The Central Role of Resolution Policy in Dealing with Systemically Important Financial Institutions

by

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Abstract

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This paper reviews the many challenges that must be faced in designing and implementing an effective resolution policy for Systemically Important Financial Institutions (SIFIs). It notes the criteria that a good resolution policy should achieve and measures each of the commonly deployed resolution tools against these standards. In addition, agency-driven procedures are compared to judicial procedures. Although many proposals exist to make bankruptcy proceedings a viable alternative to agency-driven procedures, we still lack a framework for harmonizing judicial proceedings across borders. Problems that have surfaced in the resolution of cross-border insolvencies over the past thirty-five years are highlighted with special attention to problems that surfaced in the recent crisis. The paper concludes by examining some of the most important obstacles to achieving a harmonized approach to resolving an insolvent, international SIFI.
1. Introduction

The recent crisis made clear that the United States lacked a coherent regime for resolving systemically important financial institutions (SIFIs). In this it was not alone. The Basel Committee on Banking Supervision (2010) concluded that no country had a framework for adequately addressing the problems that arise in the resolution of a purely domestic SIFI, much less a cross-border SIFI.

This paper examines the challenge of devising an effective orderly resolution policy (section 2), the objectives a good resolution system should achieve (section 3), how commonly used resolution approaches measure up against the criteria for a good resolution policy (section 4), the recent history of cross-border resolution problems (section 5), and concludes with some reflections on how to make progress in dealing with cross-border resolution problems (section 6).

2. The Challenge of Orderly Resolution

Because of its regulatory complexity, the United States provides a clear example of many of the problems. Before the Dodd-Frank Wall Street Reform and Consumer Protection Act, a U.S. bank financial conglomerate was subject to multiple resolution procedures, with no established approach for coordinating the actions of the multiple regulatory authorities involved. The bank would be subject to the FDIC’s prompt corrective action measures and, unless the systemic risk exception is invoked, the FDIC would be constrained to select the resolution method that is least costly to the deposit insurance fund. A systemically important
bank in the U.S. is almost certain to be part of a holding company, which would have undertaken a resolution itself. Since bank holding companies sometimes own 20% to 40% of the assets of the group, a lack of coordination between the bankruptcy court and the FDIC could easily lead to chaos. In addition, if the SIFI has a securities subsidiary, the broker-dealer will be subject to Chapter 7 liquidation proceedings under the bankruptcy law and the special resolution procedures of the Securities Investor Protection Corporation, while the rest of the securities unit will be subject to resolution by the court under Chapter 11 bankruptcy proceedings. Finally, if an associated insurance company is insolvent, it would be unwound under the individual state insurance guarantee systems.

Apart from the Fed and the FDIC, none of the other regulators or judicial authorities was required to consider the systemic risk implications of its decisions. Their first and foremost obligation was to protect the customers of the failing entity within their regulatory domain. Inevitably, they would ring-fence the assets they control for the benefit of the customers they are charged with protecting. Only after this objective has been met would they consider releasing additional assets to the parent. If differences in national sovereignty, statutory objectives, powers and competencies are factored in as well, you have the essential features of the cross-border challenge in resolving SIFIs.

Perhaps nothing illustrates the lack of an effective framework for unwinding the affairs of a financial conglomerate more clearly than two days in mid-September 2008. On September 15th Lehman Brothers was sent to the bankruptcy court with virtually no preparation and, two days later, AIG was saved with a massive intervention, again with virtually no significant planning or foresight. Although central bankers universally adopt the doctrine of constructive
ambiguity to deter moral hazard, market participants tend to make inferences from what the authorities actually do rather than what they say. Unless market participants believe policy responses will be random, the policy of constructive ambiguity is doomed to failure and ends up saddling policymakers with an impossible burden. When they fail to act in the supportive way market participants expected, constructive ambiguity quickly becomes destructive uncertainty. Market participants radically reduce their expectations of the probability of a bailout and consequently raise their risk premiums for all financial institutions that had been assumed to have been protected by the safety net.¹ Many dump risky assets and flee to higher quality, more liquid assets and wait on the sidelines until they feel confident that they can predict how policymakers will behave once again. The result is that governments face an intolerable trade-off between preserving stability in the short term through a bailout and enhancing stability in the long run by enhancing market discipline through resolving a failing institution in such a way that a least some losses are allocated to uninsured, unsecured creditors. Political pressures (and the fact that the long run is irrelevant unless the system can survive the short run) have led to unprecedented government interventions not only in the U.S., but in several other countries. The lack of appropriate resolution tools too often results in hastily arranged bailouts negotiated over chaotic, sleepless weekends.

