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**THE INCENTIVE COMPATIBLE DESIGN OF DEPOSIT
INSURANCE AND BANK FAILURE RESOLUTION –
CONCEPTS AND COUNTRY STUDIES**

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Abstract: Deposit insurance schemes and bank failure resolution systems are asked to fulfill conflicting public policy objectives: on the one hand, they are supposed to protect small depositors and prevent contagion risks from bank runs; on the other hand, they are supposed to minimize aggressive risk taking by banks. This paper discusses the incentive-compatible design and interaction of both components of the financial safety net and describes and compares three countries with different safety net arrangements: Germany, Brazil and Russia.

JEL Classification: G21, G28, G30

Keywords: Deposit insurance; Bank failure resolution; Brazil; Germany; Russia

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1. Introduction

Deposit insurance and bank failure resolution are important parts of the financial safety net and an incentive compatible design of both can minimize the probability and cost of financial fragility. The absence of explicit deposit insurance or the proper design of an explicit scheme can encourage large depositors and creditors to monitor banks and exert market discipline, thus reducing the risk of aggressive risk taking by banks and thus the risk of financial fragility. Effective and timely resolution of failed banks can decrease the cost that bank failures can cause to the banking system. An incentive-compatible design of bank failure resolution can contain aggressive risk-taking by banks and thus reduce the probability of bank failures ex-ante.

The financial safety net has opposing public policy objectives. On the one hand, it is supposed to protect small depositors, prevent bank runs and the breakdown of financial intermediation. On the other hand, a financial safety net has to be designed so that it minimizes aggressive risk-taking by banks, which can result in financial fragility. To understand these opposing public policy objectives, one has to consider the incentives of the major participants in the financial safety net;

- (i) bank management and owners,
- (ii) depositors and other creditors,
- (iii) the managers of the financial safety net and
- (iv) the owners of the financial safety net (ultimately the tax payer);

see Kane (2000). Given the put-option character of bank equity, bank shareholders participate only in the up-side risk of the bank business and have therefore strong incentives to take too aggressive risks, ignoring sound and prudent risk management. Effective bank regulation and supervision, as well as market discipline exercised by large depositors and creditors can keep banks in check.

The existence and design of deposit insurance and the effectiveness of bank failure resolution can have profound impact on market discipline. Depositors care mostly about the safety of their deposits. A generous deposit insurance scheme decreases incentives to exert market discipline, even of large depositors and other creditors that are not covered, if the introduction of deposit insurance signals the authorities' willingness to bail out all creditors in the case of bank failure. The owners of the financial safety net, often and, in its ultimate consequences, always the taxpayers, want to minimize its costs, while its managers might have other interests

and time horizons and might represent the interests of specific groups, such as politicians and banks.

While both deposit insurance and bank failure resolution are important in minimizing the risk of financial fragility, the proper functioning of each depends on the proper functioning of the other and the overall safety net. A deposit insurance scheme can maintain market discipline and minimize moral hazard risk only if accompanied by efficient and timely resolution of failed banks upon market signals of distress. A poorly designed deposit insurance scheme can increase financial fragility by giving banks perverse incentives and thus overload even an efficiently working bank failure resolution scheme.

While not all countries have explicit deposit insurance schemes and bank failure resolution systems, both components of the financial safety net are almost always present. Unless explicitly excluded by law, depositors often perceive the existence of implicit deposit insurance, especially for government and too-large-to-close banks. Even in the absence of a formal institutional structure to resolve failing banks, authorities are forced to address bank fragility. Perhaps paradoxically, even the complete lack of addressing failing banks constitutes a sort of bank failure resolution, though certainly not the most incentive-compatible one.

This paper discusses the incentive-compatible design of deposit insurance, bank failure resolution and their potential interactions and presents and compares the financial safety net arrangements in three countries; Germany, Brazil and Russia.¹ While recent empirical cross-country studies have evaluated the effect of deposit insurance on market discipline, financial fragility and financial development, country case studies can complement them by providing valuable insights into the institutional features of the safety net and the interaction of its different components. The remainder of this paper is organized as follows. Section 2 discusses the incentive compatible design of deposit insurance schemes and empirical cross-country evidence on its effect on banking system stability. Section 3 discusses the incentive-compatible design of bank failure resolution schemes and its interaction with deposit insurance. Section 4 describes and compares the financial safety net arrangements in Germany, Brazil and Russia and Section 5 concludes.

2. Deposit Insurance

This section discusses the incentive compatible design of deposit insurance schemes and summarizes the results of the recent cross-country literature on the effects of deposit insurance on market discipline and financial fragility.²

2.1. Deposit Insurance – Conceptual Ideas

Deposit insurance schemes are asked to fulfill conflicting public-policy objectives: on the one hand, they are supposed to protect small depositors and ensure financial stability, on the other hand, they are supposed to minimize banks' incentives to take aggressive risks. While establishing a deposit insurance scheme can promote bank stability by preventing bank runs, it is also a potential source of moral hazard. Banks can transfer some of the downside risk of their business to the owners of the deposit insurance scheme, often the taxpayer. Risk-shifting can become so substantial that rather than promoting bank stability, deposit insurance increases bank fragility.

To understand the risks of deposit insurance, one has to consider the incentive structure of bankers. Given the put-option character of bank equity, bankers face strong incentives to lend aggressively, ignoring prudent risk management. The lower their capital base, the less they have to lose and the more they can gain through aggressive lending. Market discipline exerted by creditors and regulatory and supervisory discipline from the authorities can help reduce this form of aggressive risk taking. Bank creditors can withdraw funds or demand a risk premium if observing a decline in banks' liquidity and solvency. Large creditors and depositors, such as other banks or nonfinancial enterprises, have the capacity to follow closely the banks they entrust with their deposits. Since small depositors do not have the ability or incentives to monitor banks carefully, they rely on a strong regulatory and supervisory authority, which is willing to take prompt action against weak banks, or free-ride on the efforts of large creditors.

There are several risks inherent in a deposit insurance scheme. By encouraging the confidence of depositors in the safety of their deposits, they can make depositors complacent and decrease their incentives to monitor banks. Especially the large depositors, that are the most likely and most able to monitor banks, might reduce their efforts, if they perceive the introduction of a deposit insurance scheme for small depositors as a signal that the coverage will be extended

to them in times of crisis. The existence of a deposit insurance scheme and the resulting reduced market discipline can also change the incentive structure for bank owners and managers. In the presence of insured deposits, a low capital base reduces the downside of risk even more and, when hit by a negative shock, a bank is therefore more likely to take large aggressive risks. Generous deposit insurance has thus the effect of subsidizing this aggressive risk-taking.

