Is financial stability policy now better placed to prevent systemic banking crises?

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Introduction

Widespread bank failures have severe implications for the economy. Wherever the banking system collapses, output falls sharply and the economy takes a long time to recover (Honohan (1996)). Moreover, bank failures build up political pressures for the government to intervene and rescue banks; in some instances political imperatives have replaced economic efficiency and led to the nationalisation of the banking system (Brock (1992)). Furthermore, banking crises have often occurred in conjunction with balance of payments crises (Kaminsky and Reinhart (1995)). This is nowhere truer than in emerging market countries, where banks remain at the centre of the financial system. For all these reasons, it is of utmost importance to build up a sound and stable banking system.

The first section of this paper introduces the case for and elements of a financial stability policy. The second looks at the issue of bank risk-taking and the way in which supervisory oversight deals with it. The third section summarises deposit insurance practices across countries, and the last provides an overview of responses to the operation of a lender of last resort.

1. Banks and financial stability

Banks are central to the working of a monetary economy. They play a crucial role in the provision of transaction services and the administration of a country's payment system; they are the natural suppliers of liquidity to firms and households; and they are a main conduit for monetary policy (Corrigan (1982)). The prominent role of banks in a monetary economy ensures that bank failures - and in particular those that happen in tandem - carry real consequences.

Banks' balance sheets are unique in their financial structure. Banks issue liquid, nominally valued liabilities, many of which are payable on demand at par, and they mainly acquire assets that are illiquid, relatively difficult to value, and of longer maturity than their liabilities (Lindgren et al (1996)). Most businesses do not carry the degree of leverage that banks show in their balance sheets.[1] This comparatively high leverage ratio originates in the role that banks play in the transformation of debt issued by firms and other borrowers into demand deposits, saving deposits and other assets demanded for households.[2]

A thorough understanding of the risks that arise from banks' operating environment, and the risk transformations that take place in their balance sheets, is critical for the design and implementation of financial stability policies in banking systems. Goldstein (1997) asserts that banks in emerging economies face relatively high credit and market risks; and that there have been several instances when banks (or banking systems) have suffered from an undue degree of risk concentration. The structure of the economy (eg taste, technology, endowments and the nature of shocks) might place some constraint on the scope for risk diversification in emerging economies; but bank failures are also the result of inadequate risk-taking, weak or negligent management and fraud. Maintaining adequate levels of capital can help to overcome some of these difficulties.

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[1] This assertion should be qualified. Commercial firms that show a debt/equity ratio in excess of two and a half would normally receive a speculative credit rating. By contrast, in the case of banks a ratio of 10 is considered highly conservative. For more details see Dewatripont and Tirole (1994), Table 2.3, page 23.

[2] Although other financial intermediaries are growing, their size and dynamism have not yet challenged the central role of banks in emerging economies.

Macroeconomic volatility and capital

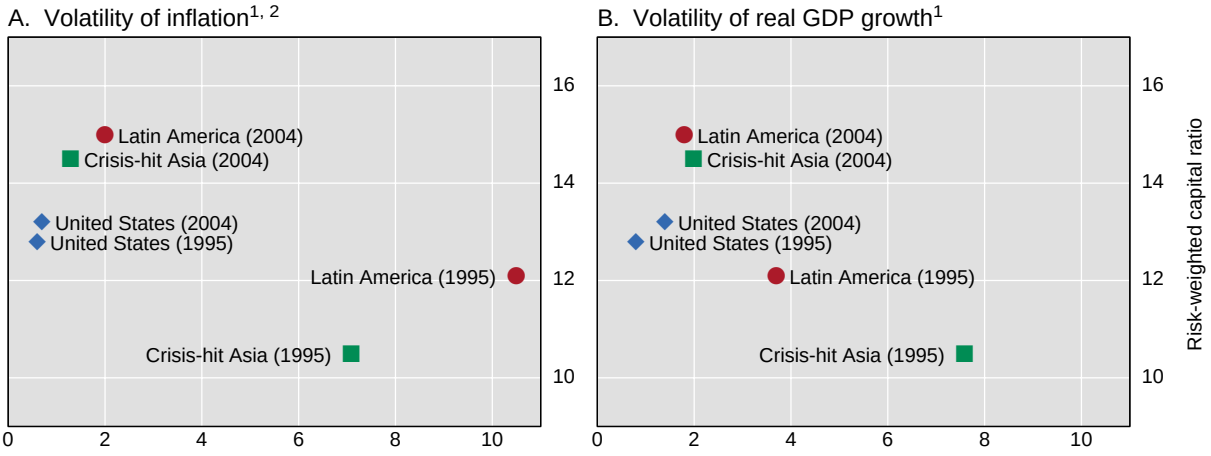
Although emerging economies are exposed to large shocks, the succession of banking crises during the last 30 years suggests that fundamental bank weaknesses have been severe. In fact, they have often been too severe to be solved by a turnaround in the economy, implying that the underlying structural problems also need to be addressed. Nevertheless, BIS (2005) notes that cyclical factors have contributed considerably to the recently improved banking sector performance. The main channel identified is the increased ability of governments to support banks.

Dealing with macroeconomic volatility is a priority to strengthen banking systems, and some progress has been made in this regard. A stable fiscal policy contributed to the supply of long-term funding to the financial system in Chile, and the stabilisation of the economy was a crucial factor in the recovery of banks in Mexico (See contributions by Moreno, by Betancour, De Gregorio and Jara and by Sidaoui in this volume).

Other factors can also play a role. First, a large foreign bank participation helps to shift abroad part of the economic losses of an adverse domestic shock. However, foreign banks can become a channel of transmission of foreign shocks to the domestic economy, and their presence can also threaten the solvency of domestic banks. The country experiences reviewed in Sidaoui, Betancour et al and Pesce provide some support to the idea that foreign banks have contributed to a more competitive business environment. Second, capital markets or other markets can help mitigate credit risk. For example, banks exposed to booming housing prices can sell bonds secured by those loans. A difficulty here has been the relatively small size of capital markets in emerging economies, although this might now be changing.[3] The paper by Zamani in this volume provides an explanation of how policy has sought to develop a diversified financial landscape. Third, the holding of higher levels of capital can compensate for a more volatile operating environment. In particular, capital provides a greater safety margin in the event of shocks and reduces the likelihood of bank failure. Other channels are discussed below. While 10 years ago banks in emerging economies - with several notable exceptions - chose not to raise capital ratios with this end in mind (Goldstein (1997)), more recently bank capital ratios have risen in several emerging economies (BIS (2005)). Graph 1 presents bank capital ratios for different regions and their relationship to macroeconomic volatility.