Most of the problems that plagued the authorities in the recent crisis could have been anticipated from earlier banking crises (Herring 2003). These lessons include the danger of uncoordinated actions by the authorities, the first-mover advantage in declaring bankruptcy, 

¹ Huertas (2010) notes that the expected loss will equal the probability of default times the sum of the probability of a bailout times loss given bailout plus one minus the probability of a bailout times the loss given default. If the probability of a bailout is 1, the expected loss will be zero. On the other hand if a regulatory action causes market participants to believe the probability of a bailout will be zero, the expected loss is simply the product of the probability of default times the loss given default. Risk premia are likely to vary with the expected loss.
the sensitivity of markets to unanticipated behavior by the authorities, the challenge of resolving an institution with substantial international corporate complexity, the disruptive impact of applying bankruptcy procedures to institutions that had been actively engaged in trading, the profound differences in resolution procedures and bankruptcy laws, and the ambiguous benefits of close-out netting.

Unfortunately, scant evidence exists that much was learned. No major advances were made in national resolution policies or in the coordination of resolution policies across countries. Indeed, as financial activity became more concentrated in fewer, increasingly larger and more complex institutions, the financial system became more vulnerable to the problems exposed in the earlier crises. It is only in the aftermath of the recent crisis that major financial centers have begun to reform their resolution procedures. The magnitude of the recent crisis has focused attention on resolution policy for the simple reason that too big to fail\(^2\) is too costly to continue.\(^3\) Andrew Haldane (2009) estimated that guarantees and subsidies extended by the U.S., the U.K. and the euro area to support the financial system amounted to 25% of world GDP in November 2009\(^4\). (See Figure 1.) Not only are costs large relative to global output, but also in some countries they are beyond the capacity of the national government to provide credible

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\(^2\) This term is a catch all for institutions that are too big to fail, too complex to fail, too opaque to fail, too interconnected to fail or too correlated to fail. Although I will use it in this general sense, it should be noted that it is misleading. Very large financial institutions, like Fidelity or PIMCO, that control hundreds of billions of assets are unlikely to be of systemic importance because of their transparency and lack of leverage. In contrast, institutions that are much smaller may be systemically important because of the critical role they play in the financial system. For example, Bank of New York Mellon (which is by no means the largest bank in the U.S.), has assets under custody and administration amounting to $25 trillion and so it is likely to be of systemic importance.

\(^3\) See Huertas (2011) for this phrase and the notion that fundamentally the solution must be either to make banks fail safe or safe to fail.

\(^4\) Note that this was before a series of costly bailouts in the euro area, several rounds of quantitative easing across the world and the cost of the bailout of the GSEs became apparent.
support. For example, Ireland’s bailout of its banks transformed a banking crisis into a sovereign debt crisis.⁵

Some industry leaders contend that these costs do not provide a sufficient rationale for reforming regulatory, supervisory and resolution policy, arguing that the recent crisis was an anomaly – akin to a thousand year flood. But this is clearly unduly optimistic. In an unpublished study, Andrew Kuritzkes has shown that the percentage of global top 100 financial institutions (ranked by assets in each year) that failed over the 20-year period from 1989-2008 was an astonishingly high 1.3%. The estimate includes firms that became insolvent (Lehman), were merged with government assistance (Bear), forced into conservatorship (Fannie Mae and Freddie Mac), or became a ward of the state through a majority-owned equity investment (AIG). There were 16 failures that met this definition in 2008 -- 8 each in the U.S. and Europe -- and another 10 firms (in Japan and Europe) before then, for a total of 26 firms over the 20 year period.⁶

How should the costs of bailouts be measured? Not just in costs to taxpayers and the strain on public finances and central bank balance sheets, but equally importantly in the resources wasted sustaining huge, Zombie-like institutions that warehouse large amounts of dodgy debt rather than serving as useful intermediaries. This delays economic recovery and the creative destruction that is the heart of dynamic capitalism. It also intensifies incentives for

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⁵ This is an interesting reversal of the pattern in the 1980s when a string of sovereign defaults threatened the solvency of many of the largest banks in the world.

