CREDITOR PANIC, ASSET BUBBLES AND SHARKS: THREE VIEWS OF THE ASIAN CRISIS*

Marcus Miller† and *Lei Zhang*‡

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Abstract

How are we to understand the East Asian crisis? There are two popular explanations: first that it was just like a nineteenth century British bank panic, calling for prompt action by a 'lender of last resort', namely the IMF; second that it was much worse — nothing less than the bursting of a modern-day South Sea Bubble.

Jeffrey Sachs of Harvard University is closely associated with the first view. He stresses the *liquidity crisis* facing the emerging East Asian economies as foreign short-term credit was withdrawn in panic. Such 'coordination failure' on the part of creditors can be handled by injecting liquidity, as Walter Bagehot pointed out in the nineteenth century — or by forcing creditors to roll over their loans.

If the panic is triggered by flawed fundamentals, then structural change — not just liquidity — is needed. What if global capital markets, lured by tales of miraculous growth and official money-back guarantees, poured money into a spectacular but unsustainable East Asian bubble? When such a bubble ends — as in Japan in 1989-90 — financial institutions face more than a liquidity problem: they are bankrupt. This account, championed by Michael Dooley and Paul Krugman, helps to explain why the IMF was unwilling to throw money at the problem.

Where do the sharks come in? Are they merely figments of Malaysian premier Mahatir's imagination? Or are there strategic short-term investors, with guarantees on their loans, who can place side bets on a coming crisis — and then pull their money out to see if their predictions

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†University of Warwick, CSGR and CEPR. Email: marcus.miller@warwick.ac.uk.

‡University of Warwick. Email: l.zhang@warwick.ac.uk.

come true? Such fears were effectively dismissed in the IMF report on hedge funds released in early 1998. But the subsequent waves of speculative attack on the Hong Kong dollar give credence to the view that big players could be taking an active role in triggering crises for economies with sound fundamentals.

These three views are discussed in the paper — along with possible policy responses.

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High on the list of possible causes of the East Asian financial crisis, Radelet and Sachs (1998a) put *bank runs* and creditor *grab races*. So we begin in section I.1 with a brief overview of liquidity crises arising from the failure of collective action among creditors. We consider creditor panics affecting both bank depositors and bondholders — and outline institutional arrangements to prevent them. Section I.2 provides an explicit model for bond valuation which is used to illustrate the case for forced rollovers and debt guarantees.

In section II we turn to the sharply contrasting view, espoused by Michael Dooley (1997) and Paul Krugman (1998a), that implicit government insurance attracts unsustainable capital inflows which are reversed in a financial crisis. This view emphasises the *moral hazard* problems inherent in deposit insurance and lays the blame for crisis at the door of poor regulation of domestic financial markets. We illustrate this using the approach of Dewatripont and Tirole (1994): depositors have a money-back guarantee, but limited liability gives the bank managers a put option in the face of losses — so they are free to gamble with other people's money leaving the government to bear the costs.

In section III, we focus on the potentially destabilising role of large players: in particular, we analyse the attacks on the Hong Kong dollar in a strategic setting where there are economic incentive for large creditors to attack a currency with sound fundamentals.

In the light of three views, we discuss, albeit briefly, specific measures for crisis prevention and management, concluding with five steps for improving the international monetary system in the light of East Asian crisis.

I LIQUIDITY CRISES: AN OVERVIEW

I.1 Liquidity crises as shifts of equilibrium

Radelet and Sachs (1998b, p4) explain recent crises essentially as 'failures of collective action' on the part of creditors. "Our preferred explanation of (recent crises) turns on the critical distinction between illiquidity and insolvency. An *insolvent* borrower lacks the net worth to repay outstanding debts out of future earnings. An *illiquid* borrower lacks the ready cash to current debt servicing obligations, even though it has the net worth of repaying the debt in the long term. A *liquidity crisis* occurs if a solvent, but illiquid, borrower is unable to borrow fresh funds from the capital market in order to make current debt servicing obligations. ... The unwillingness or inability of the capital market to provide fresh loans to the illiquid borrower is the nub of the matter."

Bank deposits

If credit is supplied in the form of bank deposits the failure of collective action shows up as a bank run. The most widely cited paper on bank runs is that of Diamond and Dybvig (1983). It is important to note that, in this model, bank runs are caused by exogenous stochastic demands for liquidity by some depositors and *not* by fear of impudent lending. Banks lend prudently and are essentially solvent but their investments are illiquid: and it is the conflict between the liquidity needs of some depositors and the illiquidity of the bank's assets that can precipitate a bank run. (Of course, if the bank run is not checked, illiquidity can become insolvency as banks seek to dump illiquid assets.)

Two ways of averting bank runs are discussed by Diamond and Dybvig (1983): first is to provide *deposit insurance*, as the Federal Deposit Insurance Corporation (FDIC) has done in United States since 1934; and second is for the central bank to act as a *lender of last resort* as Walter Bagehot recommended to the Bank of England in the 19th century. If deposit insurance is available, there is no need for depositors to withdraw their funds just because they fear others may do so. By providing liquidity to banks faced with sudden withdrawals, the central bank relieves them of the pressure to dispose of illiquid asset at a loss — and this can also reduce risk of contagion. (Note, however, that Walter Bagehot insisted that only solvent banks should be provided with such liquidity.) These two institutional responses are indicated in the top row of Table 1. The second row is concerned with liquidity crisis in bond markets to which we now turn.