Several features of explicit deposit insurance can make it more incentive compatible, decreasing moral hazard and agency costs. One such feature is to assign a margin of loss to private parties to force them to monitor banks and so increase market discipline. It is desirable to identify a group that is able and likely to exert market discipline when forced to do so. Limited coverage makes the insurance incomplete, and forces large depositors to monitor banks. Similarly, coinsurance forces at least some depositors to bear a certain share of losses, since they are reimbursed for less than 100% of their deposits. Excluding interbank deposits from the insurance forces banks to monitor and discipline one another. Excluding insider deposits (i.e. the accounts of management and influential owners) reduces moral hazard by making owners and managers participate personally in the downside risk of the bank business.

A second feature is to structure the management and funding of the scheme in an incentive compatible way. Industry-based funding and management can decrease agency problems between owners and managers of the deposit insurance scheme. Funding of the deposit insurance scheme through premiums levied on the member banks makes banks pay for the risks they take and thus reduces their incentives to take aggressive risks, thereby abusing the insurance scheme. Management by the banks can further reduce incentive problems; the member banks do not only have the capacity to monitor each other, they have also the strongest incentives to avoid insurance losses, especially if they have to pay for these losses. A complete privatization, however, might not be possible, as we will discuss in the next section. Finally, mandatory membership or strong incentives to belong to a deposit insurance scheme are important to avoid adverse selection, with strong banks leaving the scheme in order to avoid cross-subsidization of weak banks.

Not only the source of funding, but also its correct level is important.³ The adequate pricing of premiums assessed on member banks not only ensures the viability of the fund, but also reduces moral hazard risks by making banks pay for the

risks they are taking. Finally, it shows openly the cost of deposit insurance. One step further is the application of differential premiums depending on the risks banks are taking and are therefore posing to the scheme. While theoretically superior to a flat premium, which implies cross-subsidies from less risky to more risky banks, risk-based premiums are difficult to implement in reality, due to severe information problems. Rather than a perfect risk-premium match, banks are therefore often assigned to risk buckets.

While industry-based funding is more incentive-compatible than public funding, the accumulation of liquid resources is not only inefficient but also risky in weak institutional environments, where large 'pots of money' invite abuse and looting. While insufficient resources in the deposit insurance fund might undermine depositors' confidence in the scheme and prevent authorities from closing unviable banks, sufficient funds can be ensured by giving the deposit insurer access to contingent financing, either from the market or the government. This additional financing can then be repaid by additional premiums levied on the surviving banks.

While a proper design of an explicit deposit insurance scheme along the different dimensions can minimize moral hazard risk and thus the risk of financial fragility, the interaction of these design features is as important. Industry-based funding and management are important complements. Industry-based funding and public management of the scheme can make the deposit insurance fund subject to political capture and looting by politicians. Public funding and industry-based management subjects the fund to the risk of looting by the banking system. Further, industry-based management of the deposit insurance should be complemented by some role for the deposit insurer in the regulation and supervision of the member banks. While this does not imply having a parallel supervisory structure, which would be too costly for many developing countries, certain supervisory powers of the deposit insurer can enhance significantly the market discipline. This can include

- (i) mandatory participation in the licensing process,
- (ii) the right to request extraordinary audits of banks that it perceives as unsound, and
- (iii) the power to exclude member banks that it perceives to be recklessly managed.

While the latter especially might be a 'nuclear bomb' never used, it can have sufficiently strong deterring power.⁴

2.2. Deposit Insurance – Cross-Country Evidence

While the risks and benefits of deposit insurance have been discussed extensively in the literature, until recently there was no empirical cross-country evidence on the relative weights of the risks and benefits of introducing deposit insurance and specific design features. A recent data compilation has allowed to assess the effects of deposit insurance on market discipline, financial fragility and financial development (Demirgüç-Kunt and Sobaci, 2001).

Recent cross-country comparisons have shown the risks of adopting explicit deposit insurance schemes. The likelihood of a banking crisis tends to increase in the presence of a poorly designed deposit insurance scheme (Demirgüç-Kunt and Detragiache, 2003). The likelihood is even greater in countries with deregulated interest rates and an institutional environment that lacks transparency. The US savings and loan crisis of the 1980s has been widely explained by the coexistence of a generous deposit insurance scheme, financial liberalization, and the failure of regulators to intervene promptly in failing institutions.⁵

Recent empirical research has shown that specific design features, such as the coverage and the funding of a deposit insurance scheme are related with its success in terms of preventing bank runs and providing small depositor protection, while maintaining market discipline and avoiding aggressive risk taking by banks that would result in banking crises. Demirgüç-Kunt and Huizinga (1999) find that higher explicit coverage and having a funded scheme reduce market discipline, i.e. the sensitivity of the deposit interest rate the bank has to pay to changes in profits and liquidity ratios. Demirgüç-Kunt and Detragiache (2003) likewise find that the probability of having a banking crisis increases in the coverage limit and in having a funded scheme. They also find that in countries with more efficient institutions the moral hazard problems stemming from explicit deposit insurance and some of its characteristics are lower or non-existent. This raises the importance of country-specific approaches to deposit insurance schemes, taking into account other elements of the safety net and the institutional environment. Finally, Cull, Senbet and Sorge (2001) find a significantly negative impact of a poorly designed deposit insurance scheme on financial development.

The pricing of deposit insurance schemes has also been found to be important for their effect on banks' risk-taking behavior. Laeven (2002*b*) shows that most

deposit insurance schemes are not properly priced. Using different methods of calculating the actuarially fair deposit insurance premium, reflecting the risk banks take, Laeven finds that many countries do not charge their banks the actuarially fair premium, implying a subsidization of risks banks are taking. Hovakimian et al. (2002) show that risk shifting to the government or subsidization of risk taking is stronger in poor institutional environments but can be reduced with an incentive-compatible design.

Cross-country evidence on the effects of deposit insurance has been augmented by country studies. A large literature discusses success stories and failures of state-level deposit insurance schemes in the US.⁶ The successful examples functioned mostly like clubs, had strong regulatory and supervisory powers over their members and exit from the scheme was hard or even impossible. Furthermore, advantages of belonging to the 'club' included liquidity support in times of crisis. A small number of members and unlimited mutual liability prevented free riding on the collective insurance.

3. Bank Failure Resolution and Its Interaction with Deposit Insurance

This section discusses the incentive compatible design of bank failure resolution systems and its interaction with deposit insurance schemes. Underlying non-systemic bank failure resolution is the objective of protecting the banking system, but not the individual bank. To the contrary, the organized and effective exit of banks is as much part of an efficient banking system as the entry of new banks.