⁶ Twenty six failures divided by 2000 observations leads to an annualized failure rate of 1.3%. The list doesn’t include the Icelandic banks, or banks such as Northern Rock or Indy Mac, because they were too small to make the Global Top 100 list. Most of these institutions, of course, were euthanized without imposing losses on creditors (with the exception of IndyMac).
risk-taking by SIFIs that distort competition and will make future crises more frequent, larger and more difficult to manage. Mervyn King (2009) has stated that, “The massive support extended to the banking sector around the world...has created possibly the biggest moral hazard in history.”

How can the prospect of bailouts (and the accompanying distortions) be eliminated without endangers financial stability? Two obvious alternatives present themselves: (1) make SIFIs failsafe or (2) make SIFIs safe to fail. History provides little reason for optimism that the first alternative can succeed short of the imposition of comprehensive financial repression. Although supervisors have substantial power over institutions in financial distress, they have much less leverage over institutions that appear to be highly profitable— even though experience has shown this is precisely when the riskiest positions are taken. Qian, Reinhart and Rogoff (2010) show that over two hundred years of history for more than sixty countries, banking crises have occurred with distressing regularity in both high income countries and low to moderate income countries. (See Figure 2.) With the exception of one interval in which deposit rates and entry into the financial services industry were rigorously controlled, countries have been unable to conquer this problem regardless of their regulatory or supervisory approach. Moreover, regulatory arbitrage will ensure that the supervisors are always behind the curve. The “regulatory dialectic” continues to function and regulatees are inevitably more agile than regulators.

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7 The exception is an era of financial repression (roughly from World War II to the early 1970s) when interest rates and activities were strictly controlled and institutions could grow mainly if granted regulatory permission to expand their branch system. Financial repression may be an effective way to keep SIFIs safe, but the cost in terms of diminished competition, decreased innovation, and reduced managerial autonomy and accountability may be too high or simply inadequate to sustain the complex contemporary economy.

8 See Kane (1989) for a description of the dynamics that drive the regulatory dialectic.
Making SIFIs safe to fail requires a radically new, integrated approach to regulation, supervision and resolution that focuses on a possible endgame in which at least some creditors must face the risk of loss.\textsuperscript{9} The next section will focus on the general characteristics of such an approach to resolution. Section 3 will review some of the challenges that resolution policies have failed to meet with special emphasis on cross-border issues and section 4 will conclude with some observations about the challenges that must be met in order to accomplish the orderly resolution of a SIFI with significant cross-border operations.

3. The objectives of a good resolution regime

What objectives should a good resolution procedure accomplish? Oliver Hart (2002, pp. 3-5) has identified three goals that all good\textsuperscript{10} resolution procedures should meet.

1. A good procedure should deliver an ex post efficient outcome that maximizes the value of the bankrupt business to be distributed to stakeholders.

2. It should promote ex ante efficient outcomes by penalizing managers and shareholders adequately in bankruptcy states so that the bonding role of debt is preserved. In that context debt can serve as a disciplinary device to mitigate agency problems within the firm. The increased probability of financial distress puts managers’ jobs at risk and may encourage greater effort and efficiency.

\textsuperscript{9}This is, of course, consistent with Stern’s observation that the fundamental cause of the too-big-to-fail problem is the reluctance of the authorities to permit creditors to suffer loss. (See for example Stern (2009) and Stern and Feldman (2004).) He has consistently emphasized that the appropriate way to deal with this problem is to address the concerns that drive regulators to engage in bailouts. Essentially this is the rationale for making SIFIs safe to fail.

\textsuperscript{10}Given that economists do not have a satisfactory theory of why parties cannot design their own bankruptcy procedures, Hart is careful not to describe these procedures as 'optimal'.
3. A good resolution procedure should maintain the absolute priority of claims in order to protect incentives for senior creditors to lend and to avoid the perverse incentives that may arise if some creditors have a lower priority in bankruptcy than they would if the firm were a going concern.

