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Can Output Losses Following International Financial Crises be Avoided?

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**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 and proposals for reform of the international monetary system that modify explicit and implicit contractual arrangements and can be welfare improving under special circumstances. However, such proposals might also weaken the incentives that make private international debt possible.

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The government of Ecuador recently set in motion the first default of a sovereign government to an important class of external creditors which was explicitly sanctioned by the International Monetary Fund. The creditors were holders of one of Ecuador's issues of Brady bonds. Within days cross default clauses were activated on other bonds and Ecuador was embroiled in a general rescheduling exercise. 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 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 bond holders in 1999? Is it possible to set out a framework in which the Fund's offer to finance a government during its negotiations with private creditors is a welfare improving reform of the international monetary system?

The welfare 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 (1999), Rogoff (1999), Chari and Kehoe (1999), Fischer (1999), and Goldstein (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 the abolition of the IMF to the establishment of a super agency that would oversee bankruptcy proceedings for debtor governments. The purpose of this paper is to suggest that this body of work may have drawn too heavily from the experience of lenders of last resort in domestic financial markets. In particular, the model developed in this paper suggests that sanctioned default or an equivalent policy innovation is a necessary ingredient for an efficient international financial system.

We discuss IMF policies but not IMF preferences or behavior. We are not concerned with the beliefs or abilities of the Fund's management and staff. 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 shows 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.

Several related points follow from this assumption. First, the Fund's balance sheet is not a sensible aggregate for analysis. The Fund does not create money or credit. Every dollar loaned to a debtor government is matched by a dollar increase in the net debt of some creditor government. Since a well-defined set of creditor governments own the Fund, their bilateral financial relationships with debtor governments must be merged with the Fund's positions to make sense of the incentives involved. This turns out to be important because private creditors behavior depends in part on their expectations about the present value of official credit triggered by financial crises.

Second, the Fund's role in the international monetary system can be completely summarized by its participation in government-to-government lending. The Fund does not appear to be powerful because it provides a seal of approval for debtor countries. It appears to be powerful because it reflects the economic power of government-to-government financial relationships. Governments announce through the Fund the terms on which they will lend to other governments. These announcements are important to private lenders because official and private lenders compete for repayment.

In Dooley (1995) it is argued that the adversarial relationship between official and private creditors is the central problem for the international monetary system. Moreover, this framework is useful in understanding the prolonged bargaining between governments

and private creditors that followed the 1982-debt crisis. In this paper we develop the idea that the rules of the game for competition for repayment between official and private creditors determines the structure and volume of private lending.

The analysis suggests that this structure of private lending is distorted and generates costly financial crises. Moreover, a credible change in the behavior of the official creditors could have important implications for the behavior of private creditors and for the performance of the international monetary system. Private creditors watch what the Fund does very carefully, not for wisdom about the credit worthiness of countries, but for clues about the terms on which official creditors will lend to debtor governments.

## 2. The Fund and sanctioned default

IMF sanctioned default has evolved gradually as a policy supported by creditor governments. Its roots can be found in the long debate about the role of the Fund and official creditors following the 1982 debt crisis. Throughout the 1980s the Fund quietly approved adjustment programs--and has supported those programs with loans--for countries that were in default to private creditors. Like Ecuador these have been small countries and their treatment is unlikely to indicate how the creditor governments will confront a situation that involves countries large enough to constitute a systemic threat. The “too large to fail” problem that has not yet been resolved in national economies has also not been resolved in international markets.

Nevertheless, our analytical framework suggests that sanctioned default on a “case by case basis” is an almost inevitable step for the Fund and creditor countries to

take given the constraints and incentives generated by the international monetary system.

The analysis developed below suggests that the imposition of rescheduling terms on private creditors may prove necessary in order to limit the frequency and costs of financial crises.

Sanctioned default may or may not be effective in inducing private creditors to accept a writedown of their claims. Sanctioned default does change the bargaining game between debtor countries and their private creditors, but the change is subtle and may or may not significantly improve the performance of the system. In order to evaluate this issue we need an explicit model of the bargaining structure involving private creditors, debtor governments and governments of creditor countries and their agents, the international organizations.

