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MARKET DISCIPLINE – EFFECT ON BANK RISK TAKING

In 1988, the Basel Committee for Banking Supervision established minimum capital requirements for internationally active banks in the G10, in the first Basel Accord. The Accord has since been adopted in more than 100 countries world-wide. The second Basel Accord (Basel II), which will introduce new risk-based minimum capital requirements in 2006, will go beyond this and establish minimum disclosure requirements for banks as well (in Pillar III). This move has been resisted by some parts of the banking industry. Some banks argue that the costs in terms of the production of additional data are not outweighed by the benefits. The Committee's objective has been to improve market discipline for banks which is seen as a helpful additional element in bolstering financial stability.

In this paper we set out the Pillar III proposals as background, we then consider the channels for market discipline and the factors that could undermine it. We then examine evidence that better market discipline could improve the soundness of banking systems. We cite research which indicates that greater market discipline (with more information disclosure) leads banks to carry more capital relative to risk. But that factors which reduce market discipline (expectations of government support or broad deposit protection schemes) have the opposite effect.

This indicates that greater market discipline strengthens banking systems and should make banking crises less likely. We look at this question empirically and find that disclosure may have some effect in reducing the likelihood of banking crises but broad deposit protection schemes increase the likelihood. Government support appears to make banking crises less likely but may just disguise the effect of weak banking systems - we will look at this with further research.

Governments may face conflicting objectives. In order to strengthen the financial system ex-ante, they should reduce support arrangements, such as broad deposit protection arrangements, to make market discipline more effective. But if they are concerned about possible future crises they may not want to affect their ability to resolve the problems faced by the banking industry. An important issue therefore is whether broad deposit protection schemes make it easier to resolve crises. We look at this issue as well and find that they appear to increase fiscal resolution costs while having little effect on reducing output losses.

1.   Information Disclosure Under The Basel Accord

Although, the first Basel Accord did not contain provisions relating to disclosure one of the major benefits it offered was that it gave markets a way of comparing the capital of the banks according to the risk assets ratio – the ratio of capital to risk-weighted assets. There is a standard set of weights that are applied to the portfolio and the capital that is recognised in the numerator is also laid down. Banks can show the risk asset ratio in several ways –the Tier1 ratio, largely equity capital to risk weighted assets and the Tier1 plus Tier2 ratio where Tier2 includes allowable subordinated debt and some general provisions.

However, because the Committee did not lay down minimum disclosure requirements some banks have chosen not to publish the Tier1 ratio which is the more meaningful of the two. This means that the market cannot tell for some banks what proportion of their capital (under the Basel definition) is made up of debt rather than equity.

Over time even the Basel Tier1 ratio has become less useful as a common metric as banks, particularly in the USA, have securitised a large proportion of their higher quality loans in effect increasing the riskiness of their portfolios relative to capital held. By March 1998 outstanding non-mortgage securitisations by the 10 largest US bank holding companies amounted to around $200 billion – more than 25% on average of these banks' risk weighted loans (Jackson *et al* 1999).

With pressure on the first Accord, the Committee has reacted by developing a revised Accord, Basel II, with a much more fine-tuned approach to measuring the risks on the banks' portfolios. The riskiness of borrowers will be measured either by external ratings (in the simpler standardised approach) or by the banks' own assessment of probability of default in the internal ratings approach.

The Committee is also, under Pillar 3, requiring banks to disclose much more about their risks and the capital which they have to back them. Banks will have to disclose the composition of capital, including not just the Tier1 element but also any innovative instruments included in Tier1. They will also have to show the capital requirements by risk type (credit, market and operational risk).

On interest rate risk, banks will have to show the increase or decrease in earnings or economic value which would result from an interest rate shock applied to the banking book. The interest rate shocks will vary across banks reducing comparability but the size of the shock would be disclosed.

On credit risk all banks will show exposures, provisions and past due/ impaired assets by geographic region and industry type. Banks using the new standardised approach will be required to show their exposures by risk-weight bucket as well as information on their use of credit risk mitigation (collateral, guarantees). Banks using internal systems to assess the riskiness of their loans will have to publish information on the breakdown of loans by probability of default (PD) band and default outturns for the main portfolios – corporate/sovereign/interbank and the main retail portfolios. For each portfolio they will also have to disclose a weighted average loss given default per PD band. Comparability will be enhanced by the standards which will underpin the basis of the PD and LGD estimates because these will be used to set the capital requirements under the more sophisticated approaches. Again the Committee has developed a common language for credit risk (PD, LGD) which can be then be used as a common metric. Banks using the internal rating-based (IRB) approach will also have to show information on credit risk mitigation –collateral and credit derivatives. This should make it possible for the market to compare credit quality across banks. Standard and Poors recently highlighted the fact that this was one of the toughest parts of credit analysis currently, given limited disclosure and differences in the definitions used for impaired, non-performing and defaulted loans. The Basel Committee, by laying down standards for the elements behind the disclosures (eg a common definition of default), will help to ensure comparability.

Comparability is an important element in the disclosure. Lack of comparability of statisitics has made interpretation difficult in the past. The Basel Committee, as part of the introduction of the market risk amendment to the 1988 Accord, allowed banks to use internal VaR models to assess market risk. Banks using this approach were required to use a model to estimate losses, over a ten-day holding period, with a 99% confidence level. As part of the allowance that a bank could use internal models the Committee recommended hard disclosure of the VaR estimates but did not prescribe the actual measure. Banks have chosen to disclose VaRs on many different bases making any comparison across banks impossible. The table below sets out the basis for the VaRs published by the large UK banks and shows a substantial variation in approach – the same is also true of the US banks. Banks might argue that they are showing the VaR which they use for internal purposes but under the market risk amendment if they are using VaR for setting capital requirements they should also use that model for their own internal purposes.

Lloyds	HSBC	Abbey	Standard Chartered	Barclays
95%, 1 day	99%, 10 days	95%, 1 day	97.5% , > 1 day	98%, 1 day

Hendricks (1995) shows that it is not possible accurately to convert a 95% VaR to 99% using the normal distribution – the errors could be very large. VaRs on different confidence levels therefore cannot be put on to a comparable basis. Duffie and Pan (1997) do, however, show that scaling up the one-day VaR by $\sqrt{10}$ is a reasonable approximation for moving from a one-day to a ten-day holding period, making the differences in this aspect less important.

