current account is the most important determinant of the initial decline in output. However, the forecast error for insurance is also positively correlated with the output loss. The regression coefficient is small relative to its standard error, but, given the difficulty in measuring the demand for and supply of insurance, it may not be surprising that this relationship is not precisely estimated.

**Table 5.4** OLS Regression for Initial Severity of Crisis

Variable	Coefficient
Constant	-6.79** (-2.62)
1980s crises dummy	0.87 (0.32)
Reversal of current account	-56.91** (-2.28)
Forecast error	1.33 (0.42)
<i>N</i>	16
Adjusted <i>R</i> <sup>2</sup>	0.16
<i>F</i> -test for combined significance (probability)	0.18

*Note:* Dependent variable: output cost for first year following crisis. Numbers in parentheses are *t*-statistics.

\*\*Significant at the 5 percent level.

**Table 5.5** OLS Regression for Prolonged Cost of Crisis

Variable	Coefficient
Constant	0.78 (1.37)
1980s crises dummy	0.25 (0.49)
Forecast error	0.36 (0.72)
Reversal of current account	0.25 (0.06)
<i>N</i>	12
Adjusted <i>R</i> <sup>2</sup>	0.07
<i>F</i> -test for combined significance (probability)	0.88

*Note:* Dependent variable: output cost for four years following crisis. Numbers in parentheses are *t*-statistics.

Table 5.5 reports the results for a regression of cumulative output losses against the swing in the current account and the forecast errors for insurance. The swing in the current account loses much of its explanatory power, a result consistent with the idea that for a given transfer quick adjustment probably shortens the duration of the output loss. In contrast, the insurance forecast error is little changed: it remains positive but small relative to its standard error.

## 5.4 Concluding Remarks

Financial crises have important real costs, and identifying policies that could reduce these costs is a priority. In this paper we argue that predictions

for the effects of third-party interventions are quite sensitive to models of sovereign debt. In particular, if concern about strategic default is central to the design of international debt contracts, and we cannot imagine that it is not, intervention by the official sector in negotiations between sovereign debtors and their private creditors is problematic. Our analysis suggests that anticipated and unconditional lending at the time of crisis is rational to avoid the costs of default that are built into contracts. However, the expectation that insurance will be provided subsidizes capital inflows that precede crises and, in turn, intensifies the current account reversals and output losses that follow. Moreover, uncertainty about the size and distribution of insurance can generate unpredictable defaults that intensify and prolong losses in output.

## Appendix

### LHS

- Output cost for first year—difference from potential output measured as the average over the 5 preceding years (source: *International Financial Statistics* [IFS]).
- Rescue package—data for 1982 debt-crisis countries is cumulative flows (Net Flows/Official Creditors) for 1982–90 from the World Bank's *World Debt Tables* 1989–90. Other data from Dooley (2000).
- Output cost for four years following crisis—cumulative output loss over the four years following the crisis as a fraction of the precrisis year's output (source: IFS).

### RHS

- Bond stocks outstanding—gross portfolio bonds (source: DRS).
- Equity—estimate of stock of portfolio equity (source: Lane and Milesi-Ferretti)
- Foreign direct investment (FDI)—estimate of stock of inward direct investment (cumulative flow adjusted for relative price variations; source: Lane and Milesi-Ferretti).
- Forecast error—the demand error minus the supply error in the rescue package estimation equations.
- Foreign exchange reserves—at precrisis year (source: IFS).
- GDP—at year of crisis (source: IFS).
- Openness—sum imports and exports over GDP (source: IFS).
- Private loans—stock (source: World Economic Organization).
- Reversal of current account—change in the current account from the precrisis year to the year following the crisis (source: IFS).
- Short-term debt—stock (source: DRS).

## Country Cases

1982: Argentina, Bolivia, Brazil, Chile, Costa Rica, Dominican Republic, Ecuador, Jamaica, Mexico, Peru, Uruguay, Venezuela

1994: Mexico

1997: Indonesia, Korea, Malaysia, the Philippines, Thailand

1998: Argentina, Brazil, Turkey

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## Comment      Andrew Powell

Michael P. Dooley and Sujata Verma have written a truly fascinating paper (henceforth referred to as DV), which contains many interesting ideas and which is a valuable contribution to the spawning literature on “private-sector involvement” and the role of the private sector, governments, and the multilaterals in crises. In fact, there are really two papers. First, there is a theoretical part that outlines a role for a third party (the International Monetary Fund [IMF]) in a model with the possibility of both liquidity and strategic default. Second, there is an empirical part that attempts to test the “insurance view” of crises following Dooley (2000) and earlier papers by Calvo, Krugman, and McKinnon and Pill, among others.

The theoretical part of the paper develops a specific model of sovereign debt in which there is an information asymmetry in that if the debtor defaults the lender does not know if the default was for liquidity (ability to pay) or “strategic” (willingness to pay) reasons. The approach is taken from Bolton and Sharfstein (1999), hereafter BS. The BS approach has the tremendous advantages of simplicity and tractability, and DV achieve interesting results very quickly. However, in the application of the BS model

to the case of sovereign debt, there do appear to be a couple of issues worth discussing.

In BS, lenders can liquidate a defaulting corporate, and there is some probability of obtaining the residual value of the firm's assets (let us refer to this probability as  $\beta$ ). Dooley and Verma suggest that in the case of default lenders can sanction borrowers, and the residual value of the firm's assets is analogous to the market value of restructured debt. In the text, DV refer to the BS probability ( $\beta$ ) as the restructured value of the debt ( $\beta$  in the latter's model). In the equations, however, they appear to use  $\beta$  as a probability. Perhaps they have in mind that  $\beta$  is the probability that debt is restructured in some way after a failed negotiation, and  $S$  is then the utility of that outcome, including whatever was the market level of restructured debt. With this interpretation, the  $(1 - \beta)$ -type terms in the equations make more sense. (These comments refer to an earlier draft, and the authors have taken up this suggestion.)

Another issue is that if borrowers are to avoid sanctions then there is some negotiation procedure, and they simply share half of the project's output with lenders ( $\alpha = 1/2$ ), and sanctions are lifted. However, surely  $\alpha$  is also endogenous. Suppose the failed negotiations imply a 20 percent write-down of the debt. Why would borrowers share a penny more of output than absolutely necessary to make lenders better off, given that alternative? In other words, it looks like  $\alpha$  should be specifically linked to the write-down value of the debt. (The authors claim in footnote two that endogenizing  $\alpha$  does not significantly alter the results. However, equation 4 shows clearly the optimum  $\beta$ , and hence the expected efficiency loss of equation 5b depends on  $\alpha$ .)

These comments raise a more general issue as to whether the BS approach is really applicable in the international debt markets. The Incentive Compatibility constraint is designed to rule out "strategic defaults," but in an important sense all sovereign defaults are strategic. One view might be that default occurs when the present value of future output, net of debt repayments with a high debt level (and possibly higher interest rates), is less than that with a lower debt level achieved through a debt reduction and net of the short-run costs of that reduction due to trade or financing disruptions. A second approach can take place when revenues have fallen so much that it becomes politically more costly to continue to service the debt than to seek some type of renegotiation. These, then, are examples of strategic defaults, although they may occur when the ability to pay has also been reduced substantially.

Let me now turn to the role of the IMF. Dooley and Verma focus on one potential and hitherto ignored role of the IMF in the literature, namely, as an enforcer of contracts. In essence, in the event of default, the IMF says with probability  $\pi$  that the second-period output should be shared fifty-fifty. In terms of the model, this adds some extra probability to the default

state's being resolved more efficiently and hence reduces the inefficiency due to contractual incompleteness. It is interesting that there is an optimal value of  $\pi$ , or, in other words, it appears to be optimal for the IMF to intervene unpredictably. In a further addition to the model, the authors claim that in a world where contracts are supported by reputation contracts and not "gunboat" diplomacy, then the role of the IMF as the enforcer of contracts may be redundant.

I have one doubt regarding the basic result, which, in fact, stems from Dooley (2000)! Making the ex post resolution more efficient and in particular less costly for the borrower will surely reduce the amount of debt that can be supported in this model. In the model, rearranging the incentive constraint (eq. [3]) shows that  $Rx$  must be less than something to do with the returns of the project and the inefficiencies due to contractual incompleteness. In the model it appears that  $K$ ,  $y$ , and  $R$  are all exogenous, but if  $R$  is set such that the IC is just met,  $K = R$ , and  $y(K)$ , then it looks to me that there may be a trade-off for borrowers. On the one hand, the introduction of the IMF reduces the inefficiencies of the contractual incompleteness, but on the other hand it reduces the amount of debt and hence the potential project returns. (The authors have now taken up this suggestion and find that the credit ceiling depends on IMF intervention in an interesting way as illustrated in equation 6c.)

The IMF obviously plays multiple roles, and a second role, hinted at in the paper, is that of addressing the information asymmetry directly—in other words, considering the IMF not as a contract enforcer but as an auditor. This is the focus of a recent paper by Gay, Hayes, and Shin (2000). In this paper, there is a very similar trade-off to that just described, which is their reference to the IMF as "whistle blower" versus the IMF as "fireman." In their setup, the IMF is generally bad for lenders, because the fireman reduces the ex post cost of resolution and hence reduces the stock of debt that can be supported in equilibrium—following Dooley (2000)—and this unambiguously reduces lenders' welfare. However, for borrowers the IMF may be a net benefit, because improving the information available to lenders reduces the inefficiency of the information asymmetry, and this can outweigh the costs of the lower level of debt.

Gay, Hayes, and Shin (2000) also consider an IMF that acts unpredictably (in a manner they refer to as "case-by-case"), but in their setup they conclude that this will make lenders better off and may make borrowers worse off relative to the regime in which the IMF follows a specific policy rule. It is in effect an intermediate model between a no-IMF model and the full-IMF model. This contrasts with the DV result in which having an unpredictable IMF as enforcer may actually be the optimal policy. Of course, the IMF is doing different things in the two cases, so perhaps this is not too surprising.

The IMF clearly has other roles, too, apart from that of enforcer or auditor. Specifically, the IMF also provides money or promises of money. This role can protect borrowers against coordination problems between lenders. If the IMF offers standby arrangements, then this may prevent costly self-fulfilling-type runs. This is the approach taken by Gavin and Powell (1999). However, the price for such liquidity protection may be moral hazard, thus allowing borrowers or lenders to take greater risks, actually making more fundamental-type runs more likely. Gavin and Powell argue that private sector standbys (contingent facilities) might also provide countries with the same type of liquidity protection and that, if these are correctly priced (i.e., with no information problems), then these may even serve to reduce moral hazard.

To sum up this first part of the paper, DV provide an application of BS to the sovereign debt market and show that within that context the IMF may have an interesting role to play. Although some aspects of the model appear to sit uneasily with the sovereign nature of these markets, the result is intuitive and would probably carry over to other models of strategic default.

Let me now turn briefly to the second part of the paper. Curiously the theoretical model behind the second part of the paper does not appear to be fully consistent with that in the first part of the paper. In the first part of the paper, a crisis occurs when, with a specific probability, there is a bad outcome and debt cannot be renegotiated. In the second part of the paper, a crisis occurs when the demand for insurance just meets the supply. The source of this uncertainty is then different; it is related to how much the insurance is available.

Entering into this second framework, table 5.2 regresses the size of rescue packages on a set of variables. It is not clear how the variables are specified (everything in US\$?), and the only variable that is significant is bond stocks outstanding at the time of the crisis. However, bonds outstanding might have as much to do with supply as it has to do with demand (if debt finance has been used to build up reserves, or if multilaterals care more about big countries due to contagion effects, etc.). It might be better to have the dependent variable specified as a percentage of something (gross domestic product [GDP]?) and the other variables expressed either as share variables (e.g., bonds, total liabilities, etc.) or perhaps even as growth variables. Table 5.3 has the same dependent variable, and the only variable that is significant is the GDP at the time of the crisis. Because I would suggest scaling the rescue variable by GDP, this might make this variable insignificant anyway!

However, if it remained significant, this might be interpreted as a kind of too-big-to-fail result. As the text considers issues related to the supply of government guarantees, perhaps some indicators of such things should be included, for example (a) type of deposit insurance in place, (b) the extent

of public banks, (c) historical experience in allowing banks or other companies to fail, (d) bankruptcy procedures, and so on.

The results of tables 5.4 and 5.5 appear more interesting. The forecast error of the amount of insurance is proxied by the sum of the supply and demand error from the previous regressions. This raises issues about whether coefficients may be biased and also about units. It would be better to have this error expressed as a percentage and not in US\$.

To conclude, this is an interesting paper. It is really a story of two quite different and not necessarily consistent parts. I suspect that the authors could extend both, thus making a fascinating research program.