3.1. Bank Failure Resolution – Conceptual Ideas⁷

As deposit insurance, bank failure resolution has two conflicting public-policy objectives. On the one hand, it has the task of minimizing the disruption and cost of failing banks by providing for their efficient and timely exit. This includes minimizing the risk of contagion that might arise from individual bank failures. On the other hand, the incentive-compatible design of bank failure resolution is important to minimize aggressive risk-taking by banks. If bankers know that they face immediate exit combined with the immediate and complete loss of all equity in the case of insolvency, they are less willing to take aggressive risks. If depositors and

creditors know that they will suffer losses in the case of bank failure, they will be more willing to exert market discipline. If, on the other hand, the authorities give shareholders and creditors the opportunity to shift risk to the taxpayer, by providing for generous bail-outs and late intervention and closure, this increases incentives for aggressive risk taking and increases the probability and extent of financial fragility. As in the case of deposit insurance, bank failure resolution has thus to be designed to avoid problems of moral hazard – aggressive risk taking by banks – principal-agent problems between managers and owners of the system and adverse selection between banks.

In order to provide for a quick and timely exit of failing banks, while minimizing the risk of contagion and disruption to the financial sector, bank failure resolution has to address two major problems that correspond to the two sides of a bank's balance sheet. First, in order to maintain debtor discipline and access to credit, as well as the information value of an ongoing credit relationship, performing loans should be kept within the financial system and not be liquidated. Second, an interruption of the access that depositors have to their savings in the failed bank, can cause contagion and runs on other, fundamentally sound, banks. In the Argentine context, these two problems have been also referred to as refrigeration and hostage problems; efficient bank failure resolution wants to avoid that “perishable assets” leave the refrigerator, i.e. the banking system, and wants to “take the hostages, i.e. the depositors, out” first. Minimizing the risk of contagion and asset decay demands solutions other than liquidation of the bank, since liquidation of banks implies

- (i) closure of bank, thus blocking access of depositors to their savings, and
- (ii) loss of incentives for bank management to maintain debtor discipline.

Even in the most efficient judicial systems, a liquidation is therefore often not the most efficient resolution mechanism.

Alternatives to liquidation include private sector solutions, such as merger and acquisition, and mixed private-public sector solutions such as purchase and assumption techniques. While private sector solutions do not involve any public or deposit insurance resources, moral suasion and other active participation by supervisors or other financial safety net agents might be necessary to bring about such a solution. A purchase and assumption implies the transfer of assets and preferred liabilities to other financial institutions, before revoking a bank's license. Only impaired assets are left in the failing banks, together with certain liabilities, and

are subject to liquidation. A rapidly performed purchase and assumption transaction can minimize both the risks of contagion, since depositors will lack access to their funds only for a short, if any, time period, and of asset decay, especially since most credits do not leave the financial system.⁸ If done in time, before assets fall below liabilities, a completely private solution can be envisioned. If the 'good' assets are not sufficient to cover the liabilities that the authorities want to transfer, additional resources are required, either from a deposit insurance fund or public resources.

Bank failure resolution, however, also has the task of minimizing aggressive risk-taking ex-ante and thus reducing financial fragility. Specifically, it can be designed in a way to minimize moral hazard risk ex-ante and distribute the costs of bank failure in a fair way ex-post. First, an incentive-compatible distribution of losses should be made clear ex-ante and strictly observed ex-post. Shareholders should be the first ones to suffer losses by seeing their equity wiped out. Incentives of shareholders can be further improved by making them liable for losses beyond the level of the paid-in capital.⁹ This would make stock prices more sensitive to changes in underlying bank fundamentals and have shareholders participate more fully in the downside risk. Finally, subordinated debt can be used to create a class of debt holders required to take the first hit. The holders of subordinated debt would therefore have a strong incentive to monitor banks and exercise market discipline.¹⁰

Second, intervention in a failing bank should be timely, preferably well before assets fall below liabilities. This is especially important since, as discussed in Section 2, incentives for aggressive risk-taking increase as the capital falls towards zero. Further, timely intervention and resolution also avoids distortionary effects on bank competition by failing banks' attempts to attract additional deposit resources through higher rates, extend aggressively their lending portfolio and their negative effects on borrower discipline. Avoiding moral hazard risk also speaks against resolution techniques that involve a bailout of banks with public resources or regulatory forbearance to enable the bank to recover a sound capital base.

The institutional structure of bank failure resolution can be designed in an incentive compatible way, by assigning the responsibility of intervening and resolving to the agent with the highest incentives to minimize losses. Bank supervisors often have the best information for intervening early and resolving troubled banks. The ability to intervene also strengthens their power vis-à-vis the banks in their supervision (Quintyn and Taylor, 2002). Bank supervisors, however,

do not always have good incentives to intervene in banks, but rather to avoid intervening during their tenure (Kane, 1990). Reputational concerns might prevent them from intervening early (Boot and Thakor, 1993). Political pressure and regulatory capture, together with personal liability can prevent supervisors from intervening. The deposit insurance agency might have appropriate incentives to intervene but most likely, only if managed and at least partially funded by the banking industry, and thus with strong incentives to minimize losses. Finally, even if the formal authority rests with supervisory or regulatory authorities, the private sector, especially other banks, is often involved in the resolution, since it often has at least complementary if not even better information about troubled banks than bank supervisors, and strong incentives to intervene early.¹¹ Merger and acquisition and purchase and assumption techniques, described above, imply the involvement of other banks in the resolution of a troubled bank, most likely under the guidance of bank supervisory authorities. The involvement of other banks and a deposit insurance scheme financed by banks can also help reduce principal-agent problems between owners and managers of a bank failure resolution scheme and the banks themselves.

There are parallels between incentive-compatible design features of deposit insurance and incentive-compatible design features of bank failure resolution. Deposits of insiders, such as senior management and controlling shareholders should be excluded from deposit insurance coverage; the same groups should be among the last to receive compensation in bank failure resolution. Deposit insurance aims at protecting small depositors, by setting a coverage limit. Similarly, bank failure resolution can include priority ranking for small depositors in liquidation and the transfer of deposits only up to a certain limit in a purchase and assumption model.

