CHAPTER 8: FUNDING AND PRICING

Overview

- International practice in funding and pricing guarantees varies according to the industry and products in question.

- Funding issues relate to the appropriate base from which to collect contributions. Pricing issues relate to the determinants of the relative share of contributions from each contributor.

- Schemes can be pre-funded to varying extents. A growing number of schemes in other countries feature a degree of pre-funding.

- The theoretical differences between pre- and post-funding are minor although there can be some practical differences.

- Some schemes price according to the risk of the provider. This is fairer and more efficient than flat-rate pricing, but it is complex, and the risk of mistakes is considerable. Nevertheless, the arguments in favour of some degree of risk-related pricing are strong.

- Most deposit insurance schemes tend to be industry-funded and do not discriminate according to the risk of the deposit-taking institution. Pre-funded deposit insurance schemes with risk-sensitive pricing are becoming more common.

- Insurance guarantee schemes rely more on post-funding, partly reflecting the difficulty in measuring the quantum and timing of the liabilities of a failed insurer. The incidence of risk-sensitive pricing among these schemes is low.

- Many of the inputs required for pricing decisions in any type of scheme can be inferred from financial market prices, accounting or regulatory data or based on the Australian Prudential Regulatory Authority's monitoring activities.

- Risk-based pricing helps to overcome concerns about the fairness and viability of a guarantee scheme operating in a concentrated sector with a skewed size distribution of participants.

Design choices

8.1   The funding and pricing of explicit guarantees raise two major design issues.

8.2   First, it is necessary to decide whether the guarantee is to be funded via a general system of ongoing levies (pre-funding), by a specific levy on other firms or consumers in the industry after an actual failure (post-funding) or some combination thereof. A related issue is the nature and size of the funding base.

8.3   Next, there is the question of whether to price the guarantee on a risk-sensitive basis or whether to use a simpler system of levies which adopts a less sophisticated model or even disregards the relative risks created for the scheme by different participants. Decisions on both of these issues depend, among other things, on the characteristics of the industry in question, the design of the prudential framework and the ability to precisely measure risk.

8.4   The question of whether to pre-fund or post-fund a system of explicit guarantees is basically about when to collect the funds to meet payments required under a guarantee — before or after they are realised by the failure of one of the participants. In theory, either approach should lead to similar outcomes in terms of the incidence and timing of costs for participating institutions.

8.5   Firms under a post-funded scheme should, in principle, be aware of and, in some way, make provision for the contingent liabilities the scheme imposes on them. Such provisioning would need to be similar in scale to the explicit contributions firms would be required to make under a pre-funded scheme; otherwise the scheme would be under-capitalised relative to its long run needs. The choice between funding regimes, therefore, is partly about whether scheme resources are managed by the participants themselves or a separate entity.

8.6   From that perspective, the differences between pre-funded and post-funded schemes are minor. In fact, it is the rate of annual contributions (under a pre-funded scheme) or annual repayments (under a post-funded scheme) that has a more practical bearing on the impact for institutions. However, there are a number of other considerations that could bear on the question of why one approach might be preferred over the other.

8.7   A decision on the appropriate funding base involves a trade-off between equity and stability. For example, if a scheme were to guarantee only retail deposits, it may be equitable to apply levies to the retail deposit base. The variability in the rate of levy would be greater than for a scheme that applied levies across all deposits. Similarly, if a scheme were to apply to a defined set of insurance liabilities, there would be a question of the appropriate size of the base on which to levy contributions. In general, for a given level of scheme coverage and costs, the broader the funding base the more stable but less equitable the structure of levies is likely to be.

8.8   Risk-sensitivity in pricing raises larger issues. Its chief attractions are that it reduces the chance of moral hazard and maintains a level playing field among participants who provide similar products. Under fully risk-sensitive pricing, firms are charged according to the risks that they pose to the guarantee fund. This would remove any incentives which they would otherwise have to take excessive risks in the knowledge that their liabilities are protected. Achieving that outcome, however, requires that scheme managers have full knowledge of the current risk-taking by the firm and can adjust premiums as risk changes.