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## Discussion Summary

*Robert P. Flood* inquired why governments end up in this insurance business. Shouldn't the IMF prevent them from providing insurance? He also noted that Michael Dooley's crisis theory is unique—different from the first- and second-generation crisis models, because in those there is no transfer.

*Morris Goldstein* noted that the IMF is able to affect negotiations between creditors and debtors: an example of that is the “lending into arrears” policy. He also remarked that the former Compensatory Financing Facility (CFF) lending window in the IMF discredits the notion that the IMF cannot differentiate between liquidity (bad luck) and strategic default.

*John McHale* asked why, in this theory, real output costs are inevitable, and what the channels are through which this loss comes about.

*Martin Feldstein* asked whether there were any examples of commercial banks' using denial of trade credits as a punishment tool.

*Andrew Berg* noted that an important class of creditors is the Paris club and that the IMF does monitor Paris club discussions between debtors and creditors.

*Edwin M. Truman* suggested that Peru in the 1980s is the closest case to strategic default. He also noted that there were gainers from the precrisis

period—for example, through overvalued exchange rate—and these should be accounted for in this output loss accounting.

*Vincent Reinhart* suggested that if the story is accurate then maybe the IMF should have no access to capital.

*Barry Eichengreen* inquired whether the theory is consistent with previous statements by Dooley that the IMF should not condition its lending on observable characteristics.

*Peter Kenen* suggested that “strategic default” is a loaded term and may be used here inaccurately. He also noted that the devaluation and the rapid loss of reserves might be channels for output loss in developing countries.

*Martin Eichenbaum* then noted that the size of the domestic insurance pool and the definition of strategic default are tied together, and it is unclear how to differentiate between them. In response, *Feldstein* noted that in the Asian crisis, a lot of the international debt was private, and therefore, at least theoretically, it could be a crisis of insolvency—even though the Asian governments ended up taking over these bad debts.

*Michael P. Dooley* responded that, in practice, governments cannot roll over debts using their future tax receipts as collateral, because the high interest rates they are facing at the time of the crisis will make the present value of those future taxes very small.

In response to *Flood’s* question, Dooley noted that, historically, governments did go into insurance when there were some big institutional changes with unanticipated consequences. Liberalization, for example, meant that looting was possible, as long as there was no effective supervision. In Korea, the government did not understand how much it needed to regulate, for instance. He also stated that although the IMF can affect the balance of power in negotiations, it can only do good if it has superior information on the nature of crisis. What, uncomfortably, comes out of this theory, Dooley further suggested, is that the IMF should not get involved at all if it cannot monitor domestic financial markets. He added that governments of developing countries could not credibly commit to not bailing out once a crisis hits.

He concluded that the investors cheat the government, which gets money from the IMF to pay those investors. The workers, in turn, pay for these loans. Thus, during crises, there is a real transfer from workers (taxpayers) to investors and financial institutions.

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# Financial Restructuring in Banking and Corporate-Sector Crises

## What Policies to Pursue?

Stijn Claessens, Daniela Klingebiel, and Luc Laeven

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### 6.1 Introduction

Whether as a cause or an effect, a systemic banking and corporate crisis is often part of a currency crisis.<sup>1</sup> Resolving a banking and corporate crisis involves many policy choices ranging from the macroeconomic (including monetary and fiscal policy) to the microeconomic (including capital adequacy rules and corporate governance requirements), with reforms varying in depth. These choices involve trade-offs, including the amount of government resources needed to resolve the crisis, the speed of recovery, and the recovery's sustainability. Despite considerable analysis, these trade-offs are not well known—an oversight that occasionally leads to conflicting policy advice and larger-than-necessary economic costs. Even less is known about the political economy factors that make governments choose certain policies.

This paper reviews knowledge about the trade-offs involved in policies related to systemic financial and corporate restructuring. It finds that a consistent framework for bank and corporate restructuring is the key factor for success—and one that is often missing. Consistency is needed in many areas and involves, among other elements, ensuring that there are sufficient

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The opinions expressed do not necessarily reflect those of the World Bank. The authors would like to thank Peter Kenen, Jeffrey Frankel, and other participants at the conference for very helpful comments. They thank Ying Lin for help with the data.

1. In this chapter *systemic* is used to refer to a crisis that is large relative to a national economy, not necessarily one that is large relative to the global economy or that has other global spillovers.

resources for absorbing losses and that private agents face appropriate sticks and carrots for restructuring. Moreover, sustainable restructuring requires deep structural reforms, which often require addressing political economy factors up front.

The paper complements the literature review with some new empirical analysis using data for 687 corporations from eight crisis countries. It investigates the quantitative importance of some specific government policies: liquidity support to financial institutions, the guaranteeing of the liabilities of the financial system during the early phase of the crisis, and the establishment of a public asset management company during the restructuring phase. It finds that a package of these measures can facilitate quicker recovery by the corporate sector from a crisis and assist in the sustainability of the recovery. The particular policies come with large fiscal costs, however, leading to trade-offs in terms of an equitable distribution of the benefits and cost of the government intervention and, possibly, in terms of the ultimate growth impact.

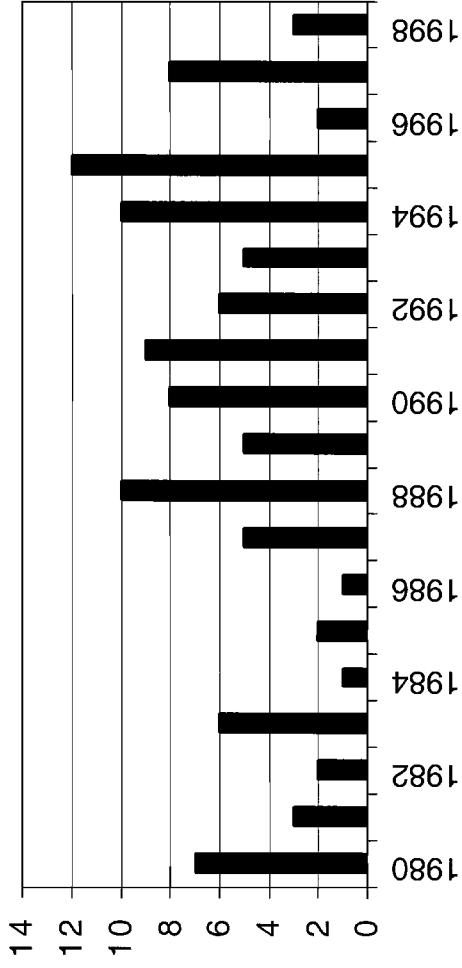
The paper proceeds as follows. Section 6.2 presents an overview of the general characteristics of banking system and corporate-sector crises. Section 6.3 reviews the literature on banking and corporate-sector crises. Section 6.4 provides empirical evidence on the effects of crisis resolution policies using firm-level data from a set of crisis countries. Section 6.5 concludes.

## **6.2 Characteristics of Banking and Corporate Crises**

A systemic banking and corporate crisis is a situation in which an economy faces large-scale financial and corporate distress within a short period.<sup>2</sup> Recent examples include the crisis in Nordic countries in the early 1990s, in Mexico in 1994–95, in East Asian countries after 1997, and in transition economies in the 1990s (although for transition economies, financial distress and structural problems had been longer-term phenomena). Banking and corporate crises appear to have become more common since the early 1980s: Caprio and Klingebiel (2002) identify ninety-three countries that experienced a systemic financial crisis during the 1980s or 1990s (figure 6.1). It also appears that crises became deeper in the 1990s relative to earlier periods (Bordo et al. 2001).

In a systemic crisis, partly as a result of a general economic slowdown and large shocks to foreign exchange and interest rates, corporate and financial sectors experience a large number of defaults and difficulties in repaying contracts on time. As a result, nonperforming loans increase sharply. This

2. We do not try to identify the exact causes of systemic distress or determine whether currency crises are caused by systemic financial distress in banks and corporations or vice versa. For such analysis, see Edwards and Frankel (forthcoming).



**Fig. 6.1 Frequency of systemic banking crises**

*Source:* Caprio and Klingebiel (2002); authors' calculations.

*Notes:* The frequency on the vertical axis indicates the number of countries that had a crisis starting in the year on the horizontal axis (total sample of crisis countries is ninety-three).

**Table 6.1** Patterns of Systemic Banking Crises

	Crisis Year	Fiscal Cost (% of GDP)	Peak NPL (% of Loans)	Real GDP Growth (%)	Change in Exchange Rate (%)	Peak in Real Interest Rates (%)	Decline in Real Asset Prices (%)
Finland	1992	11.0	13	-4.6	-5.5	14.3	-34.6
Indonesia	1998	50.0	65-75	-15.4	-57.5	3.3	-78.5
Korea	1998	37.0	30-40	-10.6	-28.8	21.6	-45.9
Malaysia	1998	16.4	25-35	-12.7	-13.9	5.3	-79.9
Mexico	1995	19.3	30	-6.2	-39.8	24.7	-53.3
The Philippines	1998	0.5	20	-0.8	-13.0	6.3	-67.2
Sweden	1992	4.0	18	-3.3	+1.0	79.2	-6.8
Thailand	1998	32.8	33	-5.4	-13.7	17.2	-77.4

*Sources:* “Crisis year” (the peak crisis year) is from Caprio and Klingebiel (2002). The “fiscal cost (% of GDP)” variable is from Honohan and Klingebiel (2002). The “peak NPL (nonperforming loans; % of total loans)” variable is from Caprio and Klingebiel (2002) in the case of Indonesia, Korea, the Philippines, and Thailand; from Lindgren, Garcia, and Saal (1996) in the case of Finland and Sweden; and from Krueger and Tornell (1999) in the case of Mexico. Gross domestic product (GDP) data are from the International Monetary Fund’s *International Financial Statistics* (IFS). The exchange rate, interest rate, and inflation data are from IFS. We use the Datastream global market indexes for Finland, Mexico, and Sweden, and the IFS global market indexes for the other countries.

*Notes:* The “real GDP growth” variable equals the percentage change in real fourth-quarter GDP in the crisis year compared to real fourth-quarter GDP one year before the crisis year. Consumer Price Index (CPI) inflation is used to get the real growth in GDP, and the growth in GDP is in terms of local currency. The inflation rate equals the percentage change in the CPI during the crisis year. The “change in exchange rate” equals the percentage change of the exchange rate versus the U.S. dollar during the first quarter of the crisis year. An increase in the exchange rate indicates an appreciation. The “peak in real interest rates” equals the peak in the real money market rate during crisis year. For the Philippines, the real discount rate is reported instead of the money market rate, due to data unavailability. The “decline in real asset prices” variable is the largest drop on a monthly basis in the stock market index during the crisis year compared to the level of the stock market index in January of the year before the crisis year. The return is in local currency and corrected for inflation.

situation is often accompanied by depressed asset prices (such as equity and real estate prices) on the heels of run-ups before the crisis, sharp increases in real interest rates, and a slowdown or reversal in capital flows (table 6.1). In countries with longer-term financial distress and other large-scale structural problems—such as several transition economies—a systemic crisis may not be accompanied by such changes in asset prices and capital flows, partly because run-ups in prices and capital flows may not have occurred.

Developments in crisis countries highlight the complicated coordination problems that arise between corporations, between the corporate and financial sectors, between the government and the rest of the economy, and with respect to domestic and foreign investors. In a systemic crisis, the fate of an individual corporation and the best course of action for its owners and managers will depend on the actions of many other corporations and financial institutions as well as on the general economic outlook. The finan-

cial and corporate sectors, always closely intertwined, both need restructuring in a systemic crisis, and the actions taken affect their liquidity and solvency. The government must set the rules of the game and be a prominent actor in restructuring. Moreover, investors, domestic and foreign, will await the actions of owners, the government, labor, and others—often implying a shortage of foreign and domestic capital when it is most needed.

A crisis and its coordination problems are typically aggravated by institutional weaknesses, many of which likely caused the crisis in the first place. Bankruptcy and restructuring frameworks are often deficient. Disclosure and accounting rules may be weak for financial institutions and corporations. Equity and creditor rights may be poorly defined, and the judiciary is often inefficient. There is usually also a shortage of qualified managers in the corporate and financial sectors, as well as a lack of qualified domestic restructuring and insolvency specialists, partly because there may be no history of corporate and financial-sector restructuring. The government itself may face credibility problems because it may have been partly to blame for the crisis, and in general it faces many time consistency problems—such as how to avoid large bailouts while also restarting the economy.

These complicated coordination problems suggest that systemic crises are difficult to resolve. Many observers have tried to develop best practices for resolving such crises. We next review that literature.