Graph 1

Macroeconomic volatility and risk-weighted capital ratios



Note: Unweighted averages of Argentina, Brazil, Chile and Colombia for Latin America, and Indonesia, Korea, Malaysia and Thailand for Asia.

[1] Volatilities are averages of the periods 1995–99 and 2000–04. [2] Measured as the annual change in consumer prices, in per cent.

Sources: Central banks; IMF and IMF staff estimates; national data.

[3] For further discussion of issues raised in this paragraph see background notes for this meeting: "Banks and aggregate credit: what is new?", "Changing nature of risks facing banks" and "Privatisation, consolidation and the increased role of foreign banks". See also Goldstein and Turner (1996).

Incentives for risk-taking and capital

Another consideration is imperfect information and its impact on the structure of banks' balance sheets. This structure would not matter in a world where shareholders, depositors and borrowers shared perfect information about all aspects of the economy.[4] In this world, banks' portfolios would just replicate the market portfolio and the constellation of risks in the portfolios would be that of the underlying economy. In the real market, however, if banks wish to undertake riskier projects they are likely to pay higher interest rates to compensate depositors for greater risks. Avery et al (1988) and Park (1995) find evidence that wholesale bank depositors can demand higher interest from banks that undertake riskier ventures. But there is no evidence that small depositors behave in this way.

Monitoring bank managers is costly. Small depositors do not normally have the necessary capabilities, either to collect and analyse information or to intervene in bank management, and they might not have the incentive to do so. However, small depositors would expect to benefit from the information collected by other depositors on banks' activities. There is a serious free-rider problem here. Moreover, because depositors or other small creditors share the same incentives, the information produced as part of the monitoring of banks' activities would be of limited use in helping to reveal their underlying risks.[5]

In the presence of information asymmetries, the structure of capital is a key determinant of bank performance. Because it affects the behaviour of different claimholders (eg management, equity holders, depositors, etc) capital is key to solving the incentive problem that they have. In particular, equity holders fear that the decisions taken by firms' management might have a negative impact on their wealth. A higher capital (or equity stake) has the potential to encourage equity holders to monitor firms' management more effectively.

Capital could also enhance bank resilience in the event of contagion or spillover. For example, claims on banks normally make up a large proportion of the wealth of households and, in the event of doubts about the soundness of a bank, small depositors might well be inclined to withdraw deposits. This can discipline managers who behave imprudently (Calomiris and Kahn (1991)). To the extent that the interbank market works properly, the movement of deposits between banks could provide peer assessments on banks' risk profiles. But if deposits leave banks, this may also lead to bank runs spreading amongst banks that share certain similarities (eg line of business, geographic areas or ownership) or even to an indiscriminate run on banks.

Moreover, banks share a large proportion of transactions amongst themselves on a daily basis. Changes in the liquidity position of one (large) bank would affect the financial position of all its counterparties and cause system-wide financial instability. This is often referred to as the "too big to fail" dilemma, but it may be not only size-dependent but also "context-dependent" (Freixas et al (1999)).[6]

2. Prudential regulation and supervisory oversight

While banks are vulnerable to a variety of shocks, it is important to bear in mind that one of their key functions is to pool credit risks by diversifying their portfolios. Banks are thus a conduit for better risk-sharing in the economy.[7] However, risk pooling by banks does not make risk disappear. Indeed, if banks do not manage risk correctly it may even lead to its concentration where diversification is low.

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[4] This is normally referred to in the literature as the Modigliani-Miller theorem. See Modigliani and Miller (1958).

[5] Grossman and Stiglitz (1980). The argument hinges on the inability of depositors to observe a clear signal in the actions of managers. Some argue that forcing bank management to disclose more and better information about operations restores market discipline (Caprio and Honohan (2004)).

[6] See discussion of interbank markets in the background note for this meeting "Changing nature of risks facing banks".

[7] Such pooling also allows banks to specialise. Part of the benefits of this accrue to firms. The benefits are large in terms of economic welfare as financial deepening is positively associated with economic growth and development.

The correct assessment of risk in bank portfolios is therefore crucial to preserving the stability of the banking sector. But better risk management has not always been a priority for policymakers. Banks might allow an urgent "need" to generate revenue (Sheng (1996)) to cause them to act imprudently, aware that it is costly to monitor their activities and in the expectation of a bailout should the worst happen. Sprong (1990) asserts that control of banking risks becomes a way of limiting claims on deposit insurance and thus making such insurance workable. Some time ago Rojas-Suarez and Weisbrod (1996) observed that internal incentive systems for risk management were not a priority for supervisors. From another viewpoint, Barth et al (2002) suggest that bad design of regulation and supervision weakens incentives to manage risks well.

Recent crises appear to have increased awareness of the importance of policies to improve risk management in banks in emerging markets. On the basis of the questionnaire responses summarised in the Table in Appendix A, the following three sections discuss how prudential regulation and the supervisory framework try to enhance risk management.[8]

Risk concentration and connected lending

In most emerging economies there is regulatory action to prevent risk concentration in bank portfolios. Quantitative limits on lending to a single borrower,[9] on holdings of securities, and on lending to related parties are commonly applied. In general, risk concentration is defined as a percentage of bank capital; although in Latin America lending limits are reported as a share of a borrower's net worth.

The lending limit for loans to a single borrower is commonly set at 25% of bank capital, although there are countries where it is below this percentage (eg India and Venezuela). In some exceptional cases, the limit is as high as 40% of bank capital. In other countries total lending to large borrowers is limited to a certain multiple of bank capital (between five and eight times) or a share of the loan portfolio (half).

Investments (eg private equity holding or placement of securities) are generally excluded from the limit to a single borrower and are subject to lower limits. For several countries it is not clear whether government borrowing from banks is subject to the same limits.

