International financial architecture and strategic default: can financial crises be less painful?

Michael P. Dooley*
University of California, Santa Cruz
Santa Cruz, CA 95064

Abstract

Recent financial crises in emerging markets have been followed by temporary but substantial losses in output. This paper explores the possibility that threats of such losses are the dominant incentive for repayment of international debt. In this environment private debtors and creditors have strong incentives to design international contracts so that renegotiation is costly. Such contracts generate dead weight losses following crises. Proposals to modify contractual arrangements, or to facilitate or impose renegotiation, can be welfare-improving under special circumstances. However, it is likely that such proposals would also weaken the incentives that make private international debt possible.

1 Introduction

On September 27, 1999 an IMF press release stated that the Managing Director of the Fund "would be willing to recommend to the Executive Board the approval of Ecuador's request for financial assistance under a stand-by arrangement once agreed policy measures have been implemented and provided Ecuador is judged to be making good faith efforts to reach a collaborative agreement with its creditors." How did an institution that was widely viewed

*Correspondence to: Professor Michael P. Dooley, University of California, Santa Cruz, Department of Economics, Santa Cruz, CA 95064, email: mpd@cats.ucsc.edu. I am grateful to Guillermo Calvo and Ben McCallum for helpful comments. This paper was prepared for the Carnegie-Rochester Conference Series, "Financial Crisis and the Role of the IMF," November 19-20, 1999.

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as being a bill collector for the commercial banks after the 1982 debt crisis take on a role that appears designed to weaken the bargaining position of bondholders in 1999? Is it possible to set out a framework in which “involving the private sector” following a crisis, and/or modifying private contracts before a crisis, are welfare-improving reforms of the international monetary system?

The output costs of recent crises in developing countries have been very heavy and the debate on how performance of the international monetary system might be improved has been intense. Recent contributions by Giannini (1998), Meltzer (1998), Eichengreen (1999), Feldstein (1998), Rogoff (1999), Chari and Kehoe (1999), Fischer (1999), Goldstein (1998), and Stiglitz (1999) address the basic issues surrounding government interventions in international capital markets. Bhattacharya and Miller (1999) provide an excellent summary of the recent literature. Policy recommendations drawn from this work range from redesigning bond contracts to the abolition of the IMF or the establishment of a super agency that would oversee bankruptcy proceedings for debtor governments.

The debate lacks focus because participants have very different views about the causes of financial crises. A central unresolved issue in this debate is the specification of incentives faced by sovereigns to repay international debt. Since creditors cannot seize assets, threats that have been modeled involve trade sanctions or prohibition of future borrowing. The empirical relevance of these enforcement mechanisms is, however, quite suspect, the former has never been observed and the latter seems very weak because defaulters are not, in fact, excluded from credit markets for long time periods. As Rogoff (1999) emphasizes, these issues are largely unresolved and are central to an evaluation of proposed reforms of the international monetary system.

In this paper we focus on the one punishment for default that has actually been observed in the past twenty years, namely the protracted loss in output in debtor countries that has followed default. Moreover we assume that the loss in output is “caused” by the inability of debtors and creditors to quickly renegotiate contracts. This creates a time interval during which residents of the country in default find it difficult to borrow from one another or from nonresidents. The idea that financial intermediation is an inherently fragile process motivates much of the recent analysis of financial crises (Stiglitz, 1999). In this paper we argue that this fragility is, in part, an endogenous response to the incentives present in the current international monetary system.

We also assume that the costs of renegotiation cannot be conditioned by the reason for default. In this special circumstance, contracts designed to discourage strategic default will impose unnecessary output losses following
unavoidable defaults. In short, there will be too much punishment relative to a first-best equilibrium. Moreover, we argue that the frequency of defaults and their associated costs are amplified if output losses fall largely on residents of debtor and creditor countries that do not participate in international credit markets.

An important conclusion is that the structure of private international claims on residents of developing countries is an endogenous response to this incentive structure. It follows that changing the nature of the contracts, or the costs of renegotiating the contracts, will alter the equilibrium level of debt.

