Resolution of Banking Crises: Theory and Evidence

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Abstract: This paper assesses the costs and benefits - in theory and practice - of alternative methods of resolving banking crises. A number of ways are described in which intervention can maintain banking activities and avoid systemic risk whilst also limiting moral hazard and the fiscal costs of intervention. Although the authorities' options are more limited in systemic crises, the paper highlights certain good practices in these situations.

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1. Introduction

Over the past quarter of a century, unlike the preceding twenty five years, there have been many banking crises around the world. Caprio and Klingebiel (1999), for example, document 112 crises in 93 developed and emerging market countries since the late 1970s. In a recent historical study of 21 countries, Bordo, Eichengreen, Klingebiel and Martinez-Peria (2001) report only one banking crisis in the quarter of a century after 1945 but 19 since then.

In resolving banking crises the authorities compare the benefits and costs of intervening.
The main benefits of intervening are usually to prevent a disruption to the payments system, damaging confidence in the rest of the banking system or to maintain the provision of credit to the economy as a whole. But such intervention also seeks to minimise the fiscal cost to the authorities and any adverse moral hazard effects that may be induced.

Policy makers risk making two types of error when considering intervening – intervening when it is unjustified resulting in a financial cost and reputational loss – or not intervening when the costs of not doing so are systemic. As discussed below, the authorities have usually intervened in the past to avoid a systemic crisis; there are few examples of non-intervention in the recent past[1].

The potential systemic threat to the economy of bank failures – and thus also the fiscal costs incurred in attempting to avoid a wider crisis – are likely to depend on the size of bank intermediation in the economy and whether borrowers have alternative sources of borrowing such as from capital markets.

But faced with a banking problem, the authorities face a trade-off between maintaining financial stability today – through offering protection to failing banks – and increasing financial instability in

the future through increasing moral hazard. As Bagehot put it, "any aid to a present bad bank is the surest mode of preventing the establishment of a future good bank".

In section 2 various measures of reducing the net costs of crisis resolution are considered. Section 3 assesses the alternative resolution strategies that can be adopted during a crisis. Section 4 considers

[1] Probably the best example within the last century was during the depression in the United States in the early 1930s.

how these resolution options are affected by the type of crisis. Section 5 assesses the evidence of how systemic crises have been resolved in practice. Section 6 concludes.

2. Measures affecting the costs and benefits of crisis resolution

In the case of a single failure of a large institution or multiple failures of small banks there may be no knock on effects on the financial system as a whole. However, during a widespread financial crisis there is a risk of widespread bank runs unless protection is given to creditors. On the other hand, blanket government protection can maintain, or re-establish, financial stability, but will encourage banks to take more risks in the future and reduce the incentive for depositors and other creditors to monitor their investments (so-called moral hazard). This will allow firms to take larger risks without paying appropriately higher risk premia to their creditors.

There are a number of measures that can be taken to maximise the benefits and to minimise the costs of intervening during a crisis.

2.A Co-insurance

Moral hazard applies both to the bank's depositors and creditors, and to the bank itself. When fully protected against possible loss, the former can be expected to exercise less care in selecting financial products for purchase. More seriously perhaps, the bank's officials may be tempted to exercise less scrutiny of loan applications, to play for time when loan problems arise, and to undertake riskier activities, when deposits are fully insured. Full insurance may even weaken the bank's defences against fraud.

Empirical studies find that widespread protection to depositors can greatly increase moral hazard. Demirguc-Kunt and Detragiache (2000) find that in the absence of an effective system of prudential regulation and supervision, more generous deposit insurance schemes increase rather than decrease the frequency of banking crises. Barth, Caprio and Levine (2001) also find that more generous deposit insurance greatly increases the probability of future crises.

Moral hazard can be limited by ensuring and making clear *ex ante*, that bank stakeholders – managers, shareholders, depositors and other creditors – share at least some of the losses. In principle, these costs could be apportioned according to the *ex ante* riskiness of the bank.

Requiring substantial amounts of bank capital at risk can also limit moral hazard. Large capital positions put stockholders in a first loss position thus reducing the attractiveness of high-risk investments.

Also, following a bank failure, existing shareholders' capital can be written down or wiped out completely as a condition for any government support. Those who acquire equity must be aware of the risk that its value could collapse or vanish in the most adverse conditions. For larger banks at least, often the shareholder will have a diversified portfolio, where the bank stock in question represents a modest share of total equity wealth. In fiscal regimes which impose a tax on capital gains, loss offset provisions will typically soften the blow, since there are likely to be capital gains on other equities that can be set against the loss in the value of shares in the bank. And individuals who hold indirect shares in the bank, in their pension fund for example, the losses should be attenuated by the likelihood that the fund (or that part of it held in equity) should be run on (or close to) index-matching principles. There can be few countries where any single bank represents as much as 2% of the total stock market capitalisation.

Although there is a potential for bank owners to take excessive risks, in practice, because the effectiveness of corporate governance is often limited, bank managers in large banks have scope to make independent decisions. Managers can, and often do, lose their job and suffer reputational damage in the case of bank failure especially if the cause of the problem can be attributed to poor management rather than bad luck[2]. That said, some managers may be willing to take the risk of losing their jobs if the upside rewards are large enough. Unless creditors bear some losses, managers that make the most risky investments may be able to obtain funding as cheaply, or almost as cheaply, as more conservative managers. To the extent that excessive risk taking is not constrained by supervision, the financial system will be less sound than otherwise.

It is widely held that limited liability legislation presents the bank's senior management with what is essentially an option. They stand to gain from the bank's success, through profit-linked bonus and the like. But if the bank goes under, their exposure is truncated. This option feature creates an incentive to gamble, since it makes little difference to them what the bank's margin of insolvency actually is in the event of failure. This moral hazard problem is particularly acute when capital is, or

[2] But this is not always the case. In the rescue of LTCM the original partners kept 10% of the equity because creditors thought it would be more efficient to liquidate such a complex portfolio with the assistance of managers. Moreover, managers who lose their jobs might be rehired by other firms.

almost, exhausted. Severe penalties for failure may restrain gambling, but they can alter its character: negatively-skewed gambles, with a high probability of moderate gain and a low probability of vast loss, become particularly attractive. Supervisors and auditors should be aware of this possibility, but may well find it hard to detect or prevent.

One answer to the problem is to relate the severity of the penalties on the senior management to the magnitude of losses. In extreme cases, directors should perhaps become liable to lengthy bans on service as directors of any public company, cancellation of severance compensation clauses in their contracts, and fines. And concealing information from supervisors should be treated as a serious offence. The principle here is that punishment should fit the crime. Graduated penalties, related to the size of the bank's insolvency margin, should serve to mitigate the convex kinks in the pay-off schedules facing the bank's senior staff, and lessen the incentive to take negatively-skewed gambles for survival.

Bank risk taking could also be constrained by basing the funding of any private sector deposit insurance schemes according to risk so that riskier banks contribute more *ex ante*. For example, perhaps the new risk weights applied to banks' minimum regulatory capital requirements in the new Basel Accord could also be applied to the funding of deposit insurance so that banks with lower risk-based capital pay more.

After erasing the value of equity, and confronting the bank's senior management with appropriately-tuned penalties, to what extent should losses be imposed on depositors and other creditors?

In most countries depositors are at least partially protected. In some countries, such as the UK, deposit insurance is seen mainly as a way to provide consumer protection to (uninformed) depositors in case of bank insolvency. In other countries, deposit insurance is seen mainly as an instrument to reduce the likelihood of depositor bank runs. In these cases insurance is usually broader in scope.

Deposit insurance schemes are often limited in two ways. One through placing a cap on the size of any deposit on which an insurance commitment is given. The other is that insurance may be incomplete. In the European Union, for example, a system of coinsurance is practised. Only 90% of

retail deposits up to a ceiling are covered, the remaining 10% being left uninsured. The earlier UK practice gave just 75% cover.

The case for limiting the extent of deposit insurance, both by the ceiling and the coinsurance fraction, is an appealing one. Depositors are encouraged to exercise care over where they place their deposits, and also to spread larger deposits across two or more institutions. However, depositors differ in their ability to make informed judgements about the dependability of particular retail banks. Those with less access to information will continue to need some protection and this forms the basis of the case for a modest first slice of deposits insured up to 100%. The scale of the insurance scheme's exposure is also contained; and since this is usually operated (or underwritten) by the government, the tax payers' ultimate liabilities are contained as well. And since wealth and size of deposit are doubtless positively correlated at the individual level, the wealth of the relatively poor is given greater protection.

The variety of deposit products offered by retail banks has proliferated in recent years in many countries. But the three traditional categories of instrument remain readily discernible. These are (a) demand deposits, against which cheques may be drawn at will, and on which little (if any) interest is paid; (b) time deposits, typically non-chequable but bearing interest, and often with notice provisions; and (c) term deposits and other credits, which bear higher interest, and may not be encashed, save at quite severe penalty, before their specified date of maturity.

Deposit insurance, if provided at all, is invariably offered on (a), and sometimes on (b) and (c). To the extent that deposit insurance is regarded as an instrument to limit bank runs, insuring (a) is easily justified. It is precisely these deposits that are most prone to vanish at once in a bank run. Further, the sacrifice of interest entailed by holding (a), as opposed to (b), is accepted only on the understanding that (a) will provide perfect, or almost perfect, liquidity; and one of the dimensions of liquidity is predictability of value on encashment. But the provision of automatic, comprehensive insurance of (b) is problematic, and for (c), still more so.

The wider the scope of deposit insurance, the greater the risk faced by the insurer, and the higher the threat to government finances. This is obviously true when the insurance is provided by a government agency. But it also applies when a private insurer is guaranteed, formally or informally, by government underwriting. Wider deposit insurance may also imply a greater concentration of risk upon the holders of uninsured deposits or credits advanced to the troubled bank. The gap

between its total liabilities and the value of its assets, when it falls into the positive range, will only very rarely exceed, say, one tenth or one fifth of its non-demand-deposit liabilities. Even a 10-20% haircut all round – on (b) and (c) combined – is of course disagreeable to those who suffer it. But seen in the context of the extra income earned on such instruments, usually over a period of some years, it is quite modest. Furthermore, agents differ in their perceptions of and attitudes to risk.

For countries with long-established safety nets, and a low incidence of failures, the best policy would presumably be to avoid changing a system that it is clearly functioning well. However, if we consider a country designing a *new* system, where part of the aim of insurance is to reduce the likelihood of depositor runs, perhaps a wise policy might be to provide generous mandatory insurance on demand deposits – possibly up to 100%, and subject to a certain limit. This could be provided through the medium of a government agency while private insurers could be left to offer banks and their creditors insurance on all other instruments, as an option which may be accepted or declined, on commercial terms. The government could and should guarantee such private insurance, at a set of charges designed to be actuarially fair. Banks would then present time-depositors and other creditors a menu of different instruments. Uninsured instruments would offer the highest yields, with part-insured instruments providing less, and fully insured ones still smaller interest. Insurance could be treated as a benefit in kind, and liable to income tax, to prevent the fiscal system distorting choices. The boundary between demand and other deposits would require careful definition. The scale of permitted annual interest payments on demand deposits could perhaps be subject to a ceiling, which might be the maximum of one per cent nominal, or the rate of consumer price inflation over the previous year. And non-demand deposits, unlike demand deposits, could be subject to minimum notice provisions (which have the further advantage of restraining or at least delaying a bank run). A commercial insurer would presumably tailor insurance fees to the expected risks at the level of the individual bank, so that supervisors and market participants could monitor how the level of fees varied over time and across financial institutions. High fees would doubtless trigger more intensive official inspections.