Lending to related parties or controlling interests is commonly permitted but subject to limits. Only a few countries do not allow it at all. These limits are generally tighter than those set for any single borrower but they have been set at the same level in a few cases. In several countries lending to controlling interests must be disclosed. In Malaysia and Venezuela, lending to related parties or controlling interests is forbidden.

Bank supervisors monitor large exposures on a regular basis; credit registries and on-site examination are a critical element. It is not clear whether this is consistent across different supervisory authorities, but most countries report on-site inspections at least once a year.

Credit quality

In recent years, credit quality has become an area in which banks in emerging economies can show improvement in risk management. In some cases, regulators have provided guidelines or formal instructions for the way bank lending activities should be conducted. Today it is very often the case that banks in most emerging economies have proper loan approval processes and credit committees overseeing the implementation of their lending policies. This was not the case some years ago.

But there are still problems. Liberal reporting and treatment of non-performing loans and renegotiated debt remains a problem. An adequate loan classification requires that the debtor's financial position be considered, comprising an assessment of its net worth, cash flow, collateral and payment history.[10]

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[8] What follows concentrates on credit risk, which is the main source of risk for banks in emerging markets. See background note "Changing nature of risks facing banks".

[9] Across most economies there is a broad definition of borrower: a single person or firm, or a group of them with economic links deep enough to make them economically dependent on each other.

[10] Goldstein (1997) argues that these should be the main elements of credit analysis.

Chile is the only country reporting that banks classify loans according to the credit rating of the borrower. In Hong Kong SAR and Singapore, credit and collateral analysis are fully incorporated into loan classification. But in many countries the main criterion remains the repayment of loans.

At least three countries report that asset quality plays a central role in their supervisory assessment of banks. This is achieved by application of the CAMEL methodology[11] in Chile, Hong Kong and Korea. For other countries it is not clear to what extent the bank examination process fosters a better assessment of a bank's lending policy. However, a number of countries conduct off-site examinations of bank loans and makes use of centralised credit registries, whereby information about banks' loan portfolios is reported on a monthly basis. At least eight countries report having such registries in operation.

Overall, there appear to have been significant improvements in policies to assess asset quality but there are still relatively large gaps relative to best practices.[12]

Loan loss provisions

Provisioning rules are a meaningful way to manage risks when the value of assets does not carry a market price. However, loan provisioning is still mostly dependent on actual loan repayments and does not take into account the current repayment capacity of borrowers and their past behaviour. Loan provisions based on actual repayments may thus encourage "evergreening" of bad loans. Several countries also report that they apply provisioning rules that differentiate between several types of loans with possible negative implications for asset quality.

In only a handful of emerging economies do banks apply portfolio models to compute loan loss provisions based on the statistical properties exhibited by such portfolios. In these cases, loss provisions are related to the expected loss in a loan portfolio. In general this approach applies to relatively large and diversified parts of the loan portfolio; most notably, mortgage and consumer lending.

As discussed further in a companion background note for this meeting,[13] the application of portfolio model techniques to estimate the need for loan loss provisions requires histories of portfolio performance and information about the distribution of risks amongst the universe of borrowers. In emerging economies, lack of information and structural changes make this a difficult task. To this end, credit registries could make a central contribution to the assessment of credit risk. In general, supervisors hold veto power on the implementation of portfolio methods for the computation of loss provisions or they retain the power to demand greater provisions if they do not agree with the model results.

Banks and capital regulation

The regulation of capital and its oversight by supervisors are important components of financial stability policies in a market economy. Demanding more capital for greater risk-taking aligns shareholders' incentives with the interests of less informed creditors. The regulation of capital in the banking industry must then balance two objectives: (i) allowing for a healthy and competitive banking system; while (ii) providing an incentive scheme that brings greater discipline to the way banking activity is conducted. Any regulation on capital faces the challenge of ensuring compliance. Moreover, how to deal with a generalised undercapitalisation of the banking sector remains a sensitive issue.

The regulation of capital in banking systems in emerging economies has evolved over the last 10 years. Nowadays, it is fast converging to the standards in existence amongst industrial economies. In a list of 16 emerging economies, all have adopted a regulatory approach that follows the standard

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[11] A bank examination methodology that rates banks based on their capital adequacy, asset quality, management, earnings and liquidity.

[12] Kane (1995) highlights the constraints that poor information systems have placed on efforts to exercise due diligence in granting new loans and monitoring outstanding ones.

[13] "Changing nature of risks facing banks".

set in the Basel Capital Accord of 1988.[14] This convergence in regulatory frameworks in emerging economies is quite remarkable.

What are the reasons? On the one hand, this is the outcome of national experimentation with different forms of banking regulation rather than the result of a supranational agreement as was the case for the large industrial economies. The degree of economic and financial integration between those economies in providing an incentive to seek a common capital framework should not be underestimated. The impulse for convergence might also have come from several other forces: capital markets searching for a familiar approach, oversight by rating agencies, peer pressure, or "beauty contests". On the other hand, the development of supranational standards in the late 1990s and a related voluntary assessment process might have made governments aware of the need to revise their own national frameworks.[15]

One consequence of convergence is that differences in the regulatory framework are less likely to alter the competitive edge of banking firms. Is this important for domestic banks in emerging economies? Arguably the answer at present is no, except for some economies with important intraregional banking relations. Most of the papers dealing with country experiences in this volume make reference to different issues as a source of a competitive edge but not to differences in the way the industry is regulated. A more important consequence at this juncture is that convergence has established a common capital framework that centres on credit and market risks. This has helped to promote greater emphasis on risk management in the banking business in emerging economies. Table 1 presents evidence on the universal use of credit and market risks as a yardstick for capital ratios in emerging economies. To the extent that the capital ratios increase with greater risk-taking, the framework can help banks in emerging economies keep risk under control. But this is not a foregone conclusion. Goldstein (1997) presents two common criticisms of the framework: (i) it does not require banks operating in more volatile environments to hold higher capital; and (ii) the significance of meeting the capital adequacy ratio is reduced if other elements of the prudential and supervisory framework are substandard. The paper by Betancour et al (2006) in this volume draws attention to the "pre-conditions" required for a capital framework to work adequately.

The common framework has incorporated two important elements into the regulation of capital in emerging markets: (i) a rule-based approach in the assessment and quantification of risks; and (ii) allowance (although limited) for the risk properties of bank assets. The rule-based approach imposes on banks the criteria for the assessment and quantification of risks and preserves some discretion for the regulator to alter this quantification. This discretion is conceptually an important issue because it puts a powerful tool in the hands of the regulator in emerging economies.