Type of Creditor	Failure of Collective Action	Institutional Responses
Depositor	'Bank Run'	Deposit Insurance
		Lender of Last Resort
Bond holder	'Grab Race'	Debt Rollovers
		Debt Guarantees

Table 1: Liquidity crises and measures to prevent them.

Bonds

A creditor who does not receive agreed debt service payments on time may be able to 'accelerate' the debt and demand payment in full which can trigger the closure of a solvent firm as assets are sold to honour such claims. A key objective of modern bankruptcy laws is to avoid premature closure of viable firms: under the provisions of Chapter XI of US bankruptcy law, for example, debt may be 'rolled up' as creditors are forced to lend into arrears (or it may be converted into shares as part of debt equity swap).

Similar problems of creditor coordination may arise in the context of international lending (where the operation of appropriate bankruptcy procedures is much more problematic). As Radelet and Sachs (1998b, p5) argue, "international loan markets are prone to self-fulfilling crises in which individual creditors may act rationally and yet market outcomes produce sharp, costly, and fundamentally unnecessary panicked reversals in capital flows".

To see this, assume creditors as a group would be willing to make a new loan, but no individual creditor is willing to do so unless other creditors do the same: then, with a failure of co-ordination among creditors, it is quite possible that there will be no lending to an illiquid borrower. (Technically, the source of multiple equilibria is pay-off externalities, i.e., the pay-offs to an agent adopting an action increase in the number of other agents adopting the same action, see Devenow and Welch, 1996, pp605–7.) Table 2 provides a simple illustration of the argument (assuming only two creditors). The setting is one in which each of two creditors has lent 50 to a borrower who is solvent but illiquid: solvent because the project will pay 120 in a years time; illiquid because there are no dividends in the meantime. At the beginning of the year, however, the borrower is required to provide a total of 20 as debt service. If each creditor is willing to relend the 10 of debt service received, the project will continue and each will receive future repayments with a present discounted value of 50. But if neither creditor is willing to roll over the loan, the debtor will default and the project will be scrapped with each creditor receiving only 30 from the scrap value. The pay-offs in these two cases are shown in the top-left and bottom-right of the table.

		Creditor 2	
		Lend	Not lend
Creditor 1	Lend	(50, 50)	(20, 30)
	Not lend	(30, 20)	(30, 30)

Table 2: To lend or not to lend?

Note that if creditor 1 is willing to lend 10 but not creditor 2, the project will still be scrapped and creditor 1 will be worse off (with a net return of only 30-10 = 20, see top-right corner of the table). Likewise, if only creditor 2 is willing to roll over the loan, the pay-offs will as shown at bottom-right. What are the equilibrium outcomes?

The cases of *both* creditors lending and *neither* lending are the two Nash equilibria of this game — where a Nash equilibrium is defined as a situation where no creditor has the incentive to deviate from his/her strategy given that the other does not deviate. Clearly, continued lending is the more socially efficient equilibrium; but a failure to co-ordinate will lead to a self-fulfilling liquidity crisis

where the debtor is pushed into default, the project is scrapped and each creditor concludes that it was right not to put extra money into a failing project!

Deposit insurance together with the prudential regulation of the banking industry is generally sufficient to avoid bank runs. But what about the bond market? In circumstances where continued lending is in the self-interest of the creditors, an *enforced roll-over* may be an appropriate way of handling the liquidity crisis. The co-ordinated roll-over which saved Korea from default at the end of 1997 provides a topical example of this policy.[1]

An alternative proposal, indicated in the second row of Table 1 as 'debt guarantees', is for an International Bondholders Insurance Corporation (IBIC) to provide insurance of international bonds issued by developing countries in return for premium paid by bond purchases. In the view of William Cline (1995, p483) such an institution "could be housed in the World Bank family ... and would seek to do for bonds what the Multilateral Investment Guarantee Agency (MIGA) does for direct investment". How would it work? "One approach would be simply to apply binary criterion: the IBC either would or would not stand ready to insure new bonds issued by a country in a given year... A better design would probably be to have the IBC provide alternative levels of coinsurance for a standard premium, with the differing coinsurance rates reflecting greater or lesser risk. The top rate might be, for example, 80%. The IBC would pay a claim of 80% of missed interest or principal payments on insured bonds in a country judged in the highest creditworthiness category. The lowest rate might be, for example, 20%. The premium might be 50 basis points in either case." (Cline, 1995, p483.) In the midst of East Asian crisis, George Soros (1997) also recommended such an agency to avoid the breakdown of international finance.[2]

I.2 Liquidity crises, forced rollovers and debt guarantees

We use a deterministic version of Bartolini and Dixit's (1991) model of sovereign debt to illustrate both the coordinated equilibrium and what happens when creditor coordination fails. As mechanisms to offset collective action failure among bondholders, we discuss both forced rollovers and debt guarantees.

[1] But the fact that half of a dozen of the chaebol have gone bankrupt suggests that the problem was not simply one of illiquidity.

[2] Soros's proposal is, however, roundly criticised by Eichengreen (1999, chapter 5) on the ground that "to assert that the international community would be able to stand aside in the event of default on uninsured loans, in disregard of the systemic consequences, is to assume a solution to the problem."