3.2. The Interaction of Bank Failure Resolution and Deposit Insurance

Both deposit insurance and bank failure resolution are subject to the trade-off between two conflicting public-policy objectives. On the one hand, they are supposed to provide financial stability and protect small depositors. On the other hand, they have to minimize aggressive risk taking and avoid moral hazard. In order to strike the right balance between both objectives, both components of the financial safety net have to be consistent with each other and other components of the safety net, such as supervision and lender-of-last resort facilities. An incentive compatible deposit insurance scheme that ensures monitoring by large depositors and creditors,

has to be accompanied by a bank failure resolution system that does intervene and close banks when the markets signal fragility. While large depositors can exert market discipline, a bailout of bank owners minimizes the effect of this discipline. A bank failure system that provides implicit deposit insurance for all depositors, not just small ones, can undermine the market discipline imposed by the explicit deposit insurance scheme. The insurance losses of deposit insurance can be minimized by an efficient bank failure resolution system that does not only allow for liquidation, but alternative resolution.

Consistency with other components of the financial safety net is as important. Unlimited access of failing banks to lender-of-last-resort facilities can give perverse incentives to supervisors to grant regulatory forbearance in order to avoid recognition of substantial losses to the authorities in charge of lender-of-last-resort facilities. Efficient bank failure resolution and incentive-compatible deposit insurance require effective supervision to

- (i) enable early intervention, thus minimizing resolution costs and
- (ii) compensate for the partial loss of market discipline that deposit insurance implies.

Finally, private agents do not only need incentives, but also the instruments to monitor banks.¹²

The technique of purchase and assumption together with implicit or explicit deposit insurance exemplifies this trade-off between conflicting public-policy objectives of the financial safety net. While contagion concerns might speak in favor of transferring a large amount of deposits to other financial institutions, moral hazard considerations would favor a strict limitation. While the coverage limit should be set sufficiently low to enhance market discipline, an efficient application of the purchase and assumption technique requires a certain minimum of deposits to be transferred to the new bank. In order to avoid moral hazard in the context of a purchase and assumption mechanism, one can apply the least cost criterion, which requires the technique to be applied that implies the lowest cost for the government or the deposit insurer. This would imply that any solution other than liquidation would have to incur costs less than the cost of paying out insured deposits minus recoveries. This would in most cases restrict the transfer of non-deposit creditors and shareholders.¹³ Another element to improve market discipline is to statutorily limit the liabilities than can be transferred to the good bank.

Applying the least cost criterion, however, faces several problems. First, only estimates are available about potential asset recoveries and the cost of a potential liquidation. Second, cost calculations do typically not take into account effects of the chosen resolution method on the behavior of borrowers and depositors, on the one side, and the behavior of other banks, on the other side. Failure resolution resulting in asset decay and depositor run increases overall failure resolution costs. Failure resolution that creates perverse incentives for other banks to take aggressive risk might ultimately increase resolution costs of other failing banks. Resolution methods with seemingly low short-term costs might thus result in large long-term costs if substantially increasing contagion or moral hazard risks.

The chosen balance between the stability and the moral hazard objectives of the financial safety net might vary with the size of the bank. Specifically, in the case of banks that are considered to be too big to close, public-policy considerations might override financial considerations of the least-cost criterion discussed so far. The economic cost calculation, in terms of financial stability, and other criteria, such as access to finance issues, might tip the balance in favor of resolution mechanisms that are not optimal from the viewpoint of avoiding moral hazard and from the financial standpoint of the deposit insurer. This includes open-bank assistance; injection of public resources in the form of debt, equity or purchase of non-performing assets, while the bank stays open for business. This can come with or without direct managerial involvement by the authorities.

Open-bank assistance poses considerable incentive and agency problems as well as legal and financial risk for the government. If the existing management and ownership structure is kept in place, risk-taking decisions are taken by agents that have little or no more downside risk and thus large incentives to take aggressive risks. This poses considerable challenges to bank supervisors to control such aggressive risk taking. If management of the bank is taken over by authorities, the deficiencies of government ownership of banks are often revealed. Cross-country experience has shown the risks of such open-bank assistance: many intervened banks had to be liquidated at the end, with the financial cost being higher than if the bank had been closed earlier. Finally, special treatment for large banks creates adverse selection problems since banks are treated differently depending on their size. Nevertheless, macroeconomic and political considerations often override this

negative experience. This raises issues concerning the predictability of such a situation and the involvement of an explicit deposit insurance scheme.

Overriding established rules of the financial safety net by public-policy considerations in the case of too-big-to-close banks can be done on an ad-hoc basis, with the event being unpredictable, or by establishing specific rules of the game, such as in the US. As in the case of deposit insurance, the optimal choice might very much depend on the institutional development of a country. While explicit deposit insurance and specific rules for open-bank assistance might be preferable in a strong legal and institutional environment, the ambiguity of an implicit deposit insurance scheme and discretion in open-bank assistance might be optimal in a weak institutional environment.

While public-policy considerations might override microeconomic considerations, deposit insurance funds should not be used for open-bank assistance. If deposit insurance is financed by the banking industry, its use for open-bank assistance would clearly constitute a case of political abuse. Further, a political decision to keep a failing bank open, should be accompanied by funding on the political level, i.e. the general budget. This would also increase the transparency of the decision and the accountability of the decision makers.

The close interaction of deposit insurance and bank failure resolution in their effects on market discipline and financial fragility raises the question of institutional interaction. Across the countries with explicit deposit insurance schemes different set-ups can be observed, ranging from the deposit insurance agency being a pure pay-box - such as in Brazil - to deposit insurers with broad mandates in supervision and failure resolution - such as in the US. Other schemes have narrow formal powers, but yield much larger powers in reality, such as the deposit insurer in Germany. More important, however, than the institutional setting is the incentive compatible overall structure of the financial safety net. Purchase and assumption techniques can be applied across different institutional settings, as the examples of the US and Argentina show.

4. Three Country Studies

This section describes the financial safety net arrangements in three countries; Germany, Brazil and Russia. These three countries do not only show very

different designs in deposit insurance and bank failure resolution, but also have different levels of financial, institutional and economic development and banking sector structure. While Germany and Brazil have already deposit insurance schemes, Russia is currently discussing the introducing of such a scheme. In the following, I describe and analyze the different financial safety net arrangements, taking into account the structure of the respective banking system.

4.1. Germany – A Private Solution

The German banking market comprises three main sectors, the largest being the savings banks, owned by cities, counties and states, followed in size by the privately owned commercial banks and the cooperative banks, owned by their members.¹⁴ Due to the geographic limitation of individual savings and cooperative banks, competition between the different groups of banks is much greater than between members of each group. While savings and cooperative banks are not necessarily profit-maximizing institutions, due to their ownership structure, the commercial banks cannot be assumed to maximize shareholder-value either. The large commercial banks vote a large part of the votes at their respective shareholder meetings themselves and there is substantial cross-ownership of commercial banks (Gottschalk, 1988).