### 6.3 Literature on Banking and Corporate Crises

Governments have used many approaches to try to resolve systemic bank and corporate distress. Resolving systemic financial distress is not easy, and opinions differ widely on what constitutes best practice. Many different and seemingly contradictory policy recommendations have been made to limit the fiscal costs of crises and speed recovery. Empirical research supporting particular views remains limited, and most research is limited to individual cases.

Sheng (1996) made the first attempt to distill lessons from several banking crises. Caprio and Klingebiel (1996) expanded on those lessons using additional crises. The main lesson from both efforts is that managing a financial crisis is much different in industrial countries from in emerging markets because emerging markets have weaker institutions, crises are often larger, and other initial circumstances differ. As a result, best practices from industrial countries do not easily transfer to developing countries. Another key lesson is that there are many trade-offs between various policies.

In reviewing the literature on financial restructuring, especially in emerging markets, it is useful to differentiate between three phases of systemic restructuring. During the first phase, which can be called the containment phase, the financial crisis is still unfolding. During this phase governments tend to implement policies aimed at restoring public confidence to mini-

mize the repercussions on the real sector of the loss of confidence by depositors and other investors in the financial system. The second phase involves the actual financial, and to a lesser extent operational, restructuring of financial institutions and corporations. The third phase involves structural reforms, including changes in laws and regulations, privatization of any nationalized financial institutions and corporations, and so on. Here we discuss the containment phase, the restructuring of financial institutions, and the restructuring of corporations.

### 6.3.1 Containment Phase

Policy-makers often fail to respond effectively to evidence of an impending banking crisis, hoping that banks and corporations will grow out of their problems.<sup>3</sup> However, intervening early with a comprehensive and credible plan can avoid a systemic crisis, minimize adverse effects, and limit overall losses (Sheng 1996). Early intervention appears to be especially important in stopping the flow of financing to loss-making financial institutions and corporations and in limiting moral hazard in financial institutions and corporations gambling for survival.

Experience also suggests that intervention and closing of weak financial institutions need to be properly managed. Uncertainty among depositors needs to be limited; otherwise, the government may have to try to resolve a loss of confidence with an unlimited guarantee on the liabilities of banks and other financial institutions. However, in practice, ad hoc closures are more the norm and often add to uncertainty, triggering a systemic crisis. For example, in late 1997 the closing of sixteen banks in Indonesia triggered a depositor run because depositors were aware that some politically connected banks known to be insolvent were kept open (Lindgren et al. 2000). Similarly, the suspension of finance companies in Thailand increased uncertainty among depositors as well as borrowers.

Reviewing several cases, Baer and Klingebiel (1995) suggest that, to avoid uncertainty among depositors and limit their incentives to run, policy makers need to deal simultaneously with all insolvent and marginally solvent institutions. Intermittent regulatory intervention makes depositors more nervous and undermines regulatory credibility, especially if regulators had previously argued that the institutions involved were solvent.<sup>4</sup> Moreover, in emerging markets regulations are often weak, supervision is limited, and

3. There are many political economy reasons that policy makers may not wish to act—thereby giving rise to a crisis—but we do not discuss them here (see Haggard 2001).

4. Baer and Klingebiel also point out that a comprehensive approach places less demand on supervisory resources. Under a piecemeal approach, insolvent and marginally solvent institutions would continue to exist while other insolvent institutions were being closed or restructured. Marginally solvent institutions would be subject to moral hazard and fraud while being unable and unwilling to raise additional capital. Especially in an environment with weak supervision, comprehensive approaches are thus more necessary.

data on financial solvency are poor, so intervention tools need to be fairly simple.

For example, a rehabilitation program for undercapitalized financial institutions—which involves institutions' indicating how they plan to meet capital adequacy requirements in the future—requires careful government oversight and good financial statements. However, such features are often missing in developing countries. Instead of relying on rehabilitation that requires good oversight and data, regulators could apply a 100 percent (marginal) reserve requirement on deposit inflows and other new liabilities, limiting weak banks' ability to reallocate resources in a detrimental way.

There are two schools of thought on whether to use liquidity support and unlimited guarantees during the containment phase.<sup>5</sup> Some argue that crisis conditions make it almost impossible to distinguish between solvent and insolvent institutions, leaving the authorities with little choice but to extend liquidity support. Moreover, it is argued that an unlimited guarantee preserves the payments system and helps stabilize institutions' financial claims while restructuring is being organized and carried out (Lindgren et al. 2000).

Others argue that open-ended liquidity support provides more time for insolvent institutions to gamble (unsuccessfully) on resurrection, facilitates continued financing of loss-making borrowers, and allows owners and managers to engage in looting. Supporters of this view also argue that a government guarantee on financial institutions' liabilities reduces large creditors' incentives to monitor financial institutions, allowing bank managers and shareholders to continue gambling on their insolvent banks and increasing fiscal costs. They further point out that extensive guarantees limit government maneuverability in allocating losses, often with the end result that the government incurs most of the cost of the systemic crisis (Sheng 1996).

In practice, there is a trade-off between restoring confidence and containing fiscal costs. Evidence on these trade-offs comes from Honohan and Klingebiel (2002), who show that much of the variation in the fiscal cost of forty crises in industrial and developing economies in 1980–97 can be explained by government approaches to resolving liquidity crises. The authors find that governments that provided open-ended liquidity support and blanket deposit guarantees incurred much higher costs in resolving financial crises. They also find that these costs are higher in countries with weak institutions.

Most important, Honohan and Klingebiel find no obvious trade-off between fiscal costs and subsequent economic growth (or overall output

5. A third school argues that the granting of government guarantees is the outcome of political economy circumstances and so is often a foregone conclusion. See Dooley and Verma (chap. 5 in this volume).

losses). Countries that used policies such as liquidity support, blanket guarantees, and particularly costly forbearance did not recover faster. Rather, liquidity support appears to make recovery from a crisis longer and output losses larger—a finding confirmed by Bordo et al. (2001). Thus it appears that the two most important policies during the containment phase are to limit liquidity support and not to extend guarantees. Where institutions are weak, governments may need to use simple methods in dealing with weak banks and a loss of confidence to avoid higher fiscal contingencies and costs.

### 6.3.2 Restructuring Financial Institutions

Once financial markets have been stabilized, the second phase involves restructuring weak financial institutions and corporations. Restructuring is complex because policy-makers need to take into account many issues. Financial restructuring will depend on the speed at which macroeconomic stability can be achieved because that determines the viability of corporations, banks, and other financial institutions, and more generally the reduction in overall uncertainty. However, macroeconomic stability often requires progress on financial and corporate restructuring, so it cannot be viewed independently of the restructuring process (see Burnside, Eichenbaum, and Rebelo, chap. 7 in this volume; Park and Lee, chap. 9 in this volume).

Restructuring refers to several related processes: recognizing and allocating financial losses, restructuring the financial claims of financial institutions and corporations, and operational restructuring of financial institutions and corporations. Recognition involves the allocation of losses and associated redistribution of wealth and control. Losses—that is, differences between the market value of assets and the nominal value of liabilities held by financial institutions and corporations—can be allocated to shareholders (through dilution), to depositors and creditors (by reducing the present value of their claims), to employees (through reduced wages) and suppliers, and to the government or the public (through higher taxes, lower spending, or inflation). Here we discuss the restructuring of financial institutions; the next section discusses the restructuring of corporations.

To minimize moral hazard and strengthen financial discipline, governments can allocate losses not only to shareholders but also to creditors and large depositors who should have been monitoring the banks. Often, however, governments assume all losses through their guarantees. There are exceptions to the model of governments' guaranteeing all liabilities in an effort to restore confidence. Baer and Klingebiel (1995) show that in some crises—notably in the United States (1933), Japan (1946), Argentina (1980–82), and Estonia (1992)—governments have imposed losses on depositors with little or no adverse macroeconomic consequences or flight to currency. In these cases, economic recovery was rapid, and financial intermediation,

including household deposits, was soon restored. Thus, allocating losses to creditors or depositors will not necessarily lead to runs on banks or end in contraction of aggregate money, credit, and output. In a related vein, Caprio and Klingebiel's (1996) review of country cases indicates that financial discipline is further strengthened when bank management—often part of the problem—is changed and banks are operationally restructured.

Besides loss allocation, financial and corporate restructuring crucially depends on the incentives under which banks and corporations operate. Successful corporate debt workouts require proper incentives for banks and borrowers to come to the negotiating table (Dado and Klingebiel 2002). The incentive framework for banks includes accounting, classification, and provisioning rules: that is, financial institutions need to be asked to realistically mark their assets to market. The framework also includes laws and prudential regulations. Regulators should ensure that undercapitalized financial institutions are properly disciplined and closed. The insolvency system should enable financial institutions to enforce their claims on corporations, allow for speedy financial restructuring of viable corporations, and provide for the efficient liquidation of enterprises that cannot be rehabilitated. Proper incentives also mean limited ownership links between banks and corporations (because otherwise the same party could end up being both debtor and creditor).

Adequately capitalized financial institutions are a key component of a proper incentive framework, because financial institutions need to have sufficient loss absorption capacity to engage in sustainable corporate restructuring. In a systemic crisis, capital will often have to come from the government through recapitalization. However, general experience—supported by recent events in East Asia—suggests that recapitalization of financial institutions needs to be structured and managed to limit moral hazard. In their analysis of forty bank crises, Honohan and Klingebiel (2002) find that repeated, incomplete recapitalizations tend to increase the fiscal costs of resolving a crisis. One possible explanation is that marginally capitalized banks tend to engage in cosmetic corporate restructuring—such as maturity extensions or interest rate reductions on loans to nonviable corporations—rather than writing off debts.

Besides adequate capitalization, preferably by private shareholders, banks' incentives to undertake corporate restructuring can be strengthened by linking government financing to the restructuring. For example, a capital support scheme in which additional fiscal resources are linked to corporate restructuring through loss sharing arrangements can induce banks to conduct deeper restructuring. Regardless, especially in weak institutional settings, limits on the actions of marginally capitalized banks will typically be necessary.

In principle, governments should only capitalize or strengthen the capital base of financial institutions with charter and franchise value. However,

apart from political economy problems, it is often difficult for governments to distinguish good banks from bad. Risk-sharing mechanisms with the private sector, such as cofinancing arrangements with government equity infusion (in the form of preferred shares) when the private sector provides capital, can help identify better banks. This setup still requires decent institutions to avoid misuse. Especially in a weak institutional environment with limited private capital, governments may want to rely more on hard budget constraints on weak banks (such as a 100 percent marginal reserve requirement on new deposits) to prevent a large leakage of fiscal resources, including those that occur through excessive guarantees on financial institutions' liabilities. Additionally, good banks may need to be actively coerced to receive support, because they may resist government interference. Without some support, however, good banks may not be able to provide financial intermediation to corporations, thus aggravating the crisis.

### 6.3.3 Restructuring Corporations

#### *Providing the Right Incentives*

The nature of a systemic crisis, as well as the already close links between the solvency and performance of the corporate and financial sectors in normal times, makes it clear that bank restructuring needs to be complemented by corporate restructuring. To start corporate restructuring, corporations should quickly be triaged into operationally viable and not financially distressed corporations, operationally viable but financially distressed corporations, and financially and operationally unviable corporations. In a normal restructuring of an individual case of financial distress, private agents will make these decisions and start the operational and financial restructuring.<sup>6</sup> However, in a systemic crisis case-by-case restructuring will be difficult because the incentives under which agents operate are likely not to be conducive, private capital is typically limited, and coordination problems are large.<sup>7</sup>

Nevertheless, the starting point is providing proper incentives for private agents to allow and encourage market-based, sustainable corporate restructuring. Given that the crisis was likely to have been partly induced by weaknesses in the environment in which the corporate sector operated, the first step for government will have to be creating an enabling environment. Depending on country circumstances, this can imply undertaking corpo-

6. Financial restructuring for corporations can take many forms: reschedulings (extensions of maturities), lower interest rates, debt-for-equity swaps, debt forgiveness, indexing interest payments to earnings, and so on. Operational restructuring, an ongoing process, includes improvements in efficiency and management, reductions in staff and wages, asset sales (such as a reduction in subsidiaries), enhanced marketing efforts, and the like, with the expectation of increased profitability and cash flow.

7. For other papers on systemic corporate restructuring, including specific case studies, see Claessens, Djankov, and Mody (2001).

rate governance reforms, improving bankruptcy and other restructuring frameworks, making the judicial system more efficient, liberalizing entry by foreign investors, changing the competitive framework for the real sector, or introducing other supportive structural measures. In general, the political economy of reform suggests that a crisis can often be a time to get difficult structural reforms accepted or at least initiated (Haggard 2001).