The International Accounting Standards Board is also focussing on the need for enhanced disclosure. In the EU adherence to international accounting standards will be mandatory for listed companies by 2005. The proposals for added disclosure are in terms of general principles but the current focus by the market on the Basel ratio for banks indicates that comparability should not be forgotten. This could perhaps be achieved with greater guidance/recommendations.

There is a coordination problem for the industry with regard to disclosure. Without official intervention it is difficult to achieve comparability in data disclosed and without comparability the worth of the disclosure is at least partly undermined.

2.   Effective Market Discipline – Conditions and Channels

The Basel Committee will be enhancing one aspect of market discipline (disclosure) but effective market discipline depends on a number of important elements. (1) The market must have the information to be able to assess the riskiness of the banks relative to capital. (2) Market participants must be at risk of loss if the banks fail or they will not act upon the information. For the threat of market discipline to affect behaviour of the banks a third element is necessary as well. (3) The cost to the bank of an adverse market view must be significant. Given that the overall objective of Pillar III is to improve market discipline it is important to consider what the main channels for market discipline are and what factors could undermine it.

A key complaint made by the banking industry with regard to Pillar III is that the emphasis placed on greater disclosure is misplaced because equity and bond investors are

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not sufficiently informed to make appropriate judgments on the material released. This assumes that it is the securities markets that provide the market discipline for banks. In this section we consider the various possible channels for market discipline, focusing on condition (3) above, and also the factors which would influence is effectiveness.

The equity price is important to the bank's management because it will determine the cost and availability of new capital. Perhaps, in terms of management incentives, the risk of becoming a take-over target if the share price is weak may be of even greater importance. Growing use of share options as part of remuneration also gives senior management a direct interest in the share price, although this does not mean that their incentives and those of shareholders are aligned because the horizon may be different.

One drawback with the share price as a channel for market discipline is that shareholders' incentives are not aligned with those of the authorities and creditors because of shareholder limited liability. If the bank fails the shareholders lose the value of the shares but do not have to meet the debts. When a bank is weak this could encourage gambling for resurrection - increasing risks for the possibility of greater returns. Shareholder assessment of risk will also be affected by the perception of the likelihood of a bailout and whether, if some action were taken, shareholder value would be kept intact. Some authorities have made clear that shareholders should expect to be penalised if a bank has to be supported, George (1994). A number of theoretical contributions have focused on the effect of the safety net on banks' and their shareholders' incentives to take excessive risk. In particular, starting with Merton (1977), a number of authors have analysed incentives created by flat-rate deposit insurance schemes. Such schemes create a subsidy to banks that is more valuable if a bank engages in riskier activities. Shareholder vigilance in monitoring a bank can also be affected by the regulatory framework if that is perceived as likely to prevent a failure. Shareholders might in effect "sub-contract" monitoring of extreme risks to the regulator. There is some anecdotal evidence that this is the case –with shareholders focussing on expected earnings rather than risks.

Subordinated debt may also help to provide market discipline. At present, banks can use subordinated debt meeting particular requirements for up to half the minimum capital required under the Basel Accord – the minimum ratio is 8% with 4% having to be Tier1 capital (shareholders funds etc) and 4% can be subordinated debt and general provisions. Discussions with banks indicate that they target the Tier1 ratio which is important for their solvency and their rating but use subordinated debt as a flexible buffer above this target level. This is borne out by the fact that banks hold proportionately more excess in Tier1 capital. For the large UK banks the average Tier1 ratio is currently around 8¾% (against a minimum of 4%) and the other Tiers (Tier2 and 3) account for a much smaller proportion (the ratio of Tier2 plus Tier3 to risk-weighted assets is less than 4%). Given the relatively modest use of subordinated debt (for the UK banks it accounts for only around 3% of total liabilities) it is a limited channel for market discipline – although it does give the banks added flexibility with regard to their capital requirements.

A more effective route for market discipline than the securities markets may well be a bank's counterparties. The cost and availability of funding is clearly important because it directly affects a bank's ongoing profitability and its ability to grow. All deposits can potentially run but the most sensitive are likely to be those from other banks because of

access to better information and more regular monitoring. They are particularly informed about market conditions given their own involvement.

Retail depositors are likely to react only when concerns have reached the press. In addition, the incentives of retail depositors are affected by the existence of deposit protection schemes. Nozaki (2002) and Blum (2002), have emphasised that deposit insurance *per se* removes the incentive of depositors to monitor banks and may, in the presence of limited liability, result in excessive risk taking. Bank counterparties will have a much more fine-tuned response to perceived risks.

Access to swap and other derivative contracts is of almost as much importance as funding. Sophisticated banking operations give rise to a myriad of exposures which need to be hedged, and access to these contracts is an essential part of risk management. It is possible for a bank to hedge interest rate risk in the banking book by match funding, ensuring there are no gaps between the refix dates on the funding and each loan but this is very cumbersome. A sophisticated bank which suddenly found it had no access to the swaps market would probably find it almost impossible to continue in business. In the case of swaps, as well as deposits, limits seem, from anecdotal evidence, to be rather more responsive than price. For community banks, which have access to large quantities of retail deposits and for whom sophisticated hedging might be less assiduously carried out, this market discipline route will be less effective.

A number of developments in recent years have started to limit interbank exposures. The introduction of RTGS for most major payments systems in the late 1990s has eliminated gross intra-day exposures between members. CLS which started in 2002 enables the banks to avoid FX settlement risk and increasing use of repo has reduced interbank exposures between banks. This is particularly the case in the US. Also the development of netting arrangements for swaps, using standard legally tested documentation, has meant that each firm is more protected in the case of the failure of a counterparty. Paradoxically these measures which make the system less vulnerable to a shock (which is clearly very important) may also, eventually, have the effect at this point of making market discipline less effective. But currently the markets are far from this point.