How could liquidity in the economy be safeguarded in situations of bank closure? One possibility would be to allow time depositors, and perhaps other creditors, to withdraw a fraction of their funds, and part with the remainder. The entitlement fraction would equal the estimated value of the troubled bank's assets, net of officially insured demand deposits, to its remaining liabilities, net of equity. These asset estimates would have to be conducted rapidly, in a few days, by the official parties involved in resolving banking crises. This would mean that time depositors could still

access the larger part of their funds, and continue making payments against them. The notice provisions attached to time deposits would provide the breathing space necessary for emergency asset estimation. The entitlement fraction would also apply to commercial institutions which had insured time deposits, giving them an immediate estimate of the losses they face. This scheme can apply whether the bank in question is liquidated or retained under new ownership and management. Mayes, Halme and Liuksila (2001) advocate a similar scheme for banks whose activities are continued but under new ownership.

2.B Private sector solutions

Where a bank is, or is close to, insolvent, existing shareholders or creditors could be asked to provide the capital shortfall. This has the advantage of attempting to keep the bank alive as a going concern whilst making those pay that have most to gain from the bank's survival. But where this involves some subsidy, such as the government purchasing non-performing loans (NPLs) at, or close to, the book value price or injecting capital into the failed bank, conditionality should be imposed on managers and shareholders.

If a failing bank is taken over by another stronger bank this has the advantage of usually penalising the incumbent managers and shareholders. The senior managers are likely to be replaced while existing shareholders should lose all, or part, of their investments. Aside from limiting moral hazard, a private sector merger or takeover will also reduce the cost of intervention to the taxpayer.

Banking crises, in any case, may reflect the need for bank consolidation. Crises are often preceded by official moves to enhance the ease of entry into the financial sector, and competition between banks (see Davis (1999)). Therefore, banking crises – especially in emerging countries – may reflect the presence of an excessive number of banks in the industry as the number of new entrants 'overshoot' in the process of liberalisation. Moreover, even in the absence of banking failures, oligopoly under free entry may lead to too many banks (see Box 1).

A number of factors may affect the likelihood of a private sector merger or takeover. First, as banking systems have become more competitive the willingness of other banks to participate in rescues may have diminished. The influence of moral suasion has waned and banks may intervene only if it is clearly in their self interest. For example, in the 1980s the UK authorities encountered

difficulties in organising private sector support for Johnson Matthey in an environment of heightened competition (see Capie, Goodhart, Fischer and Schnadt (1994))[3].

Box 1: Can too many banks increase both inefficiency and instability?

Oligopoly under free entry is often liable to lead to too many firms. The analytical result, due first to Mankiw and Whinston (1986), depends on Cournot competition in oligopoly. This takes the form of each firm setting its output quantities independently, to maximise its perceived profit, subject to the belief that its competitors' outputs are given.

In the banking context, the "overcrowding" phenomenon is perhaps best seen in a market for deposits, which is oligopsonistic. Suppose that total deposits are proportional to the rate of interest paid on them, net of an actuarially fair fee, *f*, to cover insurance. Suppose that all banks are similar, and have fixed costs of *F*. Deposits are put to work as loans, to earn a rate of return p-ε, where ε is a random variable, common to all banks, uniform on the interval $(0, \bar{\varepsilon})$, Deposits are perfectly homogeneous, and the rate of interest on deposits, *r*, is set by a market equilibrium condition, and each firm sets its volume of deposits to maximise its expected profits.

Cournot oligopsony for deposits will lead to a net yield to depositors, *r-f* of $(p-1/2\bar{\varepsilon})/(n+1)$, where n is the number of banks. Total deposits will equal $an(p-1/2\bar{\varepsilon})/(n+1)$, where *a* is the factor of proportionality that gives the scale of deposit demand. The insurance fee, *f*, will vanish if $\bar{\varepsilon} < p - r$. If this inequality fails, it will equal $(\bar{\varepsilon} + r - p)^2 / 2\bar{\varepsilon}$.

Free entry into retail banking will set the number of firms, call it *N* in this case, at the level where $(N+1)^2 = a(p-1/2\bar{\varepsilon})^2 / F$. But if *n* is chosen to maximise welfare – taken as the sum of depositors' surplus and expected profits for all banks – the resulting optimal level of n, call it *N**, is given by the condition $(N^*+1)^3 = a(p-1/2\bar{\varepsilon})^2 / F$.

Comparing *N* with *N** is always less than *N*. So if free entry brings eight banks into the arena, the social optimum calls for just 3; or if *N*=26, *N**=8. With *N* >1, we find that *N** is always less than *N*. Free entry leads to too many banks. These formulae for *N* and *N** hold just the same, irrespective of whether the downside risk of low returns on loans is large enough to make *f* positive, or not. So the social benefit from reducing the number of banks towards the social optimum holds even if there is no risk of failure. Furthermore, cutting the number of banks down from its free entry value to its social optimum will actually enlarge the total level of deposits, as well as reducing the risk of bank failure where it is present.

It follows that banking crises are likelier and more serious when the number of retail banks is large, and entry freely allowed. Resolving banking crises provides an opportunity for reducing the number of banks, whether this takes the form of merger or outright liquidation.

This point implies that the more generous margins that come from a reduction in the number of banks is not merely beneficial from the standpoint of reducing the risk of banking crises. There is also a pure efficiency again, even when banking crises cannot occur.

[3] Note, however, the failure to get private sector support for Barings in 1995 was rather because the losses at the time were uncertain.

The degree of concentration in the banking sector may also affect the ability to achieve a private sector solution. On the one hand, the failure of a large financial institution may have a significant adverse impact on other firms either through direct exposures or the impact on asset prices of unwinding its positions. So some failures may be 'too big to fail' for the private sector. The rescue of LTCM may be a case in point (see Herring (2002))[4]. Also, if a bank has franchise value it should be possible to sell it whole or in parts to other banks. A bank is usually more valuable as a going concern than if it is liquidated (James (1991)). Guttentag and Herring (1993) make the same point more graphically "banks usually are worth more alive than dead even when their value alive is negative". It is also easier to co-ordinate a rescue with fewer counterparties. On the other hand, in a banking system that is already highly concentrated, the authorities may be reluctant for competition reasons to allow further consolidation. For example, the Canadian authorities rejected two planned mergers in 1998 because they thought the increase in concentration would reduce their resolution options if a failure occurred. Domestic acquisition would have seriously reduced competition in the domestic market while acquisition by a foreign bank would have resulted in a substantial reduction in Canadian ownership and control[5].

More generally, if a crisis is widespread affecting many banks then it may be difficult to find a strong domestic bank. In such system wide crises some countries have relaxed rules on foreign entry to allow takeovers by foreign banks, for example following the banking crises in Finland, Mexico and Korea. Internationally active banks are more likely to have geographically diversified asset portfolios and therefore are less vulnerable to adverse shocks in the host country. They may also be thought to be less likely to be bailed out by the host government because it would be politically unpopular. This might increase the willingness of creditors and other uninsured depositors to monitor the bank. That said, it might be more difficult for the market to monitor a foreign subsidiary, as opposed to the group as a whole, if it is not listed on the domestic stock market[6].

If no private domestic or foreign buyer can be found immediately it might be preferable, in exceptional circumstances, for the government to takeover or guarantee a failed bank *temporarily* rather than bail it out. This has the advantage of ensuring that existing shareholders (and possibly

[4] In the case of LTCM 14 of its largest creditors injected $3.6bn. They feared that if LTCM had been allowed to fail an unwinding of their positions may have resulted in a marked decline in asset prices. This, in turn, may have resulted in losses for these counterparties (and others) that held similar positions.
[5] See BIS (2001a) Chapter 3, Annex 1.
[6] See Ramirez (2002) for some of the issues raised in the resolution of the Mexican crisis (1994-95) following foreign take over of most of the domestic banking system.

uninsured creditors) bear the losses whilst allowing time to restructure the bank before on selling to other banks. But this solution relies on state institutions being efficient and not susceptible to corruption.

2.C Transparency and disclosure

Reliable and timely disclosure of information on banks could help both supervisors and the private sector to better monitor bank risks and speed up the resolution of crises when they occur.

Through improving private sector monitoring, an increase in bank disclosure may reduce the likelihood of a bank failing in the first place. The Groupe de Contact of the European Commission's Banking Advisory Committee (1999) examined the causes of banking difficulties in 117 EEA banks since the late-1980s[7]. Almost all banks reported a healthy solvency position when difficulties emerged suggesting that provisioning, and thus capital ratios, did not accurately reflected asset impairment[8]. Similarly, at the outset of the Japanese crisis in 1992, publicly available information on banks' non-performing loans was practically non-existent (Nakaso (2001)). Also, in a sample of 729 banks in 32 countries over the 1993-2000 period, Baumann and Nier (2003) find that, at least for banks that do not enjoy implicit government guarantees, banks that disclose more information hold larger capital for given risk and have lower realised risk.

At the time of crisis, disclosure of information on banks' financial position may also reduce the likelihood of runs on fundamentally solvent banks by creditors. It would also make it easier for the authorities to judge the scale of losses and thus whether banks are insolvent. However, some stakeholders have an incentive to conceal the extent of the problem – bank managers, corporate customers (on their own positions), and the government. The latter may be unwilling (or unable) to measure the true extent of losses in a crisis.

The optimal timing for the authorities to make a public announcement of a banking problem is likely to depend on the particular circumstances. If the financial markets are already aware or expect a crisis, disclosure of policy action could reduce the panic as, for example, at the time of the failure of Barings and in the run up to Y2K. More recently, the failure of the Indonesian authorities

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[7] 'Difficulties' covered a wide range of events including bankruptcy, payment default, forced merger, capital injection, temporary State support, significant falls in overall profits or profits in particular areas of business.
[8] The capital ratio in 90% of cases was above the requirement imposed by the supervisor.

to be transparent about the precise terms of coverage of their deposit insurance scheme meant that bank runs continued in the early stage of its crisis in late 1997 (see Pangestu and Habir (2002)).

When resolving a banking crisis, transparency over the restructuring programme can speed up and make more effective the resolution process. Credibility can be enhanced through disclosing clear, measurable and commonly set yardsticks on banks that are viable and thus given support and those that are not and thus closed or merged. But this requires realistic estimates of the market value of NPLs and of any collateral taken[9]. Failure to do this may reduce the losses borne by existing shareholders, increase the fiscal costs of resolution and discourage new private sector recapitalisation. In Mexico, NPLs were purchased by the government at their book value rather than an estimate of their market value. This greatly increased the cost to taxpayers without preventing many banks' problems from reoccurring (De Luna-Martinez (2000)). And in Japan, public disclosure of NPLs over the past decade has been piecemeal with estimates of NPLs being continually revised upwards. This has undermined the credibility of the disclosed figures and since banks' capital ratios were understated bank restructuring was delayed (Nakaso (2001)).

2.D Speed of resolution

Forbearance may take the form of waiving existing rules (eg capital requirements), relaxing loan classification standards or more generally relaxing the accounting standards. Banks can operate temporarily under less stringent conditions allowing continuous flow of credit to the economy and may avoid failure and thus the cost of blanket deposit insurance. Banks are allowed time to restore capital through making and retaining profits. Delay may also mean a well thought out strategy can be devised and buy time to put together the information on a bank's financial position and to maximise the resolution options.