8.9   But risk-sensitive pricing is complex. The theory for pricing options provides a starting point for valuing guarantees, but it faces quite a number of practical limitations — especially in insurance, where *ex ante* liability valuation is difficult. In practice, risk-based premiums may need to be linked to some small number of readily available indicators of risk in a simple way which is generally accepted as giving rise to fair and sensible outcomes. The risk of charging inappropriate premiums for the guarantee therefore remains, even under a risk-sensitive system.

Objectives and principles

8.10   There are four principles which a funding and pricing scheme could attempt to enshrine:

- *Cost efficiency*. The administration of funding and pricing arrangements should avoid imposing unwarranted costs on participating institutions, their shareholders and customers.

- *Competitive neutrality.* Funding and pricing arrangements for explicit guarantees should not upset the level playing field in the provision of financial services. That is, institutions providing similar products and with

similar risk characteristics should face similar charges for an explicit guarantee. Equity is therefore a key consideration.

- *Stability*. A scheme should be a source of reassurance to depositors and policyholders of financial institutions during crises; it should create greater certainty over the condition of the financial system. Most importantly, the profile of industry contributions needs to be as predictable and broadly based as possible (given equity considerations) to avoid introducing excessive external shocks to levels of industry capital.

- *Allocative efficiency*. The pricing arrangements should ideally neutralise moral hazard risks. Financial institutions may be subject to less market discipline over their approach to risk management once a portion of their claims is insured, and regulators may also be more prone to forbearing with weak institutions if they know that policyholders or depositors are protected in all circumstances. Pricing systems can have an important role to play in preventing these outcomes.

Funding issues

8.11   In the context of a guarantee, funding issues relate to the timing and rate of contributions or recoveries and the appropriate base from which to collect these.

Pre-funding versus post-funding

8.12   Explicit guarantee schemes can be pre-funded or post-funded, or embrace a mix of both approaches. In theory, the approaches should have virtually identical outcomes. The expected contributions made over time by participants will have the same present value under either approach, provided that the choice of funding arrangement does not affect the incidence or severity of failures. The scheme design may give rise to distributional effects between old versus new or slow versus fast growing participants, but otherwise it is just the timing of contributions which differs and whether assets are depleted (under pre-funding) or liabilities incurred (under post-funding) when a failure occurs.

8.13   Regardless of the funding arrangements, therefore, participating institutions should anticipate having to finance the guarantee at some point in time. The material difference is that in a pre-funded scheme, the resources are transferred to, and managed by, an independent fund via a system of levies or

premiums. In a post-funded system, the same resources remain with the contributing institutions, which may face pressure, from regulators and investors, to allow for their contingent liabilities. Post-funded systems require the capacity to borrow which is usually backed by government as a 'guarantor of last-resort'.

8.14   Following a failure, both approaches may require equivalent transfers of funds from participants if, for example, there is a policy of rapidly restoring reserves of a pre-funded scheme to some target level.

8.15   In practice, nevertheless, this cost equivalence between funding types may break down somewhat, and there are a range of other reasons as to why one approach may be preferable to the other.

8.16   Key points in favour of pre-funding are:

- *Stability and credibility.* There is a high degree of certainty about the value of funds that are available for distribution in the event of a crisis, and payments can be made quickly and efficiently.

- *Risk-sensitivity.* Industry acceptance of risk-based pricing may be greater in the case of pre-funding where it may be viewed more in its true insurance role. In contrast, post-funding may be seen as a levy required to make up for the failures of others, with less apparent rationale for linkage to (current or past) riskiness of survivors. Ensuring industry awareness and acceptance that post-funding arrangements will be risk-based is necessary and also requires that participants are aware of the criteria which will be used to classify institutions into risk categories. To the extent that the industry focuses less on the risk-based pricing mechanism under a post-funded scheme than it would under a pre-funded scheme, the effectiveness of risk-based pricing in reducing moral hazard will be lowered.

- *Perceptions of fairness.* A pre-funded guarantee means that the failed institution will have made some prior contribution.

- *Provisioning.* Pre-funding may reduce the prospect of the burden of failures being borne by taxpayers if governments do not enforce post-funding levies.