Most crisis countries do reform the incentives for restructuring (see Claessens, Djankov, and Klingebiel 2001; Dado and Klingebiel 2002; Stone 2000a,b; and World Bank 2000 for different groups of crisis countries), although the strengths and depth of the reforms differ. For example, Indonesia adopted a new bankruptcy system to replace its pre-World War II Dutch code in August 1998, twelve months after its crisis started. Similarly, Thailand's senate approved the Act for the Establishment of and Procedure for Bankruptcy Court, intended to increase the efficiency of judicial procedures in bankruptcy cases, in February 1999, nineteen months after its crisis began. Despite the act's adoption, however, bankruptcies in Thailand remained few in number and fraught with difficulties (Foley 2000).

Beyond fixing the environment, it can be necessary to provide extra incentives for private agents to engage in (quick) corporate restructuring. These incentives can involve tax, accounting, and other measures. Banks, for example, may be given more tax relief for provisioning or restructuring loans. Corporations may be given more favorable accounting relief for recognizing foreign exchange losses. In the wake of its crisis, the Republic of Korea adopted more favorable tax rules for corporate restructuring, although they ended up being misused through cosmetic rather than real restructuring. Some countries have offered guarantees on exchange rate behavior, such as Indonesia's INDRA scheme and Mexico's FICORCA scheme (see Stone 2000a). The efficiency of such measures should be evaluated from various perspectives, taking into account their benefits for restructuring and public finance as well as their possible redistributive effects. However, although such measures may speed recovery, they often do not contribute to fundamental reforms. In any case, the general opinion is that such measures should be temporary (that is, equipped with sunset clauses).

### *Improving the Framework for Restructuring*

Even when adequate for normal times, a revamped bankruptcy and restructuring framework might not be sufficient during a systemic crisis, given the coordination problems and weaknesses in other aspects of the institutional framework. Thus, governments have created special frameworks for corporate restructuring, such as the "London rules,"<sup>8</sup> first used in Mex-

8. The London rules are principles for corporate reorganization first proposed in the United Kingdom in the early 1990s. Because the rules were not designed for systemic corporate distress, countries have tightened them in various ways.

ico and then in several East Asian countries (Indonesia, Korea, Malaysia, Thailand). The London rules involve an out-of-court accord, under regular contract or commercial law, that all or most creditor institutions are coerced to sign. With such an accord, agreements reached among most creditors can often be enforced on other creditors without formal judicial procedures.

Arbitration with specific deadlines—and penalties for failing to meet the deadlines—can also be part of the accord, avoiding a formal judicial process to resolve disputes.<sup>9</sup> The degree of such enhancements to the London rules has varied among countries. In East Asia the frameworks in Korea, Malaysia, and Thailand were the most conducive to out-of-court restructuring, whereas the framework in Indonesia was the least conducive (Claessens, Djankov, and Klingebiel 2001). These differences appear partly to explain the variations in the speed of restructuring in these four countries.

The most far-reaching proposal for enhancing the restructuring framework is “super-bankruptcy” (or “super Chapter 11”), a temporary tool that allows corporate management to stay in place and forces debt-to-equity conversions (Stiglitz 2001). This tool can preserve firms’ value as going concerns by preventing too many liquidations and keeping in place existing managers, who arguably most often know best how to run the firms. An important issue is when to call for a super Chapter 11—that is, when is a crisis systemic, and who has the authority to call for such a suspension of payments? Political economy factors should be taken into account, because some debtors could gain disproportionately from a suspension of payments. To date no country has taken this approach.<sup>10</sup>

Even with a better enabling environment, agents will likely be unable to triage corporations quickly and proceed with restructuring. The resulting debt overhang or deadlock in claims can be especially risky when institutions are weak, and it can greatly increase the final costs to the public sector of resolving the crisis. Weak banks may continue to lend to corporations that are “too big to fail,” partly as a way of gambling for resurrection, and so delay sustainable corporate restructuring. Owners of defunct enterprises may strip assets, leaving only shells of liabilities for creditors. Even financially viable corporations may stop paying promptly if faced with an insolvent banking system.

9. Out-of-court negotiations and bankruptcy or other legal resolution techniques are not the only ways of dealing with financial distress. Economists have been proposing alternative procedures for some time, centering on versions of an asset sale or cash auction. Cash auctions are easy to administer and do not rely on the judicial system (Hart et al. 1997). Although attractive from a theoretical perspective, these proposals have not had recent followers except Mexico in 1998.

10. Although bankruptcy laws differ considerably even among industrial countries, there has been a general move from more creditor-friendly regimes that are liquidation-oriented to more debtor-friendly regimes that are more restructuring-oriented (Westbrook 2001).

In such cases it may be necessary in the short run to use hard budget constraints to limit the flow of resources to weak corporations from weak financial institutions or other sources. To increase credit to corporations that can actually repay and limit lending to weak corporations it may also be necessary to have temporary across-the-board mechanisms for certain types of borrowers (such as small and medium-sized enterprises) or certain activities (such as trade financing). The need for such blunter tools will increase with a country's institutional weakness. Indonesia's market-based approach to corporate restructuring, for example, seems to have had little impact and probably only led to further asset stripping.

### *Choosing a Lead Agent*

As a next step, it is often necessary for governments to more directly support corporate restructuring. As with support for the financial system, it is essential to restructure strong and viable corporations, not weak ones. All too often, however, unviable corporations (such as those considered too big to fail) receive support instead of deserving, operationally viable corporations. This was the case with Korea's large *chaebol* and with Indonesia and Thailand's large family-controlled conglomerates. These firms ended up receiving disproportionately large financing during the first phase of the crisis, while smaller firms lacked even working capital (Domaç and Ferri 1999). Thus, it is crucial to choose a lead agent that ensures proper analysis of corporations' prospects as well as durable operational and financial restructurings.

The main choice for the lead agent in restructuring is between the government and the private sector. Many approaches are possible. A centralized asset management corporation will put the government in charge. Recapitalization of private banks will put the banks in charge. Under other models, investors and corporations can become the lead agent, with the government sharing the risks. Banks can work out nonperforming loans, for example, but with some stop-loss arrangements with the government. Alternatively, nonperforming loans can be transferred to a number of corporate restructuring vehicles that, although state-owned, can be privately run by asset managers with incentive stakes.

Most important is that the lead agent have the necessary capacity to absorb losses as well as the institutional capacity, incentives, and external enforcement mechanisms to effect restructuring. Undercapitalized banks, for example, will not be very effective restructuring agents; and without a working bankruptcy regime, private agents will not be able to force recalcitrant debtors to the negotiating table—as in Indonesia and in Thailand, where the restructuring of Thai Petrochemical Industry took three years.

Countries often choose a mix of these approaches when dealing with a systemic crisis. In 1995 Mexico tried both an asset management corporation and a more decentralized approach. The four East Asian crisis coun-

tries (Indonesia, Korea, Malaysia, Thailand) all eventually used asset management corporations, all used out-of-court systems for corporate restructuring, and most used, after some initial period, fiscal stimulus and monetary policy to foster economic growth. In addition, all enhanced, to varying degrees, their basic frameworks for private-sector operations, including bankruptcy and corporate governance frameworks, liberalization of foreign entry in the financial and corporate sectors, and so on. However, success has varied with the intensity of these measures (Claessens, Djankov, and Klingebiel 2001).

Empirical evidence on these mechanisms is limited but tends to favor the decentralized model. A study of seven centralized approaches using asset management companies found that most of the corporations did not achieve their stated objectives with corporate restructuring (Klingebiel 2001). The study distinguishes corporate restructuring asset management companies from bank rehabilitation asset management companies. Two of the three corporate restructuring companies did not achieve their narrow goal of expediting restructuring. Only Sweden's asset management company successfully managed its portfolio, acting in some instances as the lead agent in restructuring.

Rapid asset disposition vehicles fared somewhat better, with two of four—in Spain and the United States—achieving their objectives. These successes suggest that asset management corporations can be effective, but only for narrowly defined purposes of resolving insolvent and unviable financial institutions and selling their assets. However, even achieving these objectives requires many ingredients: a type of asset that is easily liquefied (such as real estate), mostly professional management, political independence, a skilled human resource base, appropriate funding, adequate bankruptcy and foreclosure laws, good information and management systems, and transparent operations and processes.

The findings by Klingebiel (2001) on asset management companies are corroborated by a review of three East Asian countries (Dado 2000). The centralized asset management companies in Indonesia and Korea did not appear likely to achieve their narrow goal of expediting bank or corporate restructuring, whereas Malaysia's was relatively successful, aided by that country's strong bankruptcy system. Success has also varied when a mix of approaches is tried. In Mexico neither the asset management company nor the enhanced restructuring framework was effective, possibly because fundamental reforms were lacking (Mexico's bankruptcy regime, for example, was not revamped until four years after its crisis). Export-led growth appears to have led Mexico's recovery after 1995 (although growth did not resolve banking problems; see Krueger and Tornell 1999).

Dado and Klingebiel (2002) analyze decentralized restructuring in seven countries: Argentina, Chile, Hungary, Japan, Norway, Poland, and Thailand. They find that the success of this approach depended on the quality of

the institutional framework, including accounting and legal rules, and on initial conditions, including the capital positions of banks and ownership links. In Norway the government built on favorable initial conditions to attain a solid overall framework for the decentralized approach. The biggest improvements to the overall framework was made in Chile, with favorable results. Poland and Hungary ranked behind Chile, although Poland improved its framework much faster than did Hungary. Thailand made little progress on strengthening its framework. In Japan, despite many reforms to the overall framework, efforts remained blocked by large ownership links. Argentina relied solely on public debt relief programs and did not change its overall framework for restructuring.

### *Changing Ownership Structures*

Just as a crisis can offer a window for structural reform, it can provide an opportunity to reform a country's ownership structures. As a direct party to the restructuring process, the state often becomes the owner of defunct financial institutions and corporations. This development severely complicates the resolution of the crisis, because the government may not have the right incentives or capacity to effect the needed operational and financial restructuring. At the same time, large ownership by the state of the financial and corporate sectors provides an opportunity to change ownership structures as part of restructuring. This move can have several benefits.

First, the changes can correct ownership structures that contributed to the crisis and so help prevent future crises. To the extent, for example, that ownership concentrated in the hands of a few families contributed to the crisis—as was argued by some for East Asia—the government can try to widen ownership structures.

Second, the government can try to obtain political support for restructuring by reallocating ownership.<sup>11</sup> One option is to reprivatize financial institutions or corporations in a way that redistributes ownership among the general public or employees of the restructured institution. Another option is to use some of the state ownership to endow unfunded pension obligations from a pay-as-you-go system. In this way, the government can create ownership structures that, over time, will reinforce its reforms.

Third, changing ownership structures can introduce third parties who have better incentives and skills in restructuring individual corporations and determining financial relief. One option is to transfer nonperforming loans to a fund jointly owned by private and public shareholders, but with the private stake having lower seniority. Private shareholders in the fund would then have the right incentives when deciding on the financial viabil-

11. Regardless of the changes in ownership and the relationships between debtors and creditors, the government may want to create a special social safety net for laid-off workers to help sustain political support for restructuring over time. See Levinsohn, Berry, and Friedman (chap. 12 in this volume) for the case of Indonesia.

ity of a corporation, but without having full formal ownership of the assets. Public resources would be provided only when all parties—creditor banks, other creditors, new private investors, the government, and the private shareholders in the fund—had reached agreement with the corporation.

#### *Pursuing Supportive Macroeconomic Policies*

Another common theme in the literature is that corporate restructuring should occur in the context of supportive macroeconomic policies. The right macroeconomic policies (fiscal and monetary) can speed the recovery of overall activity and corporate output. The appropriate fiscal stance has been extensively reviewed, especially in the context of the East Asian crisis. A review by the International Monetary Fund suggests that East Asian countries' fiscal stance was too tight initially (Lane et al. 1999). The appropriate monetary stance has been more controversial and is still being debated (see Cho and West, chap. 1 in this volume; Drazen, chap. 2 in this volume), but mainly in terms of defending the exchange rate.

An important related aspect is the effect on the corporate sector through a possible credit crunch. Microeconomic-based empirical literature suggests evidence of a credit crunch early in the East Asian crisis (Claessens, Djankov, and Xu 2000; Colaco, Hallward-Driemeier, and Dwor-Frecaut 2000; Dollar and Hallward-Driemeier 2000). The crunch was likely the result of tighter capital adequacy requirements and the monetary policies being pursued. More generally, it has been found that although tighter capital adequacy rules have minimal effects on aggregate credit provision, borrowers from weak banks are affected by tighter regulation and supervision (Bank for International Settlements 1999). Given the unbalanced financial systems in East Asia—where banks dominate and little alternative financing was available, and many banks were fragile even before the crisis (Claessens and Glaessner 1997)—it is likely that, at least initially, banking weaknesses and tighter regulation and supervision led to a credit crunch for East Asian corporations (Domaç and Ferri 1999). Following this initial crunch, corporations may have ended up with a debt overhang, with a consequent need for financial restructuring.