However, delaying bank restructuring may increase the final costs of resolution if the conditions of financial institutions deteriorate further and market distortions are allowed to continue. There is also a risk that banks will gamble for resurrection as happened, for example, in the S&Ls crisis in the United States during the 1980s. So although a rapid resolution may cause a bigger short-term fall in output due to the closure of unviable banks and their insolvent corporate borrowers, the

[9] A common method of disguising NPLs is "ever greening" where a debtor uses a new loan to repay interest on an outstanding loan so that no bad loans are recognised.

longer-term performance may be better since a properly functioning banking system should be in place sooner. In the case of bank liquidation, it is important that the bankruptcy procedures allow insured depositors and other creditors prompt access to the funds due to them. Delay in payment can reduce liquidity in the economy and encourage widespread bank runs. Knowing this increases the likelihood that the authorities will forebear and thus protect *all* creditor claims (see Kaufman and Seelig (2002)).

Although cross-country empirical studies find no evidence of a simple statistical relationship between the length of crisis and its fiscal cost of resolution (Frydl, 1999), individual case study evidence suggests that prompt intervention reduces the costs of intervention and promotes efficiency (OECD (2002a)). Also, Dziobek and Pazarbasioglu (1997) found, in a sample of 24 systemic crises, that most progress in restoring the banking system's financial strength and its intermediation role – the *benefits* of crisis resolution – occurs when countries address crises earliest.

3. Resolution strategies

There are a range of options in resolving insolvent banks. At one extreme, a bank can be kept open through an injection of capital. At the other extreme, a bank can be closed with its assets sold and depositors and possibly other creditors paid off. In between these two extremes, a bank's license may be removed but with the bank sold off to another bank in full, or part, to preserve the bank's activities. The extent of involvement of the authorities may also vary. It may be limited to encouraging or organising private sector support or extended to official financial support in the limiting case through government takeover (nationalisation).

When a bank is financially distressed there should be a preference first to encourage a private sector solution. Private solutions are preferred because they do not involve direct costs to the government and are more likely to limit moral hazard by maintaining the private ownership structure with capital holders being in a first loss position.[10] If an unassisted private sector solution cannot be found a decision would next be made of whether to liquidate the bank or provide some form of government assistance (see Graph 1). In the UK, unless there was a clear threat of a systemic crisis,

[10] But if there is a likelihood of government bail out, a private bank may buy a failed bank strip it of the good assets and then look to the government to be bailed out. For example, this occurred frequently in banking crises during the 1990s in some transitional countries of central and eastern Europe (see Matousek (2002)).

liquidation would be chosen. In the United States, the decision would depend on comparing the costs to the FDIC of liquidation with the costs of alternative resolution options. In exceptional circumstances, if there was a systemic threat, governments might consider as an interim measure a takeover or a guarantee to a failed bank. However, any such government intervention should only be for a temporary period until a private sector solution could be found and should impose losses on shareholders, managers and, if possible, uninsured creditors.

Key principles in any restructuring are that only viable institutions are kept open; the costs of restructuring are transparent and those to taxpayers minimised; losses are allocated to existing shareholders, creditors and perhaps large depositors; the resolution preserves incentives for new private capital and discipline is maintained on bank borrowers. This implies that unviable banks should be liquidated with depositors and other creditors paid off, although not necessarily in full.

The legal framework in a country will have an important bearing on both the range and effectiveness of the policy options. In some countries the supervisor lacks power to write down capital, force a merger or close and institution or if it does it can be prosecuted by creditors and owners for damages. In other countries, the authorities have the full range of options – they can replace managers and board of directors, close a bank, inject capital and nationalise. Bankruptcy procedures also vary but have an important bearing on resolution. If they are slow they can seriously delay the resolution process. The political and social context may also have large effects on the options, in practice, even when there are no legal barriers.

The extent of the potential systemic risk is likely to affect the chosen course of action. In a systemic situation the immediate aim of the authorities is usually to restore financial stability of the system as a whole, restore public confidence and avoid bank runs. Here guarantees are likely given to liability holders at the failed bank(s) and possibly more generally to the financial system as a whole to avoid or reduce panic. So the aim is first to stabilise the liabilities of the banking system before restructuring the assets of the failing banks. But if the situation is non-systemic, the focus of the resolution is on the individual failed bank's balance sheet. In this case the failed bank will either be merged with a healthy bank or liquidated.

In a liquidation, a bank is declared insolvent, closed, and depositors are paid off. The restructuring authority then liquidates all assets. In most cases uninsured depositors and other creditors are only covered if sufficient funds are available after assets are liquidated.

Liquidation exerts a strong financial discipline and in some cases can be less costly than a government sale. This can be true if the government chooses to continue funding non-economic projects or the privatisation of the bank requires guarantees and funds that exceed the cost of liquidation. Also, as has occurred in a few countries, procedures could be introduced to ensure that insured depositors and other creditors are paid promptly (see Kaufman and Seelig (2002)).

However, liquidations have rarely been used immediately in system wide crises because of the risk of provoking bank runs in the banking system as a whole. Liquidations may also increase financial instability in other ways. The initiation of bankruptcy procedures can disrupt financial markets if applied to the failure of a very large and complex bank (or other financial institution). A simultaneous close out of all market positions of a failed firm may move market prices significantly and result in losses for other firms, including counterparties. It was to avoid such a situation that the New York Fed co-ordinated equity support from the main counterparties of LTCM in autumn 1998. Moreover, reimbursing depositor and creditor claims through selling the failed bank's assets, can also be a long and disruptive process that reduces liquidity for depositors and creditors directly and, through knock on effects, may reduce liquidity in the economy more generally.

Estimating the loss in a distressed bank is a key step in a bank resolution. One technique used to determine the cost of bank liquidation is to estimate the liquidation value of the bank's assets, the cost of satisfying the insured liability holders' claims and paying the related administrative expenses involved. The cost of liquidation can then be compared to selling the bank to determine the least cost solution. If the value of the bank as a going concern is high relative to its break up value then it is more likely that selling the bank is less costly than liquidating it. On the other hand, if a large part of the bank's liabilities are uninsured, liquidation might be cheaper. In the United States, the FDIC chooses its bank resolution strategy on such an explicit least cost basis. However such cost comparisons only consider the *direct* financial costs in alternative resolutions. This calculation may understate the cost of liquidation in systemic wide crises since it ignores any knock on effects on the rest of the financial system[11]. On the other hand, the cost of selling the bank may be understated to the extent that bank restructuring protects the investments of uninsured depositors and other creditors. This risk of moral hazard can be minimised by forcing uninsured depositors and other creditors to take the same "haircut" in an assisted sale as they would in a liquidation.

[11] In the United States there is a systemic risk exception clause to the least cost approach. In practice, there has been no need so far to invoke this exception.

Mayes *et al* (2001) put forward a resolution proposal for a failed bank that combines some of the benefits of maintaining a bank's activities while imposing the same losses on shareholders and uninsured creditors that they would face if the bank had been immediately liquidated[12]. The scheme involves the government immediately, albeit temporarily, taking over any bank with negative net worth. Therefore, existing shareholders would be wiped out. The size of the bank's loss – i.e. liabilities minus assets – would then be estimated and this loss would be imposed first on uninsured creditors. The bank would then be returned to positive net worth and then sold. In the meantime, the bank would continue operating normally and depositors and creditors would have immediate access to, and receive interest payments on, the funds due to them.

3.A Unassisted resolutions

(i) Bank status unchanged

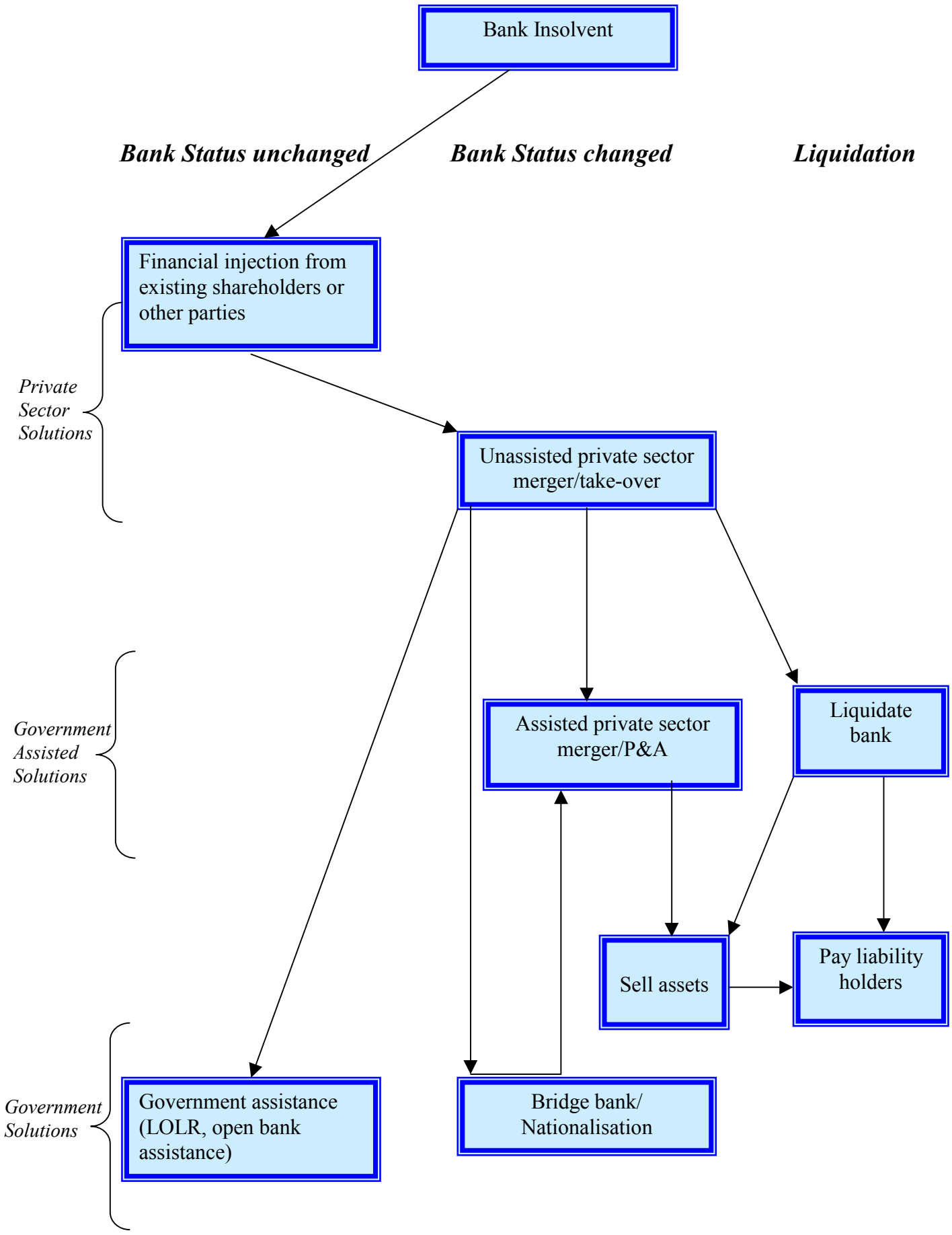
When a bank supervisor discovers (or is informed) that a bank is at, or close to, the point of insolvency the first response is to see if the bank can be rehabilitated without government assistance. There are often several steps in the process. The bank can curtail lending, either in a specific line of business or across the board, thus reducing the growth rate of the bank or the bank can sell assets or an entire part of its business to reduce its size. A request (demand) for additional capital from existing shareholders or other interested parties is often issued, management changes can be required and operational changes are almost always undertaken. In many cases these measures are sufficient to return the bank to profitability.