The rule-based approach incorporates risk weights associated with different components of bank assets. By determining these, the regulator is passing judgment on the nature and relative importance of the risks the banking sector can bear. In a sense the regulator substitutes for bank management in the judgment of risks. Given the structure of the risk weights, the supervisor can adjust the minimum amount of required capital to the riskiness of the whole bank portfolio.

Assessing risk weights is not a trivial issue in emerging economies. The risk weights embedded in the rule-based approach have generally been taken from the international blueprint for the regulation of capital. From conceptual and practical points of view this is somewhat puzzling because emerging economies tend to differ in their economic structure and the constellation of risks might well be different. Moreover, emerging markets are generally more vulnerable to financial shocks. As a result of these differences, their economies tend to be more volatile; that is, prices and quantities record larger changes in response to a shock than would be the case in developed economies. This would seem to call for some differentiation of risk weights. Prima facie, there would be a case for banks in emerging economies to hold greater capital if the probability of bank failure was more likely to have real-side effects than in a developed economy with more diversified sources of finance.

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[14] The Capital Accord dated 1988, and modified in 1996, was developed by the Basel Committee on Banking Supervision. It was originally intended to apply to international banks but was extended to all banks in the European Union and later developed into an international standard.

[15] The Reports on the Observance of Standards and Codes (ROSCs) and the Financial Sector Assessment Program (FSAP) prepared and published by the International Monetary Fund and the World Bank.

Table 1

Capital regulation

	Prudential capital requirement (in %)	Total capital ratio (in %, for 2004)1	Credit risk (yes/no)	Market risk (yes/no)	Consolidated (yes/no)
Argentina	…	12.3	Yes	Yes	Yes
Brazil	…	…	…	…	…
Chile	8	13.6	Yes	Yes	Yes
Colombia	9	10.8 [3]	Yes	Yes	Yes
Mexico	8	14.1	Yes	Yes	No
Peru	…	…	…	…	…
Venezuela	12	12.5	Yes	Yes	Yes
China	8	…	Yes	Yes	Yes
India	9	13.4	Yes	Yes	Yes
Hong Kong SAR	8	15.4	Yes	Yes	Yes
Singapore	10	16.1	Yes	Yes	Yes
Indonesia	8	19.4	Yes	Yes	Yes
Korea	8	12.4	Yes	Yes	Yes
Malaysia	8	14.3	Yes	Yes	No
Philippines	…	…	…	…	…
Thailand	8.5	13.1	Yes	Yes	No
Czech Republic	8	12.6	Yes	Yes	Yes
Hungary	8	13.2	Yes	Yes	Yes
Poland	8	15.4	Yes	Yes	Yes
Israel	9	10.8	Yes	Yes	Yes
Russia	10 [2]	…	Yes	Yes	Yes
Saudi Arabia	8	18	Yes	Yes	Yes
Turkey	8	28.8	Yes	Yes	Yes

Note: na = no answer or not applicable.

[1] Taken from questionnaire responses. [2] Banks with equity greater than EUR 5 million, otherwise 11%. [2] For 1999.

Source: Central banks.

Several countries have adjusted the common framework to their specific needs. First, a few countries have modified the risk weights for some assets in bank portfolios. In Chile and Hong Kong SAR, regulators have applied greater risk weights for mortgage loans; likewise, Venezuela reported that risk weights for government bond holdings were to be positive rather than zero. Second, a number of countries have imposed greater capital adequacy ratios on their banks. Table 1 shows that at least seven countries demand a capital adequacy ratio for their banks that is greater than 8%.

The regulation on capital does not take into account the overall portfolio risk faced by the bank. Since asset correlation is not taken into account, the allocation of assets embedded in the capital rule might not be efficient. For example, in industrial countries government bonds have a zero risk weight. The logical underpinning is that credit risk is low and stable, that government bonds are a safe haven in the event of falling risk aversion and that their return is negatively correlated with other banks' assets. However, in emerging economies these assumptions might not hold: sovereigns have defaulted, and sovereign debt returns are positively correlated with most other assets.

The introduction of the market risk amendment to the Capital Accord in 1996 was a first step away from a prescriptive rule-based approach towards models in requiring the specific quantification of risk.

This development had important consequences. In 2004 the Basel Committee on Banking Supervision published a revised framework.[16] The new framework still does not require the use of a risk portfolio model to compute capital adequacy ratios, but it makes explicit measurement of credit risk the central element for calculations of capital requirements. Moreover, although it established a rule-based approach, it envisaged the supervisory authority being able to demand an adjustment of the perceived capital requirement at its discretion. The need for this could be determined by the results of stress testing, deficiencies in risk management, or lack of internal controls.

Notwithstanding the convergence in the regulatory framework already noted, there remain some differences in the supervision of bank capital across countries. First, there are differences in the extent to which capital adequacy ratios incorporate credit and market risks. Interest rate risk is less prevalent in the computation of capital adequacy ratios than is credit risk. Second, there are differences in the frameworks used for bank regulation. For example, consolidated supervision is not universal since, in a few cases, bank regulators do not have the legal right to apply it.[17]

3. Deposit insurance

Deposit insurance is another central element of financial stability policies. Its presence reduces the incentive of bank depositors to withdraw their money all at once and bring down the bank. By increasing depositor confidence, deposit insurance has the potential to provide for a more stable banking system. But it also has its downside: as with any insurance scheme, it reduces an element of market discipline. Because depositors do not face the costs in case of a bank failure, it might reduce their incentive to monitor bank activities.

Most major emerging economies have adopted deposit insurance schemes. Nevertheless, such schemes are not universal and still have not been adopted in Chile, China, Israel or Saudi Arabia (see Table in Appendix B). Singapore has recently decided to introduce deposit insurance and has already laid down the details of how it might operate. Countries that do not have a deposit insurance scheme have in general kept a considerable role for the central bank in financing the repayment of deposits to depositors in failed banks. In general central banks can advance funds to the liquidators secured with assets from the failed bank.