#### **6.4 Additional Empirical Evidence on the Effects of Crisis Resolution Policies**

In this section, we shed more light on the costs and benefits of alternative crisis resolution policies. Specifically, we empirically investigate how policies affect the performance and financial structures of individual corporations. We focus on the corporate sector for several reasons. First, the final purpose of resolution policies, even if directed toward the financial sector only, is a revitalization of the real sector and overall economic growth. Us-

ing corporate-sector indicators can thus provide a better measure of the final outcome. Second, the effects of policies can be more precisely measured by focusing on the corporate sector rather than the financial sector. The performance of banks, for example, will be highly affected by government financial actions, such as recapitalization, and therefore may not provide a good indication of the real outcomes achieved. Third, measuring the impact of resolution policies on a micro rather than a macro level (for example, by gross domestic product) allows us to better differentiate across policies. We can control, for example, for country characteristics, such as different corporate-sector structures, when studying policies commonly adopted.

We collect company-specific data for a sample of crisis countries around the period of crisis in each respective country. Our sample selection proceeded as follows. We collected company data from WorldScope for all emerging markets and developed countries that were classified by Caprio and Klingebiel (2002) as having had a systemic financial crisis. We had to exclude all crises prior to 1989 because WorldScope does not have sufficient data before 1989. We also had to exclude countries for which the crisis period is difficult to time, either because of multiple crises (such as in Argentina) or because the crisis stretches over a long period of time without clear peaks or ends (as in Japan). This left us with seventeen countries with a systemic crisis. We had to further exclude some countries for which we did not have a significant number of corporations with available data. This set of excluded countries includes nine transition countries (Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, and Slovenia) and Venezuela. For Venezuela, for example, we only had nine corporations for the whole sample period.

Given the data availability, we are left with eight crisis countries, namely Finland, Indonesia, South Korea, Malaysia, Mexico, the Philippines, Sweden, and Thailand. For each country, we distinguish three periods. The crisis year is the year of the peak of the crisis as identified by Caprio and Klingebiel (2002). The precrisis year is defined as the average of the three years before the peak of the crisis and the postcrisis year as one year after the peak of the crisis. Table 6.2 reports the sample of crisis countries and their respective crisis years.

In total, we have company-specific data from WorldScope for 687 firms. The data could suffer from a bias if many sampled firms entered bankruptcy during the crisis years. For most countries, however, the set of firms is quite similar between pre- and postcrisis periods. In fact, the data set includes more firms during the crisis year than during the precrisis year.<sup>12</sup> This suggests that the data set does not suffer from a large survivorship or other re-

12. We have data on 990 firms for the precrisis years, 1,183 firms for the crisis years, and 889 firms for the postcrisis years. In the regressions we use a balanced panel of 687 firms.

**Table 6.2** Sample Crisis Countries and Crisis Years

	Precrisis	Peak of Crisis	Postcrisis
Finland	1989	1992	1993
Indonesia	1995	1998	1999
South Korea	1995	1998	1999
Malaysia	1995	1998	1999
Mexico	1992	1995	1996
The Philippines	1995	1998	1999
Sweden	1989	1992	1993
Thailand	1995	1998	1999

*Source:* Caprio and Klingebiel (2002); authors' definitions.

porting bias. The notable exception is the Republic of Korea, for which the number of firms reporting in the postcrisis period is significantly less than those in the precrisis and crisis periods. The main reason is that at the date of data collection many Korean firms had not yet reported their financial statements for 1999.<sup>13</sup>

In estimating the impact of resolution policies on the performance of the corporate sectors, we distinguish between the depth of the crisis, the recovery after the crisis, and the sustainability of the recovery. As a measure for the depth of the crisis, we use the difference in a corporation's operating income, defined as earnings before interest and taxes with depreciation added, as a ratio of sales, that is, the ratio of earnings before interest and taxes with depreciation added (EBITDA) to sales, between the precrisis and crisis periods. Similarly, our measure for the degree of recovery of corporate performance is the difference in EBITDA-sales between the postcrisis and crisis periods. Our measure for the sustainability of the recovery is the difference in EBITDA-sales between the postcrisis and precrisis periods.

Table 6.3 reports summary statistics of the company-specific data for EBITDA-sales, interest coverage, leverage, debt composition (share of short-term) and share of payables (trade) relative to total assets—the main variables used in the empirical analysis—across all countries. It is worth noting that the interest coverage figure (measured as operating income to interest payments) reflects both firm profitability and debt structure. We find that, measured by EBITDA-sales, firms performed the worst during the crisis year. Firms had a worse interest coverage during the crisis year than before and were more leveraged at the peak of the crisis than before the crisis. Firms generally reduced the share of short-term debt over the crisis period, whereas the share of trade debt was mostly unaffected by the crisis.

13. This reporting discrepancy may still result into a sample selection bias if, for example, late reporting is more common among unprofitable firms than among profitable firms. This would lead us to overestimate the recovery and the effects of any policies adopted on the speed of recovery.

**Table 6.3 Descriptive Statistics (means, with medians in brackets)**

	EBITDA/Sales			Interest Coverage			Debt to Assets			Short-Term Debt/Total Debt			Payables/Total Assets			N
	Precrisis	Crisis	Postcrisis	Precrisis	Crisis	Postcrisis	Precrisis	Crisis	Postcrisis	Precrisis	Crisis	Postcrisis	Precrisis	Crisis	Postcrisis	
All	0.216 [0.168]	0.120 [0.133]	0.167 [0.144]	8.333 [3.125]	2.499 [1.299]	4.863 [1.739]	0.314 [0.312]	0.427 [0.390]	0.424 [0.356]	0.536 [0.513]	0.547 [0.520]	0.504 [0.431]	0.087 [0.070]	0.080 [0.059]	0.084 [0.059]	687
Finland	0.129 [0.107]	0.136 [0.122]	0.157 [0.131]	2.272 [1.587]	1.697 [1.266]	3.184 [1.724]	0.370 [0.357]	0.432 [0.412]	0.409 [0.398]	0.253 [0.207]	0.259 [0.242]	0.281 [0.237]	0.092 [0.070]	0.086 [0.055]	0.092 [0.059]	67
Indonesia	0.256 [0.226]	0.089 [0.153]	0.292 [0.274]	9.813 [3.448]	2.942 [0.645]	9.785 [2.500]	0.323 [0.329]	0.595 [0.609]	0.503 [0.493]	0.652 [0.746]	0.710 [0.969]	0.552 [0.422]	0.097 [0.057]	0.079 [0.046]	0.076 [0.038]	54
Korea	0.162 [0.140]	-0.029 [0.119]	0.170 [0.141]	2.235 [1.515]	-0.274 [1.053]	2.125 [1.852]	0.481 [0.453]	0.566 [0.450]	0.668 [0.390]	0.505 [0.495]	0.569 [0.590]	0.463 [0.414]	0.110 [0.100]	0.092 [0.083]	0.110 [0.066]	50
Malaysia	0.226 [0.181]	0.008 [0.130]	0.122 [0.146]	16.848 [6.667]	4.061 [1.333]	5.187 [1.120]	0.212 [0.192]	0.386 [0.299]	0.390 [0.299]	0.667 [0.762]	0.630 [0.624]	0.647 [0.676]	0.075 [0.051]	0.066 [0.041]	0.067 [0.045]	180
Mexico	0.258 [0.207]	0.241 [0.225]	0.307 [0.272]	10.215 [3.280]	2.665 [1.835]	4.411 [3.125]	0.258 [0.287]	0.338 [0.319]	0.330 [0.303]	0.403 [0.336]	0.431 [0.362]	0.338 [0.252]	0.081 [0.050]	0.071 [0.050]	0.079 [0.059]	49
The Philippines	0.357 [0.271]	0.186 [0.175]	0.215 [0.175]	7.661 [4.348]	-1.908 [0.799]	2.681 [1.282]	0.258 [0.272]	0.319 [0.296]	0.320 [0.335]	0.567 [0.495]	0.505 [0.466]	0.451 [0.321]	0.104 [0.090]	0.102 [0.074]	0.098 [0.072]	46
Sweden	0.144 [0.112]	0.109 [0.088]	0.162 [0.119]	3.621 [2.778]	0.448 [1.118]	3.832 [2.000]	0.299 [0.280]	0.323 [0.346]	0.307 [0.310]	0.380 [0.299]	0.346 [0.309]	0.318 [0.246]	0.099 [0.093]	0.087 [0.078]	0.099 [0.086]	94
Thailand	0.247 [0.200]	0.255 [0.200]	0.130 [0.130]	6.304 [3.226]	4.222 [2.222]	5.840 [0.952]	0.406 [0.411]	0.504 [0.532]	0.507 [0.509]	0.619 [0.651]	0.689 [0.777]	0.635 [0.693]	0.078 [0.059]	0.080 [0.053]	0.084 [0.059]	147

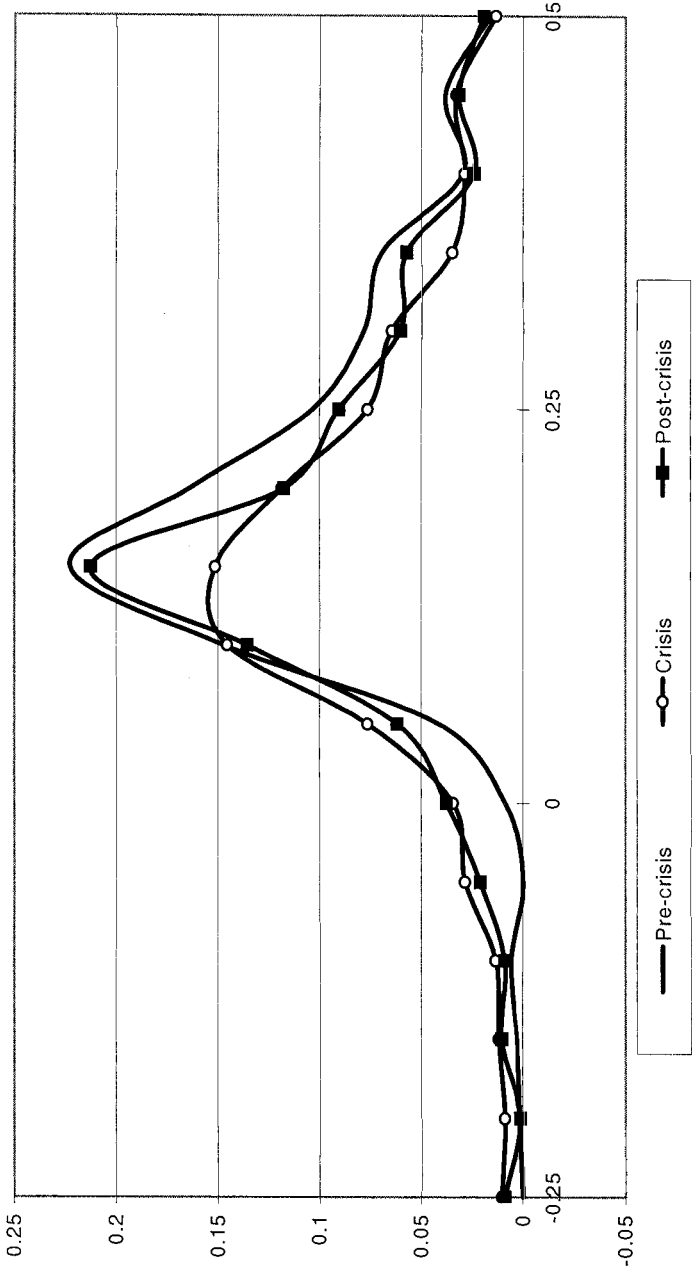
Source: WorldScope.

We also find that, although both the performance and capital structure of firms improved after the peak of the crisis, firms did not reach precrisis performance levels and financing structures within two years after the peak of the crisis.

These general trends are also reflected in figures 6.2 and 6.3, which plot, respectively, the EBITDA-sales and interest coverage ratios for the three periods. The earnings and interest coverage distributions shift to the left between the precrisis and the crisis periods and then recover somewhat, but not to the distribution before the crisis. When performance and sustainability are measured using other measures, similar results obtain. For example, the median operating return on assets falls from 5.5 percent in the precrisis period to 1.4 percent during the crisis period and then recovers to 2.8 percent in the postcrisis period. The median ratio of the market to book value of equity moves from 1.8 before the crisis period to 0.7 during the crisis period, to recover to only 1.03 in the postcrisis period.