Assume that the country's capacity to pay, X_t, grows with a percentage trend μ so that

$$dX_t/dt \quad = \quad \mu X_t dt. \tag{1}$$

The present value of capacity to pay, the country's gross international wealth W, is

$$W(X_t) \quad = \quad \int_t^\infty X_s e^{-r(s-t)} ds \quad = \quad X_t/(r-\mu). \tag{2}$$

where r is the real interest rate and we assume $r - \mu > 0$ to ensure the existence of this solution. If debt is less than gross wealth i.e., $D \leq W = X/(r-\mu)$, then the country is technically "solvent"; and in this deterministic case market value of debt will equal its face value. (Even where $D > W = X/(r-\mu)$ and the country is technically "insolvent", creditors may nevertheless have a shared interest in keeping things going as we discuss below.)

Why creditor coordination matters if the country is solvent? It may be necessary to avoid a liquidity crisis. It is true that there is no risk of such crisis if $X_t \geq rD$ (and μ is positive) and the country is always able to honour its debt service obligations in full out of current earnings. But consider the case where $X_t < rD$ and full payment of interest to existing creditors would require the issue of new debt to satisfy

$$rD_t \quad = \quad X_t + dD_t/dt, \tag{3}$$

where dD_t/dt is the amount of new borrowing. Alternatively, of course, existing lenders could simply roll over the debt. In either case, because the country is solvent, debt stands at par if creditors coordinate to inject new funds. This is shown in Figure 1 which plots the average value of debt against the current ability to pay. The former, denoted as $v \equiv V(X_t, D_t)/D_t$, is the ratio of market to face value of debt; the latter is measured as $x \equiv X_t/D_t$. For a solvent country, with $x \geq r - \mu$ and debt at par, the outcome will lie on the line segment CFP. As indicated by the arrows, x will be increasing — at the rate μ to the right of F but more slowly between C and F as debt and capacity to pay are both growing. As the latter grows faster, the country is 'growing out of debt'; see Appendix for the dynamics of x.

In the insolvent case, the outcome will lie on the line SC where $w = W/D$. Here, x is decreasing as debt grows faster than the capacity to pay. The debtor is playing a Ponzi game, but as long as v exceeds the value of assets that may be seized (shown as α in the figure), coordinated creditors will allow the game to continue. Seizure of assets will not occur until S when $v = \alpha$. (Note that under strict sovereign immunity, $\alpha = 0$ and S is at the origin.)

Coordinated equilibrium is by no means guaranteed. Let us now look at a game between the two creditors each with an equal share of the debt, assuming $r - \mu < x < r$ (where the coordinated

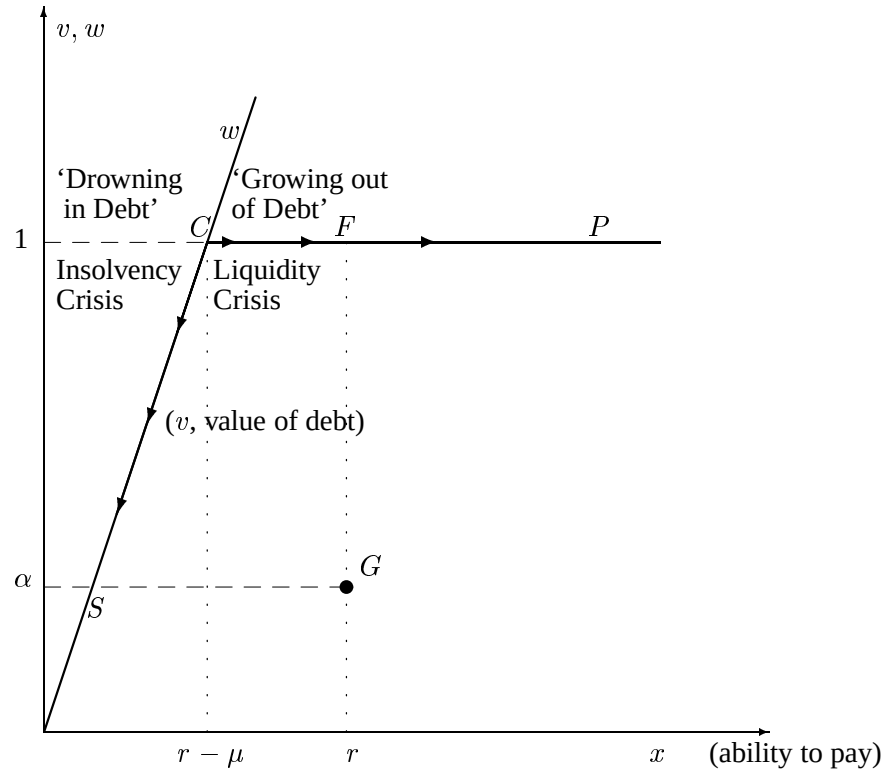

Figure 1: Debt value with and without coordination.

solution lies on CF). Suppose in particular that the current cash flow is just below the required interest payment and neither creditor can supply sufficient new lending for current interest payments to be met, though together they can. (In terms of (3), it is when $X_t < rD_t$ and each creditor can for example only supply new lending of $\frac{1}{2}dD_t/dt$.) While the coordinated solution (where each party provides new funds believing the other will do so) is one possible equilibrium, the case that neither provides new funds is another, with each creditor hesitating to inject new lending for fear of non-cooperation. (This is analogous to the multiple equilibria in Diamond and Dybvig's (1983) model of bank behaviour.) Coordinated outcomes lie on the line CF; but the failure of collective action pushes bond values down to α.