(ii) Bank status changed - private sector merger

If a capital infusion from existing shareholders or other interested parties is not available, an unassisted merger with another healthy financial institution is usually the next course of action. For an unassisted merger to occur, the extent of losses must be transparent to the prospective acquirer. If the capital of the acquiring bank is large relative to the assets of the target bank, then the losses may not be an important factor in the business decision. In this case any losses in the failing institution can be viewed as the cost of acquiring a branch or entering a new geographic area, but

[12] Nonetheless, there remains a basic conflict between imposing costs on uninsured creditors and avoiding systemic risk. Although through imposing losses on creditors, this proposed scheme limits moral hazard it may increase financial instability. Banks with large deposits at the failed bank may face substantial losses, it may result in a disruption to financial markets and the payments system more generally and it could trigger creditor runs at other banks.

Graph 1: Decision Tree in Crisis Resolution



the losses will not materially affect the financial condition of the acquiring bank. On the other hand, if the prospective acquirer and failing bank are of roughly similar size, then an accurate assessment of the failing bank's losses is essential. If the acquiring bank significantly underestimates the losses in the failing bank, the combined bank could end up failing too.

It is incumbent on bank supervisors to determine whether the proposed merger will yield a financially viable bank. Therefore, supervisors should exam the troubled bank to determine the size of losses to ensure that the acquiring institution has sufficient capital to absorb potential losses in the failing institution.

3.B Assisted resolutions

If an unassisted private sector merger is not possible, often a decision is made to liquidate the bank. However, if some form of government intervention is considered various forms are available.

(i) Bank status unchanged

One of the oldest forms of assistance is lender of last resort (LOLR). Central banks usually only provide emergency liquidity in potentially systemic situations and only for a limited period. Liquidity support can buy time to assess the underlying solvency position and to assess alternative resolution strategies. Although LOLR is intended for illiquid but fundamentally solvent banks, in practice it is often extremely difficult in the time required to distinguish between a liquidity and a solvency problem. And in most recent system wide crises central banks have made losses on lending to banks that turned out to be insolvent (see Table 4). Mechanisms should be put in place to ensure that such lending is for a limited period (eg a profile of interest rates on loans that increase over time to encourage banks to repay early). In situations where unviable financial institutions are closed the central bank often makes it clear that it stands ready to supply liquidity to the remainder of the financial system in order to help maintain overall confidence[13]. For example, the Bank of England announced such a commitment when Barings was closed in March 1995. Also, when Sanyo Securities was suspended in November 1997, the Bank of Japan injected a large amount of liquidity to offset the temporary marked decline in supply of money market liquidity at the time.

[13] When a large bank is closed central banks sometimes also act as an intermediary to facilitate the unwinding of positions between the failed bank and its counterparties.

Open bank assistance occurs when the government provides financial assistance to a distressed bank without taking over the bank or eliminating entirely the current stockholders' position. The assistance can be in the form of capital or through purchasing non-performing assets from the bank. It allows the operations of the bank to continue uninterrupted. However, there are potential weaknesses to open bank resolutions. Most importantly, if the assistance leaves the bank's management in place and protects the existing shareholders' investment it can dramatically increase moral hazard. Making government support conditional can reduce this problem for example, through replacing management, eliminating or downgrading existing shareholders' interests, and mandating an infusion of private sector capital.

There is also generally no way to determine whether the transaction is least cost since there is no comparable estimate of the loss by the private sector. The assistance can also require extensive negotiation between the bank and the government over the extent and conditions of the assistance. This can lead to a lack of transparency and government accountability.

In practice, open bank assistance has had mixed success at best and often required repeated capital injections before problems have been solved. So although the initial government capital injection might be small it can quickly build up.

(ii) Bank status changed

A common failed bank resolution is some type of assisted merger or acquisition (mergers). The transaction can be completed with another bank or by other types of institutions (if permitted by law). A merger provides business continuity for both borrowers and depositors. They can be structured in many different ways, depending on the size and complexity of the distressed bank, the funding constraints of the resolution authority, and the amount of time until failure. Banks can also be split into pieces and the deposits, branches and assets sold off separately.

Assisted mergers are sometimes accomplished using purchase and assumption transactions (P&A). In an assisted P&A the acquirer *purchases* the assets and *assumes* the liabilities, in whole or part, of

the failed bank, with the resolution authority compensating for the difference. Here, existing shareholders lose all of their investments. Uninsured creditors, too, will lose part of their investment if the P&A is only partial. For example, assume that a failed bank has net assets of $90

million, liabilities of $100 million and a capital account of -$10 million. The acquiring bank might purchase the assets ($90m) and assume all of the liabilities ($100m), leaving a $10m deficit. The acquirer might have bid $4m for the franchise value of the bank, leaving the resolution authority to contribute $6m to balance the book. Whether this cost is lower than that of liquidation would depend on the extent to which liabilities are insured or not. If insured liabilities are more than $96m then the P&A would cost the authorities less than a liquidation. But if insured liabilities are less than $96m then liquidation would be the cheaper option (see Table 1)[14].

Table 1: Alternative Costs of Resolution: P&A v Liquidation

The failing bank's balance sheet ($million)

Assets	90	Liabilities	100
		Capital	-10

Cost of P&A ($ million)	Cost of liquidation – scenario 1 ($ million)	Cost of liquidation – scenario 2 ($ million)	Cost of liquidation – scenario 3 ($ million)
Loss 10	Insured 100 liabilities	Insured 96 Liabilities	Insured90 Liabilities
Minus Franchise 4 Value	*minus* assets 90	*Minus* Assets 90	*Minus* Assets 90
= 6	= 10 choose P&A	= 6 indifferent between P&A and liquidation	= 0 choose liquidation

P&A transactions can be structured according to how much of the assets and liabilities of the failed bank are sold to one acquirer and the type of workout strategy that is adopted for the failed bank's non-performing assets. For instance, the resolution authority could decide to remove all of the non-performing and repossessed loans and substitute cash. Alternatively, the non-performing assets can be left in the bank and the government can provide a limited guarantee to the bidder against future losses. The guarantee can be made against any combination of a decline in asset value, loss on sale of the assets, income lost from non-performing loans, or legal costs for foreclosures. Although loss guarantees reduce the government's cash at resolution they may not provide the acquirer with the proper incentive to minimise the government's future losses on the non-performing loans. In fact, if

[14] It is assumed here that the administrative costs of paying out depositors are minimal.

the acquirer is paid an asset management fee prior to selling the assets there exists incentives to hold the bad assets for an extended period of time – a classic principal/agent problem. The eventual cost to the authorities may be higher than estimated at the time of the sale transaction.

One way to reduce the principal/agent problem is to align the interests of the bank and the government. One possibility is to pay a very small management fee and for the bank and the authorities to share the losses on a defined pool of risky loans (non-performing loans, or potentially non-performing ones). For example, the government could agree to absorb 90% of the expenses and losses on the pool with the acquirer agreeing to absorb the remaining 10%. There might be a "stop loss" agreement where any losses over a set amount would fall to the government or where the acquirer's share of losses would be dramatically reduced. Under this structure the acquirer chooses to make the loss sharing a part of the payment for the failed bank. Aggressive asset management and sales of the risky assets might result in losses that are less than estimated, thus decreasing the acquirer's cost for the deal.

Alternatively, the government can sell assets to an acquirer at a discount with a guarantee that the government shares in any improvement in asset values. Under a gain sharing arrangement a pool of assets would be defined an estimated value calculated. As the loans are repaid or sold the proceeds would be divided according to the sharing agreement, perhaps 90% to the government and 10% to the bank. After collections exceed the original estimated value the sharing of proceeds would shift to the bank's advantage. Conceptually either scheme should work in about the same way, aligning the incentives of the acquirer with those of the government. In practice, it is easier to set up an effective loss sharing arrangement than a gain sharing one.

The major difference in the operation of loss sharing or gain sharing is the pricing. A loss sharing agreement is easier for both parties to price than is a gain sharing one. In a loss sharing arrangement the approximate value of the agreement is easy to observe and thus to price because the maximum loss is generally set in the contract. For gain sharing, the value is much more dependent on the original valuation of the pool of assets. If the value is set artificially low the acquirer may reap a windfall, if set too high, the gain sharing will have no value.

In cases where impaired assets are removed from banks they are usually transferred to a specialised public-sector owned asset management company (AMC). The purpose of AMCs is either to dispose

of impaired assets rapidly, or to help restructure corporates over the longer-run. In systemic crises, AMCs have often been slow to sell impaired assets or to restructure corporates (Klingebiel (2000)). This is often due to the government's unwillingness to recognise the extent of its loss (or wishful thinking that the markets may recover enough to eliminate a portion of the losses). These delays can result in private sector assets (loans and real estate) being held by the government for inappropriately long periods and can compound the losses by increasing holding costs. However, Sweden's AMC was successful partly because a lot of the impaired assets were homogenous (real estate) and thus relatively easy to sell.

Box 2: Advantages and disadvantages of putting impaired assets into a centralised AMC compared with leaving them in individual banks (e.g. a subsidiary of the failing bank)

Advantages	Disadvantages
• Economies of scale: scarce skilled employees, large pool of assets easier to securitise (if allowed) especially if fairly homogenous, more leverage over debtors and may be given special powers to help loan recovery and bank restructuring;	• a large AMC, especially if holds large portion of banking system assets, may not be independent from political pressure (eg in Indonesia); there may be diseconomies of scale beyond a certain number of distressed borrowers;
• Breaks link between banks and corporates so may improve loan collectibility;	• where there is some possibility of loan repayment individual banks have informational advantage over their borrowers (non-homogenous loans);
• Single remit and allows banks to focus on intermediation role.	• banks have more incentive to recover losses than a public sector agency. This function could be carried out in a separate unit or subsidiary of the bank.

In the United States, the Resolution Trust Corporation (RTC) was also very successful in selling a very large volume of assets over its six year life. The RTC took over 747 savings institutions with $402.6 billion in assets. Of those, $157.7 billion were sold while the institutions were under government control, $75.3 billion were passed to acquirers at resolution and $169.6 billion were retained by the RTC and sold subsequent to resolution[15]. The RTC was able to take advantage of the huge volume of assets to develop a number of sales techniques for the various types of assets, including sales of single assets, auctions of asset pools (both by open outcry and sealed bid), securitisations, and joint partnership arrangements.

[15] FDIC (1998) pp. 29.

Nationalisation (where allowed) has typically occurred when a very large bank fails. The government authorities take over the banks by nationalising them, usually eliminating the stockholders interest but making whole all liability holders (depositors and other creditors). Following the banking crises in Norway and more recently (end 2000) in South Korea the government became owner of more than half of the banking system.

Nationalisation allows the authorities to take over the bank quickly, restoring or maintaining depositor confidence. It also maintains the payment system and leaves banking relationships intact, thus preserving the franchise value of the bank. During the period of nationalisation the bank's asset values can be determined, the bad assets can be liquidated (and funded) over time and the government can then return the bank to the private sector. Avoiding the scale of the bank's assets until economic conditions have recovered can also reduce the fiscal costs of crises (see Sandal (2002)).