Table 6.3 also reports the summary statistics for individual countries for the same set of variables. The patterns for each country are generally the same as for the overall medians. Some exceptions are Finland, Indonesia, Mexico, and Sweden, where postcrisis corporate-sector performance is on average better than precrisis performance. In these countries, some corporations may have benefited from the depreciation of the exchange rate, which would explain the better performance. This is not the case for the other countries: in Thailand, for example, postcrisis performance is actually the worst of all three periods. Korea and Malaysia correspond to the pattern for the whole sample, with the recovery performance above the crisis level but below the precrisis level. In terms of interest coverage, the picture is more uniform across the countries: some deterioration during the crisis, generally followed by an improvement. The exceptions are Malaysia and Thailand, where the average interest coverage ratios decline throughout.

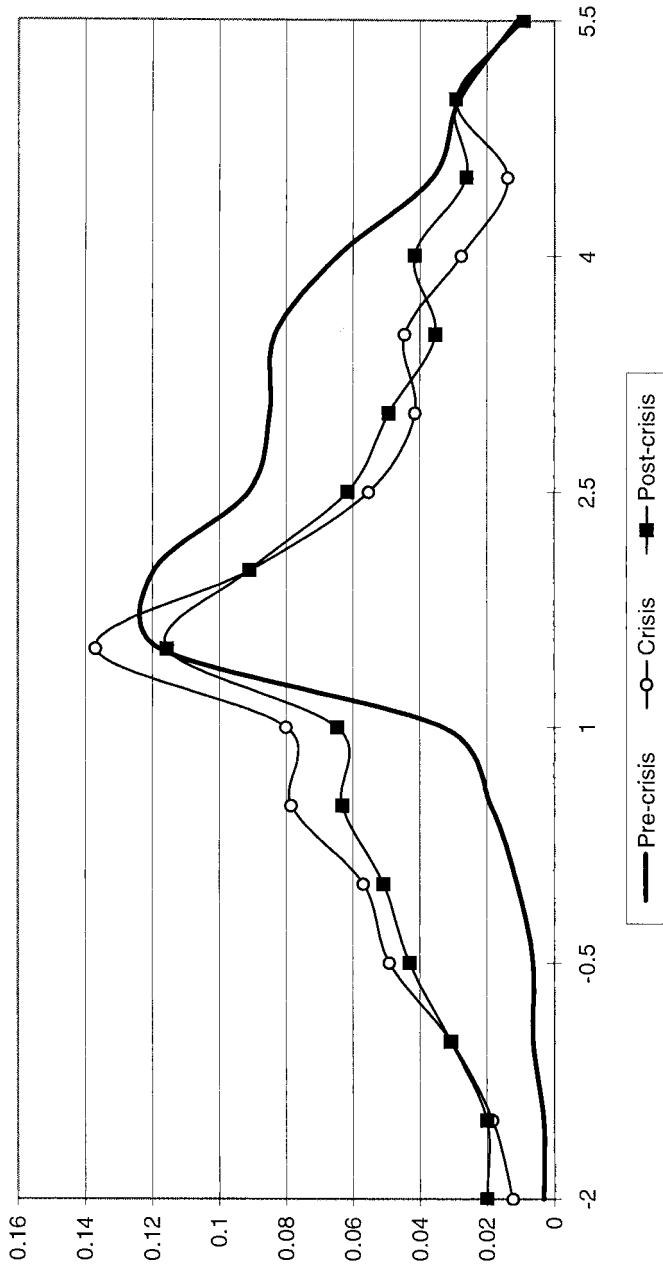
Apart from industry and other corporation-specific factors, such as corporations' initial financial structures, differences in the policies adopted may explain some of the differences. Our literature review, and in particular Honohan and Klingebiel (2002), motivates the specific policy measures we investigate. Honohan and Klingebiel identified for a large sample of countries those policy measures that could be systematically linked to the fiscal costs of resolving a systemic crisis. The three specific policy variables we use from their analysis are (a) whether the central bank has provided liquidity support to financial institutions during the crisis; (b) whether the government has guaranteed bank liabilities; and (c) whether the government has established a publicly owned, centralized asset management company. As noted in section 6.3, Honohan and Klingebiel show that these three measures particularly increased the overall fiscal costs of resolving a crisis, controlling for a number of country-specific factors. Because we investigate



**Fig. 6.2 EBITDA-sales across periods (fraction of firms)**

Source: WorldScope.

Notes: The sample includes firms from eight countries: Finland, Indonesia, South Korea, Malaysia, Mexico, the Philippines, Sweden, and Thailand. The figure presents the distribution of EBITDA-sales averaged across all firms in the eight countries. The figure is smoothed.



**Fig. 6.3 Interest coverage across periods (fraction of firms)**

Source: WorldScope.

Notes: The sample includes eight countries: Finland, Indonesia, South Korea, Malaysia, Mexico, the Philippines, Sweden, and Thailand. The figure presents the fraction of firms with specific interest rate coverage across all firms in the eight countries. The figure is smoothed.

**Table 6.4** Resolution Policies across Sampled Countries

	Yes	No
Guarantee	Finland, Indonesia, Korea, Malaysia, Mexico, Sweden, Thailand (7)	The Philippines (1)
Liquidity support	Finland, Indonesia, Korea, Mexico, Thailand <sup>a</sup> (5)	Malaysia, the Philippines, Sweden (3)
Public AMC	Indonesia, Korea, Malaysia, Mexico (4)	Finland, the Philippines, Sweden, Thailand (4)

Source: Honohan and Klingebiel (2002).

<sup>a</sup>Liquidity support is provided to nonbank financial institutions only, not to deposit and money banks as well.

whether these policies resulted in improved performance and financial sustainability of the corporate sector, we can shed some light on whether a trade-off might exist for certain policies between fiscal costs and corporate-sector outcomes.

Table 6.4 presents the policy measures taken in the sampled countries. There are many similarities in policies across countries. Almost all countries' governments, for example, guaranteed the liabilities of the financial sector during the crisis, and only the Philippines did not. About half of the countries had extensive liquidity support to the financial sector, and, similarly, about half did establish a public asset management corporation. The Philippines is the only country that did not undertake any of the three resolution measures. The correlation between the implementation of these policy measures is substantial,<sup>14</sup> suggesting that they tend to be implemented as a package.

Given the limited number of countries in our sample and the fact that the policy measures are correlated, it is difficult to assess the impact of the implementation of each of the three policy variables in isolation, and regression results from using individual policy dummies could be unreliable. We therefore create a composite policy index in our empirical work. This policy index, called "Policy," is simply defined as the sum of the number of resolution measures taken to restore financial stability in the country. The three resolution measures considered include the provision of guarantees, liquidity support, and the setup of a public asset management company. The Policy variable thus ranges from zero to three. Table 6.5 shows the value for the Policy variable for the eight crisis countries.

As company-specific control variables, we use each corporation's initial leverage ratio (measured as total debt-asset ratio), initial debt composition

14. The simple correlation between "liquidity support" and "guarantees" is 49 percent, between "liquidity support" and "public AMC [asset management corporation]" 47 percent, and between "guarantees" and "public AMC" 49 percent.

**Table 6.5** Policy Index across Crisis Countries

	Policy Index
Finland	2
Indonesia	3
South Korea	3
Malaysia	2
Mexico	3
The Philippines	0
Sweden	1
Thailand	3

*Source:* Honohan and Klingebiel (2002); authors' calculations from table 6.4.

*Notes:* The policy index is defined as the sum of the number of resolution measures taken to restore financial stability in the country. The three resolution measures considered include the provision of guarantees, liquidity, support, and the setup of a public asset management company.

(measured as ratio of short-term debt to total debt), size (measured as the natural logarithm of sales), and use of trade debt (measured as ratio of payables to assets). To control for any sectoral differences across firms, we use industry dummies (based upon two-digit Standard Industrial Classification codes) in the regressions.

Using these variables, we aim to answer the following questions. What are the effects of the announcement of these policies during the containment phase on firm performance and sustainability? Does the implementation of the set of resolution measures during the resolution phase of a crisis affect the speed of firm recovery? In addition to the resolution policies themselves, we also want to assess how certain firm-specific factors influence both the speed and the sustainability of the recovery of the corporate sector.

We use the following specific model to explain the depth of the crisis, as measured by the deterioration of firm profitability, the EBITDA-sales ratio (equation [1]).

$$(1) \quad \frac{\text{EBITDA}}{\text{Sales}}(\text{precrisis}) - \frac{\text{EBITDA}}{\text{Sales}}(\text{crisis}) =$$

$$f \frac{\text{EBITDA}}{\text{Sales}}(\text{precrisis}), (\text{Policy index, initial firm-specific variables}$$

$$[\text{precrisis}], \text{ industry dummies}).$$

We use first differences, rather than percentage changes, because the EBITDA-sales ratio can take on nonpositive values. Given that the model is specified in first differences, and because we also control already for many firm specifics, we can ignore any fixed firm effects. With the Policy index variable being our main focus, we also ignore any other changes in the macro environment. We therefore assume that, conditional on a crisis taking place, the effect of the implementation of the crisis resolution measures dominates

all other changes in country-specific effects. Although we include industry dummies in all regressions, these are not reported. In terms of firm specifics, we expect that larger firms and firms with sounder debt structures suffer less from a crisis. We further expect that trade debt may act as an important substitute for bank financing during a crisis. Given that the number of observations per country differ, we estimate equation (1) using both ordinary least squares (OLS) and weighted least squares (WLS) with weights related to the number of observations. All results are presented in table 6.6.

High firm profitability at the onset of the crisis is found to be strongly correlated with the depth of the crisis. Our interpretation is that the profitabil-

**Table 6.6** Depth of Crisis: EBITDA/Sales

Variable	OLS (1)	WLS (2)
Constant	0.112 (0.183)	0.224 (0.199)
EBITDA/sales precrisis	0.522** (0.244)	0.531*** (0.120)
Sales	-0.018* (0.042)	-0.024** (0.010)
Payables	0.504** (0.255)	0.492** (0.208)
Leverage	0.079 (0.089)	0.147 (0.097)
Short-term debt	0.228*** (0.053)	0.171*** (0.059)
Policy	0.010 (0.109)	0.007 (0.015)
Adjusted $R^2$	0.117	0.133
Durbin-Watson stat	1.99	2.06
$N$	603	603

*Notes:* Dependent variable is the difference between the EBITDA-sales ratio in the precrisis year and the EBITDA-sales ratio in the crisis year. “Precrisis EBITDA-sales precrisis” is the ratio of EBITDA to sales in the precrisis year. “Policy” is an index of policy measures directed toward restoring financial stability. It is the sum of three dummy variables. The first dummy variable takes value 1 if the government has issued an unlimited guarantee on bank liabilities, and zero otherwise. The second dummy variable takes value 1 if the government has provided open-ended liquidity support to financial institutions, and zero otherwise. The third dummy variable takes value 1 if the government has established a publicly owned, centrally managed asset management company, and zero otherwise. “Sales” is the natural logarithm of net sales in thousands of U.S. dollars in the precrisis year. “Payables” is the ratio of payables to total assets in the precrisis year. “Leverage” is the ratio of total debt to assets in the precrisis year. “Short-term debt” is the ratio of short-term tot total debt in the precrisis year. We include industry dummies, but these are not reported. We report heteroskedasticity-corrected standard errors between brackets. Equation (1) is estimated using ordinary least squares. Equation (2) is estimated using weighted least squares with weights related to the number of country observations.

\*\*\*Significant at the 1 percent level.

\*\*Significant at the 5 percent level.

\*Significant at the 10 percent level.

ity of these firms rose to abnormally high levels until the onset of the crisis, possibly as a result of a credit boom preceding the crisis, and shortly thereafter experienced a sharp decline during the credit crunch. Larger firms are found to be less affected by the crisis than smaller firms. This may be because larger firms were more diversified and could absorb the shocks better. It could also be that banks renewed credit more easily for larger firms and stopped rolling over credits for small and not-well-connected firms. We also find a sharper decline in corporate profitability for firms with larger shares of short-term debt, suggesting that such firms were affected by the increases in interest rates that occurred during the crisis period and were more exposed to the risks of banks' not renewing credit lines. Furthermore, the regression results show that firms that depended more on trade debt were more affected. This suggests that firms themselves were also less willing to offer each other trade credit during a financial crisis. This could be because of a decreased ability of many debtors to repay the credit or, more generally, because of uncertainty on the financial health of firms. The findings on short-term and trade debt together suggest that firms that had healthier financing structures—lower debt-equity leverage and more long-term debt—managed the crisis better.

We do not find that the crisis resolution measures had any impact on reducing the drop in profitability in our sample of countries, as the coefficient on Policy is insignificant. One interpretation is that this set of crisis resolution measures is not sufficient or does not consist of the right type of measures to stop the downfall in corporate profits. Another interpretation is that these measures can only be implemented past the peak of a crisis, making them ineffective to limit the decline. Either interpretation sheds doubt on the common policy advice to adopt these measures quickly.