Models of sovereign debt based on alternative enforcement mechanisms tend to keep contractual arrangements in the background. In Bulow and Rogoff (1989), for example, default gives the creditor the right to reduce the value of domestic output in the debtor country. In one important sense the punishment mechanism proposed above is similar. In both frameworks the debtor pays because of the threat of lost output following default. But in the more conventional framework the loss in output is independent of the nature of the contracts. Moreover, since both parties know exactly how the other values alternative strategies, renegotiation is immediate and costless.

In this paper we assume that creditors and debtors can commit not to renegotiate by designing contracts that are very difficult to renegotiate even if, after default, it would be in both parties’ interests to do so. This is a well-known feature of international debt contracts. The “failure” of coordination among creditors following default to deal with a debt overhang has long been recognized as a source of output losses following default. What is less recognized is that international debt contracts are designed to frustrate coordination. Equal-sharing clauses allow individual creditors to recover payments to other creditor countries in the creditor countries’ courts if one creditor tries to settle outside a general agreement. In most cases restructuring debt requires unanimous or almost unanimous approval among creditors.

Eichengreen and Portes (1995) and Eichengreen (1999) argue that modifying contracts in order to facilitate renegotiation is a promising route for reform of the current system. Three general improvements are suggested. First, contracts could set out collective representation so that it is clear ex ante how bargaining coalitions are formed after default. Second, a qualified majority of each class of creditors should be able to approve binding changes in the contracts. Third, contracts should set out how payments would be shared among creditors. This approach has been endorsed by the G-10 Deputies (1996), the G-22 (1998), and by Fischer (1999) but criticized strongly by the private sector (Folkerts-Landau and Garber, 1999). The bar-

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1 See Hart and Moore (1999) for a discussion of the importance of the ability to commit to not renegotiate contracts.
gaining model set out below suggests that the critics of these proposals are on solid ground.

2 A model of sovereign debt

We can explore these ideas in the context of a simple accounting framework.\(^2\) Assume a world that lasts for three periods. In the first period a foreign creditor lends the government \(K\) to buy assets where \(K\) is a dollar amount. The risk-free interest rate is assumed equal to zero. The government uses \(K\) to import an asset that in the second period yields \(x\) with probability \(\theta\) and zero with probability \(1 - \theta\). This outcome is observed by the creditor but cannot be verified.\(^3\) For this reason the payment specified in the financial contract is not conditioned by the outcome and default is triggered by nonpayment.

The asset lasts for one more period but depreciates uniformly during the period and yields a certain return \(y\) if utilized for the entire third period. The government agrees to pay \(z\) in the second period. If the government pays less than \(z\), it is in default and the productivity of the asset is impaired until a new agreement is reached for sharing the residual value of the asset \(y\). During the third period the asset is not productive if a negotiation for sharing \(y\) is in progress. We assume that debtors and creditors can design contracts that set the duration of the negotiation.

The value of the asset declines during the third period from \(y\) to zero. This specification of the punishment technology is appealing because it means that the creditors are only able to interfere with the debtor’s ability to utilize the assets for as long as the assets last. This seems consistent with the sharp but temporary declines in output observed following recent crises. The alternative interpretation that the creditors can punish the debtor forever and without regard to the seriousness of the offense is less appealing. One might think of a subsistence economy lifted temporarily to a higher level of output by an infusion of foreign capital, but once the capital depreciates the creditor has no way to push output below the initial level. An alternative interpretation is that, over time, debtors and new creditors find a way to subordinate existing creditors.

If the government can pay, which occurs with probability \(\theta\), it will consider a strategic default. The temptation to keep \(z\), the contractual payment in period two, is compared to the value of \(y\) that the government expects to capture following a negotiation with the creditors. The incentive constraint

\(^2\)The structure of this game borrows from a model of corporate finance developed by Bolton and Scharfstein (1996). Bhattacharya and Miller (1999) develop an explicit model of bargaining between official and private creditors but do not consider strategic default.

\(^3\)See Bolton and Scharfstein (1996) for a discussion of this assumption in the context of a corporate finance model.
for the government to pay \( z \) if \( x \) occurs is

\[
gyt_s < y - z
\]  

(1)

where \( gyt_s \) is the expected share of \( y \) that goes to the government following a strategic default and a negotiation lasting \( 0 < t_s < 1 \). The value of strategic default depends on the expected duration of the negotiation in period three and the share of the residual value of \( y \) that is expected to go to the debtor.