These three objectives apply equally to financial and non-financial firms, but in the case of SIFIs, three additional objectives should be taken into consideration:

4. A good resolution procedure should also be mindful of the costs of systemic risk. It should be cognizant of, and attempt to limit, the spillover effects that may not only damage other institutions but also markets, the financial infrastructure, and, ultimately, the real economy.

5. A good resolution procedure should protect taxpayers and other potential sources of bailout funds from loss, since imposing losses on parties that do not share in the ex-ante gains creates perverse incentives that encourage excessive risk taking by SIFIs.

6. A good resolution procedure should lead to quick, predictable results. Markets abhor negative surprises, particularly if they result from unanticipated behavior by regulators that results in unexpected losses. Traders may simply withdraw from risky markets until they are confident they understand the new playing field.

If a rationale exists for treating SIFIs differently than other kinds of firms in insolvency, it can be found in these latter three objectives. The key is to assure continuity of systemically important services for customers and markets. That after all is what happens in normal
corporate reorganization bankruptcy procedures – the firm can continue in operation, while its capital is being restructured. This often avoids liquidation, preserves going concern value and assures that investors bear losses in line with strict seniority of their claims. But the stays imposed in normal bankruptcy proceedings do not work for banks. As Huertas (2011a) notes, “The very essence of banking is the ability to make commitments to pay – depositors at maturity, sellers of securities due to settle, borrowers who wish to draw on lending commitments, derivative counterparties who contracted with the bank for protection from interest rate, exchange rate or credit risks. Putting a stay on payments to creditors is equivalent to stopping the bank’s operating business.” Unlike airlines, retailers or automobile companies, banks cannot readily operate in bankruptcy. So bankruptcy for a bank has been tantamount to liquidation.11

This is usually the least desirable outcome for both creditors and society because it usually results in the loss of going concern value for creditors and threatens financial stability to the extent that systemically important services are abruptly discontinued. Liquidation imposes very significant incremental losses relative to the losses that would be realized if the entity can continue to operate while its capital is being restructured. That is true for banks as well (Huertas 2011a). Nonetheless because some countries have no resolution tools other than bankruptcy courts, we have had substantial experience with problems in applying bankruptcy to cross-border institutions, and several scholars are working on amendments to the normal bankruptcy process to make it more effective in resolving SIFIs, we will include bankruptcy processes in the analysis.

11 See, however, revision of the bankruptcy code proposed by Jackson (2010), Jackson and Skeel (2010), Bliss and Kaufman (2011) and Scott (2011) that would mitigate many of the deficiencies in current bankruptcy processes.
The first critical issue is how to define a SIFI. This is surprisingly contentious. Some believe SIFIs cannot be identified ex ante because it is impossible to predict how a crisis will unfold. Others believe that most SIFIs could be defined but that they should not be identified ex ante because it will exacerbate moral hazard. I believe that most SIFIs can and should be identified ex ante and that moral hazard should be controlled by making it costly to be designated a SIFI. Moreover, unless SIFIs are publicly identified ex ante they cannot be regulated and supervised differently from other institutions and no meaningful resolution plan can be developed.

SIFIs should be identified by characteristics, not by charter. The designation should depend on the degree to which an institution is systemically important as indicated by its: (1) size relative to the economy; (2) complexity as measured in terms of (a) the number of its affiliates, (b) its operational and financial interdependencies, (c) the number of regulatory agencies or courts that would have to approve the resolution of the group; and (3) its performance of systemically important functions.

Among this group of institutions supervisory attention should be allocated with a view toward the SIFIs most vulnerable to a shock as reflected in: (1) the amount of leverage employed by the group; (2) exposure to a liquidity shock; (3) the alignment between corporate structure and lines of business; and (4) the “resolvability” of a SIFI as measured in an estimate of the time it would take to resolve. These data should be factored into the standard

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12 This point of view is often accompanied by a concern about “cliff” effects in which a very slight change in size may change an institution’s classification. This problem diminishes in importance, however, when multiple indicators are taken into account, which is appropriate in any event. Size alone does not capture all of the concerns regarding systemically important institutions.
examination and statistical evaluations that inform the diagnosis and triage stage in the resolution process. (See Figure 3.)