As can be seen from the figure, the collapse in the market value of debt (from F to G) caused by failure of the collective action can be substantial.[3] For the two creditor case, the substantial gain

[3]What happens if the debt is short term? In terms of Figure 1, this corresponds to a higher interest payment by the

to coordination may well ensure that both parties agree to supply the additional funds. But if the number of creditors is large and if the liquidity crisis could be resolved without all creditors rolling over their lending, each individual creditor may have an incentive to free-ride and coordination will collapse.

It follows logically that a liquidity crisis can be avoided by a *forced rollover*, where the debtor is given more credit by all lenders. If each and every lender is forced to lend into arrears, that solves the coordination problem![4] Another strategy, which may seem more attractive for both lenders and borrower, is for a third party with a 'deep pocket' (e.g., the government) to give lenders a guarantee. Figure 2 illustrates. The dashed line $G'G'$ gives the value of the guarantee designed to check creditor panic by limiting the downside risk. If in the region of potential liquidity crisis, CF in the figure, creditors are now willing to lend into arrears, crisis will be averted and the government will not be called upon to deliver on its guarantee. This is an attractive outcome: but is there a catch somewhere?

Unfortunately, yes. Unconditional guarantees can have 'adverse incentive' effects which diminish the capacity to service debt (so-called moral hazard). Assume, for example, that these adverse incentives reduce the expected growth of earnings, and move the valuation function down from Ow to Ow'. This will make things worse not better. At the point where x equals r, for example, the moral hazard effects of a guarantee designed to protect an illiquid borrower imply that the guarantor has to bail out an insolvent borrower — which could prove extremely expensive. And if the guarantee was too costly to be credible, it could well trigger the creditor panic it was supposed to avoid! These issues are taken up in more detail in the next section.

Lastly consider a case of mistaken identity, namely, the Latin American debt crisis of the 1980s, a solvency problem which was treated initially as a liquidity problem. Figure 1 may be used to illustrate in broad brush fashion two phases of this crisis. In the first phase, 1986–88, the Baker Plan sought to achieve creditor coordination on the mistaken assumption that debtor countries would 'grow out of debt'. But it was progressively recognised that they were in fact 'drowning in debt' (i.e., to the left of point C in Figure 1 and not to the right). To remedy this situation, the Brady Plan of 1989 included 'debt and debt service' reductions (Cline, 1995, p237), i.e., debt write-downs. In terms of Figure 1, a debt write-down which increases x (and also v) can shift debtor countries to the right of point C giving them a realistic chance to grow out of debt. In his reexamination of this

country, so point F moves to the right while the critical level of $x = r - \mu$ remains the same. So shortening the maturity of the loan increases the range of liquidity crisis (i.e., the horizontal distance between C and F).

[4]This was what happened in December 1997 when Central Banks of G-7 countries pressured their own national lending institutions to roll over their debts and thus prevented unilateral default by Korea.

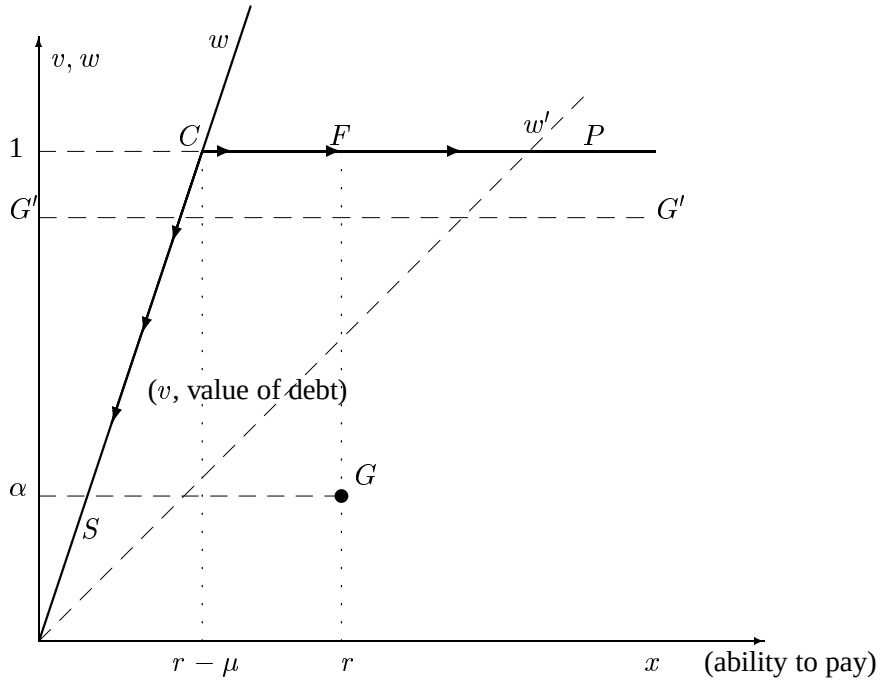

Figure 2: Debt guarantees and moral hazard.

episode, Cline (1995) writes as follows: "A debt strategy originally intended to orchestrate lending until countries could increase exports and restore credit-worthiness (the Baker Plan) [gave] way to a forgiveness plan that had the predictable effect of cutting off new long-term lending from the banks (the Brady Plan). However, the broadly cooperative, market-oriented nature of the forgiveness plan contributed to an atmosphere of confidence for other categories of creditors, including bond holders, so that renewed capital flows through other channels accomplished the return to the capital market." The moral of the story is that creditor coordination may be necessary but not sufficient to solve debt problems!