For most large internationally active banks the size of their inter-bank exposures gives them a strong incentive to monitor the credit worthiness of their counterparties. Sudden failure of a large counterparty could cause their own failure. This is a much stronger incentive than that faced by most investors in the securities markets. Also this market discipline route is not subject to the criticism leveled against the Pillar III disclosures that investors are not sufficiently informed to assess the information released correctly. Bank counterparties are informed because they operate in the same markets.

But even with the current strong incentives banks have to monitor the riskiness of their counterparties, as with any other market discipline channel, the effectiveness will be contaminated by any expectations of government support. Indeed the external ratings, at least in part used by the market to assess risk, explicitly reflect the rating agencies assessment of likelihood of support from a parent or in the case of a large bank more likely the government.

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3.   The Effect of Market Discipline on Bank Risk Taking

Given that greater disclosure of information under Pillar III will affect bank costs, at least to a degree, an important question is whether greater market discipline will help to strengthen the system by changing bank behaviour.

There is a small literature that examines the extent to which banks respond to changes in the market assessment of their riskiness. Covitz, Hancock and Kwast (2000) provide evidence that banks' decision to issue additional subordinated debt is influenced by yield spreads. Increases in yield are associated with a reduction in new issues of debt. However, Bliss and Flannery (2002) fail to find any evidence that following a change in yield spreads for subordinated debt banks respond by changing their balance sheet allocations. From this evidence, it is not clear that the subordinated debt channel is an effective route for market discipline. Given the modest reliance on this type of debt such results may not be entirely surprising. In particular, changes in subordinated debt spreads may not be sufficiently costly to the bank and its management to result in effective market discipline. In addition, as pointed out by Evanoff and Wall (2000), these studies are attempting to capture one aspect of discipline imposed by the debt market – *ex post* discipline. It may well be difficult to identify the exact timing of any management reactions to the application of market discipline let alone the threat.

None of these studies reviews whether banks for which market discipline is likely be weak are less sound than those facing effective market discipline. There are some theoretical papers which consider this question. Cordella and Yeyati (1998) assume bank deposits are uninsured but that banks enjoy limited liability which induces them to prefer higher risk for given return. They show that if depositors can observe banks' behaviour the amount of risks that banks decide to take on will be efficient. Bank managers will know that the more risks they take the greater the compensation required by the depositors. However, if the amount of risk taking is unobservable, then limited liability will induce the bank to choose a higher risk profile at the expense of depositors.

In a similar vein, Boot and Schmeits (2000) present a theoretical analysis of the incentives of banks to take risks and relate these to the degree of bank transparency. The degree of transparency determines the sensitivity of the bank's funding cost to its risk-taking behaviour. In their model, bank managers have to exert effort in order to reduce risk. Since effort is costly, in the absence of transparency, the manager will choose lower levels of effort, thus resulting in higher risk. As transparency increases, effort and thus risk become more observable implying that banks will face a higher short-term funding cost for low levels of effort. Consequently, managers will choose higher effort levels and thus lower risk when transparency is high than when it is low.

An alternative view might be that banks disclosing less information might be forced by the market to carry more capital relative to risk, because of the information asymmetry. This would imply that the market could overcome the lack of information and exert effective discipline nonetheless.

Empirical studies of the effect of transparency on risk-taking have been limited. However, Baumann and Nier (2003) using a panel data set covering 729 banks from 32 countries do find that market discipline, measured in a number of ways, results in banks holding more capital relative to risks than banks subject to less market discipline. In

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particular they show that both deposit insurance and expected government support have a negative effect on bank capital buffers. While information disclosure, measured in several ways has a positive effect on bank capital relative to risk. They focus not on the sheer quantity of information released but on whether banks make information available on key comparable statisitics. They find that banks which release none of these keys statistics could have ratios of equity capital to assets 1.2 percentage points lower relative to risk than banks which do release them.

This is encouraging with regard to the objectives of Pillar III. It indicates that greater disclosure of clear comparable information will strengthen the banking system. But it also highlights the effects of factors which could reduce market discipline. Banks expected to benefit from government support could have an equity to assets ratio 1.2 percentage points lower than those not expected to benefit. This indicates that to make Pillar III fully effective governments need to take action as well on some aspects of public policy which could reduce market discipline.

But a further important question which could influence the outcome of this debate is whether the amount of market discipline also affects the likelihood of banking crises and the severity of those that do occur. This is important given that the policies adopted by governments which reduce market discipline have been put in place to reduce the likelihood of banking crisis. The findings from the Baumann and Nier paper lend weight to the assertion that market discipline could help to strengthen the financial system and therefore reduce the likelihood of crises but does not provide conclusive evidence. We look at this question explicitly.

4.   The Effect of Market Discipline on Banking Crises

Market discipline, by encouraging banks to reduce risks relative to capital, should, overall, make a banking crisis less likely. But the individual factors which affect the strength of market discipline could have a much more complex effect on the likelihood of crises. *Ex ante* market discipline could reduce the likelihood of severe problems developing in the banking industry, however, if problems do develop, it is possible that some factors which reduce the effectiveness of market discipline (eg widespread spread deposit protection schemes or expected government support) could actually help to stave off a full crisis.

Deposit Insurance

Theory suggests two opposing ways in which deposit insurance might affect the likelihood of banking crises. First, deposit insurance if sufficiently extensive may reduce the likelihood of bank runs. This channel is suggested by models such as Diamond and Dybvig (1983), where bank runs may occur in a bad equilibrium in which depositors may lose their confidence in the banking system even if banks are fundamentally sound. But it extends to models where the likelihood of the bank run is increasing in the likelihood of bank insolvency, such as Bhattacharya and Jacklin (1988), etc. In these models deposit insurance reduces the likelihood of depositors to run and thus decreases the likelihood of a banking crisis. On the other hand, the moral hazard incentives induced by deposit insurance might encourage banks to increase the risk of default. When banks are subject to the threat of a bank run, they might behave more prudently than if they would if that threat was removed by a comprehensive deposit insurance scheme. More generally,

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deposit insurance may reduce the link between a bank's risk of default and its funding cost, creating an incentive for the bank to increase default risk at the expense of depositors or the deposit insurance fund[1].