8.17   Against that, pre-funding has a number of disadvantages.

- *Uncertainty of failures.* While there is a degree of science that can be applied to estimating probabilities and sizes of institutional failures, in reality the

timing and costs of failures are impossible to predict with any certainty. There is, therefore, a risk that any pre-funding arrangements will levy higher contributions on participating institutions than are actually warranted. While there are ways of ameliorating this problem, such as by targeting a maximum level of accumulated funds, the risk would remain that such funds are never needed. Conversely, the scheme may prove to be under-funded and require increased contributions after failures occur. Under a post-funded arrangement, of course, the size and timing of imposts on institutions would be targeted to a known level of required recoveries and annual limits on levies could be applied.

- *Moral hazard*. A large and highly visible pool of funds may encourage complacency toward risk in both prudential regulators and participating financial service providers. In other words, it may exacerbate the moral hazard that is commonly associated with all guarantees. However, this may be no greater than for a post-funded scheme backed by government operating under statutorily imposed requirements.

- *Equity*. Pre-funded schemes often have a target size that is expressed in terms of the value of insured claims. When the scheme reaches its target size, there are significant questions about how to limit its growth, refund any excess contributions to past contributors and charge new entrants for the insurance provided by the existing pool of funds. Contribution 'holidays' seem an obvious solution, but they give rise to other problems; for example, negating the intended impact of any risk-based premium pricing, and creating discrete and unpredictable jumps in premium rates.

- *Cost inefficiency*. In theory, there should not be much difference between the administrative costs of pre-funded and post-funded schemes. In practice though, pre-funded systems with stand-alone administration present some risk of 'regulatory creep' — the expansion of another arm of bureaucracy beyond economically efficient limits.

8.18   A further argument commonly advanced in favour of pre-funding over post-funding is that post-funding tends to be pro-cyclical in its impact on institutions. In particular, since it will more likely be the case that failures of financial institutions will occur in times of general weakness in economic conditions, the suggestion is that post-funding arrangements will impose costs on institutions at a time when they are least affordable. As noted, however, there should in theory be no difference between the two funding approaches in terms of their timing impact on institutions — any pre-funded scheme would have to be recapitalised after it is utilised, potentially creating a similar profile

of contributions to any post-funded scheme. The difference lies in the timing of payments by the remaining institutions.

8.19   Under either arrangement, however, it would be possible also to smooth the cost imposts, by imposing annual limits. In the case of post-funding, for example, initial costs could be met from taxpayers or borrowings which could then be repaid by the fund over an extended time frame. This would create a similar profile of contributions to pre-funding. There is a risk, however, that governments may decide not to recoup funds (via levies) provided by the government under a post-funded scheme.

8.20   Pre-funding is especially common in the more mature banking systems of the Organisation for Economic Development (OECD) countries; of the 28 OECD countries which have deposit insurance, 21 have pre-funded systems. In the case of insurance guarantee funds, pre-funding is much less common, perhaps reflecting the uncertainty associated with calculating the quantum and timing of policy liabilities. Some schemes (for example, Norway and France) combine pre- and post-funding by requiring members to set aside required contributions each year, but allow the members to manage those funds themselves.

Box 8.1: The Terrorism Risk Insurance Scheme: A model for funding?

In Australia, the Terrorism Risk Insurance Scheme may provide some guidance on the appropriate degree of pre-funding. It suggests that up-front premiums could be charged with a view to accumulating a modest reserve of cash which could be supplemented by callable lines of credit. One advantage of such an arrangement relative to a purely post-funded model is that the up-front premiums, in addition to covering fund administrative costs, can also be applied to funding fixed costs associated with the post-funding elements, especially any stand-by credit facilities. The post-funding elements could also involve scope to escalate premiums if necessary to repay any borrowings within a reasonable timeframe.

Funding base

8.21   Another key issue requiring attention is the appropriate funding base for any guarantee scheme. At the highest level there are questions about the relative proportions of public funding and private funding. Were public (taxpayer) funding considered appropriate, many of the issues would

disappear. This section therefore focuses on those issues to be considered under private funding models.

8.22   The options might be considered against the four principles outlined at the beginning of this section.

8.23   In broad terms there are two issues to consider:

- the extent to which separate schemes or sub-schemes should be established for the various sectors; and

- the nature and size of the funding base within each scheme.

8.24   Establishing separate schemes or sub-schemes for the various industry sectors, for example separate schemes for banks, building societies, credit unions, life insurers and general insurers, would certainly reduce the scope for cross-subsidies between the sectors. The expected cost and contributions to each scheme could be isolated to that sector.