Several deposit insurance schemes offer only limited coverage as a means to prevent moral hazard.[18] To avoid excessive risk-taking, schemes in most emerging economies tend to be limited in their scope and coverage. Thus, they seek to protect small depositors fully while leaving large depositors covered only partially. Extending insurance to the smaller (and more numerous) depositors has the potential to reduce the incidence of bank runs. Arguably, deposit insurance provides for less market discipline.

The limits on coverage are quite variable between countries, and this is probably due to both general and idiosyncratic elements. Differences in income per capita across countries matter: wealthier countries are likely to offer comparatively greater insurance in nominal terms. Idiosyncratic factors - like the past experience of a banking crisis - could also result in a higher coverage ratio. Some countries do not extend deposit insurance to branches of foreign banks, but do so in the case of foreign bank subsidiaries. Other countries do not make such a distinction.

Deposit insurance schemes may be funded privately (through contributions from banks) or from recourse to the government purse. Most commonly, participating banks are asked to make a contribution. When this is the case, contributions are based on the amount of deposits insured. There has also been a shift towards considering the risk profile of the bank: those with riskier business who are therefore more likely to tap the deposit insurance scheme are likely to pay higher fees. Examples include Hong Kong SAR, Singapore, Hungary, Poland and Turkey. This raises some interesting issues

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[16] The document is entitled *International Convergence of Capital Measurement and Capital Standards: a Revised Framework*.

[17] This is reported in the case of Thailand, although legal modifications are being tried.

[18] Caprio et al (2002) provide evidence that deposit insurance generosity is positively correlated with bank fragility. Demirgüç-Kunt and Detragiache (2002) show that deposit insurance generosity predicts future banking crises.

about the complementary nature of deposit insurance premia and risk-weighted capital adequacy ratios.

While the rationale for deposit insurance is clear, there are some thorny issues that arise in the case of systemic banking problems. In general, deposit insurance will not have the resources needed to pay out a large proportion of bank deposits. This poses problems of credibility for the deposit insurance system if the banking problem is regarded as large. Systemic banking crises in emerging economies also tend to be associated with an increase in sovereign risk, which further threatens the credibility of the insurance guarantee. In cases where depositors cannot distinguish between sound and troubled banks, the deposit insurance scheme is then likely to lose its effectiveness, and the banking system may destabilise easily (Levy Yeyati et al (2004)).

4. Lender of last resort

In many countries financial stability policies include a lender of last resort for the banking system. Banks are exposed to a great extent to liquidity risk (the risk that the cost of adjusting financial positions will increase substantially or that they will lose access to financing). This is particularly the case because banking is a heavily leveraged business and many banks' assets are illiquid. If depositors decide to exchange their deposits into cash, the banking system will need a source of external liquidity. The loss of deposits in one bank cannot be dealt with by borrowing from other banks because their liquidity does not increase when deposits are exchanged for cash.

Problems in the functioning of the interbank market can also pose a risk for systemic liquidity. Normally, banks keep liquid assets in the form of cash or a balance in an account at the central bank. Alternatively they may have deposits with other banks or access to borrowing from them. The interbank market allows banks to recycle liquidity amongst themselves. However, at some point the interbank market may not work properly. Interbank market failures arise in general from imperfect information about the true health of a bank or increased risks that make banks less willing to lend.

The failure of a large bank, or a number of smaller ones, can have systemic implications. The nature of banking credit relations determines that a large group of households and firms might not be able to obtain financing. This might reverberate through the financial system. In this vein, a bank run can affect the functioning of the payment system. Bank liabilities dominate as means of exchange but finality is only achieved when a means of payment is exchanged in settlement for customer transactions. For this reason banks daily clear large amounts of liabilities relative to their stock of assets. While an essentially bilateral commitment, these operations are frequently settled on a multilateral basis. Disruptions in the settlement of a bank's liabilities can have a knock-on effect on other banks.

Real-time payment systems eliminate these exposures between banks. However, if the central bank provides uncollateralised intraday liquidity to facilitate the process, it then takes on the credit risk. In recent years there has been a move towards real-time gross settlement systems for interbank payments and central bank lending has been collateralised. Under these circumstances, the lender of last resort can just stand ready to purchase high-quality marketable assets from banks' portfolios. Banks will keep them in their portfolios as they internalise the risk of an illiquid portfolio (Goodfriend and King (1988)).

But there are other instances where a lender of last resort is required to lend on less secured terms, involving the central bank taking onto its balance sheet the illiquid assets of banks in exchange for liquidity. James (1991) provides evidence that the liquidation value of a bank is lower than its market value. It is then possible that in the case of bank insolvency - and because of the divergences in valuation cited by James - the central bank would be taking on a significant risk.

Historically, the central bank has provided the function of lender of last resort for banks although this has also involved risk capital support for banks. This raises some issues concerning financial stability. If the lender of last resort reduces the liquidity risk that banks face, its presence might reduce the incentive of banks to keep adequate levels of liquidity. This raises the possibility that the involvement of the central bank increases moral hazard. One way to address this is to limit lending to a short period of time. This may provide the "breathing space" that a sound but illiquid bank might need. A second way is to impose borrowing limits. Table 2 shows that most central banks in emerging economies impose limits on lending to banks. In most cases the limits are on the amounts borrowed but several

also impose limits on the length of the lending period. Some countries report no limits to borrowing but in most of these cases lending is collateralised, and the amount of acceptable collateral provides the limit.

Table 2

Lender of last resort

	Borrowing limits (yes/no or details)	**Cost (interest rate charged, ppa)**	**Does access prompt supervisory action? (yes/no)**
Argentina	…	…	…
Brazil	…	…	…
Chile	Yes. Limit of 90 days	…	Yes
Colombia	Yes	Overnight rate + 1%	Yes
Mexico	Yes	Market rate	Yes
Peru	…	…	…
Venezuela	No. Amount of reserve requirements affects credit extended	Market rate + spread (not defined)	Yes
China	Yes	2.25% in most cases	Yes
India	Yes	Repo rate/bank rate	Yes
Hong Kong SAR	Yes. Limit of 100-200% of capital base and up to HKD 10 billion	Base rate + margin based on market conditions	…
Singapore	Yes	Market rate + margin	Yes
Indonesia	Collateralised	…	Yes
Korea	Yes	3%	Yes
Malaysia	Collateralised	…	Yes
Philippines	…	…	…
Thailand	Yes. On a case by case basis	The higher of 1-day repo rate or average minimum loan rate of 5 largest banks	Yes
Czech Republic	No. Limits on maturity	Money market rate + margin (depends on collateral)	Yes, but depends on bank's financial situation
Hungary	No. Based on collateral	O/N rate + 0.5-2%	No
Poland	No. Based on collateral	Lombard rate	No
Israel	Based on collateral	…	Yes
Russia	Yes	Market rate	…
Saudi Arabia	No	…	…
Turkey	Yes, in most cases. Based on collateral	Money market rate	Yes

Note: … = no answer or not applicable.