The German financial safety net is largely industry-based. Before the introduction of a compulsory deposit insurance scheme following the adoption of a EU mandate in 1994, three deposit insurance schemes, for cooperative, savings and commercial banks, respectively, were completely industry-based, voluntary, outside government supervision and without government-back-up funds. Rather than the Bundesbank, a separate institution, the Liquidity Consortium Bank, jointly owned by the Bundesbank and large banks of all three sectors, provides lender of last resort facilities. The supervision by the Federal Banking Supervisory Office (FBSO) is complemented by supervision by the deposit insurance schemes and bank failures are mostly resolved with substantial organizational and financial involvement by the industry.¹⁵

After the Herstatt crisis in 1974, the three banking groups introduced their respective industry-based schemes to avoid political pressure and deeper government involvement in the financial sector. Savings and cooperative banks have both regional insurance schemes and a national compensation scheme. The schemes of both savings and cooperative banks do not directly guarantee deposits, but rather the

institutions themselves, thus offering unlimited depositor protection. On top of the deposit insurance scheme, depositors of savings banks are protected by an explicit institutional guarantee of the public owners.

The design of Germany's deposit insurance scheme for commercial banks seems at odds with some of the principles laid down above. It is a voluntary scheme with a very high coverage – all non-bank deposits are covered up to 30% of the liable capital of a bank.¹⁶ There is no co-insurance and only interbank accounts, bonds payable to bearer and insider accounts are excluded from coverage. Financing and management, on the other hand, are completely private. Banks pay an annual premium of 0.03% per year, with higher premiums for banks that are perceived to be more risky. The risk assessment is undertaken by the Auditing Association of the German Bank Association but kept secret. The premiums can be raised or set at zero, depending on the financial situation of the deposit insurance fund. There is no public funding and the Bundesbank is prohibited by law from functioning as lender of last resort to deposit insurance schemes. The deposit insurance scheme, organized within the German Bank Association, has substantial regulatory and supervisory powers vis-à-vis its members. The deposit insurance scheme gives a non-binding opinion to the FBSO on new bank license applications. The Auditing Association of German Banks can impose corrective actions on member banks if circumstances indicate an increased riskiness in the bank's business or violations of the Banking Act or other laws governing banks. Penalties may restrict the volume of deposit business or particular types of lending. Finally, members may be expelled from the scheme, especially for missing or wrong information, and for being classified in the worst risk class for more than two years in a row.

With nearly unlimited coverage and no coinsurance, the German deposit insurance scheme offers little incentives for depositors to exercise market discipline. Monitoring by peer banks replaces monitoring by depositors in the German commercial banking sector. This is accomplished by

- (i) the completely industry-based nature of funding and management of the scheme,
- (ii) the exclusion of interbank deposits from the insurance, and
- (iii) the almost complete coverage of deposits.

The fact that interbank deposits are excluded increases the incentives for banks to monitor one another, while the almost-complete coverage of non-bank depositors

seems to increase market discipline exercised by the banks.¹⁷ Given the complete private nature of the scheme and the lack of public back up funding, the member banks cannot expect to externalize any costs stemming from a distressed member bank. The almost-complete coverage therefore increases pressure on the member banks to monitor one another.

The resolution of failed banks is undertaken jointly by FBSO and banks. Cooperative and savings banks enjoy the institutional support of other banks in their respective groups. The resolution of commercial banks is mostly done in informal cooperation between FBSO and bank creditors of the troubled banks. The resolution of Schröder, Münchmeyer, Hengst and Co (SMH) in 1983, a small private bank, is an example of such cooperation. Under pressure from the Bundesbank and the Federal Banking Supervisory Office, banks with outstanding claims on SMH agreed to convert their claims into subordinated debt, in exchange for managerial control. The deposit insurance scheme stepped in to compensate depositors and foreign creditors. A month later, the bank was split into a good and a bad bank, with the good bank being sold to Lloyds Bank and the bad bank being taken over by the German Bank Association and liquidated. Interestingly enough, the problems at SMH were discovered by the Bank Association, not by the Supervisory Office, and the German Bank Association stood at the center of the rescue.¹⁸

The private character of the German financial safety net has its roots in the structure of the German banking system. Both deposit insurance and bank failure resolution of commercial banks are completely integrated in the German Banking Association, the first formally, the latter more informally. The commercial banking sector therefore resembles a club that enforces mutual monitoring, but also mutual support. This club character also minimizes the adverse selection problem that might arise from the voluntary character of the deposit insurance scheme by preventing the exit of member banks.¹⁹ The high concentration reinforces the club character and allows the quick resolution of troubled banks by involving only few large players. Having separate deposit insurance schemes for each group of banks (public, cooperative and private) reinforces the club-like nature of the deposit insurance schemes by aligning the interests of individual banks more closely.²⁰

The private nature of the financial safety net reduces agency cost between owners of the safety net, its managers and banks, since these three groups coincide in the German case. Unlike in most other countries, the taxpayer is not the safety net

owner, thus eliminating potential agency problems between public managers and the taxpayers as owners of the safety net.

While Germany has not suffered from any systemic banking crisis or large bank failure over the last 25 years – an indication of the success of its safety net – this has to be interpreted within the country’s institutional framework, legal tradition and banking structure. The high level of institutional development and an anti-bankruptcy bias in Germany can partly explain the lack of aggressive risk taking. The ownership patterns and the resulting lack of shareholder-value maximizing behavior might decrease efficiency in the banking sector, but might also help reduce aggressive risk taking.