If \( x \) is less than \( z \) the government is solvent but illiquid in period 2 and we assume for now that the difference is rolled over into a payment due at the end of period 3. This simple expression highlights what we believe is a fundamental feature of international debt contracts. By entering into a contract that is difficult to renegotiate, the debtor can credibly commit to repayment when able to repay. Equally important, the creditor can commit to imposing a penalty even if, after a strategic default, it would be in the creditor’s interest to immediately renegotiate the credits. With no uncertainty about \( y \) or its distribution among creditors, we will never observe a strategic default since creditors would never agree to a loan with a payment that violates condition 1.

But we will observe defaults when bad luck, which occurs with probability \( 1 - \theta \), makes it impossible for the debtor to pay. In the next section we discuss the nature of bad luck in the context of an insurance crisis. It is important to note that the dead-weight loss generated by the need to rule out strategic default does nothing to help resolve the conflict following an unavoidable default. The easy way to think about this is that the time needed for renegotiation is determined ex ante by the nature of the contracts. As soon as this time expires, the debtor and creditor immediately agree on a share of whatever remains of \( y \) that goes to each.

If we ignore the possibility of strategic default, the dead-weight loss in output observed following defaults would appear to be a needless consequence of the failure of coordination among creditors. But as condition 1 clearly shows, the threat of a costly negotiation is necessary to support any level of positive international debt. Indeed the loss benefits neither the creditor nor the debtor in the state of nature where bad luck has made the debtor unable to pay. We now turn to this state of the world.

If the government cannot pay all of its creditors, which happens with probability \( (1 - \theta) \), there is a similar negotiation. The problem is that the contracts have been designed to impose a fixed cost before a meaningful negotiation can start. After taking all this into account, the creditor must expect to make a fair (zero) rate of return

\[
\theta(z) + (1 - \theta)cyt_b - K = 0
\]  

(2)

where \( cyt_b \) is the share of \( y \) that goes to the creditor following an unavoidable default.
Note that $g y, c y, t_s$ and $t_b$ are a complicated function of the structure of debt and that $t_s$, the time interval following a strategic default, may not be equal to $t_b$ but they are probably related. Thus, a country with a very small chance of bad luck would tend to choose a debt structure that generates costly renegotiation following a strategic default. But that debt structure will also generate costly renegotiations following an unavoidable default.

The problem for the government is to maximize its net revenue from investment subject to the constraints set out in 1 and 2. The general form of the government's net revenue function is:

$$\theta(x + y - z) + (1 - \theta)gyt_b = R$$  \hspace{1cm} (3)

Substituting (2) into (3), we arrive at:

$$R = \theta(x + y) - K - (1 - \theta)yt_b$$  \hspace{1cm} (4)

The first three terms on the right-hand-side of (4) are the first-best expected return on the asset if there is no default. The fourth term is the dead-weight loss from the negotiation that follows an unavoidable default. In the context of this model an effective reform of the international monetary system is one that reduces this loss but at the same time supports the same or a higher amount of debt.

3 Insurance

Is it plausible that bad luck could have caused recent crises in Asia? There were some macroeconomic shocks such as exchange-rate overvaluations but they seem to have been quite mild. But in our framework “bad luck” is not limited to macroeconomic shocks or policy errors. In this section we argue that government insurance can generate unavoidable defaults.

Suppose the debtor government allows private investors to borrow from nonresidents with an implicit government guarantee. Payoffs for the debtor and creditor are no longer directly associated with the productivity of the investment. The important distortion is that the penalty for strategic default for the private debtor is the share of the loss in output that is triggered by a strategic default. Suppose that the private investor borrows from the foreign creditor and invests in a foreign asset. This is often called capital flight and has been an important empirical regularity preceding recent crises in Asia and elsewhere.\footnote{See Dooley (1998) for estimates of capital flight from Asian emerging markets prior to recent crises.}

In period 2 the investor has the ability to repay but considers default. The private penalty is the debtor’s share of the decline in output generated
by the contractual arrangements. But if the government cannot tax offshore investments, the private debtor's share in this loss can be close to zero.