Source: Central banks.

Borrowing at punitive rates could also help in curtailing moral hazard; but punitive lending is less common. In general central banks charge market interest rates. It is also true that a higher interest rate might just end up sinking an illiquid bank or encourage greater risk-taking by its managers.

Most countries report that borrowing from the rediscount window prompts corrective action (Table 2). The nature of the supervisory action may vary but the prospects of opening the doors to the intervention of the regulator might be a powerful deterrent to imprudent behaviour.[19] Conditioning liquidity assistance on prompt corrective actions might provide for some constructive ambiguity. This is effectively ambiguity about whether liquidity intervention will in fact take place, about the terms for assistance and about the penalties. The downside of constructive ambiguity is that it places considerable discretion in the hands of the agency responsible for crisis management.

[19] See Table in Appendix C for details about prompt corrective actions in emerging economies.

Appendix A

Country	Risk concentration	Provisions	Credit registry	Other prudential regulations	Supervisory assessment
Hong Kong SAR	Lending limit of 25% of bank capital for borrower. Exceptions apply.	HKMA does not prescribe rules. Borrower can be pooled in risk categories and provisioned as a single borrower.		Lending to related parties limited to 5% of borrower's net worth. Total lending to related parties cannot exceed 10% of bank capital. Investment limited to 25% of firms' capital. Also applies to land holding of the bank.	CAMEL
India	Lending limit of 15% of bank capital for single borrowers and 40% of bank capital for group borrowers. In the case of infrastructure projects, 5 percentage points more are granted.	General provision rules. Advice to provision at time of credit event. Up to one year to provision for rehabilitation packages.		Investments up to 5% of total advances and 20% of net worth.	Off-site monitoring. Monitoring of real estate lending each month. On-site examination. Quarterly reporting.
Korea	Lending limits of 20% of bank capital for single borrowers and 25% of bank capital for group borrowers. Total of exposures greater than 10% of bank capital should not exceed five times bank capital.	Provision rules make a distinction for household, credit card and other loans.		Lending to shareholders is limited to 25% of bank capital or a proportion of their shareholding. Lending to related parties is limited to 10% of bank capital.	CAMELS: capital, assets, management, earnings, liquidity and stress testing.
Malaysia	Lending limit of: 25% of bank capital for borrower; or 35% if private debt securities in bank portfolio. Total of exposures greater than 15% of bank capital cannot exceed 50% of total loan portfolio.	Provisioning rules do not vary according to type of borrowing.	Central bank owns and manages a credit registry. Banks report single loans but not credit assessment.	Lending to shareholders or their affiliates is forbidden.	Off-site monitoring. On-site examination. Monthly reporting.

Country	Risk concentration	Provisions	Credit registry	Other prudential regulations	Supervisory assessment
Singapore	Lending limit of 25% of bank capital for borrower. Total of exposures greater than 15% of bank capital cannot exceed 50% of total loan portfolio.	Loan loss provision computed from portfolio models is permitted for consumer loans.	The Bankers' Association owns and manages a credit registry for its members. Creditworthiness assessment available. Access to information is restricted.	Banks are not allowed to engage in non-financial activities. They are also not allowed to invest in more than 10% of the share capital of/have significant influence over a company engaging in non-financial activities. Equity investment in a single company restricted to 2% of bank capital except in the case of financial companies where the acquisition has been approved by MAS. Total equity investment to 10% of capital.	On-site examination. Monthly and quarterly reporting.
Thailand	Lending limit of 25% of bank capital for borrower. Risk mitigation is limited to collateral in the form of government securities that reduce lending limits.	Loan classification embedded in the law (not a central bank regulation). Bank supervisor can demand provisioning on a particular loan.	There is a single credit bureau managed by a private company. All banks have chosen to report to it. Reporting for single borrowers and credit payment history is monthly. Cannot provide credit assessment report.	Investments limited to 10% of companies' shares and 20% of bank capital. Lending to related parties limited to 5% of bank capital, 50% of borrower's net worth and 25% of its liabilities. Exception if lending carries government securities or certificates of deposit as collateral.	On-site and off-site examination. Supervisors forecast capital adequacy ratio. Regular reporting system.

Country	Risk concentration	Provisions	Credit registry	Other prudential regulations	Supervisory assessment
Chile	Lending limit of 5% of borrowers' equity. Can be raised to 10% if excess is in foreign currency for trade financing (exports) and up to 15% if the excess (in any currency) finances public works.	Provisions are based on credit rating of borrower. Debtors can be pooled up in risk categories and provisioned as single borrowers according to risk characteristics.	Central bank loan registry managed by supervisor. Monthly reporting of loans granted and credit rating. Rating may be individual or pooled.	Lending to related parties is permitted but it should be granted under the same conditions as to non-related parties.	Banks are not subject to concentration or exposure limits in the regulations. The supervisor will grant a better rating to a bank that diversifies risk.
Colombia	Lending limit of 40% of borrowers' net worth.	Provision rules for consumer, commercial, mortgage and micro-credit according to months due (1-18 months).	Banks report loans to supervisor on a monthly basis. Data comprise amounts, interest rate, loan quality and borrower. No public access to data.	Lending to related parties is limited to 10% of borrowers' equity. Up to 25% if collateral for at least 5 pp is pledged.	Assessed by the Superintendency of Banks. On-site supervision.
Mexico	Lending limits range from 12 to 40% of bank capital for borrowers depending on the bank's capital adequacy ratio (eg if it is between 10 and 12% then it can lend up to 25%). Total of three largest exposures cannot exceed 100% of bank capital. Collateral increases borrowing limits up to 100% of bank capital.	Provision rules for housing, consumer and commercial loans. Based on payment record and financial and collateral analysis. Internal models permitted.		Lending to related parties is limited to 75% of banks' capital. Investments limited to 15% of business' net worth.	On-site supervision.
Venezuela	Lending limit of 10% of bank capital for a single borrower and 20% of bank capital for a group borrower.	Provision rules for general lending and microfinance.		Lending to controlling interest forbidden. Lending to employees of the supervisory authority forbidden.	Monthly reporting. Regulations and direct instructions.