However, there are a number of problems with nationalising banks. First, government managers do not have the same incentives as private bank managers. In market economies, private sector banks are essential for efficiently allocating credit. On the one hand, government managers could be so risk averse that they refuse to grant new loans to financially viable firms. On the other hand, government-run banks can be used to create "policy loans" and thus create future losses. Evidence suggests that countries with higher shares of state-owned banks tend, on average, to display higher a percentage of non-performing loans and higher operating costs (Goldstein and Turner (1996)). But causation can run both ways here.

Bridge banks are also a form of nationalisation, but with a set time period. In the United States, for example, this is for an initial limit of two years with a possible extension to five years. Bridge banks are conceived as a holding period so that a final resolution strategy can be effected. Most industrialised countries with systemic crises have assumed temporary ownership of troubled large banks with the aim of restructuring so they can be sold to a private institution.

A bridge bank can be an efficient technique for dealing with very large, complex banks that need to continue ordinary business operations. Little additional money is usually required in a bridge bank as the bank can continue to operate and raise deposit under the government's temporary ownership. While the government can maintain the business operation of the bank, the set time period forces the resolution authority to focus on cleaning up the bank's balance sheet in preparation to sell it.

Prior to authorising a bridge bank the authorities should make a determination that it is likely to result in a lower cost resolution strategy than alternatives.

Table 2: Alternative Resolution Strategies for Failed Banks: Who Bears the Losses?

	Managers (lose job)	Shareholders (lose money)	Creditors (lose money)	Employees (lose jobs)
Bank Status Unchanged				
Shareholders capital injection	No	No	No	No
Government injection[1]	Probably	Probably, at least partly	Possibly, partly	Probably
Bank Status Changed				
M&A[2]	Possibly	Probably, at least partly	Possibly, partly	Possibly
P&A[2]	Possibly	Yes	Yes if P&A partial	Possibly
Nationalisation/Bridge bank	Probably	Yes, at least some	Possibly	No
Liquidation	Yes	Yes	Yes, uninsured	Yes

1 Government injection is usually conditional on changes in senior management, some losses to shareholders and restructuring often results in job losses. It may also be preceded by financial restructuring whereby uninsured creditors accept some losses.

2 A private sector M&A would typically replace managers if there are large business overlaps between the acquirer and the acquired. A write-down of existing shareholders' capital is likely beforehand and there may be some losses to uninsured creditors. In a P&A, existing shareholders will be wiped out and uninsured creditors will make losses if the acquirer assumes only some of the original banks' liabilities. Mergers often result in the consolidation of bank operations that result in staff reductions.

4. Type of shock and resolution technique

Systemic crises occur along 2 dimensions: (i) the breadth of the shock that hits the financial system. For example, is the impact of the initial shock confined to one or two banks only or does it affect many banks? and (ii) the depth of the transmission across the system. Such contagion or spillover effects could reduce the value of other banks' assets through direct exposures to the failed bank or indirectly through the impact of the failing bank's reaction to the shock, for example, through depressing the price of marketable assets that are also held by other banks. Also, on the liability side, an initial bank failure could result in a withdrawal of deposits from other banks thought to face similar problems as the failed bank.

The extremes of these two dimensions are shown in Table 3.

Quadrant A consists of an idiosyncratic shock to one bank where the contagion effects for the system are thought to be negligible such as the failure of a small or medium-sized bank due to management failure or fraud. Quadrant B shows where there are common shocks hitting a number of banks but where the spillover effects are likely to be small. This would be the case where a

group of banks have limited interlinkages with the rest of the financial system, such as a specific shock to a region (New England in the early 1990s) or sector (US savings and loans crisis in the 1980s). Quadrant C shows where the shock is specific but the linkages are thought to be strong. This would normally involve a so-called Large Complex Financial Institution (LCFI). In the past this might have included the failures of Continental Illinois and LTCM. Quadrant D depicts a situation where there is a common shock hitting a number of banks that could potentially affect the whole system. There is of course a continuum between these polar cases. If the region or sector is large enough then B and D would be interchangeable while if one bank dominates the banking system so too would C and D.

If an idiosyncratic shock causes the failure of a small or medium-sized bank – quadrant A – the policy response itself, or the bank's reaction to the policy action, is likely to have no direct short term impact on the rest of the banking system. Its borrowers, for example, could probably switch, albeit at some cost, to other lenders. Other similar banks thought to be weak would lose deposits but there would be a flight to quality *within* the banking system rather than a reduction in the aggregate deposits of the system. In contrast, if one very large bank fails (quadrant C), or a number of banks fail at the same time (quadrant D), then this may not be the case. If the LCFI failure is due to a purely specific factor, such as fraud, the systemic threat will depend on the size and type of direct linkages that the failed bank has with the rest of the financial system. But if the shock is more general, other unconnected banks might also be vulnerable or perceived to be so by lenders.

In case D – a system wide crisis – the key immediate aim is to stabilise the financial system as a whole (at minimum fiscal and moral hazard cost) and only then to focus on restructuring the failed banks. In case C – the failure of one large bank – the focus is to maintain the activities of the problem bank or failing this to unwind it in an orderly fashion to limit the impact on other financial institutions and markets. In the United States the FDIC would likely set up a bridge bank immediately following the failure of a (deposit-taking) LCFI (see Bovenzi (2002) and the accompanying paper by Marino and Shibut (2002)).

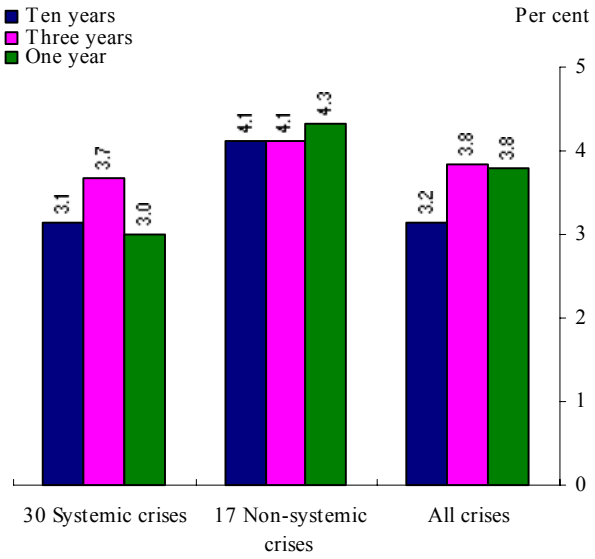
The policy alternatives during a 'systemic' crisis are further restricted because these crises have occurred when banks have faced a common marked adverse shock to their assets usually a macroeconomic downturn, such as occurred in the Nordic countries and Japan, rather than resulting from the impact of contagion following the failure of just one individual bank (see Borio (2003)). This is seen in Chart 1 which shows the pattern of output growth immediately prior to 47 crises –

Table 3: Types of Shocks to the Banking System

TRANSMISSION OF SHOCK	SHOCK: Idiosyncratic	SHOCK: Common
No widespread contagion	**Small-medium bank** **A** **Barings** **BCCI**	**B** **Sectoral or regional banks** **S&L (US)**
Potential widespread contagion	**Continental Illinois** **C** **LTCM** **Isolated LCFI failure**	**Small banks (UK)** **D** **Nordic Countries (early 90s)** **Japan (90s)** **East Asia (late 90s)**

30 systemic ones and 17 non-systemic ones[16]. Prior to systemic crises there tends to be a boom in output growth a few years beforehand but a marked fall in output immediately preceding the crisis. This means that the external environment in which to resolve a systemic crisis is usually more difficult than in a non-systemic one.

Chart 1:
Pre-crisis average (median) GDP growth in 47 banking crises



Source: Bank calculations

[16] Systemic banking crises are defined as where much or all of bank capital in the system is exhausted (see Caprio and Klingebiel (1996), 1999)).

During a systemic crisis it may be difficult to find well capitalised domestic private banks to buy the failed banks. More reliance will need to be put on takeovers by foreign banks or the government (or other government support). It may also be more difficult to penalise some stakeholders. In principle, existing shareholders' capital can, and should, still be written down during systemic crises. However, evaluating the underlying value of impaired assets will be more difficult than during normal market conditions. Estimates of cash flows, interest rates and underlying business conditions will be uncertain, as will the value of collateral. This may result in an understatement of losses thus imposing costs on the government rather than existing shareholders, such as occurred recently in Mexico and Indonesia. It may also be difficult to impose losses on creditors without exacerbating the liquidity crisis.

There may also be insufficient high quality managers to replace the management of failed banks. On the other hand, in principle at least, there may be more justification to keep managers in their jobs when bank failures are caused by *unexpected* macroeconomic events rather than bank specific ones. If the cause of the banking problem is bank specific it is more likely caused by poor management. In the most serious cases - such as fraud - losses could include criminal proceedings. But if the shock was purely exogenous to the bank, such as a terrorist attack, there may be a case for being more lenient in any rescue. That said, in practice, in deep cyclical downturns when widespread bank failures usually occur, banks appear to be partly responsible for creating the boom in credit and spending beforehand (see Chart 2). More generally, most studies on the causes of banking crises isolate bad management as an important causal factor. The European Commission (1999) found that in a sample of 117 bank failures in the EEA, management and control weaknesses were significantly contributory factors in nearly all cases. The key role played by poor management is also found in academic studies. Dziobek and Pazarbasioglu (1997) found in a sample of 24 systemic banking crises in emerging-market and developed countries that deficient bank management and controls (in conjunction with other factors) were responsible in all cases while Caprio and Klingebiel (1996) found in a study of 29 bank insolvencies, deficiencies in bank management were often significant.

Often too a system wide banking crisis is accompanied by a currency crisis. This may increase banking system losses if banks, or their customers, have large net foreign currency exposures. And the authorities may respond by *increasing* interest rates to reduce pressure on the domestic currency rather than by *reducing* rates to help alleviate pressure on the banking system.

5. Empirical evidence on crisis resolution

5.A Short run impact

In all recent widespread banking crises the central bank has provided liquidity support to problem banks to offset withdrawals from depositors and other creditors. Also blanket guarantees of depositors and often other creditors have been provided, albeit sometimes temporarily (see Table 4). Confidence in the banking system has usually been quickly restored.

Based on a questionnaire response, the OECD (2002a) recently compared the techniques and practices used in member countries. In addressing problems, the central bank or government agency typically stepped in fairly early on to supply liquidity which in most cases helped to avert a panic by investors. Most governments protected depositors, in whole or part, up to the statutory minimum. Liquidations were used only occasionally and typically only for smaller institutions or where only a small part of the banking system was impaired. When large commercial banks have been in trouble, problems have been resolved usually through mergers and some mix of government capital injection and increased government control. Existing shareholders' capital has been written down[17]. In most countries, government ownership has only lasted for a short period until a private buyer has been found. But in some crises, such as in Norway, banks have remained nationalised for years after the crisis.