### 3. What is wrong with international capital markets?

The debate on reform of the international monetary system lacks focus because participants are unwilling to take a stand on the nature of the distortion that generates a role for government intervention. An exception is the argument that there are no inherent distortions so the appropriate reform is to abolish the IMF. This is a serious argument. If a distortion cannot be identified and its empirical relevance established, a good policy would be to do nothing and at least do no harm. In this paper we propose a distortion and offer some suggestions for evaluating its empirical importance.

Schemes to improve the architecture of the international monetary system have borrowed heavily from the literature on central banks' role as lenders of last resort to domestic financial systems.<sup>1</sup> We believe the analogy has been pushed too far. There are

important differences in the economics behind government's intervention in domestic financial markets and governments' intervention in international capital markets.

The key difference is that the economic incentives that shape private financial arrangements that are prone to crises are different in domestic and international markets. Within countries, financial intermediaries provide maturity transformation and a payments system that is welfare improving but can generate costly crises. The possibility of runs on banks and other financial intermediaries generates a role for government intervention. Some types of government intervention, in turn, create a moral hazard problem.

Similar problems have undoubtedly played a role in recent crises in emerging markets. But in this paper we focus on an alternative mechanism for crises. In our framework the international financial system is prone to crises because the "threat of crisis" is the only effective incentive for repayment by sovereign debtors. The structure of private international claims on residents of developing countries is an endogenous response to this incentive structure. The important distortion associated with international capital flows is that contracts that are designed to be costly to renegotiate in order to rule out strategic sovereign default are also costly to renegotiate when default is unavoidable.

As with crises generated by runs there is a clear role for government intervention to mitigate the costs of the crises generated by the structure of international credits. Moreover, it seems quite unlikely that governments can credibly promise not to respond to a crisis once it is under way. There is no serious disagreement about the general point that government intervention in financial markets, even if well motivated, distorts private

behavior both within national financial markets and in the international markets. The problem, however, is not to eliminate moral hazard but to find the best way to balance the costs of moral hazard with the benefits of stabilizing financial systems that are inherently prone to crises.

This balancing act can only be evaluated in the context of a model. Is sanctioned default an important and credible response to the moral hazard? To answer this question we must first address several basic and unresolved issues in the theory of sovereign debt. The most important question is why do private creditors expect sovereigns to repay? In any sensible model private creditors have to expect to earn a risk adjusted rate of return on their loans to developing countries equivalent to that available in international capital markets. Since loans to private residents in developing countries have frequently become loans to the government, creditors must expect the debtor government to repay with some probability.

For sovereign debt the lack of collateral (or the means to seize it) means that some alternative threat is necessary to provide an incentive for repayment. The typical threats that have been modeled involve trade sanctions or prohibition of future borrowing. The trouble with these enforcement mechanisms is that the former has never been observed and the latter seems very weak relative to the amount of debt observed. As Rogoff (1999) emphasizes, these issues are largely unresolved and are central to an evaluation of changes in the international monetary system.

In this paper we focus on the one incentive that has actually been observed in the past twenty years, namely the protracted loss in output in debtor countries that has followed default. We assume that this is the dominant incentive for repayment for debtor

governments and for side payments by creditor governments. The working hypothesis is 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 are unable to borrow from one another or from nonresidents. One explanation for the breakdown in financial intermediation in the debtor country is the inability of new credits to be credibly senior to existing credits (Dooley, 1995). Since existing credits sell at a substantial discount their contractual yield is also very high. Few or no new debtors will be willing and able to finance investment at these high rates. The breakdown in financial intermediation, particularly in domestic banking markets that dominate financial intermediation in developing countries, is the enforcement technology that makes international capital flows possible.

We assume that creditors cannot condition the loss of output ex ante by the reasons for nonpayment. This will determine the nature of the contracts necessary to support international debt. A common perception is that international credit contracts have evolved by historical accident to make renegotiation difficult. Our analysis suggests the opposite interpretation. In the absence of some legal authority with the right to seize assets, default on an international contract must trigger some alternative punishment technology.