Nevertheless, the threat of the dead-weight loss remains important to the creditor. Because the government guaranteed the credit, following a private strategic default, the debt is now the debt of the government. In this case the threat is not to interfere with the use of the investment but with the output of all residents of the debtor country. Recall that our hypothesis is that the loss in output is caused by a breakdown of financial intermediation within the debtor country. This impairs the usefulness of the entire domestic capital stock, not just that small part financed by foreign borrowing. As in the simple case developed above, there is a powerful incentive for the debtor government to avoid default if it can.

What resources does the government have with which to make payments? The standard answer is the present value of future tax receipts. But this could be a very small share of the present value of future domestic output. This government has already demonstrated that it cannot control expenditures in the form of losses on implicit liabilities. In order to borrow from the market against future tax revenues, the government would somehow have to convince creditors that it would not have to use future taxes for future bailouts. It follows that solvent countries can be represented by insolvent governments.

In Dooley (2000) an empirical estimate of the resources available to credit-constrained governments is proposed. This consists of liquid assets such as foreign-exchange reserves and lines of credit from nonmarket sources such as creditor governments and international organizations. In the model set out in that paper the capital inflow/crisis sequence is initiated by a positive shock to the pool of resources that makes insurance credible. The moral hazard problem is not associated in any special way with lines of credit from official lenders but, as shown in Table 1, credits from international organizations and creditor governments have been quantitatively important components of resources available to bail out private creditors.

When the insurance crisis occurs, the government exhausts its assets and then has no choice but to default on any remaining liabilities. If everyone knew exactly who and what would be insured, the crisis would occur as soon as the government's liquid assets were just equal to its liabilities. There would be a "crisis" but no "default," that is, no need to renegotiate contracts. An important implication is that perfectly anticipated crises would not generate default as we have defined it and that there would be no loss in output following the crisis.

But what are the chances that the attack will exactly exhaust the government's assets with no default on individual contracts? This seems to us remote because there are several opportunities for miscalculation. The insurance pool might be smaller than expected. For example, the central bank
### Table 1:
Capital Flows and Liquid Assets for Selected Emerging Markets

<table>
<thead>
<tr>
<th>Country</th>
<th>Period</th>
<th>Change in Private Liabilities to Nonresidents¹</th>
<th>Net Private Capital Inflows²</th>
<th>External Debt 1989³</th>
<th>Increase in Official Reserve Assets⁴</th>
<th>Rescue Package⁵</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>1990-98:4</td>
<td>202.8</td>
<td>60.5</td>
<td>44.9</td>
<td>131.2</td>
<td>n.a.</td>
</tr>
<tr>
<td>Brazil</td>
<td>1990-98:2</td>
<td>162.3</td>
<td>147.9</td>
<td>111.3</td>
<td>62.1</td>
<td>41.5</td>
</tr>
<tr>
<td>Argentina</td>
<td>1990-98:2</td>
<td>126.1</td>
<td>69.4</td>
<td>64.7</td>
<td>23.3</td>
<td>n.a.</td>
</tr>
<tr>
<td>Korea</td>
<td>1990-97:2</td>
<td>120.2</td>
<td>66.1</td>
<td>33.1</td>
<td>15.4</td>
<td>52.8</td>
</tr>
<tr>
<td>Mexico</td>
<td>1990-94:1</td>
<td>114.4</td>
<td>95.7</td>
<td>95.6</td>
<td>19.6</td>
<td>47.0</td>
</tr>
<tr>
<td>Thailand</td>
<td>1990-96:2</td>
<td>68.7</td>
<td>86.3</td>
<td>23.5</td>
<td>29.3</td>
<td>17.2</td>
</tr>
<tr>
<td>Russia</td>
<td>1994-97:2</td>
<td>41.9</td>
<td>-30.5</td>
<td>79.0</td>
<td>5.3</td>
<td>23.0</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1990-97:3</td>
<td>44.8</td>
<td>48.0</td>
<td>53.1</td>
<td>15.9</td>
<td>40.0</td>
</tr>
<tr>
<td>Malaysia</td>
<td>1990-97:3</td>
<td>42.2</td>
<td>40.7</td>
<td>18.6</td>
<td>17.7</td>
<td>n.a.</td>
</tr>
<tr>
<td>India</td>
<td>1990-98:4</td>
<td>37.3</td>
<td>60.3</td>
<td>62.5</td>
<td>23.5</td>
<td>n.a.</td>
</tr>
<tr>
<td>Turkey</td>
<td>1990-98:3</td>
<td>29.7</td>
<td>34.9</td>
<td>41.6</td>
<td>14.7</td>
<td>n.a.</td>
</tr>
<tr>
<td>Chile</td>
<td>1991-98:3</td>
<td>28.3</td>
<td>31.4</td>
<td>18.2</td>
<td>12.0</td>
<td>n.a.</td>
</tr>
<tr>
<td>Hungary</td>
<td>1991-98:4</td>
<td>28.0</td>
<td>23.1</td>
<td>20.6</td>
<td>8.0</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