In the recent crises in east Asia, Lindgren *et al* (1999) found that the announcement of temporary blanket guarantees to all depositors and other creditors were successful in stopping runs by domestic deposits although not in securing rollover of foreign liabilities. De Luna Martinez (2000) found not a single case of a depositor bank run during the Korean and Mexican crises once blanket guarantees were provided to depositors and other creditors and central bank liquidity was provided for a short period. More generally, Demirguc-Kunt, Detragiache and Gupta (2000) found in a sample of 36 developed and emerging-country banking crises that at the outset of crises, deposits in the banking system *as a whole* did not decline. One interpretation of this is that blanket guarantees, which have usually been provided in systemic crises, have been successful in stopping banking system runs. But an alternative view is that broad guarantees were not needed, and depositors

[17] In some countries, shareholders have been left with nominal amounts because of legal restrictions on full write downs or to avoid costly legal challenges by existing shareholders.

would in any case have simply shifted from perceived weak domestic banks to strong ones. The recent Indonesian situation appears to provide evidence for the first interpretation. In Indonesia it was only after the central bank shifted from a limited to a full guarantee that liquidity runs were stemmed[18]. However, Goldstein (2000) believes that the limited deposit insurance scheme could have avoided a bank run had the public been convinced at the time that all, rather than just a few, of the insolvent banks in the system were being closed.

In a sample of 40 developed country and emerging market crises, Honohan and Klingebiel (2000) find that open-ended liquidity support and blanket government guarantees are associated with higher fiscal costs of crisis resolution[19]. However, this does not imply necessarily causation. Fiscal costs would be expected to be higher the larger the adverse shock to the banking system. But in face of such a potential systemic threat it is more likely that the authorities would also provide liquidity support and guarantees to liability holders. For example, full-blown systemic crises such as those in Japan, east Asia and in the Nordic countries would be expected to incur higher resolution costs together with government guarantees and LOLR, than smaller banking problems such as the US S & L crisis, Credit Lyonnais and the banking problems in Australia and New Zealand in the late 1980s. However, Honohan and Klingebiel include such episodes of banking problems as well as major crises in their sample. This suggests that comparisons of crisis intervention techniques and fiscal costs need to take account of the magnitude of the crisis. Second, even if intervention results in higher fiscal costs this needs to be weighed against the potential benefits to the wider economy from avoiding a systemic meltdown of the financial system. In the United States' banking crisis in the early 1930s the absence of depositor guarantees and liquidity support kept the fiscal costs low but the adverse consequences to the broader economy were severe with output falling by 30% from peak to trough.

Table 5 shows some simple relationships between fiscal costs and government guarantees and liquidity support in a sample consisting only of *systemic* crises – that is where the capital of the whole banking system was depleted or close to depletion[20]. The regressions also allow for quantifiable proxies for the size of the shock to the banking system – non-performing loans/ total

[18] According to Lindgren *et al* (1999) the run occurred because depositors thought they would only receive limited protection (up to the equivalent of $2000) as was announced for the first round of 16 banks that were initially liquidated in November 1997.
[19] Open-ended liquidity support is defined as liquidity support provided for more than 12 months which is greater than the aggregate capital of the banking system. Blanket guarantees are either explicit government guarantees or implicit ones proxied by where state banks account for more than 75% of the banking system's assets.
[20] Clearly some of the other resolution techniques discussed in section 3 may affect the costs of resolution but these are difficult to quantify in a simple metric.

loans[21], the amount of bank intermediation in the economy (measured by bank credit/GDP) and whether a currency crisis also occurred simultaneously – and the ability of the financial system to withstand the shock (crudely proxied by GNP per head).

Fiscal costs reflect the various types of expenditure involved in rehabilitating the financial system, including liquidity support, purchases of non-performing loans, bank recapitalisation and payments made to depositors and other creditors, either implicitly or explicitly through government-backed deposit insurance schemes. These estimates may not be strictly comparable across countries. They may also overstate the final costs to the government to the extent they will receive future proceeds from re-privatisation and income from loan recoveries (see Sandal (2002) for a discussion of these issues).

The results also need to be treated with a degree of caution, because of the limited sample of crises (33) and the potential importance of country specific factors affecting the costs of crisis. Nonetheless, bearing these caveats in mind, liquidity support on its own is positively associated, albeit only weakly, with higher fiscal costs of crises (Table 4 equation 1). But this relationship disappears altogether once factors proxying for the size of the shock and ability to withstand the shock are included (equations 2-3). There also appears to be, at most, weak positive association between government guarantees and fiscal costs in these systemic crises (equations 4-6). Fiscal costs tend to be higher, perhaps not surprisingly, in countries with a higher degree of banking intermediation and where simultaneously a currency crisis occurred, most of who had in place previously a fixed exchange rate regime (see also Table 6). A marked depreciation in the domestic exchange rate could result in losses for banks with large net foreign currency liabilities (eg Korea 1997) or if banks have made loans to firms with large net foreign currency exposures, who default on their loans (eg Indonesia 1997). Moreover, the fiscal costs of *twin* crises seem to be high, no matter whether liquidity support is given - for example in east Asia, Mexico and Finland – or not – such as in a number of Latin American countries in the early 1980s (see Table 6).

But an important issue is whether crisis intervention techniques reduce or not the wider costs to the economy – proxied here by output losses during the crisis period[22]. The regressions shown in Table 7 suggest that open-ended liquidity support is associated with *larger* declines in output during a

[21] Data on non-performing loans need to be treated with caution. The data are available only for some countries and in some cases may understate the degree to which loans in the banking system are impaired.
[22] Output losses are measured as either the sum of growth rates (YCOSTS1) or output levels (YCOSTS2) during the banking crisis from the pre-crisis trend. For a discussion of the issues in measuring the output costs of banking crises see Hoggarth and Saporta (2001).

banking crisis. This is still the case after allowing for other factors that may affect the output cost of banking crisis such as the amount of banking intermediation and whether a currency crisis also occurs or not (Table 7 equations (1)-(4)). But there is no evidence, either positive or negative, of association between deposit guarantees and the output costs of crises (Table 7 equations (6) and (7)).

Bordo et al (2001) also found, in a sample of 29 countries over the 1973−97 period, that banking crises were associated with much bigger output losses when open-ended liquidity support was provided (but guarantees had no effect either positive or negative). They argue that liquidity support may have reflected a reluctance of some countries to allow bank failures. This meant that support was in some cases given to insolvent banks as well as to those that were fundamentally sound but illiquid. This may have increased moral hazard and enabled some banks to gamble for resurrection and facilitated the continued flow of financing to loss-making borrowers.

5.B Longer run impact

In a sample of 24 systemic banking crises, Dziobek and Pazarbasioglu (1997) considered which crisis resolution strategies were most effective in improving banks' performance. They found that resolution measures were more successful in improving the banking system's balance sheet (stock) positions than their profit (flow) performance. Balance sheets can more easily be improved through an injection of equity or swapping bonds for bad loans. But improving profits is more difficult, and takes longer, because it requires *operational* restructuring.

Demirguc-Kunt, Detragiache and Gupta (2000) also find that real bank credit fell markedly in the first three years after crisis, despite some recovery in real output, as banks switched their portfolio into other assets[23]. This highlights the difficulty of getting banks to intermediate again in the aftermath of a crisis perhaps reflecting the persistency of poor credit worthiness of borrowers and lack of good collateral. Some banks may also have switched their portfolio into more liquid and

[23] There is a difficult identification problem of knowing the extent to which the decline in the amount of credit and its share of total assets reflects either (i) a desire for banks to reduce lending, (ii) a constraint, such as insufficient capital, on the ability of banks to lend or (iii) a fall in loan demand by banks' customers.

Table 4: Features of Bank Resolution in Recent Systemic Crises

	RESOLUTION TECHNIQUES										LOSSES TO			COSTS AND BENEFITS		
	Non-performing loans at peak (% of annual GDP)	Speedy and transparent resolution	LOLR (% of annual GDP at peak)	Blanket guarantee to liability holders	NPLs valued realistically	Government open bank assistance	Private sector merger or P&A	Nationalisation (% of banking system assets)	Centralised AMC	Liquidation (% of banking system assets)	Managers	Shareholders (eliminated or diluted)	Creditors	Gross fiscal costs (% of annual GDP)	Recovery in bank credit	Recovery in bank profits (% of assets)
Sweden 1991-93	11	Yes	No	Yes[1]	Yes, but gradually	Yes	Yes	No, not long term[12]	Yes	No	Yes	Yes, but mixed[14]	No	4	Large fall; slow recovery	Fast
Norway 1988-92	9	Yes	Yes (3.6) – losses	No[2]	Varied across banks	Yes	Yes	Yes (50)	No	Yes (1)	Yes	Yes	No[3]	2.5	Modest fall; slow recovery	Slow
Finland 1991-93	9	Yes	Yes – losses[11]	Yes[1]	Yes, but gradually	Yes	Yes, foreign only	No, not long term[13]	Yes	No	Yes	Yes, but mixed	No	11	Large fall; no recovery	Slow
Japan 1992-	13	No	Yes – losses	Yes	No, forbearance	Yes	Yes	Yes but limited	Yes	Yes	Yes	Yes	No	20	Modest prolonged fall; no recovery	No recovery
Mexico 1994-95	11	No	Yes – no losses	Yes	No, at book value	Yes	Yes, mainly foreign	No	Yes	No, bankruptcy laws unclear	Yes	Yes but limited	No	20	Very large fall; no recovery	Slow
Thailand 1997-98	15	Yes	Yes (22) – losses	Yes	Yes	Yes	No[4]	Yes (12)	No[5]	Yes (13)	Yes	Yes	Some initially	44[6]	Large fall; no recovery	Slow
South Korea 1997-98	30-40	Yes	Yes (2) – no losses	Yes	Yes	Yes	Yes	Yes (14)	Yes	Yes (15)	Yes	Yes	No	21[7]	Modest fall; fast recovery	No recovery
Indonesia 1997-98	65-75	No	Yes (17) – losses	Yes but not initially[8]	Not initially	Yes[9]	No[4]	Yes (20)	Yes	Yes (18)	Yes	Yes	No[10]	52.5	Very large fall; no recovery	Slow following a very large fall

Source: Batunanggar (2002), De Luna Martinez (2000), Drees and Pazarbasioglu (1998), Honohan and Klingebiel (2000), Lindgren et al (1999), OECD (2002a), Nakaso (2001), Pangestu and Habir (2002) and Sandal (2002).

1 Blanket guarantee were introduced in 1992 but not removed until July 1996 in Sweden and December 1998 in Finland.

2 Government announced though that the stability of the banking system would be protected.

3 Aside from one small bank liquidation - Norion Bank - where private creditors only received 70% of their investments.

4 But merger of state banks.

5 Decentralised approach. Impaired assets handled within individual banks.

6 Thailand estimate includes contingent liabilities but excludes future estimated revenues to the government from bank asset recoveries (estimated 9% of GDP by IMF (2002)).

7 Between November 1997-June 2002 a net 114.3 trillion won of public funds was injected into financial institution (originally 156.3 trillion was injected of which 42 trillion won has so far been withdrawn).

8 Bank runs continued until a blanket guarantee was announced.

9 Including to unviable banks.

10 Losses initially imposed on creditors and large depositors of 16 liquidated banks were detracted since the blanket guarantee applied retroactively.

11 Losses on capital injected (into Skopbank) rather than LOLR in the traditional sense.

12 However, the Swedish state took over Gota Bank and Nordbanken in the autumn of 1992, the third and fourth largest banks at the time. After bad assets were transferred to "bad banks", the banks were merged. Since the banking crisis the Swedish government kept a significant, although gradually reduced, ownership share in Nordbanken. Norbanken is now part of Nordea, and the Swedish government is the largest shareholder in Nordea with an ownership share of 18.6%.