8.25   This might be attractive on the grounds of cost efficiency and competitive neutrality — for the fact that it is less likely that customers or shareholders of strong firms provide benefits to weaker or unrelated firms. It might also allow the different industry risk characteristics to be embedded within each scheme.

8.26   Appropriate pricing mechanisms within a single scheme are an alternative means of pursuing this outcome; and the possibility of cross-subsidy remains within each scheme in any case. Pricing therefore remains important, regardless, particularly in pursuing efficiency objectives.

8.27   On the other hand, establishing multiple smaller schemes would be potentially less financially stable, on the basis that the failure of an individual financial institution within a given scheme would have a relatively greater impact on other members. Multiple schemes would not achieve the maximum benefits available from diversification across institutions and sectors and this would increase the size of the aggregate capital base required to absorb unexpected losses. In addition, mergers between institutions operating in different schemes may create transition problems, and differential charges may create artificial incentives for institutions to convert to a different form to change schemes. Greater correlation of failure within sectors (such that multiple failures may occur) than between sectors would also increase the capital base required to absorb unexpected losses or increase the volatility of contribution rates.

8.28   Apart from the issue of the number of schemes and sub-schemes, a residual question to be addressed is the appropriate base upon which to calculate contributions within each scheme.

8.29   The same questions arise again — but at an intra-sector level. The trade-off will be between equity, efficiency and stability. The practical dimension to this problem is how to appropriately match contributions with beneficiaries.

8.30   In the case of deposit insurance, for example, it is common that contributions are collected on the basis of the total insured deposit base (rather than total liabilities). In the case of insurance, it is not as clear how the appropriate base of insured liabilities might be calculated. For example, efficiency and stability might suggest that total insurance liabilities across all insurance categories be used, despite the scheme only applying to a proportion of these. Pursuing equity, on the other hand, might suggest it was inappropriate to expect contributions from those insurance firms underwriting commercial lines which were not guaranteed.

8.31   Of course, it would be a matter for each financial institution to decide how to share the impost among their customers and other stakeholders.

Pricing issues

8.32   Pricing issues relate to determining the relative share of contributions from each contributor. The key questions are whether it is possible to strike an appropriate balance between simplicity and efficiency by requiring uniform or differential contributions from participants.

International practice

8.33   Some schemes price contributions to the guarantee scheme according to the riskiness of the insured products or institution, whereas others levy a flat-rate, usually on either total deposits or insured liabilities.

8.34   In relation to deposit insurance schemes operating internationally, flat-rate pricing is clearly the more popular option, particularly among OECD countries. This may reflect its transparency or its low implementation and maintenance costs. It is perhaps also more consistent with post-funding. Only three schemes combine post-funding with risk-sensitive contributions.

8.35   Over time, there have been significant changes in the popularity of the two pricing regimes. Most notably, risk-based pricing has become more common. Of the 23 schemes which feature this pricing method, 15 have been introduced since 1990, and a further five of the schemes have been revised since then. The total of 20 represents more than half of all schemes introduced since 1990.

8.36   The rates of insurance among pre-funded deposit insurance schemes vary widely. For recently established schemes which use insured deposits as a base, premiums vary between 0.1 and 0.5 per cent of the base, with a modal value of 0.3 per cent (30 basis points). Several emerging markets have premiums which are considerably higher. Canada — a country with a financial system broadly comparable to Australia's — charges between 0.02 per cent and 0.16 per cent of insured deposits according to a risk assessment of each institution (International Association of Deposit Insurers 2003).

8.37   It is useful to put these figures into some perspective. If deposit insurance premiums were fully passed on to depositors, the effect of the highest 0.16 per cent premium would be reduce the interest rate per annum on an insured term deposit from say 5.00 to 4.84 per cent. However, there is some evidence that some part of the insurance premium is absorbed by bank profits. More importantly, such a change merely makes explicit, and current, a cost of risk-bearing which taxpayers in general, or other stakeholders, would otherwise face (for example, as in the case of the HIH Group of Companies (HIH)).

The mechanics of risk-sensitive pricing

8.38   Risk-sensitive pricing has two major advantages over flat-rate pricing:

- it can ameliorate the moral hazard problems that are commonly associated with financial guarantees; and

- it is more equitable to the participating institutions.