¹ Source: IFS 78 b e d + 78 b g d + 78 b u d.
² Source: IFS and IIF. 78 a; dzf - 79 dbdzf.
⁴ Source: IFS, IL. D2P.
⁵ Source: BIS, 69th, 70th Annual Report.
may have sold reserves forward and not accounted for this reduction in net international reserves. The expected assistance from the IMF and other official creditors may be smaller than expected or delivered too slowly. The liabilities may have been larger than expected. Finally, an attack on another country may have reduced assistance available to the country in question, a situation that would account for contagion in our framework.

An important implication of this argument is that we should see crises followed by very different losses in output depending on the nature of the surprise. If the government has more resources than investors expected, there will be little or no renegotiation and a quick recovery. Relatively rapid recovery in Mexico and Korea might reflect positive surprises while slow recovery in Indonesia might be an example of a negative surprise. Careful empirical work will be needed to sort the evidence.

4 Bailing in the private sector

Our framework is also useful in evaluating proposals for “involving the private sector” in renegotiating debt. A relatively straightforward example is a “standstill” during which private creditors are forced to roll over credits and perhaps interest payments. As a first cut, assume the standstill is a surprise to both debtors and creditors. This is a special case since we evaluate the effect on the dead-weight loss but do not return to the basic model and see how the level of debt is affected. Even in this special case the effects of such a policy move will depend on a number of assumptions. We define a standstill as an agreement between the Fund and the debtor government that provides official credit for some interval during which the debtor government agrees to negotiate with private creditors and to implement an adjustment program but not to service private debt.

In the context of our model the Fund replaces private creditors for some interval delaying the breakdown in domestic financial intermediation and the associated real costs. As Jeffery Sachs (1995) points out, debtor countries cannot “file for bankruptcy and obtain a standstill on debt servicing. Under a standstill, creditors must refrain from trying to collect the debt, pending a collective solution to the indebtedness problem. Moreover, the law provides for the enterprise to borrow new working capital funds even after filing for bankruptcy, in order to ensure the continued operation of the firm.” We are skeptical that a supranational legal authority will ever be able to provide similar protection to countries. But in our framework, a standstill with official credit might provide similar benefits to the debtor country.

If the ability of private creditors to impose real costs on the debtor government erodes over time, even temporary assistance by official creditors would mitigate the costs of default for the debtor country. If the private creditor’s
power to punish does not erode over time, private creditors can wait out the official sector and the game is much less changed.

A complete analysis of the systemic effects of involving the private sector requires that we return to the basic model. An important question emerges. Can the IMF distinguish between strategic and bad luck defaults? If they can, and if private creditors believe they will do so, the same private contracts will continue to be an effective deterrent to strategic defaults. In effect the Fund is eliminating the dead-weight loss that follows a bad luck default. Private creditors should be quite happy about this since, by eliminating the dead-weight loss following an unavoidable default, their expected returns rise.

A difficult question is raised by the possibility that private strategic behavior in the form of capital flight creates a situation in which the debtor government has no choice but to default. Cooper (1992) anticipated this issue in observing that one of the factors that made creditor governments hesitate to intervene after the 1982 crisis was that capital flight accounted for a large share of the debt of developing countries in Latin America. It seems clear that the Fund would have to refrain from assisting debtor governments in this situation even though the costs fall entirely on innocent bystanders.