As has just been noted illiquidity is often the close cousin of insolvency. But efforts to bail out those close to insolvency may face serious problems of moral hazard. How relevant is this for events in East Asia? Radelet and Sachs (1998b) argue that, because external debt was substantially short term and the regional growth had been so strong, the problem was one of illiquidity and not insolvency. An alternative view (Dooley, 1997/8; Krugman, 1998a) is that money-back guarantees for depositors and limited liability for lenders had generated excessive spending in real estate in Thailand, for example, and over-investment in Korean manufacturing, so insolvency was just round the corner.

How severe moral hazard problems can arise when illiquidity slides into insolvency is addressed in this section taking banks as an example.[5] Assume that domestic banks have invested both local and foreign currency deposits in domestic interest-earning assets with stochastic returns, X. Let D indicate the value of total deposits being invested and D_F the amount of foreign currency deposits. Let the equity value of bank, i.e., the value of assets less deposits, be given by the schedule MN in Figure 3 where MN is an increasing function of loan returns, X, plotted along horizontal axis. (MN has a slope of $1/r$ where r is market rate of interest).

For values of X close to X_B, the net equity of the bank is close to zero. This is when observers predict that loan managers will 'gamble for resurrection'. This is because they can increase the net equity value of the bank by increasing the variance of returns: high returns will enhance bank profits but low or negative returns will be written off through bankruptcy.

To illustrate, let the alternative investment available to loan managers have higher risk but lower mean return, (-μ), as indicated by the line ML in the figure whose slope is $1/(r+\mu)$. Note that ML lies everywhere below MN, the value of investing safely. Why would managers ever be tempted switch to such high risk, low yield assets? Would they not prefer to close the bank down at the point X_L where ML crosses the horizontal axis? To do this would be to ignore the way expected profits depend on the variability of returns and the limited liability of the bank shareholders: together they imply that the net equity of the bank is given by the schedule GG when deposits are invested in risky assets. So risky investment is more profitable than safe investment when bank capital is low (i.e., to the left of S where GG crosses MN).

[5]The moral hazard problems arising in the banking industry are analysed by Dewatripont and Tirole (1994), assuming that financial panic can be avoided by a deposit insurance. In their monograph on the prudential regulation of banks, they treat the problem as one of corporate governance and discuss how effective the BIS capital adequacy ratio may be as triggers for regulatory action. The same model is also used in Bond and Miller (1998).

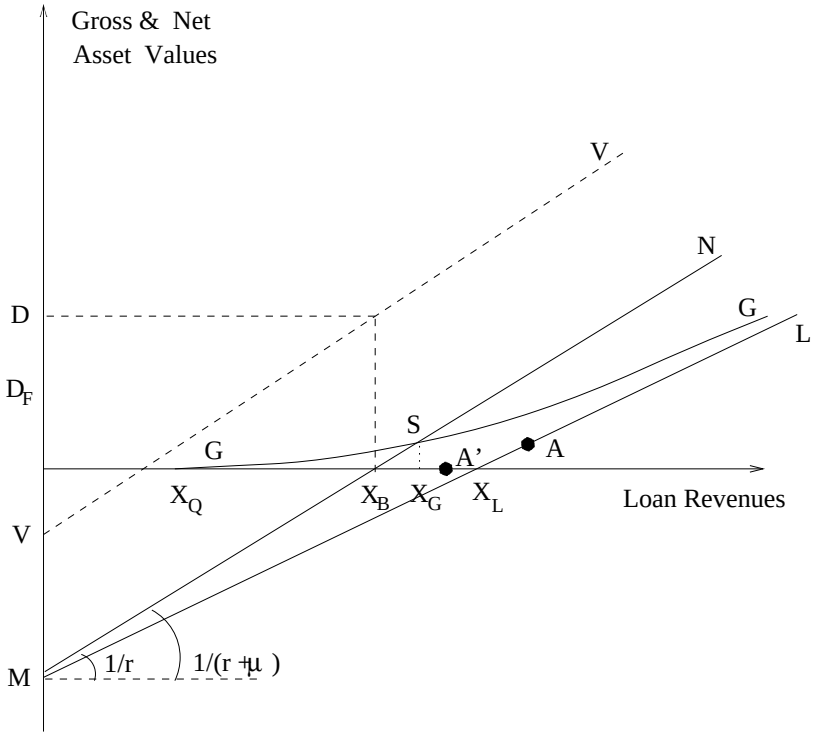

Figure 3: Moral hazard in banking: ‘gambling for resurrection’.

[We can see this by the following argument. Assume that X_L is chosen at the close down point and consider returns fluctuating above and below this level. Note that if returns go above X_L, this will increase the banks profits as shown at the point A; but if returns fall below X_L, profits only fall to zero as a result of limited liability, see point A'. The expected value of profits (at the point above X_L on the ray joining A and A') is positive, so, why close down? Is it not better to wait? Yes, because the economic value of waiting before closing down is in fact captured by schedule GG which lies above ML by the put value implicit in limited liability. The schedule GG is tangent to the horizontal axis at X_Q and approaches ML asymptotically to the right as X goes to infinity where X_Q is the point which the loan manager would like to exercise the option of going bankrupt.]