8.39   If a financial service provider is charged fully and fairly for the risks that its activities create for a guarantee scheme, then it will not be complacent toward those risks; nor will it have incentives to seek out excessively risky projects on behalf of its shareholders, investors and customers. In other words, this approach meets the four pricing principles.

8.40   The chief disadvantage of risk-sensitive pricing is complexity. A principal reason for this is simple uncertainty. Neither the scheme operator nor the financial service provider can know what will happen to the future value of the insured institution's assets or liabilities, and this greatly complicates premium setting.

8.41   There are, nevertheless, a number of possible approaches that could be considered in determining risk-based premiums.

8.42   One approach involves the use of option pricing techniques. The rationale for utilising option pricing methodology was discussed in Chapter 7, and is there applied for the purpose of estimating possible **average** premiums required to fund likely future costs of guarantees. The difficulty with the methodology, however, is that much of the input information required is difficult to obtain or estimate, or is simply not available, especially at the firm level.

8.43   A further difficulty with such an approach lies in the need to gain general acceptance of, and be able to credibly defend, reasons for differences in premiums charged to different institutions. It is doubtful that an option pricing approach would currently meet this requirement. More generally, while perfect risk-related pricing may be desirable, it is not clear that it is feasible, nor that some other form of risk-related pricing combined with prudential regulation and risk-based capital requirements would not suffice to manage moral hazard.

8.44   These complications lead towards relying on observable risk indicators, such as financial statement information or market prices, or regulatory risk assessment measures.

8.45   For example, premium calculations could take into account measures of regulatory capital and measures of subordinated liabilities relative to the value of guaranteed products provided by the institution. Regulatory capital requirements are calculated using risk weights, which reflect the riskiness of assets (and other activities) of an ADI, to calculate a measure known as risk-weighted assets. The ratio of the ADI's capital base to risk-weighted assets provides one indicator of financial soundness.

8.46   A possible risk-sensitive pricing source is the Probability and Impact Rating System (PAIRS) and Supervisory and Oversight Response System (SOARS) analysis of the Australian Prudential Regulatory Authority (APRA). Reflecting the confidential nature of the analysis, appropriate disclosure and

administrative review mechanisms would need to be examined, whilst ensuring transparency in risk-rating.

8.47   There are other information and risk measurement techniques which could complement (or substitute for) the assessments of APRA. Some of them rely on financial market data; others rely more on information which the firm itself discloses, or on information provided by international regulators. They include:

- *Yield spreads*. The difference between the yield on a firm's corporate debt and the return on an instrument which is similar, but free of credit risk (such as a Commonwealth Government security) is a measure of credit risk (albeit dependent upon the priority ranking of those claims). That is, the observed premium may be more applicable to claims more junior than deposits. The premiums on a credit default swap over a risk-free rate of return may be informative in similar ways. [1]

- *Ratings*. Ratings published by the major agencies measure credit risk of particular liability classes of institutions. Some approximate a pure probability of default measure; others also allow for the loss that would arise in the event of default. Ratings may rely on subjective assessments of the firm or on information available from financial markets.

- *The share price*. Shareholders in financial institutions would clearly suffer most from the institution's failure. The price that they are prepared to pay for shares therefore reflects, to some degree, their expectations of the firm's probability of default. This idea has been applied extensively to banks in the United States and Europe and underpins some proprietary models used by banks for measuring default risk of corporate customers.[2]

- *Credit scoring models*. These use balance sheet and income statement data to gauge the probability of default, and they are especially useful for unlisted firms. The Z-score is perhaps the oldest and best known example (Altman, 1968). Adaptations and refinements of the model feature in a number of proprietary credit rating systems. An illustration of its use in deposit insurance is provided in Box 8.2. Since this technique only estimates a probability of default, it needs to be combined with some estimate of loss given default and ultimate cost to a guarantee scheme for use in premium setting.

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1   See Reserve Bank of Australia (2003) for details.

2   Merton (1977) is the seminal theoretical article in this area. Gizycki and Goldsworthy (1999) apply the idea to Australian banks.