We use the same type of regression model to explain the (relative) recovery of the profitability of firms (equation [2]).

$$(2) \frac{\text{EBITDA}}{\text{Sales}}(\text{postcrisis}) - \frac{\text{EBITDA}}{\text{Sales}}(\text{crisis}) = f \frac{\text{EBITDA}}{\text{Sales}}(\text{precrisis}) - \frac{\text{EBITDA}}{\text{Sales}}(\text{crisis}), (\text{Policy index, initial firm-specific variables (precrisis),}$$

industry dummies).

We again use first differences because the EBITDA-sales ratio can take on nonpositive values. Compared to equation (1), the main difference in the regression setup is that we use the drop in firm profitability (the dependent variable in equation [1]) rather than the initial level of firm profitability as independent variable. This way we control for the possibility that profitability recovers more for firms that are hit more during the initial stage of the crisis. We estimate equation (2) again using both OLS and WLS, with the results presented in table 6.7.

**Table 6.7** Recovery from a Crisis: EBITDA/Sales

Variable	OLS (1)	WLS (2)
Constant	-0.394** (0.157)	-0.293** (0.141)
EBITA/sales drop	0.772*** (0.138)	0.738*** (0.062)
Sales	0.025* (0.014)	0.016** (0.008)
Payables	0.544*** (0.171)	0.154 (0.151)
Leverage	0.044 (0.095)	0.054 (0.064)
Short-term debt	0.050 (0.058)	0.035 (0.038)
Policy	0.036*** (0.012)	0.041*** (0.011)
Adjusted $R^2$	0.459	0.541
Durbin-Watson stat	2.06	2.20
$N$	592	592

*Notes:* Dependent variable is the difference between the EBITDA-sales ratio in the postcrisis year and the EBITDA-sales ratio in the crisis year. “EBITDA/sales drop” is the difference between the EBITDA-sales ratio in the precrisis year and the EBITDA-sales ratio in the crisis year. “Policy” is an index of policy measures directed toward restoring financial stability. It is the sum of three dummy variables. The first dummy variable takes value 1 if the government has issued an unlimited guarantee on bank liabilities, and zero otherwise. The second dummy variable takes value 1 if the government has provided open-ended liquidity support to financial institutions, and zero otherwise. The third dummy variable takes value 1 if the government has established a publicly owned, centrally managed asset management company, and zero otherwise. “Sales” is the natural logarithm of net sales in thousands of U.S. dollars in the precrisis year. “Payables” is the ratio of payables to total assets in the precrisis year. “Leverage” is the ratio of total debt to assets in the precrisis year. “Short-term debt” is the ratio of short-term to total debt in the precrisis year. We include industry dummies, but these are not reported. We report heteroskedasticity-corrected standard errors between brackets. Equation (1) is estimated using ordinary least squares. Equation (2) is estimated using weighted least squares with weights related to the number of country observations.

\*\*\*Significant at the 1 percent level.

\*\*Significant at the 5 percent level.

\*Significant at the 10 percent level.

We find that the recovery of firm profitability is strongly correlated with the decline in firm profitability during the initial stage of the crisis, suggesting a large mean reversion in firm profitability around the crisis period. However, firm profitability does not recover completely to its precrisis level, which suggests that it may take more than one year to recover from a crisis or that there is a permanent loss. The sharp recovery is in line with the results of Eichengreen and Rose (chap. 3 in this volume), Dooley and Verma (chap. 5 in this volume), and Park and Lee (chap. 9 in this volume) that the V-shaped recovery is the norm in currency crises. We also find that the recovery of larger firms is slightly better than those of smaller firms, suggest-

ing that larger firms may be in a better position to absorb shocks because they are more diversified or because larger firms are politically better connected than smaller firms.

The other firm-specific variables are generally not statistically significant, possibly because we already included firm-specific decline in profitability in the regression, which has strong explanatory power. Surprisingly, however, firms' financing structures do not appear to affect recovery. This may reflect some offsetting effects. On one hand, more risky financing structures should make it more difficult for firms to obtain financing to resume their operations. On the other hand, there can be incentive effects from tighter financing situations. It has been found, for example, for a sample of U.S. firms that perform poorly for a year that higher predistress leverage increases the probability of operational restructuring, thus accelerating recovery (Ofek 1993).

Interestingly, we find that the policy index is strongly correlated with the recovery in firm profitability. This suggests that the implementation of measures directed toward restoring the financial health of banks, such as removing nonperforming loans from banks' balance sheets, have a positive spillover effect toward firms by increasing banks' ability to resume lending to more viable firms, thus accelerating the recovery of firms. The quantitative importance of the policy variable is significant. Firm profitability would have increased on average by around 10 percent if the country had implemented all three crisis resolution measures considered.<sup>15</sup> Of course, these are simulated results for the average country, and actual results will differ widely across countries. In Sweden, many loans were removed from banks' balance sheets, and corporate-sector performance recovered relatively quickly. This also happened in Indonesia, but the gains in corporate-sector performance, if any, have been very limited so far, whereas the fiscal costs have been very large.

To assess the sustainability of the recovery, we investigate the factors influencing the difference in corporate performance after the crisis and before the crisis. We estimate the following model (equation [3]).

$$(3) \quad \frac{\text{EBITDA}}{\text{Sales}}(\text{postcrisis}) - \frac{\text{EBITDA}}{\text{Sales}}(\text{precrisis}) = f \frac{\text{EBITDA}}{\text{Sales}}(\text{precrisis}), (\text{Policy index, initial firm-specific variables [precrisis], industry dummies}).$$

Equation (3) has the same explanatory variables as equation (1). The dependent variable tries to measure the lasting impact of the crisis on firm profitability. If the dependent variable is small, that is, the firm's profitabil-

15. The average increase of around 10 percent equals the regression coefficient of the policy index variable in equation (2) times three.

**Table 6.8** Sustainability: EBITDA/Sales

Variable	OLS (1)	WLS (2)
Constant	0.095 (0.168)	-0.171 (0.146)
EBITDA/sales precrisis	-0.840*** (0.127)	-0.565*** (0.117)
Sales	0.006 (0.012)	0.019*** (0.007)
Payables	-0.155 (0.151)	-0.233 (0.159)
Leverage	-0.001 (0.076)	-0.007 (0.063)
Short-term debt	-0.060* (0.032)	-0.024 (0.039)
Policy	0.040*** (0.013)	0.033*** (0.012)
Adjusted $R^2$	0.306	0.202
Durbin-Watson stat	1.96	2.06
$N$	598	598

*Notes:* Dependent variable is the difference between the EBITDA-sales ratio in the postcrisis year and the EBITDA-sales ratio in the precrisis year. “EBITDA/sales precrisis” is the EBITDA-sales ratio in the precrisis year. “Policy” is an index of policy measures directed toward restoring financial stability. It is the sum of three dummy variables. The first dummy variable takes value 1 if the government has issued an unlimited guarantee on bank liabilities, and zero otherwise. The second dummy variable takes value 1 if the government has provided open-ended liquidity support to financial institutions, and zero otherwise. The third dummy variable takes value 1 if the government has established a publicly owned, centrally managed asset management company, and zero otherwise. “Sales” is the natural logarithm of net sales in thousands of U.S. dollars in the precrisis year. “Payables” is the ratio of payables to total assets in the precrisis year. “Leverage” is the ratio of total debt to assets in the precrisis year. “Short-term debt” is the ratio of short-term to total debt in the precrisis year. We include industry dummies, but these are not reported. We report heteroskedasticity-corrected standard errors between brackets. Equation (1) is estimated using ordinary least squares. Equation (2) is estimated using weighted least squares with weights related to the number of country observations.

\*\*\*Significant at the 1 percent level.

\*Significant at the 10 percent level.

ity has recovered to the level from before the crisis, then the recovery from the crisis can be thought to be sustainable. The regression results are presented in table 6.8.

We find that firms with high profitability at the onset of the crisis do not recover fully over the crisis period to precrisis levels of profitability. This suggests either that these firms had unsustainable levels of firm profitability, possibly associated with a precrisis credit boom, or that it takes more than one year for firms to recover fully from a systemic crisis. We also find some evidence that firms with relatively large amounts of short-term debt before the crisis have greater difficulties in recovering to their precrisis levels of firm profitability, which possibly reflects difficulties in resolving their financial distress. The other, firm-specific variables are not statistically significant.

We find that postcrisis levels of firm profitability are closer to their precrisis levels for firms in those countries that took (more) crisis resolution measures. According to the regression results, the simultaneous implementation of all three policy measures under consideration would increase firm profitability by some 12 percentage points of sales.

The policy index, being a composite index, does not allow us to disentangle the different effects of the three policy measures on changes in firm profitability.<sup>16</sup> Nevertheless, we speculate that our findings are the results of two types of actions. The provision of liquidity support and the extension of unlimited guarantees both restore confidence in the financial system and indirectly help improve the performance of corporations. The establishment of public asset management companies directly alleviates firms' financial conditions by removing nonperforming loans of corporations from banks and granting financial relief. Of course, these measures come at (substantial) fiscal costs.

The regression results may suffer from a potential endogeneity problem if the implementation of the crisis resolution measures is more likely in countries with a deeper financial crisis. In this case there would be reverse causality between the dependent variable, "drop in EBITDA-sales," and the Policy index variable. We performed some tests for the existence of this problem and did not find evidence that would suggest a major endogeneity problem in the regression results. Specifically, the policy index variable is not significantly correlated with the drop in EBITDA-sales between the precrisis period and the crisis period (the dependent variable in equation [1]), nor with the firms' initial debt structures (as measured by the ratio of debt to total assets or short-term debt to total debt in the precrisis period).<sup>17</sup> Also, an ordered probit or logit model with the policy index as dependent variable and the change in EBITDA-sales and debt structure indicators as explanatory variables does not produce any significant results. This suggests that reverse causality is not a major problem.

As robustness on our dating of crises, we ran the same regressions in equations (1) and (2) with a different crisis year, namely one year earlier than the crisis years reported in table 6.2. We found results that are very similar to those reported in tables 6.6 and 6.7. Again, we find that crisis resolution measures do not help to prevent the decline in firm profitability during the early stage of the crisis but are effective (although costly) in terms of the recovery from a crisis. For ease of presentation we do not include these results.

16. We noted earlier that such an exercise would produce highly unreliable results because of the high correlation among the three policy measures and the limited number of countries in the sample. We therefore do not make this effort.

17. The correlation between the policy index variable and the difference in EBITDA-sales in the precrisis period and the crisis period is only 3 percent; between the policy index variable and the initial debt-assets ratio 14 percent (but not significantly different from zero); and between the policy index variable and the initial ratio of short-term debt to total debt 11 percent (also not significantly different from zero).

## 6.5 Conclusions

The literature on systemic restructuring emphasizes the need for governments to actively intervene to overcome the many coordination problems in a systemic crisis and to relieve the shortage of financial capital, both of which impede progress with case-by-case restructuring. The core issue in dealing with a systemic crisis then becomes how to resolve coordination issues while preserving or enhancing incentives for normal, market-based restructuring and transactions. Achieving both goals requires consistent government policies, among both issues and sectors, and over time.

The literature also stresses that fiscal and monetary policies have to support the recovery process in a systemic crisis. Policies must strike the right balance between supporting the exchange rate and avoiding a serious credit crunch created by high interest rates. Supportive policies also cover other dimensions, such as the strictness of capital adequacy requirements and whether an allowance should be made for automatic rollover of payments by small and medium-sized enterprises during the early phases of a crisis. As extensively debated in the context of the East Asian crisis and earlier (for example, following Chile's 1982 crisis), these supportive policies have not always been in place during systemic crises.

Especially during the containment phase of a systemic crisis, but also afterward, governments have to balance achieving stability with aggravating moral hazard. One dimension is avoiding the extension of government guarantees of financial institutions' liabilities, which can create moral hazard and reduce freedom in future loss allocations. Another dimension is the closing or suspension of some financial institutions. Although it signals a certain supervisory stance and limits moral hazard, closing financial institutions can inhibit the restoration of depositors' confidence. In some systemic crises during which the institutional framework for bank resolution was weak and there was much uncertainty among depositors and investors on the intrinsic value of the banking system, closing banks without addressing the large problems in the financial system aggravated the crises.

Consistent financial reform involves, among other things, changes in prudential regulation affecting financial institutions' profitability and the availability of private capital. Capital adequacy requirements, for example, need to be made consistent with current and future bank profitability and the availability of new private capital. Raising capital adequacy requirements during a systemic crisis is often not useful because capital is negative, bank earnings are low or negative, and little or no new capital is available.