SIFIs that appear to be highly vulnerable to a shock because of high leverage, outsized exposure to a liquidity shock, a massive misalignment between corporate structure and lines of business or because they would take an excessively long time to resolve would be identified as problem institutions and subject to significant additional supervisory scrutiny. (Those SIFIs that do not have these characteristics would be subject to much less intensive oversight.)

This is the fundamental reason that resolution policy must be integrated with regulatory and supervisory policy. Many of the details essential to identifying and classifying SIFIs, a fundamental objective of supervisory policy, must be accumulated during the process of formulating resolution plans. In the absence of such details, triage cannot be properly executed, thus wasting supervisory resources and leaving the system more vulnerable to crisis than it might otherwise be.

4. The role of rapid resolution plans

The resolution plan should begin with the assumption that the SIFI is insolvent under the regulatory definition of insolvency. This definition should be above the point of economic insolvency and standardized across countries because differing insolvency standards (and differing rights to intervene in a deteriorating institution) can lead to disorderly insolvencies or

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13 See also The Pew Financial Reform Project (2011) for a particularly useful survey of standards for rapid resolution plans.
14 In contrast, Huertas (2011) argues that the recovery plan is at least as important as the resolution plan. I have taken the view that the recovery plan is subject to considerable subjective judgments and therefore is likely to generate controversy that can cause a distraction. Moreover, it is something that management will have an incentive to do in any event, while a resolution plan requires official intervention. I am in complete agreement, however, with his view that the authorities must have full discretion in implementing the resolution plan of their choice. In my view, the rapid resolution plan will simply give them the data to do so more efficiently.
massive, improvised bailouts. The plan should be a joint undertaking of the institution, its board of directors, and the principal supervisors. Although clearly the supervisors must have decisive control, it is equally important that the resolution plan be perceived as a fundamental part of good corporate governance at least on a par with business continuation planning. The plan should contain seven elements:

(1) The SIFI must map its lines of business into the corporate entities that must undergo some sort of resolution process in the event of insolvency. Each of these separate entities and its location must be justified to the board of the SIFI and, ultimately, to the primary supervisors for each of the different lines of business and to the college of supervisors established for the SIFI. Fragmentation of lines of business across numerous legal entities will be difficult to justify

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15 Conventional definitions of insolvency stress either cash flow insolvency (inability to meet liabilities when due) or balance sheet insolvency (liabilities exceed the value of assets). But these standards are likely to exacerbate systemic risk because they will invariably lead to much greater losses and the prospect of spillover costs that could have been mitigated or prevented by earlier regulatory intervention. Nonetheless, this decision requires a careful balancing of the rights of shareholders against those of creditors and the prospect of systemic risk. Hüpkes (2009b) and Alexander (2009) present particularly insightful discussions of these trade-offs. Moreover, even among countries that have chosen to permit regulators to intervene before the point of cash-flow or balance sheet insolvency, debates continue on whether it is better to rely on rules (which make actions predictable and increase the accountability of the supervisory authorities) versus discretion (which permit supervisory authorities to exercise discretion over when to intervene). The U.S., for example, has chosen to rely primarily on rules, while the U.K. has introduced a special resolution regime that permits considerable discretion about when the authorities should intervene.

16 Ron Feldman (2010) has argued that the planning must be driven by supervisors, not firms. Although supervisors must have the final word, much can be gained by maintaining a dialogue between the firm, its board and the authorities. His point that resolution plans must lead to changes in the operations of financial institutions and supervisors before a crisis hits is on the mark.

17 This list overlaps substantially with the recommendations of the SIPIC Trustee charged with liquidating Lehman Brothers (Giddens, 2010, Exhibit D). Giddens, however, places special emphasis on details regarding all accounts including account holder agreements, applicable systems and associated collateral and a reconciliation of clearing sub-ledgers with the general ledger. This undoubtedly reflects his frustration in obtaining even the most basic information about customer accounts and collateral. He also emphasizes the importance of obtaining the cooperation of clearing banks, exchanges, clearing houses, custodians and major counterparties. Although Kaufman (2011) argues that it is essential to know the details of the resolution procedure before you can devise a useful rapid resolution plan, I have found that, with minor exceptions, the kind of information you would require is virtually the same whether the resolution is conducted by the courts or a resolution agency. It is only if you devise a recovery plan as well, that these other kinds of assumptions – liquidation values, etc. – are important.
to the board and the authorities because it would impede any attempt to salvage going-concern value from a line of business if it cannot be easily separated from the rest of the group and sold. The resolution procedures must be described for each entity, including an estimate of how long they will take to complete. The dialogue between the SIFI and its primary supervisor will inevitably be contentious because it will represent a dramatic change from past practice and will cause the SIFI to focus on possibilities it would rather not contemplate. As Lord Turner (Giles et al., 2009), chairman of the Financial Services Authority in Britain, has noted, “In the past, authorities around the world have tended to be tolerant of the proliferation of complex legal structures designed to maximize regulatory and tax arbitrage. Now we may have to demand clarity of legal structure.”