Given the possibility of switching from safe to lower yielding high risk assets, loan managers will be tempted to gamble when net returns of the safe portfolio are at X_G or below. Who is to prevent loan managers from behaving in this way? Without deposit insurance, it would in principle have to be depositors who monitor portfolio manager when X is close to X_G and promptly punish any sign of gambling (by firing the manager, for example). But as Dewatripont and Tirole (1994) point out this is a counsel of perfection; most bank deposits are small and the most depositors are uninformed and unsophisticated. Consequently, to protect small depositors exposed to the moral hazard of loan managers who gamble, the government usually guarantees deposits and takes upon itself the task of monitoring portfolio allocation decisions and punishing mismanagement.

What if the state provides the guarantee but fails to check the moral hazard (which seems to have been true in several East Asian countries). Certainly local taxpayers must expect substantial tax charges as required to cover the losses of the insurance agency, as American experience with Savings and Loan institutions clearly demonstrated! But provided the agency will be bailed out, local currency depositors can rest assured.

The same may not be true for foreign currency depositors.[6] They see local banks mismanaging their portfolios without any regulatory response and they can forecast bank insolvencies. They also know that, while the local central bank can print domestic currency, it can't print dollars! So, if foreign currency reserves are low (relative to foreign currency deposits), they can have no assurance that there is an effective lender of last resort. This is a recipe for a bank run as foreign currency depositors head for safety. And the central bank, having lost all its reserves will be forced to float the currency.

[6] "The effective functioning of deposit insurance depends on the deposits being in domestic currency; countries with dollarized banking systems often leave themselves exposed to creditor runs even when some deposit insurance arrangements are in place, because such deposit insurance often lacks adequate reserve funds and therefore credibility", Radelet and Sachs (1998, p9).

In short, *if returns fall to the critical value, (X_G), and this does not trigger an appropriate regulatory response, it can be the signal for the exit of foreign depositors and a full-blown financial crisis*. The danger of allowing or encouraging substantial short-term capital inflows to pour into weakly regulated banking system is only too apparent. Short-term foreign deposits may easily exceed foreign currency reserves and low bank returns trigger exit rather than regulation.

Note that for assets in fixed supply the combination of deposit guarantees and limited liability can also give rise to rapid asset price inflation. As Krugman (1998a) observes, fixed assets may be priced on the basis of the best possible outcomes (i.e., at 'Pangloss values') with the government covering losses in all other cases. In his assessment, the crisis was the bursting of an asset price bubble created by moral hazard in banking.

Lastly, we note that the willingness of the IMF to act as a lender of last resort in foreign currency term is necessarily hampered if there is unchecked moral hazard in local banking system. Unconditional lending into this situation will not avoid the problem, it may even lead to greater losses to local tax payers (as the American S&L experience confirms).

III ARE THERE SHARKS IN THE SOUTH CHINA SEA, STRATEGIC ASPECTS OF THE ATTACK ON THE HONG KONG DOLLAR

There can be multiple Nash equilibria — either everyone lends or no one lends — without any individual being in a position to shift the equilibrium (see Cooper and John, 1991). By using two-creditor examples to illustrate the coordination problem, it may appear that we have overplayed the strategic aspects of the situation. But the attack on the Hong Kong Dollar in summer of 1998 suggests otherwise. Players big enough to move markets were, it seems, able to place bets so as to reduce the number of equilibria from two to one — namely to attack the currency!

The first table below illustrates the payoffs to each of two players considering whether to speculate against the Hong Kong currency — which has been pegged against the US$ for fifteen years. If neither attacks the peg is sustained. Any player attacking on its own will fail (with a loss of 5). But if both attack, the HK$ will be forced to devalue giving profits of 20 each. So there are two Nash equilibria the speculators may choose. For sharks to make a killing they have to hunt in packs!

The payoffs in Table 3 do not incorporate the benefits of what has been described as the "double play in which speculators push up the local interest rates by selling HK$ and benefit from short positions in the stock market" (*Financial Times*, September 7, 1998). Assume that any player who sells HK$, drives up interest rates and makes a profit of 6 on the short position taken in the stock

		Player 2		
		Attack		Not attack
	Attack	(**20, 20**)	⟵	(-5, 0)
Player 1		↑		↓
	Not attack	(0, -5)	⟶	(0, 0)

Table 3: Payoffs to a speculative attack on HK$.

market before the attack. The payoffs *including the benefits of the 'double play'* are shown in the next table. What is the effect of adding 6 to the payoff of any attacker? A successful attack is, of course, more profitable. But even an unsuccessful attack now pays dividends as the double play more than covers the costs of the attack. There is only one Nash equilibrium: attacking is the dominant strategy!

		Player 2		
		Attack		Not attack
	Attack	(**26, 26**)	⟵	(1, 0)
Player 1		↑		↑
	Not attack	(0, 1)	⟵	(0, 0)

Table 4: Payoffs with the 'double play' of 1998.

It is, we believe, for this reason that the Hong Kong Monetary Authority (HKMA) has gone to such drastic lengths to defend the peg — using its reserves to buy a substantial fraction of the shares in the Hang Sheng Index and impose a 'bear squeeze' on speculators. The effect has been to replace the profits of the double play with losses so attacking the peg is no longer the dominant strategy. (In addition, by increasing bank liquidity the HKMA has reduced the risk of interest rate rising sharply when large amount of HK$ are sold and made it much more expensive for speculators to manipulate the territory's money markets.)