13 The government took over Skopbank and the Savings Bank of Finland (a commercial bank based on the merger of 41 small savings banks). The Savings Bank of Finland was split up and sold fairly rapidly whereas the government decided to wind up Skopbank in 1998.

14 In the case of Nordbanken, private shareholders (which held around 30% of the equity - the Swedish government held the rest) were paid an amount for their shares equal to the share price at share issue the year before the crisis (2 bn SEK in total). This is perhaps a rather special case where the Swedish government felt responsible for the bank's problems as the major shareholder. The state also feared a law suit from private shareholders on the grounds of misrepresentation of the financial situation in Nordbanken in connection with the share issue.

Table 5: Impact of Liquidity Support and Government Guarantees on Fiscal Costs (FCOSTS) of Resolution in Systemic Banking Crises

	A. Liquidity Support (LOLR)			B. Blanket Guarantees (GUAR)		
	(1)	(2)	(3)	(4)	(5)	(6)
LOLR	6.9 (1.3)	4.0 (0.8)	3.0 (0.4)			
GUAR				6.8 (1.2)	6.8 (1.3)	1.2 (0.1)
CRGDP		0.22 (2.1)			0.23 (2.2)	
CUR		8.1 (1.5)	12.5 (1.6)		8.1 (1.5)	12.7 (1.6)
NPLGDP			0.5 (1.9)			0.5 (2.0)
GNPP		-0.8 (1.3)			-1.0 (1.7)	
R^{-2}	0.02	0.13	0.26	0.02	0.16	0.25
DW	2.3	2.2	1.5	2.2	2.0	1.6
Number of observations	33	33	19	33	33	19

FCOSTS: Fiscal costs of resolution % of GDP. Source: Caprio and Klingebiel (1999), Barth et al (2000), IMF (2002), OECD (2002a, 2002b).
LOLR: 1 where liquidity support provided for more than 12 months that is greater than the aggregate capital of the banking system, 0 otherwise. Source: Honohan and Klingebiel (2000).
GUAR: 1 where explicit government guarantee or implicit one (where state banks account for 75% or more of banking system assets), 0 otherwise. Source: Honohan and Klingebiel (2000).
CRGDP: Bank credit to the private sector/annual GDP (%). Source: IMF, International Financial Statistics.
CUR: 1 where currency crisis, 0 otherwise. Currency crisis is a nominal depreciation (against the US dollar) of 25 per cent combined with a ten per cent increase in the rate of depreciation in any year of the banking crisis period. Source: IMF, International Financial Statistics.
NPLGDP: Non-performing loans/annual GDP (%). Data available for only 19 countries.
GNPP: GNP per head (US$000s, PPP) in the year that the banking crisis began.

safer assets. In many cases, liquidity was needed to finance depositor runs especially by foreign residents while government bonds helped banks with depleted capital to meet their minimum required capital ratios since they carried a lower regulatory risk weight than loans.

Some caution is needed in interpreting credit data during crises, for example, the treatment of loans that are written off. Nonetheless, in the aftermath of most recent systemic crises bank lending has been depressed for years (see Chart 2). In fact, at the end of 2001 real bank lending in Finland and Mexico was still 17% and 67% respectively below pre-crisis levels. Mexican banks have been discouraged from lending, partly by a lack of creditor rights and inadequate bankruptcy laws resulting in even good borrowers not repaying loans. Interestingly, lending has been maintained most in Norway and Korea – two countries that initially used nationalisation as a resolution method. In most banking crises, profits too, have remained negative for years (see Chart 3).

Table 6: Liquidity Support, Depositor Guarantees and the Fiscal and Output Costs of Banking Resolution in 33 Systemic Crises 1977-2000[a]

	Number of crises	Average length of crisis (years)	Non-performing loans (per cent of total loans)[b]	Bank credit/ annual GDP (%)[c]	GNP per head (US$ 000s, PPP basis) at the start of the crisis	Cumulative fiscal costs of banking resolution (per cent of GDP)[d]	Output costs1[e] (per cent of GDP)	Output costs2[e] (per cent of GDP)
All countries	33	3.8	26.6	43.0	6.6	15.6	13.6	27.5
LOLR								
– Yes	21	4.3	31.8	45.4	6.6	18.1	17.4	42.9
– No	12	2.9	17.9	38.8	6.6	11.2	7.3	1.8
Blanket deposit guarantee								
– Yes	22	3.8	29.1	47.1	8.6	17.9	14.0	26.4
– No	11	3.9	17.3	34.7	4.1	11.0	12.8	29.8
Banking crisis alone	10	4.5	22.8	43.5	7.2	9.0	8.0	10.9
Banking and currency crisis[f] Of which:	23	3.5	28.4	42.8	6.3	18.4	15.8	33.9
– with LOLR	16	3.9	34.3	42.8	5.8	19.9	18.9	46.9
– without LOLR	7	2.6	15.0	42.6	7.5	15.2	8.9	4.4
Of which:								
– with blanket deposit insurance	16	3.2	30.0	45.8	8.6	21.2	15.5	29.5
– without blanket deposit insurance	7	4.3	19.5	35.7	3.7	12.3	16.7	44.0

Source: Caprio and Klingebiel (1999), Barth et al (2000), IMF (1998) , Honohan and Klingebiel (2000), IMF (2002), OECD (2002a, 2002b) and IMF Financial Statistics various issues.

(a) A systemic crisis is defined as when all, or nearly all, the capital in the banking system is eroded (see Barth et al (2000)). The crises are Finland (1991-93), Japan (1992-), Korea (1997-98), Norway (1988-92), Spain (1977-85), Sweden (1991), Argentina (1980-82), Argentina (1995), Brazil (1994-96), Bulgaria (1996-97), Chile (1981-83), Colombia (1982-87), Cote d'Ivorie (1998-91), Czech Republic (1989-91), Ecuador (1996-), Ghana (1982-89), Hungary (1991-95), Indonesia (1997-98), Mexico (1994-95), Philippines (1981-87), Philippines (1998-99), Poland (1992-95), Senegal (1988-90), Slovenia (1992-94), Sri Lanka (1989-93), Thailand (1983-87), Thailand (1997-98), Turkey (1982-85), Turkey (2001-), Uruguay (1981-84), Venezuela (1994-95).

(b) Estimated at peak. Data available for 19 countries only. Comparisons should be treated with caution since measures are dependent on country specific definition of non-performing loans and often non-performing loans are under recorded.

(c) Average during the crisis period. Credit to the private sector from deposit money banks (IFS code 22d).

(d) Bank recapitalisation, government payouts to liability holders and public sector purchases of NPLs.

(e) Output costs1 is the cumulative deviation in GDP growth during the crisis period from its pre crisis 3 year trend: Output costs2 is the cumulative deviation in the level of output during the crisis from its 10 year pre crisis trend. see Hoggarth et al (2002). Data exclude Cote d'Ivorie.

(f) A currency crisis is defined, as in Frankel and Rose (1996), as a nominal depreciation in the domestic currency (against the US dollar) of 25 per cent combined with a ten per cent increase in the rate of depreciation in any year of the banking crisis period. The latter condition is designed to exclude from currency crises high inflation countries with large *trend* rates of depreciation.

Table 7: Impact of Liquidity Support and Government Guarantees on Output Costs

1. YCOSTS1								
	A. Liquidity Support (LOLR)				**B. Blanket Guarantee (GUAR)**			
	(1)	**(2)**	**(3)***	**(4)**	**(5)**	**(6)**	**(7)***	**(8)**
LOLR	10.1 (2.6)	7.8 (2.2)	8.5 (2.1)	6.1 (1.4)				
GUAR					1.2 (0.3)	-1.2 (0.3)	-0.2 (0.0)	-1.3 (0.2)
CRGDP		0.15 (2.7)	0.12 (2.0)			0.17 (2.7)	0.15 (2.1)	
CUR		6.1 (1.6)	8.0 (1.9)	7.9 (1.8)		8.1 (2.0)	9.5 (2.1)	8.9 (1.9)
NPLGDP				0.2 (1.4)				0.3 (1.8)
R^{-2}	0.16	0.32	0.34	0.33	0.00	0.21	0.21	0.24
DW	2.1	2.0	2.1	2.2	2.1	2.0	2.2	2.3
Number of observations	32	32	27	19	32	32	27	19
2. YCOSTS2								
	A. Liquidity Support (LOLR)				**B. Blanket Guarantee (GUAR)**			
	(1)	**(2)**	**(3)***	**(4)**	**(5)**	**(6)**	**(7)***	**(8)**
LOLR	41.1 (3.5)	36.7 (3.0)	31.9 (2.3)	20.3 (2.3)				
GUAR					-3.5 (0.2)	-7.8 (0.5)	-11.7 (0.8)	14.4 (1.6)
CRGDP		0.20 (1.0)	0.22 (1.1)			0.30 (1.3)	0.36 (1.5)	0.44 (3.2)
CUR		14.2 (1.1)	15.6 (1.1)	4.1 (0.5)		23.7 (1.6)	21.1 (1.4)	7.3 (0.9)
NPLGDP				-0.1 (0.0)				-0.5 (1.5)
R^{-2}	0.26	0.26	0.22	0.20	0.00	0.04	0.05	0.37
DW	2.5	2.4	2.0	2.0	2.2	2.1	1.8	2.3
Number of observations	32	32	27	19	32	32	27	19

YCOSTS1: Sum of output growth deviations during crisis period from previous 3 year trend.
YCOSTS2: Sum of output level deviations during crisis period from previous 10 year trend. Source: Hoggarth et al (2002).
* excluding central and eastern European transitional countries.

6. Conclusion

As evident from the experience of the Great Depression, in the absence of intervention, banking crises can have a dramatic adverse impact on the economy. So nowadays authorities use a range of techniques to minimise the broader disruption of bank failures. But any intervention aims to minimise the fiscal cost and of inducing moral hazard into the financial system.

In cases of individual bank failures, the authorities usually first seek a private sector solution. Any losses are first allocated to existing shareholders, managers and, in some cases, uninsured creditors rather than to taxpayers. Restructuring policies are transparent with only viable institutions kept open while unviable ones are liquidated.

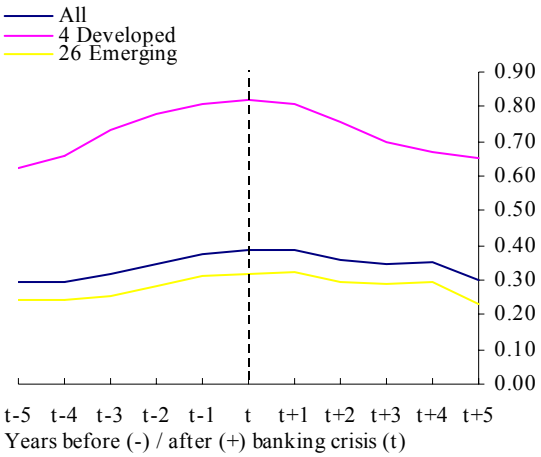
In system wide crises, however, policy options are more limited. It is usually difficult to find a private sector solution domestically and so there is more reliance on foreign takeovers and government intervention, including by the central bank. *Temporary* government assistance is often preferred to liquidation in order to avoid selling bank assets at fire sale prices. Also, because of concerns of widespread liquidity runs, blanket guarantees are usually given early to *all* bank creditors.