(2) The SIFI must identify key interconnections across affiliates, such as cross-guarantees, stand-by lines of credit, contractual commitments or loans that link the fate of one affiliate to that of another. The plan should also identify operational interdependencies such as information technology, service agreements, staffing allocations, human resource and related

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The collapse of Lehman Brothers presents a particularly good example of this problem. It had lines of business that were fragmented across numerous subsidiaries that were caught up in multiple insolvency procedures on three different continents with no prospect of reassembling the line of business even though this may have preserved substantial going-concern value.

\[\text{19}\] Hupkes (2009a, p. 515) made the point clearly in an article titled “Complicity in complexity: what to do about the ‘too-big-to-fail problem,’” in which she argues that policymakers need to give more attention to how the complexity of an institution’s legal structure affects the resolution process. She explains that the size of an institution is not the crux of the matter. “Rather it is the complexity of large financial institutions that makes rapid and orderly wind-downs virtually impossible.”

\[\text{20}\] The very rumor that a SIFI was making a resolution plan might set-off a run in the absence of a general legal requirement that all SIFIs must do so. The legal obligation will enable the SIFI to do something it should be doing as a matter of good governance, without fear of undermining its reputation.

\[\text{21}\] This notion has generated a considerable amount of controversy in Britain, with bankers generally taking the view that the supervisory authorities have no business monitoring their tax avoidance strategies. Alistair Darling, Chancellor of the Exchequer, has tartly responded (Giles et al, 2009), “I do worry when an organization is structured for tax purposes rather than for the efficiency of its business and the strength of its business.”
support systems, trading and custody systems, as well as liquidity, and risk management procedures that would impede the separation of one unit from another.

(3) The SIFI should be required to develop and maintain a virtual data room that contains information that an administrator or resolution authority would require to make an expeditious resolution of the entity. This is likely to require investment in an improved management information system that is quite granular and provides details such as organizational structures, loan and counterparty exposures disaggregated by borrower or counterparty, currency and legal entity. The SIFI must also identify key information, trading and custody systems, indicating where they are located, and the essential personnel to operate them. Plans must be made to make these systems available to all entities at home or abroad during the resolution process, whether they are operated by the SIFI or outsourced to a third party. As a practical matter, this may require that backup IT operations be segregated in a separate subsidiary that could continue to function while the rest of the firm is resolved.

(4) The SIFI must identify any activities or units it regards as systemically important, and demonstrate how they could continue to operate during the resolution process. This will usually require that they be separately incorporated and made bankruptcy-remote so that they could easily be detached from the group if necessary in order to keep the systemically important function operating while other parts of the group are resolved. Arrangements should also be in place to make a rapid transfer of customer accounts to another institution in the event of resolution.

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22 This too is likely to be a contentious point as demonstrated by the years it has taken the FDIC to gain authority to require insured banks to identify insured deposits to facilitate rapid payouts. Banks successfully resisted for a number of years claiming that it would be an overwhelming technological challenge.

23 Hüpkes (2005) wrote insightfully about this in the context of global financial institutions.
(5) The SIFI must consider how its actions may affect exchanges, clearing houses, custodians, and other systemically important elements of the infrastructure. Ideally it should identify how it can disconnect from these highly automated systems without creating serious knock-on effects. This will require cooperation with these systemically important parts of the infrastructure. A particularly good example of a successful effort of this sort was the CHIPS (Clearing House Interbank Payment System) initiative enabling its bank participants and key central banks to withstand the simultaneous failure of the four largest participants.