Implicit Government Support

As in the case of explicit deposit insurance, two opposing forces may be at work. First, government support may prevent severe problems in a banking system from actually culminating in a crisis –in other words the support could disguise the extent of weakness in the banks. Governments typically extend implicit support to their banking system precisely because they want to prevent a systemic crisis. The country average of the support rating assigned to the banks in a particular country may reflect both the willingness and the ability (in fiscal terms) of the government in question to bail out its banks and thus to prevent a systemic crisis. On the other hand, again, implicit government support may result in moral hazard incentives for banks who may be tempted to exploit the implicit subsidy provided by the government by increasing their risk. This may increase the probability of banking problems developing.

Disclosure

More disclosure may have the potential to increase the discipline that markets exert on banks to keep prudent levels of solvency. More disclosure may thus have a potential to reduce the incidence of banking crises. There may be a question mark as to whether disclosure is a good thing once a crisis has hit. On the one hand, if banks are hit by a (macroeconomic) shock that is not of their own making more disclosure might have a destabilising effect in that under high disclosure the banks funding costs may react adversely, exacerbating the difficulties of the bank, see Cordella and Yeyati (1998). On the other hand with more disclosure investors may be able to distinguish better between banks, reducing the likelihood of information contagion and a general loss of confidence in the banking system.

Empirical Approach

Data

We use the original Baumann and Nier data set on market discipline which covers 32 countries[2] over the years 1993-2000. Seven of these countries experienced a banking crisis after 1993 - Korea, Thailand, Indonesia, Malaysia, Japan, Turkey and Argentina. In the case of the first four listed the onset of the crisis was in 1997/98. Turkey and Argentina experienced banking crisis that started in 2001 while Japan's crisis has been

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[1] In principle the funding charge adopted in deposit insurance schemes could be linked to a bank's relative riskiness. But, in practice, the funding charge of most schemes is independent of a bank's riskiness.
[2] These are Austria, Australia, Argentina, Belgium, Brazil, Canada, Chile, Finland, France, Germany, Greece, Hong Kong, Indonesia, Ireland, Israel, Italy, Japan, Korea, Malaysia, the Netherlands, Norway, Poland, Portugal, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, the UK and the US.

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ongoing over the whole period[3]. We look at how the extent to which the likelihood of a country experiencing a crisis after 1993 was affected by the strength of market discipline in that country.

The Market Discipline Variables

The key factors that could indicate the strength of market discipline for banks are the extent and shape of any deposit protection arrangements and expectations of support, which should both reduce market discipline, and disclosure which should increase it.

(1) Deposit Protection

Demirgüc-Kunt and Sobaci (2000) provide a dataset on the existence and extent of deposit insurance schemes across countries. Baumann and Nier used this to construct an index of the extent of depositor protection (depins). It takes into account the features which will affect market discipline from depositors – coverage of interbank deposits by insurance, co-insurance (ie, less than 100% payout on the portion of deposits covered) and unlimited coverage.

depins= sum of depins2, depins3, depins4, depins5

depins2=1 if there exists an explicit deposit insurance scheme, =0 otherwise

depins3=1 if there is no coinsurance, =0 otherwise

depins4 =1 if interbank deposits are covered, =0 otherwise

depins5=1 if coverage is unlimited, =0 otherwise

The higher the value of the index, the lower the discipline on banks from depositors.

(2)   The Safety Net

An important factor which will influence the strength of market discipline is the market expectation vis a vis government support. The Fitch rating agency assigns a support rating that reflects the probability of support from a parent or the government. For most large banks only the latter is important. The support rating ranges from 1 (near certain bail-out) to 5 (bail-out very unlikely). Baumann and Nier constructed a measure of government support which takes the value 1 if the public support rating indicates that a bail-out is very likely (support rating equal to 1 or 2) and 0 if the public support rating indicates a low probability of a bail-out (rating is 3, 4, or 5) .

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[3] Our definition of crisis countries includes Japan. This may raise a number of questions regarding the enogeneity of some of the market discipline variables. In particular, government support is measured as of the end of the sample period. In Japan, measured government support is high, potentially due to the way the Japanese government responded to the crisis. In addition, unlimited deposit insurance was introduced only in 1996, in response to the crisis. On the other hand, anecdotal evidence suggests that in Japan, there had always be a presumption on the part of depositors and markets that banks would not be allowed to fail. All results are qualitatively unchanged if Japan is excluded from the list of crisis countries.

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(3)   Disclosure

Baumann and Nier constructed a disclosure index measuring the amount of information available from banks' published accounts as represented in the Fitch BankScope data base.The disclosure index records whether or not the bank provides information on 18 categories of core disclosure in its published accounts (as represented in the BankScope database). All of the 18 categories are related to one or more dimensions of the bank's risk-profile (interest rate risk, credit risk, liquidity risk and market risk) or the capital/reserves it holds to back the risk. For each category, a value of one is assigned if the bank provided information and zero, if the bank did not provide information. The variable (disc) is normalised to take values between zero and 1.

The composite index is defined as $DISC = \dfrac{1}{20} \sum_{i=1}^{18} s_i$

where each subindex, s_i can be related to one or more sources of risk or the buffers against risk.

Table 1: Sub-indices used to Construct the Composite Disclosure Index

	Subindex	Categories
Assets		
Loans	S_1 : Loans by maturity	Sub three months, three-six months, six months - one year, one-five years, five years +
	S_2 : Loans by type[a]	Loans to municipalities/government, mortgages, HP/lease, other loans
	S_3 : Loans by counterparty[a]	Loans to group companies, loans to other corporate, loans to banks
	S_4 : Problem loans	Total problem loans
	S_5 : Problem loans by type	Overdue /restructured /other non-performing
Other earning assets	S_6 : Securities by type (detailed breakdown)	Treasury bills, other bills, bonds, CDs, equity investments, other investments
	S_7 : Securities by type (coarse breakdown)	Government securities, other listed securities, non-listed securities
	S_8 : Securities by holding purpose	Investment securities, trading securities
Liabilities		
Deposits	S_9 : Deposits by maturity	Demand, savings, sub three months, three-six months, six months - one year, one-five years, five years +
	S_{10} : Deposit by type of customer	Banks deposits, municipal/government
Other funding	S_{11} : Money market funding	Total money market funding
	S_{12} : Long-term funding	Convertible bonds, mortgage bonds, other bonds, subordinated debt, hybrid capital
Memo lines		
	S_{13} : Reserves	Loan loss reserves (memo)
	S_{14} : Capital	Total capital ratio, tier 1 ratio, total capital, tier 1 capital
	S_{15} : Contingent Liabilities	Total contingent liabilities
	S_{16} : Off-Balance Sheet Items	Off-balance sheet items
Income statement		
	S_{17} : Non-interest Income	Net commission income, net fee income, net trading income
	S_{18} : Loan Loss Provisions	Loan loss provisions

(a) The categories chosen reflect the presentation in the BankScope database.