4.2. Brazil – A Financial Safety Net in Development

The Brazilian financial system is dominated by two large banks that are owned by the federal government. Together with the largest three privately-owned banks, they account for over 50% of total banking system assets. This contrasts with a large number of small privately-owned small banks. A recent wave of privatization and liquidation has reduced the importance of banks owned by the Brazilian states. Failure of several large privately-owned banks in the mid-1990s was resolved with a good-bank-bad-bank model, with the Central Bank providing resources to fill the balance sheet gap. Subsequently, bank regulation has been tightened and bank supervision significantly improved. While the Central Bank used to be responsible for all four components of the financial safety net – bank failure resolution, deposit insurance, regulation and supervision and lender of last resort facilities - the 1988 Constitution prohibited the use of any public money for the protection of depositors, prompting the set-up of an industry-based scheme in the wake of the banking crisis of the mid-1990s.²¹

Many elements of the Brazilian deposit insurance scheme – Fundo de Garantidor de Creditos (FGC) – reflect the incentive compatible standards as described above. It was established in 1995 as a mandatory insurance scheme for all deposit taking banks, with a relatively low coverage (currently around 6,000 USD, or twice GDP per capita).²² There is no co-insurance but inter-bank, non-resident and insider deposits were initially excluded.²³ The scheme is financed by premiums assessed on the banks (currently 0.3% per year), and there is no public bank-up funding due to the constitutional ban mentioned above. While there are provisions

for increasing premiums in times of need, premiums do not vary according to riskiness of banks. The statutes mandate a build-up of liquid assets up to 5% of covered deposits, thus making it an ex-ante scheme. FGC is managed by the banking industry, but under public policy guidance.²⁴

Unlike in Germany, the deposit insurance agency FGC is limited to a pay-box function. It does not have any involvement in the supervision of its member banks and no role in the resolution of failed banks. While the limited coverage, the compulsory membership and the industry-based financing and management are incentive compatible, reducing problems of moral hazard, principal-agent problems and adverse selection, the scheme could be strengthened by an increased role of the deposit insurer in supervising its members and allowing it to apply disciplinary measures against member banks. Finally, while the institutional framework does not give concerns on the potential abuse of the current ex-ante financing, ex-post contingent financing seems more efficient, especially in the light of very high interest spreads in the Brazilian financial market.

The Brazilian deposit insurance scheme has had to deal mostly with small bank failures, with one notable exception. Most likely, it has contributed to the trust and the relative stability in the Brazilian banking system after the banking crisis in the mid-90s, by paying out insured deposits of failed banks relatively quickly.

The resolution of troubled banks in Brazil is an extrajudicial process, led by interveners and liquidators appointed by the Central Bank. While the extrajudicial character of bank failure resolution was introduced to avoid the inefficiency and slowness of the judicial insolvency process and to benefit from the expertise of the Central Bank in the banking system, the results have been disappointing. Liquidations take very long since liquidators do not have any incentives to terminate the process rapidly and carry subjective liability for any of their actions during liquidation. Liquidations are also hampered by court interventions by owners and other stakeholders. Given the unlimited priority ranking of tax liabilities and labor claims, other creditors do not have incentives to press for rapid liquidation. Most of the failed banks are liquidated, resulting in asset decay and destruction of credit relationships. While intervention, a six-month period that can be extended once and during which the bank is closed, has the objective to save the bank, it has mostly resulted in subsequent liquidation. Purchase and assumption techniques, that involved the sale of good assets and deposits to another bank, were applied only to a

few large banks during the banking crisis of the mid-1990s. The Central Bank took the leading role in this process, identifying purchasers for troubled banks and providing liquidity support to fill the balance sheet gap. The resolution of these banks also allowed foreign bank entry into the Brazilian financial market.

While the deposit insurance scheme shows many elements that reduce the risk of moral hazard and financial fragility, it is not well linked to the rest of the safety net and the deficiencies in the bank failure resolution system limit its effectiveness in reducing moral hazard risks. While financing and management by the banking industry help decrease agency problems between managers and owners of the scheme and help minimize risks of regulatory and political capture, regulatory and supervisory powers vis-à-vis its member banks might strengthen the scheme in the long-term. These might include non-binding recommendations on new bank license applications, the possibility to request extraordinary audits of banks it perceives to be unsound, and the power to exclude members it perceives as recklessly managed. These are powers similar to the ones that the German deposit insurer has and do not need the build-up of any additional supervisory capacity, as the German example shows.²⁵ Further, a more extensive role for the deposit insurer can be considered in the context of a reform of the bank failure resolution system. On the one side, one can envisage the introduction of a purchase and assumption model as in Argentina, with the deposit insurer continuing with its pay-box role and supplying funds to cover any balance sheet gap that is left after the separation of good assets and preferential creditors (such as insured depositors) from the bad bank that is sent to liquidation.²⁶ This would imply however, the statutory application of the least-cost criterion to avoid political abuse of banks' premium payments. On the other side, one can imagine a model closer to the US case, with a more substantial role of the deposit insurer in intervening and resolving troubled banks.

The current bank failure resolution system can be significantly improved upon, by providing for a purchase and assumption technique that allows the transfer of performing assets and preferential creditors – including insured deposits – to another bank, while the remaining assets and non-preferential liabilities – including shareholders' claims - stay behind in the bank to be liquidated. This would avoid problems of asset decay and potential contagion through depositor runs. While the liquidation of small troubled banks over the last couple of years, involving payout of insured deposits by FGC, has implied only a relatively small economic cost, such a

purchase and assumption model would not only be more efficient for small banks but be indispensable for the resolution of medium-sized or larger banks.

*4.3. Does Russia Need a Deposit Insurance?*²⁷

Russia's banking sector suffered a major set-back in the 1998 banking crisis. The unilateral restructuring of government debt resulted in a collapse of the payment system and depositor runs. Since there was no formal deposit insurance scheme in place, a large part of household deposits were protected by transfer from privately owned banks to the government-owned Sberbank, the former savings bank. These new resources and the collapse of several private banks allowed Sberbank subsequently to transform itself into a universal bank, building up a large loan portfolio. Currently, Sberbank dominates the retail deposit market with over 75% market share and its assets constitute around 25% of total banking system assets. Many of the private banks do no function as intermediaries, but limit their lending activity to enterprises in their business groups.

The 1998 crisis and the subsequent years have brought to light significant weaknesses in the regulation and supervision of banks. The response to the crisis was limited to regulatory forbearance and liquidity support to selected banks without disclosure of the criteria with which these banks were chosen. Regulatory forbearance, while in theory with the purpose to relieve pressure from the banks, allowed bank owners to strip assets and facilitated capital flight. The dual role of the Central Bank as owner and regulator of the largest two banks in the banking system - Sberbank and Vneshtorgbank – leads inevitably to conflicts of interest. A special bank restructuring agency (ARCO), created to deal with the resolution of large troubled banks, has had a very mixed record. Several of the intervened banks stayed open and in several cases, shareholders and management could stay on. The liquidation of other banks by ARCO has been very slow.

The bank failure resolution shows significant deficiencies both in its legal and institutional structure as well as in its enforcement. With exception of the banks referred to the above-mentioned ARCO, the Central Bank is responsible for intervention and the resolution of troubled banks. However, it was not until 1998 that a Bank Bankruptcy Law was enacted and not until 2002 that the revocation of a bank license by the Central Bank led automatically to its liquidation. Before the 2002 amendment, a court had to find a de-licensed bank to be bankrupt before liquidation

could begin, resulting in a large number of phantom banks. Further, the Central Bank does not use its powers to intervene sufficiently early in a troubled bank. The liquidation process is administered by a court-appointed liquidator and has been reported to be extremely slow and nontransparent. Further, the legal priority for household deposits has often been ignored in favor of large creditors and shareholders.