Existing models of sovereign debt 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. Since neither party benefits from actually imposing the penalty, and since both parties know exactly how the other values alternative strategies, the two parties to the debt negotiation alternate in

making offers that they know the other side will immediately accept. In fact, it is difficult to construct a two party game where there is any delay to a negotiation. An exception is a war of attrition in which uncertainty about the opponent's preferences can stall agreement.

In this paper we consider the case in which creditors can commit not to renegotiate by designing contracts that are very difficult to renegotiate.<sup>2</sup> This is a common feature of international contracts. Equal sharing clauses allow individual creditors to recover payments to other creditor countries in the creditor countries' courts if one tries to settle outside a general agreement. Restructuring debt requires unanimous or almost unanimous approval among creditors. Eichengreen and Portes (1995) and Eichengreen (1999) argue that modifying contracts is the most 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 Stanley Fischer (1999) but criticized strongly by the private sector (Folkerts-Landau and Garber, 1999). The bargaining model set out below suggests that the critics of these proposals are on solid ground.

#### 4. A model of sovereign debt

We can explore these ideas in the context of a simple accounting framework.<sup>3</sup> 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.<sup>4</sup> For this reason the payment specified in the financial contract is not conditioned by the outcome and default is generated 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  $z$ , a negotiation is triggered 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. 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 only 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 offence 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 creditor(s). The incentive constraint for the government to pay  $z$  if  $x$  occurs is

$$(1) \text{ gyt}_s < y - 2z$$

where  $\text{gyt}_s$  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 she is able to repay. Equally important, the creditor can commit to impose 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 renegotiation is necessary to support any level of positive international debt. Indeed the loss benefits neither the creditor nor the debtor in the state 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  $(1-\alpha)$ , 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

$$(2) \alpha(z) + (1-\alpha)cy_{t_b} - K = 0$$

where  $cy_{t_b}$  is the share of  $y$  that goes to the creditor following an unavoidable default.

Note that  $gy$ ,  $cy$ ,  $t_s$  and  $t_b$  are a complicated function of the structure of debt and that  $t_s$  will generally not be equal to  $t_b$  but they are probably related. Thus, a country with a very small chance of bad luck would choose a debt structure that generated 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:

$$(3) \quad 2(x + y - z) + (1 - 2)gyt_b = R$$

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

$$(4) \quad R = 2x + y - K - (1-2)yt_b$$

The first three terms on the RHS 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.

## 5. Insurance

Suppose now that 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 her 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.<sup>5</sup>

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.

But 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 the IMF 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.

Most observers have questioned the plausibility of the view 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. 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 government would pay out just the right amount and there would be a crisis but no need to renegotiate any contracts, in fact, no default and no loss in output. But what are the chances that the attack will exactly exhaust the government's assets with no default on individual contracts?

This seems to me remote because there are several opportunities for miscalculation. The insurance pool might be smaller than expected, for example, the central bank 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, for example, deposits at branches of Korean banks may have been a surprising drain on the insurance pool. 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 thought there should be very little renegotiation and a quick recovery. Relatively rapid recovery in Mexico and Korea might reflect positive surprises while Indonesia might be an example of a negative surprise. Careful empirical work will be needed to sort the evidence.

#### 6. Bailing in the private sector.

We are (at last) prepared to evaluate sanctioned default in the context of a model of international debt and crises. As a first cut, assume the sanctioned default 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 sanctioned default 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.

One way to interpret such a policy in the context of our model is that the Fund replaces private creditors for some interval delaying the breakdown in domestic financial intermediation and the associated real costs. As Jeffery Sachs (1993) 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 to countries. But sanctioned default might provide similar protection.

If, as we assumed above, 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 sanctioned default requires that we return to the basic model. A very interesting question emerges. Can the Fund 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.

Even if the Fund cannot distinguish between strategic and bad luck defaults the sanctioned default might be a useful policy. By making sanctions against countries following private strategic defaults ineffective, there will be no basis for loans subject to such behavior. This does not mean that there will be no international capital flows but only those private flows will require an alternative mechanism for creditors to monitor what is done with their money. Direct investment is an obvious alternative mechanism.