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(4)   US Listing

Market discipline may be affected by a whether or not a bank has a US listing. SEC disclosure requirements may mean that a US listing improves disclosure when compared to alternative disclosure regimes. The variable *list* takes the value 1 if the bank is listed on the New York Stock Exchange, Nasdaq, or the Amex.[4]

Empirical Approach

We run OLS as well as probit regressions on the following simple model of banking crises

$$crisis = f(MKD, Z) + \varepsilon$$

where MKD are market discipline factors and Z are control variables. The hypothesis we would like to test is whether market discipline factors increase the likelihood of a banking crisis developing over the sample period, for given initial conditions, such as the level of GDP per capita, the growth rate per capita and others.

Crisis is a country dummy variable that takes the value 1 if there has been a crisis and 0 otherwise. OLS regressions regress this dummy separately on each of the right hand side variables. Probit regressions recognise that crisis is defined as zero-one events and are based on a model of the probability of banking crises.

Results

The benchmark results are based on a crisis definition that assigns a value of 1 to the following countries: Japan, Korea, Thailand, Indonesia, Malaysia, Turkey and Argentina. It thus excludes the Nordic countries for which the onset of the crisis was before the start of the sample period, but includes Turkey and Argentina, for which the onset of the crisis was after the end of the sample period[5].

Table 2 shows simple OLS regressions of the crisis dummy on market discipline variables. Under both the listing measure and the disclosure index, more disclosure appears to reduce the likelihood of crises, even though statistically, under both measures the effect is not strong.

The composite index of the existence of and extent of deposit insurance is positive, but not significantly different from zero. This suggests that there is no strong evidence either way on whether the extent of deposit insurance increases the likelihood of crises. Our measure of deposit insurance is a composite measure of both the existence and extent of deposit insurance. It is thus possible, that its components have different and possibly conflicting effects on the incidence of crises. By contrast, the variable measuring implicit government support has a strong negative effect on the likelihood of a banking crisis, which is significant at the 10 % level (P-value 6%). This suggests that the willingness and ability of governments to bail out their banks significantly reduces the likelihood of a crisis – this may just mean that it reduces the likelihood that a crisis will actually

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[4]We have also assigned the list variable to U.S. banks on the grounds that U.S. banks listed on a primary U.S. exchange are subject to the same disclosure regime as foreign banks listed on a U.S. exchange. Our regression results are not sensitive to this choice.
[5] Other crisis definitions are possible. The results do not materially depend on which definition is employed.

crystallise but does not reduce the likelihood of problems in the banking system (in effect there could be a hidden crisis).

Table 2: Crisis Regressions

	(1) OLS	**(2) OLS**	**(3) OLS**	**(4) OLS**
Dependent Variable	Crisis	Crisis	Crisis	Crisis
Deposit Insurance	0.0156 (0.837)			
Government Support		-0.4215* (0.063)		
Disclosure			-0.5950 (0.320)	
US Listing				-0.2963 (0.429)
No. of obs.	32	30	32	32
R-squared	0.0014	0.1181	0.0329	0.0210

P-values in parenthesis
*** Statistical significance at the one percent level
** Statistical significance at the five percent level
* Statistical significance at the ten percent level

If the separate factors affecting the magnitude of support under the deposit insurance scheme are each used as variables the different effects can be seen – see Table 3.

In particular, unlimited deposit protection schemes have a strongly positive effect on the incidence of banking crises which is significant at the 1 per cent level[6]. Unlimited deposit protection schemes therefore do seem to lead to less sound banking systems. The latter finding is in line with the result in Demirgüc-Kunt and Detragiache (2002) and underscores the moral hazard effects of this particular feature of the deposit insurance regime. The coverage of interbank deposits is not statistically significant[7].

In contrast to the effect of an unlimited scheme, the existence of an explicit scheme appears to reduce the likelihood of a banking crisis although this is not quite significant at the 10% level. This is in contrast with Demirgüc-Kunt and Detragiache (2002) who find in a sample of 61 countries between 1980 and 1997 that the existence of an explicit scheme increases the incidence of a banking crisis for countries that do not have an effective system of prudential regulation and supervision. However, like ours, their result

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[6] In these regressions the obverse of unlimited coverage is limited coverage or an implicit scheme. An alternative is to regress only on the subset of countries that did have an explicit scheme. The results of such an alternative regression are very similar to the one reported. Analogous remarks apply to coinsurance and interbank coverage.
[7] Interbank deposits are covered in only two countries in our sample, the US and Canada, neither of which experienced a banking crisis over the sample period.

is statistically weak and only just significant at the 10% level (with a P-value of 8%). The reason for the conflicting results in different samples might be related to the fact that, on theoretical grounds the effect of an explicit scheme is ambiguous. On the one hand, an

Table 3: Crisis Regressions

	(1) OLS	(2) OLS	(3) OLS	(4) OLS
Dependent Variable	Crisis	Crisis	Crisis	Crisis
Existence of Scheme	-0.2686 (0.137)			
Coinsurance		0.0079 (0.959)		
Coverage of Interbank			-0.2333 (0.456)	
Unlimited Coverage				0.8621*** (0.000)
No. of obs.	32	32	32	32
R-squared	0.0721	0.0001	0.0187	0.3695

P-values in parenthesis
*** Statistical significance at the one percent level
** Statistical significance at the five percent level
* Statistical significance at the ten percent level

explicit scheme might reduce the likelihood of a depositor run, on the other hand an explicit scheme may remove the disciplining force of the threat of a run. Further, Gropp and Vesala (2003) argue that the introduction of an explicit scheme might even have beneficial incentive effects. Based on a European sample these authors show that the introduction of an explicit scheme may reduce moral hazard if deposit insurance credibly leaves out non-deposit creditors. This is because with a scheme in place governments may be more willing to let firms fail.