Overall, the existing financial safety net does not seem incentive compatible, posing significant moral hazard, principal-agent and adverse selection problems. Banks are not thoroughly supervised and shareholders not punished in the case of failures, thus giving them opportunities and incentives for aggressive risk-taking. There does not seem to be a level playing field between banks, given the dual role of the Central Bank as regulator and owner of the largest two banks and the preferential treatment of politically well-connected private banks. Late intervention, slow liquidation and partial bail-outs of shareholders and large creditors create perverse incentives.

While there is currently no industry-wide deposit insurance scheme, the Russian government is preparing the introduction of such a scheme in the near future. By introducing such a scheme, Russia hopes to increase trust in the financial system, develop financial intermediation, and thus foster economic development. It is also believed that the extension of deposit insurance to all banks would reduce the competitive advantage that the state-owned banks, especially the former savings bank Sberbank, hold over private banks in attracting retail deposits. The scheme would be compulsory for all banks, including Sberbank. The proposal provides for a coverage limit of 95,000 Rubles (around 3,000 USD), which approximately equals GDP per capita, with a co-insurance of 25% on deposits over 20,000 Rubles. Coverage would be limited to household deposits, but include both Ruble and foreign-exchange accounts. The scheme would be jointly financed by premiums assessed on the banks – 0.6% on covered deposits - and budget support from the government. Management would be public and under guidance from the Central Bank that is also responsible for regulating and supervising the banking system. The scheme would be reduced to a pay-box function, without any role in supervision of its member banks.

While the limited coverage of the proposed scheme is incentive compatible, the proposed public management and joint private and public financing increases the

risks of political and regulatory capture and poses significant moral hazard risks. The envisaged ex-ante accumulation of liquid resources invites political abuse and looting. The lack of any regulatory and supervisory powers vis-à-vis its member banks deprives the deposit insurer of any means of minimizing insurance losses by imposing market discipline on banks, while the availability of back-up funding by the government decreases the incentives to do so.

Given the extremely weak supervisory and regulatory framework and deficiencies in the bank failure resolution system, the introduction of a deposit insurance scheme at this stage seems premature. The lack of serious supervision and prompt supervisory action means that such a scheme would pose a high risk of moral hazard to the system. In the absence of the necessary market and regulatory discipline, the increased ability that an insurance scheme would give to private banks to attract additional resources would be likely to encourage those banks to lend aggressively and imprudently.

While a deposit insurance scheme has been proposed to level the playing field between government-owned and privately owned banks, the effect of the deposit insurance scheme on the relative competitive position of government-owned vis-à-vis private banks depends on a hard-budget constraint being imposed on the government-owned banks, so that they price risk correctly and function according to fully commercial terms.

5. Conclusions

This paper discusses the incentive compatible design of deposit insurance and bank failure resolution, in the context of the overall financial safety net. An incentive compatible design has to address problems of moral hazard – inherent incentives for banks to take aggressive risks -, principal-agent problems between owners and managers of the financial safety as well as the banks and problems of adverse selection of banks. Limited coverage, industry-based funding and management and compulsory membership can reduce moral hazard, principal-agent and adverse selection problems in deposit insurance schemes. Prompt intervention and wiping out equity and potentially claims of large creditors, significant financial and organizational involvement of banking sector in the resolution of troubled banks and equal treatment of all banks can minimize these risk in bank failure resolution

systems. The effectiveness of deposit insurance and bank failure resolution in reducing the risk of financial fragility does not only depend on the incentive-compatible structure of each, but also on the effective interaction of both. Purchase and assumption techniques exemplify the close interdependence of both, but also the tensions.

The analysis of the financial safety nets in Germany, Brazil and Russia underlines the importance of analyzing the whole financial safety net, taking into account the structure of the banking system and the level of institutional development, when assessing deposit insurance schemes and bank failure resolution systems. The structure of the German banking system facilitates a financial safety net with a completely private deposit insurance scheme and a bank failure resolution scheme that relies heavily on financial and organizational support from other banks. While the Brazilian deposit insurance scheme is incentive compatible along many dimensions, it is not well integrated into the overall financial safety net, and the current system of bank failure resolution that consists mainly of liquidation is inefficient and inadequate for failure of medium and large banks. The Russian bank failure resolution system, finally, gives perverse incentives to bank owners and managers, by intervening too late and often in favor of shareholder and managers who have taken the decisions that led to the fragility in the first place. Given these deficiencies and a weak supervisory and institutional framework, the proposed introduction of a deposit insurance scheme seems a risky undertaking that will most probably increase the probability of financial fragility rather than reducing it.

Since a country's financial safety net has to be adapted to a country's level of institutional development and banking structure, one can certainly not simply export Germany's private solution to other, especially developing, countries. However, one can learn certain lessons. First, embedding the financial safety net and its different components in the banking community can reduce principal-agent problems by making banks the managers and owners of the safety net. Second, assessing risk-based premiums based on auditing by the deposit insurer itself helps align incentives of banks and deposit insurer and thus minimize moral hazard risk. Finally, while a completely private solution might not be possible, especially in the case of a systemic crisis, a private-public partnership that relies on a completely industry-based solution for non-systemic crises can reduce risks to the financial safety net. A legal prohibition of public depositor protection, as in the cases of Germany and

Brazil, not only forces banks to bear the cost of deposit protection, but can also force them to actively participate in bank failure resolution, as the German case shows.