One of the most disturbing features of the East Asian crisis has been the destabilising role of capital flows. Could it be that the payoffs to short term creditors — after adding in the benefits of government guarantees and 'double plays' — have made capital flight the dominant strategy? (If you can pull your money out of Thailand with a dollar guarantee and profits on short selling the Baht to boot, why keep on lending?)

What can be done to avert further financial crises or at least to mitigate their consequences?[7] One step upon which most commentators are agreed is to improve the regulation of financial institutions in emerging countries, so as to insure greater transparency and proper monitoring of bank portfolios,[8] and taking prompt corrective action when danger threatens. Beyond that, commentators differ widely. We outline three contrasting views.

Go with the flow: the US Treasury view

We begin with the 'liberal', or free market view of the US government as recently put by Larry Summers (1998), deputy secretary of the US treasury. "The case for capital account liberalisation", he argued, "is a case for allowing capital to seek the highest productivity investments", though he warned that "inflows in search of genuine economic opportunities are one thing. Inflows in search of government guarantees ... are quite another". In view of the acknowledged danger of liberalising capital flows when incentives are distorted, he concluded that "the pace of opening up should be matched by the pace of developing a sound domestic financial system".

What changes (if any) are needed at international level? Summers acknowledges that "there will never be enough money in the world to respond as an official lender of last resort to all the crises that can appear... as capital flows increase"; but he dismisses proposals for "speed bumps or other forms of capital controls" as more likely to do harm than good. Three suggestions are made from improving the global financial system. The first two are familiar and uncontroversial — greater transparency and improved prudential standards; third is the proposal to "ensure that policymakers do not confront the choice between uncontrolled chaos and confusion, on the one hand, and large bailouts, on the other". (It is not made clear how these can be achieved though the reference to bankruptcy law implies some sort of workout procedure, see below.)

International monetary reform: A first best approach

The appropriate counterpart to globalised capital markets would in principle be the globalisation of controls developed at the national level — mechanisms like deposit insurance and the lender of last resort. The former could well be delegated to national central banks: but not the latter. This poses

[7] This section is largely based on Miller and Luangaram (1998). For later and more detailed assessments see Bhattacharya and Miller (1998), Eichengreen (1999) and Griffith-Jones (1999).

[8] Canada and Britain have proposed a new surveillance structure for this purpose: this would combine the World Bank financial operations unit with staff from the IMF and be responsible both for general surveillance and for devising financial sector reform for countries in crises. (FT, April 17, 1998.)

the key question: can the IMF as currently constituted act as an effective international lender of last resort?

Even those in favour of substantial reform answer no. In Sachs's view, for example, current IMF procedures are too slow to stop bank runs in any case; and he is against enhancing their resources and discretion because, according to him, the IMF is already too powerful and too unaccountable (*Financial Times*, December 1997). Krugman too is skeptical: instead of "a sort of super-IMF with the huge resources needed to act as a full-fledged lender of last resort and with extensive direct regulatory powers over the banks of member countries", he reckons that "we will be lucky if the existing, far-from-super IMF gets the modest funding increase it is seeking". (*Financial Times*, "Start taking the Prozac", April 9, 1998.)

What about second best?

International monetary reform: Second best approaches

Noting that financial liberalisation preceded the dangerous buildup of short-term foreign currency exposure in East Asia, Radelet and Sachs (1998b, p36) conclude that ... "the rapid push towards fully open capital markets among the developing countries would seem to be misguided. There is certainly no strong empirical evidence that economic growth in middle-income developing countries depends on unfettered access to short-term capital flows from abroad... The policy goal ... should be to support long-term capital flows, especially foreign direct investment, and equity portfolio flows, but to limit short-term international flows mainly to the financing of short-term trade transactions". Two mechanisms for doing so are discussed, first inflow controls (as in Chile) and second explicit supervisory limits. Though they concede the former are more attractive on economic grounds, they argue for the latter in term of practical enforcement (administration and monitoring).

Since Korean debt default was avoided by an involuntary rollover on the part of western banks just before Christmas of 1997, Radelet and Sachs (1998b) make the case for generalised orderly work-out arrangements. ("The Korean negotiations demonstrated that such a mechanism could work in practice. Now, we suppose, we will have to discover whether it can work in theory!", p38.) In other words, besides prudential limits on capital controls, they are hinting at another institutional innovation — the equivalent of an International Bankruptcy Court. The strategic case for a payments standstill is made in Miller and Zhang (1997) and in the BIS annual report (1998) which emphasises the need to get creditors to the negotiating table to restructure (and write down) debt.

In the disastrous circumstances of the current crisis, Krugman (1998b) has recommended stabilising exchange rates with widespread exchange controls on capital account transactions, leaving

interest rates free to help stabilise domestic demand.

In the light of the crisis in East Asia we end by proposing steps to resolve the burden of outstanding debts and to change the international rules of the game to prevent recurrent crisis.

A *Steps needed to resolve the current crisis*

1 For the Asian central banks to quantify the losses resulting from deposit insurance and to devise appropriate packages for financial reconstruction (as Thailand has recently done).

2 For creditors and debtors, in Indonesia for example, to get together to negotiate the write-down of debts that are beyond the capacity to pay. To bring creditors to negotiating table, debtors might consider a unilateral stay of payments with continued lending by international financial institutions subject to appropriate conditionality.

B *Steps to reforming the international monetary system*

1 establishing a *surveillance mechanism* of countries financial regulations and supervisory systems, jointly staffed by the IMF and the World Bank (which can also devise financial sector reforms for countries in crisis).