Tables 4 and 5 show the results of probit regressions that included control variables in addition to the market discipline variables. The control variables are the GDP per capita as well as the GDP growth as of 1997. Most market discipline variables retain their sign, even though the level of significance of the results is not improved when compared to the simple regressions. Of the control variables, GDP per capita has a particularly strong influence on the incidence of crises. With the exception of Japan, all countries that experienced a banking crisis under our definition were emerging market economies. It is not surprising therefore to see the level of per capita GDP assume high explanatory power in our sample. As a result, the explanatory power of some of the market discipline

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variables appears reduced. Table 5 includes the current account deficit/surplus as a percentage of GDP in 1995 in addition to the aforementioned control variables. The current account variable has a negative effect, indicating that countries with a large current account deficit in 1995 were more likely than other countries to experience a banking crisis. This clearly is a reflection of the fact that in most cases in which the country is identified as having had a banking crisis, the country also experienced a currency crisis. Indeed, all crisis countries with the exception of Japan experienced such a "twin crisis". Since a large current account deficit is a leading indicator of a currency crisis the explanatory power of this variable is high. Indeed, in this regression the combined effect of GDP per capita and the current account deficit would have been expected to drive out some of the other variables, including some of the market discipline variables. Against such an expectation the market discipline variables turn out to be reasonably robust, with the level of significance only marginally changed when compared to the simple regressions without any control variables.

Table 4: Crisis Regressions

	(1) Probit	**(2) Probit**	**(3) Probit**	**(4) Probit**
Dependent variable	**Crisis**	**Crisis**	**Crisis**	**Crisis**
Deposit Insurance	0.3599 (0.228)			
Government Support		-0.8171 (0.414)		
Disclosure			-3.3168 (0.185)	
US Listing				-2.0422 (0.355)
Gdp_g_97	-2.3146 (0.855)	-0.4990 (0.967)	3.8802 (0.756)	3.6171 (0.757)
Gdppcap_97	-0.0001** (0.029)	-0.0001 (0.225)	-0.0001* (0.059)	-0.0001* (0.059)
No. of obs.	31	29	31	31
R-squared	0.2150	0.1736	0.2252	0.2010

P-values in parenthesis
***   Statistical significance at the one percent level
**   Statistical significance at the five percent level
*   Statistical significance at the ten percent level

This study, admittedly based on a small sample of countries, does indicate that governments should closely look at factors which could enhance market discipline. The adoption of the Basel Pillar III requirements could lead banks to hold more capital to back their risks and could reduce the likelihood of banking crises. But unlimited deposit protection schemes would reduce the amount of capital held to back risks and would make banking crises more likely.

Widespread expectations of support for the banking system damage market discipline but

Table 5: Crisis Regressions

	(1) Probit	**(2) Probit**	**(3) Probit**	**(4) Probit**
Dependent variable	Crisis	Crisis	Crisis	Crisis
Deposit Insurance	0.6865 (0.122)			
Government Support		-1.1259 (0.296)		
Disclosure			-1.4145 (0.626)	
US Listing				-3.3167 (0.237)
Gdp_g_97	-5.2952 (0.779)	0.4354 (0.976)	3.8040 (0.804)	10.0440 (0.522)
Gdppcap_97	-0.0001 (0.391)	-0.0000 (0.876)	-0.0000 (0.650)	-0.0000 (0.740)
Current account deficit/ Surplus 95	-20.4391* (0.085)	-13.8395* (0.081)	-11.8309 (0.245)	-15.1533 (0.216)
No. of obs.	26	25	26	26
R-squared	0.3591	0.2996	0.2668	0.3324

P-values in parenthesis
*** Statistical significance at the one percent level
** Statistical significance at the five percent level
* Statistical significance at the ten percent level

appear to help stave off actual crises. However, to a degree it could be disguising an actual crisis caused by severe intrinsic weakness in the banks. An important extension of this work will be to look at bank level effects. We will be going on to look at bank level data on sharp falls in capital to see whether the likelihood of problems developing for a single bank are influenced by the extent of earlier market discipline for that bank. This will overcome the problem that some aspects of public policy which reduce market discipline could either reduce the likelihood of crises or simply disguise them .It will also mean that the sample size will be much larger than is possible at a country level.

5.   The Effect of Widespread Support in Crises

The evidence set out above indicates that countries should reduce the scale of their deposit protection arrangements to make market discipline more effective but should not abolish them altogether. But countries which are concerned about possible future crises or widespread bank failures could be reluctant to change their policy in this area if they felt that it would worsen their ability to deal with a crisis were it to occur. It is therefore worth considering whether widespread deposit protection schemes are important for crisis resolution.

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 temporarily (see Table A, in the annex).

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 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 but this may have reflected the inability of depositors to distinguish between weak and less weak banks. 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.This may again come down to the extent of disclosure on the banks in normal and crisis times. The more that is known about the risk profile of the banks the easier it would be to overcome information asymmetries in crises.

In a sample of 40 developed country and emerging market crises, Honohan and Klingebiel (2000) find that the introduction of blanket government guarantees in the midst of a crisis are associated with higher fiscal costs of crisis resolution. However, this does not imply necessarily causation. Fiscal costs would be expected to be higher the

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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 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.

Equations 1-2 in Table 6 show some simple relationships between fiscal costs and government guarantees in a sample consisting only of *systemic* crises – that is where the capital of the whole banking system was depleted or close to depletion. The regressions also allow for quantifiable proxies for the size of the shock to the banking system - 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).