Consistent reform is also needed for public recapitalizations. Any public recapitalization of banks must take into account the availability of fiscal resources. In several crisis countries the recapitalization of financial institutions with government bonds did not restore public confidence because limited fiscal resources were available to back the bonds. A related in-

tertemporal consistency issue in any crisis is government credibility. We did not address this issue directly in this chapter, but *ex ante* consistency is a precondition for credibility.

Finally, approaches to restructuring must be consistent with a country's institutional capacity. Institutional deficiencies can rule out approaches in some countries that may be best practices in other countries. These best practices can include heavy reliance on a market-based approach to corporate restructuring, in which banks are recapitalized and asked to work out debtors. Where corporate governance and financial regulation and supervision are weak, however, such an approach may be a recipe for asset stripping or looting rather than sustainable restructuring. Thus, emerging markets and industrial countries will need different approaches to systemic restructuring.

Although many of these lessons are often mentioned in the literature we reviewed, best practice policies are often not applied. Mistakes can be made in the middle of a crisis. Afterward, it is easy to point out these inconsistencies. Even before, however, there have been many clear cases of inconsistent financial restructuring programs. These inconsistencies usually develop because policy makers are trying to overcome political constraints, and it is hard to judge whether they do so in the most efficient manner. However, inconsistencies can also reflect genuine differences of opinion among policy makers and advisers on what constitutes best practice, as with the need to guarantee all liabilities during the early stages of a crisis. The end result is similar, in that consistency is often lacking.

Specific lessons from the empirical part of the paper reinforce some of the general lessons and add new evidence to some that may be more controversial. The analysis on data of corporate-sector performance suggests that a package of government guarantees on bank liabilities, the provision of liquidity support, and the setup of public asset management companies help both the recovery and sustainability, but that these policies do not mitigate the depth of the crisis. Although the empirical results suggest that measures such as asset management companies can help in the short run, they may not provide the right incentives for banks and firms to improve firm capital structures in the long run. Moreover, for all measures there will be a trade off: although they may speed up recovery, they have also been shown to increase fiscal cost.

More generally, government efforts to restructure need to take into account the political economy factors behind the causes of a crisis and its resolution. In this context there might be ways to change ownership structures in a systemic crisis so that recovery is expedited and a more sustainable outcome results. However, although we lack complete understanding of systemic crises, we know even less about the political economy of systemic crises.

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## Comment Peter B. Kenen

As I have been asked to discuss a paper on a subject to which I have not given a great deal of attention, my comments are those of an interested con-

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sumer rather than an expert critic. I trust that the authors will treat them that way. Their paper has two parts; the first surveys the literature, and the second presents some new results. My comments, however, are in three parts. The first two track the authors' own; the third raises an additional question.

### **The Survey of the Literature**

The compact survey in the first part of the paper left me somewhat puzzled. It sets out several desiderata that should govern financial and corporate restructuring and says that there may be trade-offs between them, but it does not tell us what to do when they come into conflict or cannot be satisfied. This is not the authors' fault; it resides in the nature of the problem at issue. Let me offer some illustrations that raise intriguing questions.

At several points, the authors emphasize the need for private-sector incentives to facilitate restructuring and minimize direct public-sector involvement. Here is one example:

Successful corporate debt workouts require proper incentives for banks and borrowers to come to the negotiating table. . . . The incentive framework for banks includes accounting, classification, and provisioning rules . . . [It] also includes laws and prudential regulations. Regulators should ensure that undercapitalized financial institutions are properly disciplined and closed. The insolvency system should enable financial institutions to enforce their claims on corporations, . . . and provide for the efficient liquidation of enterprises that cannot be rehabilitated.

However, what if the various rules and systems are inadequate? It may be possible to design and introduce better systems rapidly, but the paper mentions recent cases in which it has taken too long—and in which the new systems have not worked well, partly because of the time required to recruit and train the people needed to make those systems work well. The authors assert that a crisis can be a good way to get difficult reforms accepted, but their own examples raise questions about that. Finally, it can take a great deal of time for banks and other creditors to enforce their claims against corporate debtors, and this raises another difficult issue.

The authors stress the need for quick and decisive action to rehabilitate the banking system, so as to avoid repeated, inadequate recapitalizations that prove in the end to be more expensive and less effective than a single comprehensive effort. The rapid rehabilitation of the banking system is indeed essential for the early and orderly rehabilitation of the corporate sector. Is that possible, however, if one must wait for the banks themselves to enforce their own claims on the corporate sector and discover through that process how large their own losses will be? Without knowing the true size of the banks' losses, it may be very hard to achieve a rapid, comprehensive recapitalization of the banking system.

The authors deftly distinguish between two ways of restructuring the corporate sector. An asset management corporation (AMC) puts the government in charge. The rapid capitalization of the banking system puts the private sector in charge. All other things being equal, most of us would presumably prefer to put the private sector in charge. In many cases, however, all other things are not equal. Or, to put it differently, they are equally unsatisfactory. There are incestuous relationships between the public and private sectors and within the private sector. Under these second-best conditions, the AMC approach has much to recommend it, especially if the AMC is also empowered to enforce expeditiously its own claims on the corporate sector by recourse to special arrangements that bypass unsatisfactory bankruptcy regimes. That may be the best way to clean up the banks' balance sheets quickly. There is merit, moreover, in the authors' suggestion that several AMCs be established under public ownership but under private management. Incentives built into the contracts with the private managers may be the most promising way to circumvent the incestuous relationships that could otherwise corrupt the AMCs' dealings with the banking and corporate sectors. Nevertheless, governments may be reluctant to give privately managed AMCs the special powers they may need to enforce their claims quickly.

Consider, finally, the authors' discussion of liquidity support and comprehensive guarantees of bank liabilities. Here again there is need to take account of the second-best situation in a particular country. It is, of course, better to have deposit insurance in place before the onset of a crisis. When there is no such system in place, however, ad hoc guarantees may be unavoidable. If the monetary authorities find it difficult to distinguish between illiquid and insolvent banks, they cannot expect depositors to do that. It is, I think, inappropriate to test the efficacy of guarantees by asking, as the paper does, whether they help to minimize distress in the corporate sector. The efficacy of such guarantees must be judged on a case-by-case basis, by asking what would have happened to the banking system if they had they not been used. How much more liquidity support would have been required? How much money would have crossed the foreign exchange market, causing a precipitous depreciation and worsening the plight of banks and firms with large foreign-currency debts?

### **The Regression Analysis**

The point I have just made, about testing the efficacy of guarantees by looking for their impact on the corporate sector, leads me directly to the second part of the paper, which contains the authors' empirical work. For the reason already mentioned, I was not especially surprised to find that guarantees have no significant influence on the plight of the corporate sector. I was somewhat surprised, however, to find that liquidity support had a significantly positive effect on the sustainability of corporate recovery, mea-

sured by the change in the interest-coverage ratio. I was indeed surprised to find that liquidity support and the use of AMCs had statistically significant effects in several of the authors' regression equations.

Nevertheless, I have misgivings about those regression equations, because they depend so heavily on the use of dummy variables that vary across countries but not across firms. A single firm-specific variable, leverage, appears in tables 6.5 and 6.6 but is not statistically significant. The same variable appears in table 6.7 and is significant, but it is interacted there with two dummy variables, and there is no firm-specific variable in table 6.8. That last table, moreover, has *no* significant right-hand-side variable whatsoever—which leads me to make a suggestion. Because the use of the change in the debt-to-asset ratio did not yield any significant results in table 6.8, should the precrisis level of that same ratio be used as the only firm-specific explanatory variable in tables 6.5 and 6.6? It has no explanatory power in either table, save when interacted with a dummy variable, and its distribution in figure 6.4 is oddly different from those of the other firm-specific variables. Might it be better, then, to use the precrisis level of the interest-coverage ratio, not that of the debt-to-asset ratio, as the firm-specific proxy for leverage in tables 6.5 and 6.6?

Let me make one more suggestion, reflecting my misgivings about the use of country-specific dummy variables to explain firm-specific outcomes. It might be useful to ask whether the same dummy variables (or the policies for which they stand) help to explain the cross-country differences in the country means of the firm-specific data shown in table 6.3. There would appear to be big differences in the levels and changes of those means, but the authors have not sought to exploit them.

### Going One Step Further

Let me conclude by raising a question that is not discussed in the paper. The authors may be right to say that crises help to foster the acceptance of far-reaching structural reforms. Acceptance, however, is not sufficient. Implementation is crucial, and that is a time-consuming process—a point that the authors readily acknowledge. Thus far, however, the international community has failed to devise a menu of carrots and sticks designed to foster crisis-preventive financial reform in emerging-market countries. There are, by now, some sixty codes and standards aimed at describing best practice in the financial and corporate sectors, and several official bodies, including the Financial Stability Forum, have looked at ways of encouraging emerging-market countries to adopt those practices. Unfortunately, these bodies have come up empty-handed. There was talk of using the Core Principles for Banking Supervision to fine-tune the new version of the Basel capital-adequacy rules, but that was not done. The International Monetary Fund (IMF) has said that it will use adherence to a “critical mass” of codes and standards to judge a country's eligibility for a Contingent Credit Line, but

that may prove to be a rather elastic test. In the end, the official sector seems to have decided that the private sector should apply the carrots and sticks—that it should reward compliance with key codes and standards by granting market access and should punish noncompliance by withholding market access.

That approach, however, runs up against a serious practical problem. I said before that the various codes and standards aim at defining best practice rather than minimally acceptable practice. Therefore, emerging-market countries insist on being judged and rewarded for the *progress* they have made, not by the *extent* to which they comply with the principal codes and standards. For their part, however, market participants have little interest in progress; they are concerned with observable compliance—and rightly so from their standpoint. We have therefore reached something of an impasse. The official community continues to insist that emerging-market countries undertake far-reaching structural reforms in the financial and corporate sectors but has done little to encourage reform. It has passed the buck to the private sector, which has neither the resources nor the incentives to oversee the long process of structural reform. As a result, the reform process has lagged badly in some countries and has barely begun in others. We may have to wait for the next crisis—not because it is a propitious time for reform but because it is the only feasible time. If that is so, however, the cost of delay will be paid inevitably as part of the cost of the next round of crises.

## Discussion Summary

*Joshua Aizenman* pointed to the political economy considerations of guarantees and argued that structural reforms may not start at all in the absence of guarantees.

*Martin Feldstein* made a reference to the almost complete nationalization of Korean banks and, with respect to the issue of reprivatization, pointed to the problem of finding buyers while at the same time maintaining domestic ownership.

*Vincent Reinhart* remarked that the optimal choice of a restructuring vehicle depends on the pace of the ongoing “looting.” He emphasized the importance of the separation of the banking and the corporate sector and the risk of a crisis spreading from the first sector to the latter. With respect to the empirical part of the paper, he asked whether the issue of survivor bias was accounted for.

*Morris Goldstein* remarked that it seems useful to have a task force (a “fire team”) ready for immediate assistance with crisis assessment and management. This might prevent the blanket guarantees typically issued during the chaotic period immediately following the attack.

*Jeffrey Frankel* noted that the phrase *systemic crisis* is usually used to mean a crisis in a country that is sufficiently large and important to threaten the entire global financial system. This paper needs to be clear that it is using *systemic* in another sense.

*Edwin M. Truman* recommended that the authors take into account the large part of the economies being affected by crises. In particular, he added, if a large fraction of an economy is involved in a crisis, there are very few domestic investors capable of and willing to buy financial-sector assets. He also recommended that the authors include Japan in the sample.

*Yung Chul Park* remarked that Korea had made several contacts with the International Monetary Fund prior to the crisis.

*Nouriel Roubini* remarked that there are essentially only two possible solutions—either to offer a guarantee to depositors or to let the depositors bear the cost—and that, either way, the taxpayers will end up paying.

*Martin Eichenbaum* noted that part of the problem lies in smaller banking systems' being more likely to become subject to shocks.

*Michael M. Hutchison* made a reference to the Swedish banking crisis and noted how quickly a political consensus was reached for resolving the crisis. He argued that a prerequisite for the quick rescue in the case of Sweden is found in transparency and the separation of public and private sector. He asked if the regressions presented in the paper would be able to pick up such cross-country differences.

*Michael P. Dooley* remarked that an important implication of third-generation crisis models is that crises resolve nothing, an implication supported by the current paper, whereas policy changes are required in order to achieve lasting improvements.

*Stijn Claessens* argued that blanket guarantees are not always necessary and that it is possible to protect certain parts of the financial sector through more selective guarantees. He added that regardless of whether guarantees were used the same pattern of recoveries was observed in the data. He acknowledged the issue of limited demand for assets among foreign investors and the preference for selling assets to domestic buyers. He also agreed that the econometric analysis needs to control for survivor bias. In response to Truman, he remarked that Japan was not included in the data set due to uncertainty regarding the timing (start and end) of the Japanese crisis.