Country	Risk concentration	Provisions	Credit registry	Other prudential regulations	Supervisory assessment
Czech Republic	Lending limit of 25% of bank capital for borrower. No limits to bond holdings of governments from OECD. Collateral admissible to reduce lending exposure (government bonds).	Loan loss provisions from portfolio models. Different methodology for banks following IFRS and those that are not. Supervisor might request a capital deduction for differences between estimates based on portfolio losses and a fixed coefficient.	Central bank manages the Central Register of Credits. Individual loans, loan characteristics and financial information of borrower. Credit assessment is not reported.	Lending limit of 20% of bank capital for controlling interest. Total lending to controlling interests cannot exceed eight times bank capital. Internal control system comprising risk management.	Off-site supervision: monthly, individual bank; quarterly, consolidated group. Based on regulatory reporting. On-site examination.
Poland	Lending and off-balance sheet claims cannot exceed 25% of bank capital. Total of exposures greater than 10% of bank capital cannot exceed eight times capital. Lending to OECD governments and banks is excluded (or lending secured against them).	General provision rules. Application of portfolio model possible after prior approval by supervisor (no bank applied for it).	Banks report to BIK (credit bureau) claims greater than 2.5% of bank capital (for large banks there is a loan size limit). Monthly update. Credit quality provided. Access only possible for central bank and supervisor.	Lending limit of 20% of bank capital for related parties. Operational risk and internal controls.	Off-site supervision based on reports filed. On-site examination. Lending exposures greater than 10% of bank capital must be reported.
Hungary	Lending limit of 25% of bank capital for borrower. Total of exposures greater than 10% of bank capital cannot exceed eight times capital.	General provision rules. General risk provisions permitted.	Private credit bureau. Banks must report their loans but not their credit assessment. Access is restricted to participating banks.	Investments are limited to 15% of bank capital. Total exposure cannot exceed total bank capital. Excludes government bonds and debt securities; and investment in other financial firms (but these holdings are limited to 60% of bank capital). Limitations on lending to related parties. Disclosure required. Real estate limited to 5% of bank capital (excluding buildings for bank facilities).	On-site supervision (individual and consolidated basis). Off-site examination.

Country	Risk concentration	Provisions	Credit registry	Other prudential regulations	Supervisory assessment
Israel	Lending limit is scaled as a proportion of capital for: (i) large exposures; (ii) high leverage buyouts; (iii) industry concentration; (iv) exposure to LDC; and (v) debt in arrears. Collateral can be offset against exposure.	General provision rules and special rules for housing loans.	Centralised loan registry managed by the Bank of Israel. Proprietary use for supervision. Individual loans and financial information reported.	Credit management, internal control and best practices. Operational risk and IT management.	Off-site examination. On-site examination. Regulations play a major role in oversight.
Russia	Individual or group borrowing is limited to 25% of bank capital. Total of exposures greater than 5% of bank capital cannot exceed eight times capital.	Provisions for individual loans based on degree of impairment. Collateral is not taken into account for loan classification but it is for provisioning.	No centralised credit registry exists. There is oversight of credit bureaus by the central bank.	Lending to related parties limited to 50% of bank capital.	
Turkey	Limits to individual or group borrowing.	General provisioning rules.	The central bank manages a loan registry. Banks report risk positions on a monthly basis. No credit assessment reported. Consumer credit lending is publicly available.	Limits on lending to related parties.	

Source: BIS on national central banks.

Appendix B

Deposit insurance schemes

	Coverage (general/fractional, limits (per depositor, per bank))	Insurance premium (percentage or range)	Are insurance premiums risk-weighted? (yes/no)	Can deposit insurance be extended to other liabilities?	Do deposit insurance arrangements differ between foreign and domestic banks? (yes/no)
Argentina					
Brazil					
Chile	Does not have a traditional deposit insurance system. Sight and time deposits guaranteed by the central bank	na	na	na	No
Colombia	Up to 75% of deposits or limit of COP 20 million (approx USD 9,000) per depositor	0.5% of deposits	Yes. Based on bank rating	No	No
Mexico	Limit of UDI 400,000 (approx USD 133,000)	na	No	na	No
Peru					
Venezuela	Up to USD 5,000 on domestic currency deposits	0.5% of deposits	No	No. It was extended in the crisis of 1994-95	na
China	No deposit insurance	na	na	na	na
India	Limit of INR 100,000 (approx USD 2,300)	10% of deposit	No	No	No
Hong Kong SAR	Limit of HKD 100,000 (approx USD 13,000); excl interbank and connected deposits; incl foreign and domestic currency	0.05-0.14% (until the first year in which the target fund size is reached), 0.0075-0.02% thereafter, of deposits	Yes, based on CAMEL ratings	Not explicitly mentioned, but probably not (no)	Yes, foreign banks are allowed to seek exemption provided that deposits in HK offices are covered by the bank's home jurisdiction
Singapore	Limit of SGD 20,000 (approx USD 12,000)	0.03-0.08% of deposits	Yes	No	No

Deposit insurance schemes (cont)