8.48   Risk-related premiums are a highly desirable feature of any guarantee scheme. Practical issues do dictate simplicity in application and relation of premiums to a relatively small number of acceptable risk indicators. The Federal Deposit Insurance Corporation (FDIC) for example, currently allocates banks and thrift institutions to nine general premium buckets based on a two-way classification of capital adequacy and supervisory assessment rating. Introducing any such approach which relies on supervisory risk assessments does, however, raise concerns about whether and how such information should be made public as part of the premium setting process.

8.49   A concern is often expressed about the viability of a guarantee scheme in a concentrated industry, such as in the Australian financial sector. One argument is that the failure of a very large participant will exhaust the scheme's capital reserves unless these are exceptionally large — and that to achieve such a position, premium rates will be intolerably high. Equivalently, levies imposed under a post-funded scheme in such circumstances would threaten the viability of participants.

8.50   This is undoubtedly a reasonable concern if all liabilities of the institutions involved are covered by the guarantee scheme. However, limiting a guarantee scheme's coverage to a relatively small proportion of liabilities which have first priority over the institution's remaining assets mitigates that problem to a significant degree. In such circumstances, the scale of failure required to impose costs on the fund is of such a large magnitude (see Chapter 7) that probability of occurrence is low, while the loss given failure to the fund may also be quite low.

8.51   Risk-based pricing serves to ameliorate the practical concern often expressed about the viability and fairness of a guarantee scheme in a highly concentrated industry with a skewed size distribution of participants. Large institutions would generally be expected to contribute more to a scheme, reflecting a scale effect, but this would be significantly muted if they pose lower risks to the scheme.

8.52   In the authorised deposit-taking institutions (ADI) sector, concerns that the failure of a large bank would impose unsustainable contribution costs on smaller participants are mitigated due to the interaction of depositor preference, current balance sheet structures, and limits on scheme coverage (as shown in Chapter 7).

8.53   In the insurance sectors, where there is a smaller buffer of non-priority liabilities to limit scheme costs, this may remain an issue of concern (but less so

if firm prudential oversight of solvency trends limits the degree of any insolvency which occurs).

8.54   The extent to which scheme viability due to concentration risk remains a problem is essentially an empirical matter about the probabilities of (and also correlations between) failures of varying scale for large financial institutions — for which there is little data upon which to base firm opinions. Such events would also appear to fall into the category of major crises for the financial system, where it would be expected that systemic stability concerns and other government actions would occur and override the independent operation of the guarantee scheme.

8.55   In general, balancing the considerations of fairness to participants, difficulties in accurately assessing risk and thus risk-based premiums, and efficient scheme administration, suggests that some mix of pre- and post-funding may be optimal. Consideration may also need to be given as to whether different styles of funding arrangements might be applied across different industries.

Box 8.2: Z-Scores

Z-Scores are a simple and common way of using an institution's financial results to measure its probability of default. Statistical analysis of financial characteristics of firms which have failed in the past is used to identify the relevance of various characteristics in predicting failure. Firms currently operating are given a Z-Score which is an indicator of default risk and formed by weighting relevant characteristics for that firm according to an equation such as:

$Z = 0.012X_1 + 0.014X_2 + 0.033X_3 + 0.006X_4 + 0.999X_5$

Where: X_1 = working capital/total assets
X_2 = retained earnings/total assets
X_3 = earnings before interest and tax/total assets
X_4 = market value of equity/book value of total liabilities
X_5 = sales/total assets

Z-scores are not an especially sophisticated tool for measuring default risk. But they have been used for some time and are among the best options for assessing institutions which do not issue traded debt or equity.

The French deposit insurance scheme, the *Fonds de Garantie des Dépôts*, includes a **synthetic risk indicator** as part of member premium calculations.

'A synthetic risk indicator shall be calculated for all institutions whose deposit base is not nil at the closing date then used as a basis for calculating a contribution. The synthetic risk indicator shall be the arithmetic mean of the following scores:

- a score relating to solvency;

- a score relating to risk diversification;

- a score relating to operating profitability; and

- a score relating to maturity transformation, where relevant.

Scores shall be given on a scale of 1 to 3; the higher the score, the lower the quality.'[3]

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3   Fonds de Garantie des Dépôts
    website.<http://www.garantiedesdepots.fr/reglements_99_06.php#annexe>.