In all recent systemic crises the central bank or government agency has stepped in early on to provide liquidity and blanket guarantees to depositors. In nearly all cases investor panics have been quelled but at the cost to the budget and of increasing future moral hazard. Open-ended liquidity support also appears to have prolonged banking crises thus increasing, rather than reducing, the output costs to the economy. Restructuring has usually occurred through mergers, often government assisted, and some government injections or increase in control. Shareholders have usually lost their capital and senior managers their jobs, but creditors have rarely made losses. Liquidations have been used only occasionally and typically for smaller institutions.

Resolution measures have been more successful in improving banks' balance sheet positions than their ongoing profitable or encouraging them to intermediate credit again to the economy. In many cases, bank lending remained subdued for years after a banking crisis. So although the *types* of techniques used can reduce the net costs of crises, the costs in any case are still likely to be large suggesting that crisis *prevention* should be a key objective of financial stability.

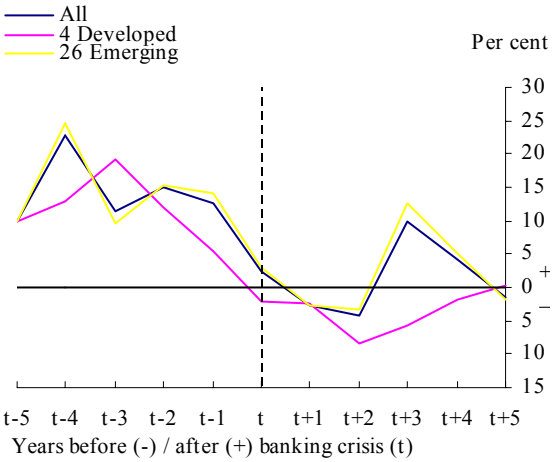
Chart 2: Change in bank credit before and after systemic crises

Chart 2a:
Countries: All 30 systemic crises
Bank credit/GDP ratio



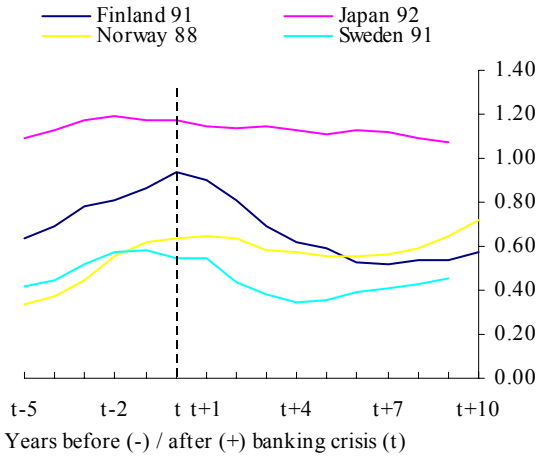
Sources: IFS and Datastream

Chart 2b:
Countries: All 30 systemic crises
Real annual bank credit growth



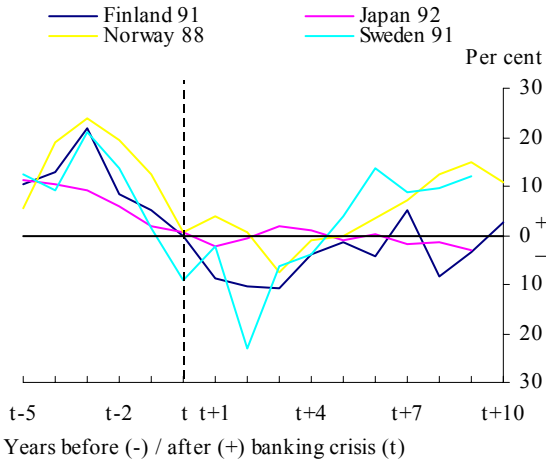
Sources: IFS and Datastream

Chart 2c:
Developed Countries: Early 1990s
Bank credit/GDP ratio



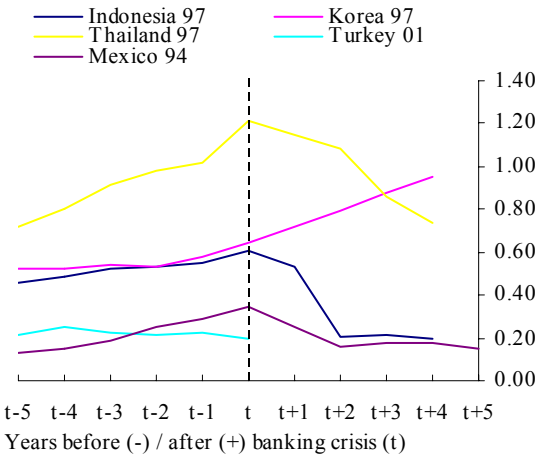
Sources: IFS and Datastream

Chart 2d:
Developed Countries: Early 1990s
Real annual bank credit growth



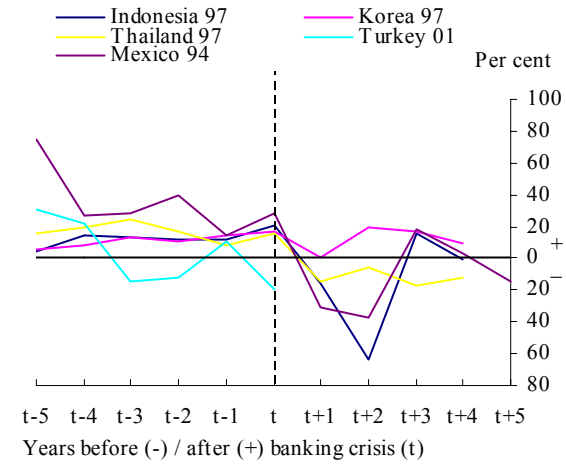
Sources: IFS and Datastream

Chart 2e:
Emerging-Markets: Recent
Bank credit/GDP ratio



Sources: IFS and Datastream

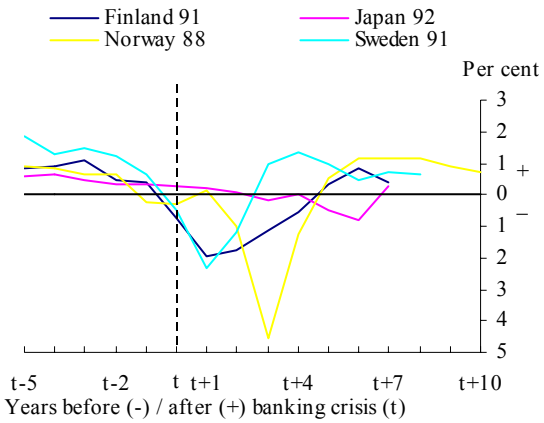
Chart 2f:
Emerging-Markets: Recent
Real annual bank credit growth



Sources: IFS and Datastream

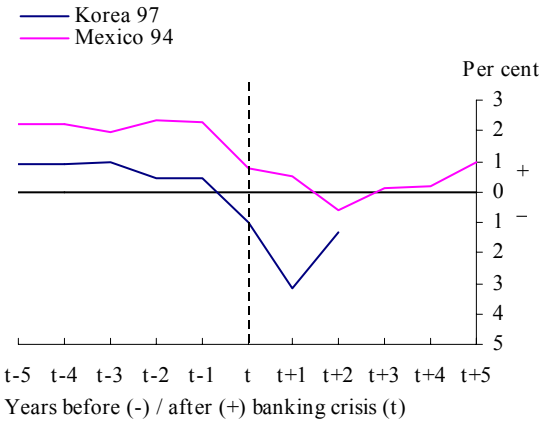
Chart 3: Commercial banks' profits in recent systemic crises

Chart 3a:
Developed Countries: Early 1990s
Commercial banks' profits before tax – per cent of total assets



Source: OECD & Drees & Pazarbasioglu

Chart 3b:
Emerging-Markets: Recent
Commercial banks' profits before tax – per cent of total assets



Source: OECD

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Appendix

Crisis	Duration (years)	Non-performing loans (%)	Bank credit/GDP	Fiscal costs (% of annual GDP)	Output costs 1 (% of annual GDP)	Output costs 2 (% of annual GDP)	Blanket Deposit insurance (1 yes, 0 no)	Extensive liquidity support (1 yes, 0 no)	Currency crisis as well (1 yes, 0 no)	GNP per head (US$000s PPP)
Finland 91-93	3	9	89.8	11	22.4	44.9	1	1	1	15.8
Japan 92-	11	13	119.5	20	24.1	71.7	1	1	0	21.5
Korea 97-98	2	35	70.3	21	16.7	12.8	1	1	1	14.7
Norway 88-92	5	9	61.2	2.5	9.8	27.1	1	1	0	17.3
Spain 77-85	9	n/a	68.1	5.6	15.1	154.9	0	1	1	4.7
Sweden 91	1	11	50.8	4	11.8	3.8	1	0	1	17.2
Argentina 80-82	3	9	29.8	55.3	20.7	25.9	1	0	1	6.4
Argentina 95	1	n/a	19.7	1.6	11.4	5.8	0	0	0	10.5
Brazil 94-96	3	15	31.7	7.5	0	-12.7	0	0	0	6.1
Bulgaria 96-97	2	75	20.6	13	17.1	20.1	1	1	1	4.3
Chile 81-83	3	19	58.8	41.2	41.4	24.3	1	1	1	2.7
Columbia 82-87	6	25	14.7	5	6.7	31.4	0	1	1	2.9
Cote d'Ivorie 88-91	4	n/a	36.1	25	n/a	n/a	0	1	0	1.7
Czech Republic 89-91*	3	n/a	49.9	12	13.1	10.1	1	0	0	6.3
Ecuador 96-	3	n/a	26.8	13	2.9	3.7	0	0	1	4.7
Ghana 82-89	8	n/a	25.3	6	5.5	47.4	1	1	1	0.9
Hungary 91-95	5	n/a	29.9	10	15.7	87.8	1	1	1	6.1
Indonesia 97-98	2	70	60.8	52.5	24.5	20.1	1	1	1	3
Malaysia 97-98	2	20	104.1	16.4	19.4	17.9	1	0	1	10.9
Mexico 94-95	2	11	31	20	9.5	5.4	1	1	1	7.2
Paraguay 95-98	4	n/a	22.9	5.1	3.9	7.4	1	1	0	3.7
Philippines 81-87	7	n/a	23.2	3	35.2	111.7	0	1	1	2.4
Philippines 98-99	2	20	45	0.5	7.6	8.8	0	0	1	3.5
Poland 92-95	4	n/a	11.7	3.5	0	63.5	1	1	1	4.9
Senegal 88-91	4	50	27.8	9.6	9.3	1.3	1	1	0	1.3
Slovenia 92-94	3	n/a	22.8	14.6	0	-23.5	1	0	1	7
Sri Lanka 89-93	5	35	21.3	5	0.6	-10	1	0	0	1.9
Thailand 83-87	5	15	44.5	1.5	0	-2.8	0	0	0	1.7
Thailand 97-98	2	46	118.8	44	25.9	28.1	1	1	1	6.2
Turkey 82-85	4	n/a	19.2	2.5	0	-5.9	0	0	1	2.8
Turkey 01-	2	19	19.6	31	9.3	23	1	1	1	6.1
Uruguay 81-84	4	n/a	33.4	31.2	42	64.1	1	1	1	4.6
Venezuela 94-95	2	n/a	8.9	20	14.7	10.6	0	1	1	5.6

* Czech Republic GNP per head is 1991 and bank credit/GDP is 1993.