Table 6: **Impact of Government Deposit Guarantees and explicit limited deposit insurance on the Fiscal Costs (FCOSTS) of Resolution in Systemic Banking Crises**

	A. Blanket Guarantees		B. Limited Deposit Insurance	
	(1)	(2)	(3)	(4)
GOVERNMENT GUARANTEE	6.8 (1.2)	6.8 (1.3)		
LIMITED EXPLICIT DEPOSIT INSURANCE			-11.0 (1.9)	-8.5 (1.5)
CREDIT/GDP		0.23 (2.2)		0.19 (1.9)
CURRENCY CRISIS		8.1 (1.5)		9.8 (1.8)
GNP PER HEAD		-1.0 (1.7)		-0.74 (1..3)
R^{-2}	0.02	0.16	0.11	0.31
DW	2.2	2.0	2.4	2.2
Number of observations	33	33	32	32

FCOSTS: Fiscal costs of resolution % of GDP. Source: Caprio and Klingebiel (1999), Barth et al (2000), IMF (2002), OECD (2002a, 2002b).

GOVERNMENT GUARANTEE: 1 where explicit blanket government guarantee or implicit one (where state banks account for 75% or more of banking system assets), 0 otherwise. Source: Honohan and Klingebiel (2000).

CREDIT/GDP: Bank credit to the private sector/annual GDP (%). Source: IMF, International Financial Statistics.

CURRENCY CRISIS: 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.

GNP PER HEAD: GNP per head (US$000s, PPP) in the year that the banking crisis began.

LIMITED EXPLICIT DEPOSIT INSURANCE: 1 where explicit and limited deposit insurance scheme in place before the crisis, 0 otherwise. Source: World Bank database.

t – statistics in brackets

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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.

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, widespread deposit guarantees on its own is positively associated, albeit weakly, with higher fiscal costs of crises (Table 6 equation 1). This relationship is maintained once factors proxying for the size of the shock and ability to withstand the shock are included (equation 2). Fiscal costs also 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 B in the appendix). 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). However, the regressions shown in Table 7 suggest there is no evidence, either positive or negative, of association between widespread deposit guarantees and the output costs of crises (Table 7 equations (1)-(3)). Therefore, the introduction of widespread guarantees appears to increase the fiscal cost of crisis resolution without any clear-cut impact in reducing the broader output costs to the economy.

Table 7:   **Impact of Government Deposit Guarantees on Output Costs**

	1. YCOSTS		
	(1)	**(2)**	**(3)***
GOVERNMENT GUARANTEE	1.2 (0.3)	-1.2 (0.3)	-0.2 (0.0)
CREDIT/GDP		0.17 (2.7)	0.15 (2.1)
CURRENCY CRISIS		8.1 (2.0)	9.5 (2.1)
R^{-2}	0.00	0.21	0.21
DW	2.1	2.0	2.2
Number of observations	32	32	27

YCOSTS: Sum of output growth deviations during crisis period from previous 3 year trend. Source: Hoggarth et al (2002).

*excluding central and eastern European transitional countries.

t – statistics in brackets.

There is also an issue of whether <u>explicit</u> *ex ante* deposit insurance schemes reduce or increase the overall costs of resolution. It appears that countries that had in place a <u>limited</u> explicit scheme had lower fiscal resolution costs than countries with either an unlimited scheme or no explicit scheme (see Table 6, equations (3) and (4), and Table B in the appendix). This might imply that limited explicit schemes reduce the potential scope of bail out by making it clear *ex ante* who would and would not be covered by the scheme in a crisis. Dermirgüc-Kunt and Detragiache (1998) also found that countries that had in place explicit deposit insurance schemes had lower fiscal costs of resolution than countries without such schemes.

Kaufman and Seelig (2002) also emphasise that during a crisis it is important that insured depositors (and other creditors) have prompt access to the funds due to them. Delay in payment can reduce liquidity in the economy and encourage widespread bank runs. Knowing this may increase the likelihood that the authorities will forebear and thus protect *all* creditor claims.

Overall there does seem to be evidence that the existence of a limited deposit protection scheme is helpful in reducing the costs of crisis resolution but that widespread government guarantees to creditors appear to increase the fiscal costs without reducing the broader output costs.

6.   Information Disclosure in a Crisis

Another important question is whether greater information disclosure is helpful even during a crisis.

Information disclosure by banks may have an important role to play even for crisis countries. Disclosure of information on banks' financial position may reduce the likelihood of runs on fundamentally solvent banks. There can be a lack of good data on the banking system at the time of the crisis making it difficult to distinguish between weak and less weak players. 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. Almost all banks reported a healthy solvency position when difficulties emerged suggesting that provisioning, and thus capital ratios, did not accurately reflected asset impairment. Similarly, at the outset of the Japanese crisis in 1992, publicly available information on banks' non-performing loans was practically non-existent (Nakaso (2001))

That said, it is possible that information disclosure in a crisis could be de-stabilising. Morris and and Shin (1999), looking at the game theoretic implications, argue that more disclosure might exacerbate sudden market movements but the general effect is ambiguous. On the other hand asymmetries of information will also be destabilizing when there are market concerns. Banks/investment banks under market pressure or subject to rumour are tending to disclose much more information. Generalised concerns about risks in particular areas of activity have also led to increased disclosure. Concerns about overheating in the UK mortgage market led to material new disclosures by major players.

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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 non-performing loans (NPLs) and of any collateral taken. Failure to do this may reduce the losses borne by existing shareholders, increase the fiscal costs of resolution and discourage new private sector recapitalisation. During the Mexican banking crisis of the mid-1990s 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)).This indicates that the development of clear Pillar III disclosures could help to aid the handling of crises.

7. Implications for Public Policy and Conclusions

The Basel Committee is trying to improve market discipline by requiring greater disclosure of comparable statistics on banks' risk profiles and on the capital held to back them. There is evidence that increased disclosure will affect bank behaviour by encouraging them to hold more capital to back their risks and may make banking crises less likely.

An important question for many countries will be whether the new disclosure requirements should be adopted for all banks, not just the internationally active. Some countries may be applying Basel II only to their large internationally active banks. One issue will be whether the banks would voluntarily adopt the new disclosure standards.