	Coverage (general/fractional, limits (per depositor, per bank))	Insurance premium (percentage or range)	Are insurance premiums risk-weighted? (yes/no)	Can deposit insurance be extended to other liabilities?	Do deposit insurance arrangements differ between foreign and domestic banks? (yes/no)
Indonesia	Limited	0.10%	Not yet, plans to introduce this in 2007	No	No
Korea	Limit of KRW 50 million (approx USD 47,000)	0.025-0.3% of deposits depending on the sector	No	No	No
Malaysia	Limit of approx USD 15,000	0.02% of total deposits or 0.06% of eligible deposits	Not yet, plans to introduce this in 2006	No	No
Philippines					
Thailand	Currently blanket guarantee but DIA to be formed to provide limited coverage	0.20%	No	No, except in 1997 crisis where creditors were also compensated	No
Czech Republic	Limited basis on local and foreign currency deposits	0.1% of deposits	No	No	No
Hungary	Limit of HUF 6 million (approx USD 29,000) for domestic currency and lower limit for foreign currency	na	Yes, based on capital position. Capital ratio below 8% faces a higher charge	No	No
Poland	Effective limit of EUR 20,000, covers domestic and foreign currency deposits and includes other claims such as CDs, savings bonds, etc	Annual contributions depend on banks' risk-weighted assets and amounts set by the Bank Guarantee Fund Council	Yes, based on risk-weighted assets	No	Domestic banks and foreign subsidiaries are covered but foreign branches are covered by home country scheme
Israel	No formal deposit insurance scheme	na	na	na	na

Deposit insurance schemes (cont)

	Coverage (general/fractional, limits (per depositor, per bank))	Insurance premium (percentage or range)	Are insurance premiums risk-weighted? (yes/no)	Can deposit insurance be extended to other liabilities?	Do deposit insurance arrangements differ between foreign and domestic banks? (yes/no)
Russia	Limit of RUR 100,000 (approx USD 3,500)	Max 0.15% of deposits	No	Banks which had a licence as of the date the Deposit Insurance Law came into effect but which have not joined the deposit insurance system are compensated by the central bank	Unclear
Saudi Arabia	No deposit insurance scheme	na	na	na	na
Turkey	Limit of YTL 50,000 (approx USD 36,000)	0.15% + 0.02-0.05% depending on the bank's CAR	Yes	No, but happened during crisis period	No

Note: na = no answer or not applicable.

Source: Central banks.

Appendix C

Country	Agency responsible	What prompts corrective action?	Actions
Hong Kong SAR	Monetary Authority (in consultation with Financial Secretary)	No specific criteria provided	Order to cease operations Restriction of deposit-taking Restriction of other activities Appointment of adviser to management Appointment of manager to take over
India	Reserve Bank of India	Deterioration of financial strength: (i) capital adequacy ratio; (ii) non-performing assets (net of provision); and (iii) return on assets	Capitalisation plan (limit asset growth, dividend payment or new capital demand) Restriction of other activities (CD rollover, limit interbank borrowing, etc) Change of ownership Merger or liquidation
Korea	Financial Supervisory Commission	Capital adequacy ratio below 8% and rating below 3[1] Management improvement order: capital adequacy ratio below 2% and rating of 5	Management improvement plan. If the supervisor approves the plan, it will support it with bad asset purchases or a capital injection Merger with another institution, appointment of receiver or suspension of business
Malaysia	Central Bank of Malaysia	No specific criteria provided Informal enforcement action Remedial action	Written commitments; letter of undertaking Restriction of lending activities Appointment of adviser to management Change of management Filing of a petition of liquidation
Singapore	Monetary Authority of Singapore	No specific criteria provided	Demand for bank to take corrective action [draw upon excess liquidity or reserves with MAS; order access to interbank market or parent bank support; restructure portfolio] Restrict operations Impose prudential conditions Appointment of adviser to management Appointment of manager Takeover by another institution Revocation of licence/request to High Court for liquidation
Thailand	Bank of Thailand and Ministry of Finance	No specific criteria provided Problems identified	Corrective plan Management changes Restriction of business Bank liquidation
Chile	Banking Supervisory Authority	No specific criteria provided Troubled bank Insolvent bank	Capital increase Change in financial contracts except sight deposits Liquidation (managed by BSA)
Colombia	Superintendency of Banks. Network between MoF, SB & CB	Troubled bank, at discretion of the supervisor	Takeover by supervisor Liquidation

[1] In Korea, the bank supervisor issues ratings for individual institutions that range from 1 to 5 on a quarterly basis.

Country	Agency responsible	What prompts corrective action?	Actions
Mexico	Pending approval	Capital adequacy ratio less than 8% Capital adequacy ratio less than 7% Capital adequacy ratio less than 4%	Corrective plan aimed at capital increase. Suspension of dividend payments Restrictions on asset growth/new business Supervisor approval for new operations Supervisor could also appoint management Bank resolution process launched with involvement of MoF, BC, SB and DI
Venezuela	Superintendency of Banks and Financial Institutions	Deficient capital adequacy ratio Access to central bank rediscount window Failure to comply with regulations	Demand for capital increase Order to cease new lending and deposits Asset sale Change of management Closure of bank The supervisor enjoys great discretionary power to launch corrective action measures Takeovers are reserved for the deposit insurance fund
Czech Republic	Czech National Bank	Shortcomings in the activities of the bank Capital less than two thirds adequacy ratio Stability of the banking system at risk	Corrective plan Other possible actions: change of management, change in bank licence, fine, restriction or veto of power over transactions with related parties Demand for capital increase Prohibition of acquisition of risk assets Ceasing of lending to related parties Taking control of ailing bank
Hungary	Financial Supervision Authority/Central Bank (MoU in existence)	Failure to comply with capital adequacy ratio	
Poland	Commission for Banking Supervision	Severe loss and threat of insolvency Losses that exceed half of any bank's capital	Corrective plan Appointment of adviser/controller Restriction of lending/deposit payment to related parties Calling of an extraordinary general meeting of shareholders Taking control of bank Taking control of bank away from shareholders Revocation of licence and closure of bank
Israel	Bank of Israel (through the Supervisor of Banks)	Instability of banking institution Solvency problem Persistent solvency problems Insolvency	Rediscount window support Demand for rectification Order to cease certain operations Suspension of dividend payments Restriction of board's decision-making power Appointment of management Appointment of bank examiner to advise management

Country	Agency responsible	What prompts corrective action?	Actions
Russia	Central Bank of the Russian Federation	Lack of compliance with legal framework Preventive: no threat to the interest of creditors and depositors Enforcement	Fine for a value of up to 0.1% of capital Prohibition of operations for up to six months Revocation of licence
Turkey	Banking Regulation and Supervision Authority	na	na
Saudi Arabia	Saudi Arabia Monetary Authority (authority responsible)	Troubled bank	Appointment of adviser to management Order to cease management Order to cease lending/funding operations Revocation of licence (in coordination with Minister of Finance, who acts on recommendation from SAMA)

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