5 Reform of the IMF?

It has become fashionable to attribute crises and the output losses to obvious blunders by the IMF. The model developed in this paper suggests that crisis prevention and management are inherently difficult tasks. Involving the private sector runs the risk of undermining the incentives that make private international debt possible. In fact, we believe that experts from both ends of the political spectrum who focus on the Fund as a flawed institution, or an institution staffed by flawed individuals, are wasting their time. The Fund is a financial intermediary among governments. The important implication is that in acquiring “deposits” and making “loans” (buying and selling currencies in fundspeak), the Fund’s management and staff cannot stray far from the conditions established in bilateral official credit arrangements. While the Fund has gone to remarkable lengths to obscure the fact that it is an intermediary, including the adoption of an impenetrable accounting framework, the fact is that it borrows from a well-defined set of creditor countries and lends to a well-defined set of debtor countries. If the Fund attempted to borrow or lend on terms different from those available in bilateral arrangements, either the creditor or the debtor government would bypass the multilateral institution. As with any financial institution the threat of disintermediation is a powerful constraint on Fund behavior. It follows that the Fund does not make policy.

The Fund is, of course, not completely powerless. There is, presumably,
some externality generated by governments' policies that makes an organization like the Fund viable. Governments will put up with some level of irritation from the Fund staff and management. But experience suggests that only very minor irritations are tolerated. If there are incentive or agency problems in official lending intermediated by the Fund, it is not a problem generated by the incentives faced by international bureaucrats but by national governments.

6 Alternative interpretations and liquidity crises

Much of the recent debate over reform has focused on the idea that the international monetary system needs a lender of last resort. In the above framework we assumed that conditions one and two always hold ex ante and that creditors do not force a solvent debtor to default. A more complete model would take into account the possibility that creditors might find it difficult to coordinate a rollover. This would look like a solvent default in that, following a good outcome in period 2, the debtor is unable to make the payment unless creditors agree to provide additional credit. The case for official lending to avoid default and unnecessary losses in output is, in this case, overwhelming.

The Diamond-Dybvig model of bank runs suggests that crises and losses are avoidable if private creditors can be induced to behave in their collective interests. Our model suggests that crises are the aspect of the current international monetary system that makes international lending possible. Moreover, the costs of cleaning up after a crisis will necessarily involve losses either for taxpayers (in creditor and/or debtor countries) or creditors. The allocation of the loss is an important part of crisis management.

The bank-run analogy also suggests that changes in the rules of the game that alter contracts ex ante, or impose coordination ex post, will help solve the problem. This approach might be a useful way to interpret debt crises. But this idea may have led the analysis in the wrong direction.

In contrast, if crises are the result of distorted private credit markets, the lack of coordination among private creditors following a crisis is an endogenous response to the incentive structure. There are good reasons for private creditors to structure their claims so that they are very difficult to renegotiate. Coordination problems among private creditors following the crisis, and the associated economic costs for the debtor and creditor governments, is the feature of the system that makes the promise of repayment of private debt credible in these distorted markets.

It follows that treating the symptom, the difficulty of renegotiating sovereign debt, will not improve the performance of the international monetary system.

Effective reform will have to address the far more difficult task of altering the incentives faced by private debtors and creditors.

7 The evidence

The two theoretical models are probably never encountered in their pure form. A system prone to Diamond-Dybvig runs will have a lender of last resort or deposit insurance. The existence of this government intervention generates moral hazard and real economic losses quite independent of liquidity crises. Nevertheless, to make sense of the tradeoffs involved it is useful for now to pretend that these are unrelated causes of crises.

There is no question that recent banking and balance of payments crises have generated huge losses in output in debtor countries and noticeable losses in output in creditor countries. But it is unfortunate that close examination of recent crises does not help much in distinguishing between these very different views of the origins of crises. As Fischer (1999) makes clear, poor management of a liquidity crisis can generate losses on credits that would have been repaid in the absence of a crisis. It follows that observed losses are consistent with distorted credit markets or with poorly managed liquidity crises.