(6) The SIFI must identify the procedures it would follow during resolution. This report should be quite detailed including, at a minimum, a list of bankruptcy attorneys and administrators who might be called upon, individuals who would be responsible for press releases and various notifications to counterparties and regulators, and a good faith estimate of the time it would take to resolve each separately chartered entity.

(7) The resolution plan should be reviewed at least annually and updated if the institution executes a substantial merger or a restructuring that introduces additional complexity.

The managers of the SIFI must demonstrate to their board of directors that the resolution plan is complete and feasible. Boards should recognize that oversight of resolution plans is as much their responsibility as oversight of business continuity plans. Indeed, when the SIFI approaches insolvency, the board's fiduciary duty becomes one of maximizing the bankruptcy estate that can be passed on to creditors.24 If the board finds the plan is excessively complex or time consuming, it has a duty to require management to simplify the corporate

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24 The absence of a credible plan would be presumptive evidence of a failure to carry out this fiduciary duty.
structure of the firm, invest in more powerful IT systems or reduce the scope of its activities so that it can be resolved in a reasonable amount of time.\(^{25}\) This process may also have a useful side benefit. Considerable research in cognitive psychology shows that decision-makers are likely to be more risk averse when they are forced to confront worst case scenarios even if they consider them unlikely to happen.\(^{26}\)

Next, the primary supervisor\(^{27}\) must evaluate the resolution plan in cooperation with both any other domestic supervisors of businesses in which the firm may be active and the international college of supervisors (or crisis management group) established for each SIFI. This group must certify that the plan is feasible, and the estimated time for the resolution is plausible and acceptable. In addition, it must ensure that all systemically important activities have been identified and properly insulated, so that they could be spun-off to another firm in the event of insolvency.\(^{28}\) If the primary supervisor or the college of supervisors finds the plan is not feasible or would take an unacceptable amount of time to execute, it should have the power to compel the SIFI to propose alternative options.

The SIFI might propose alternatives such as simplifying its corporate structure, improving its IT infrastructure, spinning off activities or placing a line of business in an affiliate

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\(^{25}\) Precisely what is 'a reasonable amount of time' will likely change as the approach is implemented. The ultimate goal ought to be a plan that can be implemented over a weekend, but earlier iterations will clearly take much longer. Some have advocated the need for a twilight (‘cotton wool’) period between intervention and the decision to start liquidation to allow resolution to proceed more smoothly.

\(^{26}\) See Guttentag and Herring (1984) and the references cited therein.

\(^{27}\) In countries with a unified regulatory system, this is clear. In others, like the United States, it may not be unless the entity is a Bank Holding Company or a Financial Services Holding Company. Clearly this is one of the first problems to be resolved if there is ambiguity about who has overall responsibility for an institution - e.g. AIG - or whether the primary supervisor is competent to carry out its duties - e.g. Lehman Brothers.

\(^{28}\) Hüpkes has emphasized this point repeatedly. See, for example, Hüpkes (2005).
with no financial connections to any other affiliates and financed completely by equity.29 The supervisory authorities, however, must have substantially greater resources than they currently do, and the power to compel action if the SIFI does not propose an acceptable alternative. If they lack such power, no meaningful action is likely to be taken, and the entire exercise will become a senseless and costly ticking of boxes. It may even prove counterproductive to the extent that it encourages market participants to believe that a problem has been solved when in fact it has not. The temptation to cut corners will be intense because the process will be enormously costly for both SIFIs and the authorities. Yet these costs will surely be small relative to the very large support provided by American and European governments to prop up their financial systems during the crisis.

Since many financial firms have become much too complex to take through any kind of resolution procedure in a reasonable amount of time, it seems naive to expect these firms to give up willingly the complexity30 that virtually assures them access to subsidies, a safety net, and a competitive advantage over other smaller, less complex institutions. For example, Citi (which has a habit of stumbling into a crisis every ten years or so) has $2 trillion in assets, is active in more than 160 countries, with 2,435 majority-owned subsidiaries, participating in 550 clearance and settlement systems. Its current structure defies any plausible orderly resolution process. To be credible the process of resolution planning must produce demonstrable

29 One might question how these equity investments should be treated in computing consolidated minimum capital requirements. The equity investment should count fully because the purpose of imposing the equity requirement on these bits of the infrastructure, including the systemically important pieces, is to make them easy to detach from the failing institution. They should be relatively easy to sell because they are often systemically important parts of the infrastructure.