2 devising a set of administratively practical, *capital inflow controls* and regulatory procedures along the lines of FDICIA (1991) to reduce the financial vulnerability of emerging market economies.

3 *not* writing the requirement of capital account liberalisation into the Articles of the IMF for the foreseeable future.

4 instead, convening a Working Party of the G10 to recommend changes in the Articles of the IMF needed to protect debtor countries trapped in liquidity crisis and to consider the case for capital controls as a defensive measures for countries in crisis.[9]

Without prompt action to renegotiate debts, countries in crisis will be condemned to prolonged recession: without reform of the international monetary system these crises will recur.

[9]Bearing in mind the strictures laid at the door of global financial markets by George Soros (1998), for example, other devices worth considering in a crisis include: (i) more public disclosure of the position taken by hedge funds, as proposed by Malaysia; (ii) banning borrowing in local currency by hedge funds and other foreign banks, see the actions of the Hong Kong Monetary Authorities against speculators, Dieter (1998); (iii) including hedge funds and merchant banks in a target group of creditors whose exit will attract regulatory censure — by increasing the with-holding penalties in Chilean capital controls, 'exit taxes', or by regulatory action in their G7 host countries, for example; (iv) two-tier exchange rates — with a floating rate on capital account.

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Appendix

The dynamics of x in the deterministic case

Let the value of assets that may be seized be proportional to the debt level $S_t = \alpha D_t$, then the debt value is determined by

$$V(X_t, D_t) \;=\; \int_t^\tau \min\{X_s, rD_s\} e^{-r(s-t)} ds + e^{-r(\tau - t)} S_\tau, \tag{4}$$

where τ is the time that the debt value falls to that of the collateral assets.

It can be seen from (4) that $V(X_t, D_t)$ is homogeneous of degree one in X_t and D_t, so the average debt value $v \equiv V(X_t, D_t)/D_t$ is a function of the ratio $x_t \equiv X_t/D_t$. The dynamics of x_t is given as follows. If $x \equiv x(0) \geq r$, then

$$dx_t \;=\; \mu x_t, \tag{5}$$

and the average debt value is equal to par so $v = 1$. If $x < r$, then

$$dx_t \;=\; x_t[x_t - (r - \mu)]dt. \tag{6}$$

The solution for (6) is

$$x_t \;=\; \frac{(r-\mu)x}{x - [x - (r-\mu)]e^{(r-\mu)t}}, \quad x = x(0). \tag{7}$$

This solution is increasing over time when $x > (r - \mu)$ and decreasing when $x < (r - \mu)$.

Debt valuation in the case where x is stochastic

Adding uncertainty gives broadly the same qualitative results as in the deterministic case, and we briefly sketch the solutions in Figure 3. To capture the short maturity of loans, assume that debt repayment $c \geq r$. Let us first look at the coordinated solution. When x is very large, the firm is expected to have little difficulty in repaying the debt, so the debt value v goes asymptotically towards par c/r. The fact that v lies below c/r is because there is always a positive probability for the debt to be restructured (i.e., its value reduced). When x is very low, the debt value approaches the scrap value α. Debt value v joins the horizontal line α smoothly at L because creditors can trigger liquidation optimally. The value of debt without coordination is shown as the first passage option v' which joins the scrap value at $x = c$ and asymptotically goes to c/r as x increases. It is clear from the figure that *the region of liquidity crisis* (the range between $r - \mu$ and c) *increases if c increases* (when the maturity of the debt decreases). Since v is monotonically increasing in x, *the shorter the maturity of the debt the larger the losses to both borrowers and lenders if collective action fails.* So forced rollover becomes even more important in preventing the failure of collective action when debts are predominantly short term.

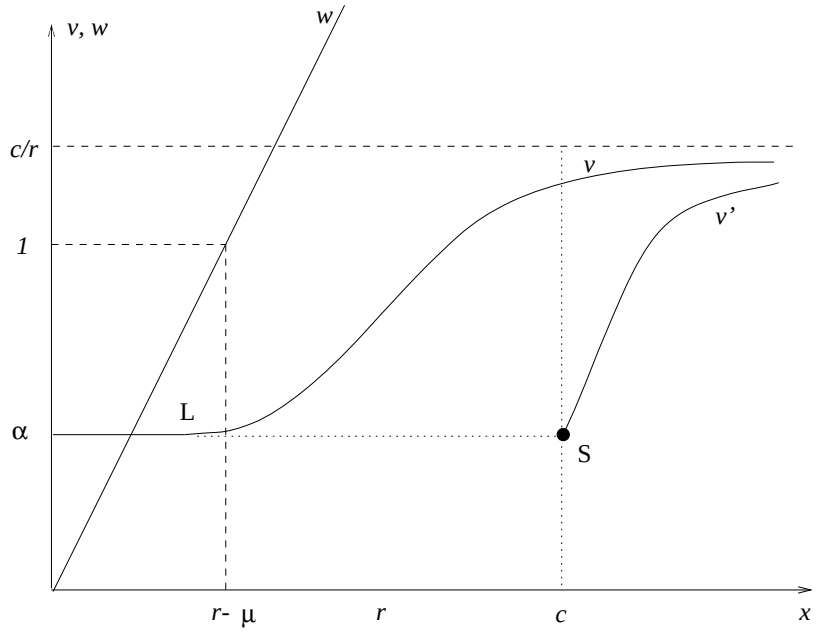

Figure 4: Debt value under uncertainty.