An important objection to the idea that creditor moral hazard has been an important ingredient in recent crises in emerging markets is the observation that quantitatively important and easily identified subsets of creditors have suffered very heavy losses. While the relevant class of unprotected creditor varies across countries, in every case holders of equity claims on emerging markets have suffered very heavy losses. These creditors, it is argued, could not have believed that they were protected by a lender of last resort.

The facile answer to this objection is simply that not all investors have to be protected by insurance in order for the behavior of investors who are protected to be distorted. But this begs the question of why investors who do not expect to be insured participate at all in markets that are very likely to be led to a crisis by the behavior of insured investors. Clearly, it is argued, the crisis was a surprise to the investors that were not insured and therefore also very likely a surprise to those investors that ex post benefited from governments’ intervention.

Our solution to this puzzle is that rates of return on insured and uninsured investments do suggest that crises and bailouts are anticipated. As argued in Dooley (2000), a crisis is not the inevitable end game in a situation where insurance is driving capital inflows to a developing country. An equity investor who diversified holdings across all the emerging markets might expect with certainty that some would suffer crises and the associated losses for equity holders. But it may not be possible to predict which individual countries
would fail to come to grips with the distorted capital flow and limit it either through regulation or taxation. This suggests that a rational investor that expected a crisis with some probability less than one would be willing to hold uninsured investments such as equities if the return on a diversified portfolio across emerging markets was attractive.

If crises were expected, we should find very large differentials in returns for insured and uninsured investments before crises. This pattern of returns is clearly evident in the emerging markets during the capital inflow episode that started around 1990. Bank deposits in emerging markets paid very small premia over similar deposits in industrial countries. Moreover, Kaminsky et al. (1998) provide evidence that short-term interest rates were of no value in predicting crises. Emerging market bonds paid higher returns consistent with their place in line for insurance. The extraordinary rates of return on emerging market equity leading up to crises has been interpreted as evidence that the markets were gripped by irrational enthusiasm. When the enthusiasm evaporated, the bubble burst and the crisis resulted. Our interpretation is just the opposite. The puzzle is not why equity prices reached such high levels but why they were so low at the start of the capital inflow episode? Our hypothesis is that equity values rose toward a level consistent with a successful integration of emerging markets into the international financial system. But investors expected some, and perhaps even most, of these transitions to fail. When price/earnings ratios returned to their historical levels, large losses on the failures would be offset by the extraordinary gains from the successful markets.

Dooley and Shin (1999) provide a detailed case study of Korea in order to evaluate the plausibility of the view that moral hazard was the dominant cause of the crisis. We conclude that the Korean balance-of-payments crisis was fully consistent with the view that insurance motivated private investors and generated the crisis. The Korean banks did not take open foreign-exchange positions but did very rapidly expand their lending activities into high-risk assets. The banks also considerably increased their exposure to maturity mismatches but did not pay depositors a significant premium. Moreover, depositors did not shun banks that were known to have very weak balance sheets. The regulatory structure failed because it did not consolidate foreign branches of Korean banks with the domestic balance sheet. Banks were willing to bet the bank because the franchise value of the banks fell long before the crisis, suggesting that these institutions had little to lose by exploiting insurance. Deposit rate premia paid by Korean banks were quite modest and did not increase as the crisis approached. Finally, the bailout of foreign depositors in Korean banks was very nearly complete, suggesting that both the banks and their depositors were rational in accepting a modest risk premium before the crisis.
8 Conclusion

Financial arrangements that allow quick and efficient resolution of sovereign defaults seem to be in everyone's interest. If output losses associated with recent crises in emerging markets are intensified by poorly designed contracts, redesign of the external liabilities of debtor countries and/or official involvement in renegotiation could be an effective reform. But if private international financial arrangements depend on the threat of output losses during the interval over which contracts are renegotiated, reform will be much more difficult. The model developed in this paper suggests that if the threat of loss in output is an important incentive for repayment, redesign of private contracts or effective ex post intervention by official creditors might reduce international lending to zero. Moreover, while it is possible that ex post intervention by official creditors, "involving the private sector," that discriminates between strategic and bad-luck defaults could improve the performance of the system, this will be difficult to implement. In cases where the debtor government makes its own bad luck by insuring private risk-taking, it is difficult to see how involving the private sector could be a useful reform.
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