References

- Barth, J.R., Caprio, G. Jr., and Levine, R. (2003). 'Bank regulation and supervision: what works best?', *Journal of Financial Intermediation*, forthcoming.
- Beck, T. (2002). 'Deposit insurance as private club: is Germany a model?', *Quarterly Review of Economics and Finance* 42, pp. 701-19.
- Boot, , A.W.A., and Thakor, A.V. (1993). 'Self-interested bank regulation', *American Economic Review* 83, pp. 206-12.
- Calomiris, C. W. (1989). 'Deposit insurance: lessons from the record', *Economic Perspectives* (Federal Reserve Bank of Chicago), May/June, pp.10-30.
- Calomiris, C. W. (1990). 'Is deposit insurance necessary? A historical perspective', *Journal of Economic History*, vol. 50, pp.283-95.
- Calomiris, C. W. and Powell, A. (2000). 'Can emerging market bank regulators establish credit discipline? The case of Argentina', NBER Working Paper 7715.
- Calomiris, C. W. (1997). 'The postmodern bank safety net: lessons from developed and developing economies', American Enterprise Institute, Washington D.C.
- Cull, R., Senbet, L.W. and Sorge, M. (2001): 'Deposit Insurance and Financial Development', World Bank Policy Research Working Paper 2682.
- De Juan, Aristobelo (undated). 'Dealing with problem banks: the case of Spain', mimeo.
- De la Torre, A. (2000). 'Resolving bank failures in Argentina: recent developments and issues', World Bank Policy Research Working Paper 2295.
- Demirgüç-Kunt, A. and Detragiache, E. (2003). 'Does deposit insurance increase banking system stability?', *Journal of Monetary Economics*, forthcoming.
- Demirgüç-Kunt, A. and Huizinga, H. (1999). 'Market discipline and financial safety net design', World Bank Policy Research Working Paper 2183.
- Demirgüç-Kunt, A. and Kane, E. (2002). 'Deposit insurance around the globe: where does it work?', *Journal of Economic Literature*, vol.60, pp.175-95.
- Demirgüç-Kunt, A. and Sobaci, T. (2001). 'Deposit insurance around the world: a data base', *World Bank Economic Review*, vol.15, pp.481-90.
- English, W. B. (1993). 'The decline of private deposit insurance in the United States', *Carnegie-Rochester Conference Series on Public Policy*, vol.38, pp.57-128.
- Glaessner, T. and Mas, I. (1995). 'Incentives and the resolution of bank distress', *World Bank Research Observer* 10, pp. 53-73.

- Gottschalk, A. (1988). Der Stimmrechtseinfluß der Banken in den Aktionärsversammlungen der Großunternehmen, WSI Mitteilungen, vol. 41, pp.294-304.
- Hovakimian, A.; Kane, E. and Laeven, L. (2002). 'How country and safety-net characteristics affect bank-risk shifting', World Bank mimeo.
- Kane, E. (1989). 'The S&L insurance mess: how did it happen?' Urban Institute Press, Washington. D.C.
- Kane, E. (2000). 'Designing financial safety nets to fit country circumstances', World Bank Policy Research Working Paper 2453.
- Laeven, L. (2002a). 'Bank risk and deposit insurance', World Bank Economic Review, vol.16, pp.109-37.
- Laeven, L. (2002b). 'Pricing of deposit insurance', World Bank mimeo.
- Lundberg, E. (1999). 'Saneamento do sistema financeiro – a experiência Brasileira dos últimos 25 anos', in: Saddi, J. (ed): 'Intervenção e liquidação extrajudicial no sistema financeiro nacional – 25 anos da Lei 6.024', Textnovo, São Paulo, pp. 53-70
- Quintyn, M. and Taylor, M.W. (2002). 'Regulatory and supervisory independence and financial stability', IMF Working Paper 02/46.
- World Bank (2002). *Building Trust: Developing the Russian Financial Sector*, Washington, D.C.

¹ This paper does not discuss the resolution of systemic banking crises, but rather focuses on the resolution of individual banks.

² For an overview of the theoretical and empirical literature on deposit insurance, see Demirgüç-Kunt and Kane (2002).

³ For an overview over the literature on deposit insurance pricing, see Laeven (2002b).

⁴ The deposit insurance scheme of the German commercial banks has the power to exclude members but this has not been applied in the 27 years of its existence (Beck, 2002). Spain's deposit insurance scheme also has the right to expel members in order to coerce failing banks into failure resolution by the deposit insurance scheme (De Juan, undated).

⁵ See among others, Kane (1989).

⁶ For a description of successful and failed deposit insurance schemes in the US see Calomiris (1989, 1990) and English (1993).

⁷ See also Glaessner and Mas (1995) for a discussion of the incentive-compatible design of bank failure resolution schemes.

⁸ A variant of the purchase and assumption technique is the model of a bridge bank applied for very large banks, where the deposit insurer or another safety net agent takes over a failing bank for limited time before selling it to another institution.

⁹ A caveat has to be made here. In countries with weak liquidation systems, unlimited shareholder liability might give them perverse incentives to prolong the liquidation process, without the benefits of recovering additional resources, as the example of Brazil shows.

¹⁰ Calomiris and Powell (2000) discuss the effects of introducing a subordinated debt requirement in Argentina.

¹¹ Insolvent banks betting on resurrection often try to attract additional liquidity from depositors by raising interest rates, thus distorting competition in the banking system. The improper resolution of a troubled bank can result in wide-spread depositor run and decrease in debtor discipline.

¹² Barth et al. (2003) show the importance of private monitoring for reducing the risk of financial fragility and financial development.

¹³ This is more stringent than the less cost criterion, which only requires a resolution that is less than the cost of a liquidation and reimbursement of all depositors and creditors, including uninsured ones.

¹⁴ The respective share in total banking assets in 1999 were 36% for the savings banks, 25% for the commercial banks and 13% for the cooperative banks. See Beck (2002).

¹⁵ For more details on the German deposit insurance schemes, see Beck (2002).

¹⁶ Given that the average equity size of a commercial bank was 295.5 million Euro in 2000, the average limit is around 90 million Euro or 300 times GDP per capita.

¹⁷ Laeven (2002a) finds that out of a sample of 12 countries, German banks take the lowest risk.

¹⁸ The failure of Schmidtbank, another small private bank, is a more recent example. In 2001, the supervisory authorities forced the shareholders to sell the bank for one Euro to the four major private banks and the regional Landesbank.

¹⁹ Only a few small banks do not participate in the private deposit insurance scheme. However, they are still subject to the mandatory limited deposit insurance according to the EU mandate.

²⁰ There is trade-off in the optimal number of participating banks in a deposit insurance scheme, between diversification, requiring a large number of banks, and monitoring and disciplining, working better with a small number of banks.

²¹ See Lundberg (1999) for a historic and technical overview over the Brazilian financial safety net.

²² While the coverage has been constant in local currency, the devaluation has continuously reduced the coverage in U.S. dollar terms.

²³ A change in statutes approved in late 2002 includes inter-bank and insider deposits in the coverage.

²⁴ The statutes have to be approved by the National Monetary Council, a body including the Central Bank governor and the Minister of Finance, among others.

²⁵ The German Banking Association and the Auditing Association contract auditors for any audit.

²⁶ See de la Torre (2000) for a detailed analysis of the Argentine model.

²⁷ For the following, see chapters 5, 10, 11 and 12 in World Bank (2002).