Research carried out by the Bank of England into the timing of changes in disclosure by a very limited sample of large UK banks has indicated that it is driven by external requirements. US and UK accounting standards have developed in a similar way over the past twenty years with the US leading the way making a US listing important. This research indicated that banks react to new requirements promptly (sometimes a year ahead of the required date) but do not appear to have been proactive in providing more than was required. This is also supported by the evidence from the world-wide sample used for the Baumann and Nier study. There are a number of German banks in the sample and disclosure of the Tier 1 ratio (ie, shareholders' funds to risk weighted assets), which is the key measure in terms of a bank's solvency (see Jackson, Perraudin and Saporta 2002), was largely limited to banks with a US listing. There could be a co-ordination issue where banks would only disclose information if other banks had to as well (Shaffer 1995). Mandatory requirements could therefore be important.

Several arguments have been put forward which might discourage the authorities from requiring greater disclosure. One is that if banks are rated they disclose private information to the rating agencies making public information disclosure less important. In fact the Baumann and Nier research on the effect of disclosure found that the existence or not of a rating was far less important in terms of a bank's risk profile than the amount of disclosure to the market as a whole. This may be because of the effect which implied

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support has on the ratings, limiting their usefulness in terms of an assessment of intrinsic credit worthiness.

For disclosure to reduce information asymmetries the type of information disclosed is critical. It is not enough for banks to increase the amount of qualitative information about risk and risk management or the production of a range of disparate measures. They need to produce hard disclosure which is directly comparable across banks and encompasses the measures of importance to the market – this is where the comparable disclosure under Basel II will have an important effect.

The industry is resisting requirements for comparable disclosure on the grounds that tailoring the disclosure to a bank's own circumstances/systems is important. But the huge focus given to the Basel I ratio, because it is broadly comparable, highlights the importance of publishing other common measures.

The widespread resistance to comparable disclosure is difficult to understand – banks with low risk profiles might be expected to be in favour. It is possibly the case that given the cyclical nature of banking all banks believe that they may experience difficult times on occasion. Also there are clearly costs entailed in disclosing more and the private benefits may not been seen as outweighing them. There are, however, several papers which have shown a link between lower disclosure and higher costs of funding which should influence the banks – Botosan (1997) and Sengupta (1998). The authorities of course have to take into account the public benefits as well.

However, increasing disclosure, though helpful, will not ensure that market discipline is effective. Governments also need to consider the main channels for market discipline for their banks and factors which could reduce its effectiveness –such as widespread expectations of support and broad deposit protection schemes.

Governments concerned about possible future financial crises may be reluctant to change their existing support arrangements. But there is evidence that very broad deposit protection schemes may make banking crises more likely and their resolution more costly.

In contrast, widespread expectations of government support for banks, which encourage banks to hold less capital relative to risk, appear to make banking crises less likely. But this may be because the support simply helps to prevent a crisis from occurring if the banking sector has become weak. We will be carrying out further research to look at the effect of market discipline, including expectations of support, at a bank level.

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Table A: Features of Bank Resolution in Recent Systemic Crises

	RESOLUTION TECHNIQUES								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)	Gross fiscal costs (% of annual GDP)	Output losses [11]	Output losses2 [11]
Sweden 1991-93	11	Yes	No	Yes[1]	Yes, but gradually	Yes	Yes	No, not long term[2]	4	11.8	3.8
Norway 1988-92	9	Yes	Yes (3.6) – losses	No[3]	Varied across banks	Yes	Yes	Yes (50)	2.5	9.8	27.1
Finland 1991-93	9	Yes	Yes – losses[4]	Yes[1]	Yes, but gradually	Yes	Yes, foreign only	No, not long term[5]	11	22.4	44.9
Japan 1992-	13	No	Yes – losses	Yes	No, forbearance	Yes	Yes	Yes but limited	20	24.1	71.7
Mexico 1994-95	11	No	Yes – no losses	Yes	No, at book value	Yes	Yes, mainly foreign	No	20	9.5	5.4
Thailand 1997-98	15	Yes	Yes (22) – losses	Yes	Yes	Yes	No[6]	Yes (12)	44[7]	25.9	28.1
South Korea 1997-98	30-40	Yes	Yes (2) – no losses	Yes	Yes	Yes	Yes	Yes (14)	21[8]	16.7	12.8
Indonesia 1997-98	65-75	No	Yes (17) – losses	Yes but not initially[9]	Not initially	Yes[10]	No[6]	Yes (20)	52.5	24.5	20.1

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   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%.
3   Government announced though that the stability of the banking system would be protected.
4   Losses on capital injected (into Skopbank) rather than LOLR in the traditional sense.
5   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.
6   But merger of state banks.
7   Thailand estimate includes contingent liabilities but excludes future estimated revenues to the government from bank asset recoveries (estimated 9% of GDP by IMF (2002)).
8   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).
9   Bank runs continued until a blanket guarantee was announced.
10   Including to non-viable banks.
11   Output losses is the cumulative deviation in the growth of method output from its pre-crisis trend and output losses 2 is the cumulative deviation in the level of actual output from its pre-crisis trend (see Hoggarth, Reis and Saporta 2002).

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Table B: **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 costs[e] (per cent of GDP)
All countries	33	3.8	26.6	43.0	6.6	15.6	13.6
Blanket deposit guarantee							
– Yes	22	3.8	29.1	47.1	8.6	17.9	14.0
– No	11	3.9	17.3	34.7	4.1	11.0	12.8
Banking crisis alone	10	4.5	22.8	43.5	7.2	9.0	8.0
Banking and currency crisis[f] *of which*:	23	3.5	28.4	42.8	6.3	18.4	15.8
– with blanket deposit insurance	16	3.2	30.0	45.8	8.6	21.2	15.5
– without blanket deposit insurance	7	4.3	19.5	35.7	3.7	12.3	16.7
Explicit *ex ante* deposit insurance							
– Yes *of which*:	15	4.2	27.6	36.2	6.7	11.0	12.2
Limited	9	4.0	36.3	29.8	5.0	7.4	13.0
Unlimited	6	4.5	20.6	45.7	9.2	16.6	11.1
– No	17	3.5	27.7	49.7	6.5	17.2	14.5

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 costsis the cumulative deviation in GDP growth during the crisis period from its pre crisis 3 year 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.

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