## 7. Alternative interpretations and liquidity crises

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. It is not surprising that advocates of an international lender of last resort interpret crises in this context.

We cannot hope to review all the origins of financial crises that have been offered in the literature, but it is crucial to distinguish the model developed above from the alternative that has dominated recent discussions. The alternative analysis is based on liquidity crises similar to those set out in the Dymond-Dybvig model of bank runs.<sup>6</sup>

The bank run model suggests that crises and losses are avoidable if private creditors can be induced to behave in their collective interests. The model developed above 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 either the creditor 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.

## 8. 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 most likely to be 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 to mitigate the costs of the crisis.

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 that diversified her 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 if the return was high enough to compensate for the effects of crises.

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. 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 were they 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) provides 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.

## 9. Conclusions

Financial arrangements that allow quick and efficient resolution of sovereign defaults seem to be in every one's interest. If recent crises in emerging markets are similar to bank runs, a redesign of the external liabilities of debtor countries could be an effective reform. But if private international financial arrangements depend on the threat of output losses, reform is 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 might reduce international lending to zero. Moreover, while it is possible that government to government lending following crises can be welfare improving, the conditions under which this is the case are quite special. The model also suggests that creditor governments could reduce the costs of bad luck defaults by imposing a legally binding reduction in the present contractual value of private claims on the sovereign. Jeffery Sachs has advocated this approach since shortly after the 1982 crisis and recently Chari and Kehoe (1999) provide a persuasive argument that this would be an effective policy reform. But we are still a long way from a political consensus that this is a viable alternative.

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<sup>1</sup> See Goldstein (1999) for a review and evaluation of various proposals.

<sup>2</sup> See Hart and Moore (1998) for a discussion of the importance of the ability to commit to not renegotiate contracts.

<sup>3</sup> The structure of this game borrows from a model of corporate finance developed by Bolton and Scharfstein (1985). Bhattacharya and Miller (1999) develop an explicit model of bargaining between official and private creditors but so not consider strategic default

<sup>4</sup> See Bolton and Scharfstein (1996) for a discussion of this assumption in the context of a corporate finance model.

<sup>5</sup> See Dooley (1999) for estimates of capital flight from Asian emerging markets prior to recent crises.

<sup>6</sup> See Chang and Velasco (1999).

**Table 1: Capital Flows and Liquid Assets for Selected Emerging Markets**

	Period	Change in Private Liabilities to Nonresidents <sup>1</sup>	Net Private Capital Inflows <sup>2</sup>	External Debt 1989 <sup>3</sup>	Increase in Official Reserve Assets <sup>4</sup>	Rescue Package <sup>5</sup>
China	1990-98:4	202.8	60.5	44.9	131.2	n.a.
Brazil	1990-98:2	162.3	147.9	111.3	62.1	41.5
Argentina	1990-98:2	126.1	69.4	64.7	23.3	n.a.
Korea	1990-97:2	120.2	66.1	33.1	15.4	52.8
Mexico	1990-94:1	114.4	95.7	95.6	19.6	47.0
Thailand	1990-96:2	68.7	86.3	23.5	29.3	17.2
Russia	1994-97:2	41.9	-30.5	79.0	5.3	23.0
Indonesia	1990-97:3	44.8	48.0	53.1	15.9	40.0
Malaysia	1990-97:3	42.2	40.7	18.6	17.7	n.a.
India	1990-98:4	37.3	60.3	62.5	23.5	n.a.
Turkey	1990-98:3	29.7	34.9	41.6	14.7	n.a.
Chile	1991-98:3	28.3	31.4	18.2	12.0	n.a.
Hungary	1991-98:4	28.0	23.1	20.6	8.0	n.a.

<sup>1</sup> Source: IFS 78 b e d + 78 b g d + 78 b u d.

<sup>2</sup> Source: IFS and IIF. 78 a ; d z f - 79 d b d z f.

<sup>3</sup> Source: World Bank, Global Development Report.

<sup>4</sup> Source: IFS, 1L.D2F.

<sup>5</sup> Source: BIS, 69<sup>th</sup>, 70<sup>th</sup> Annual Report.

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