30 See DeYoung, Kowalik and Reidhill (2011) for a theoretical analysis of how the inability of the resolution authority to make a credible commitment to close a complex, insolvent bank creates an incentive for banks to become still more complex.
improvements in the resolvability of such institutions. It may be necessary to appoint an independent commission to ensure that progress continues to be made.

Alternatively, Andrew Kuritzkes (2010) has suggested that a periodic tax of $1 million be levied on each subsidiary of a SIFI. The tax would be deferred for five years, with the first collection in 2016 to incentivize firms to simplify their legal structures. The tax would be collected at five-year intervals thereafter. Based on current legal structures, the costs to international financial conglomerates would be significant, ranging from $134 million to $2.6 billion for the top thirty financial conglomerates. The tax could be justified by the negative externalities associated with cross-border activity, legal complexity, and regulatory forum shopping. Others have suggested that capital requirements be calibrated to create similar incentives to simplify corporate structures, but capital requirements are already burdened with a number of objectives and have proven remarkably ineffectual in deterring risk-taking (IMF (2009, Ch. 3, p. 7)).

Imposing constraints on the size or structure of firms has traditionally been justified solely on grounds of competition policy, not as a way of enhancing financial stability. But what was once unthinkable is now being widely discussed. Governor of the Bank of England, Mervyn King (2009), former Governor of the Federal Reserve Board, Alan Greenspan (McKee and Lanman, 2009) and former Secretary of State and Treasury, George Shultz (2008) have all said, in effect, “Any bank that is too big to fail is simply too big.” Perhaps, most surprisingly, Jamie

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31 See Herring and Carmassi (2010).
32 More recently, this option appears to have been rejected even in the U.K., where it received the greatest public attention. The Vickers Commission preliminary report recently concluded that although it was regrettable the government had merged Lloyds with HBOS, it should not be undone. Nonetheless, Lloyds is likely to be required to sell more branches to enhance competition for retail business. Stern and Feldman (2009) analyze the approach
Dimon (Sender, 2009), CEO of JP Morgan Chase, has endorsed a resolution mechanism that would wipe out shareholders and impose losses on creditors but protect the financial system when a SIFI fails: “We think everything should be allowed to fail... but we need a resolution mechanism so that the system isn’t destroyed. To dismantle a bank in a way that doesn’t damage the system should be doable. It’s better than being too big to fail.”

During the process of evaluating resolution plans, the primary supervisor and the international college of supervisors will gain an understanding of the regulations and tax provisions that provide SIFIs with incentives to adopt such complex corporate structures. It may be excessively optimistic to believe that these insights will help inform future regulatory, accounting and tax reforms, but it would be useful, nonetheless, to highlight some of the unintended consequences of these official actions in the hope that it might influence future reforms at the margin.

In addition, if a SIFI is involved in more than one line of business, the supervisors who oversee each of the important lines of business should be required to simulate a resolution each year under varying stress conditions. In this process, each supervisor must develop modes of cooperation with the others or make clear its intention to ring-fence the SIFI’s operations sympathetically, but also conclude that breaking up is hard to do and harder still to sustain since firms will inevitably attempt to reconsolidate.

33 The EU has a mechanism for taking account of competition policy in the case of a failing SIFI that receives state support. Former European Commissioner for Competition Neelie Kroes has required that Commerzbank, ING, the Royal Bank of Scotland, and Lloyds downsize to compensate for the anti-competitive effects of the subsidies they have received. The EU Competition Commissioner can force banks to take a range of actions, including mandates to 'sell billions of euros of assets, close branches, cut balance sheets drastically, restrict payments to investors, executives and staff, and focus more narrowly on retail banking' (Reuters, 2009). The United States lacks any mechanism for considering such issues except in the merger approval process (which is often given short shrift in the case of a shot-gun merger). And although the EU action is taken after the extension of a bailout, it seems preferable to the frequent U.S. pattern of subsidizing the merger of a very large bank with another even larger bank with scant regard for competitive effects. See further Dewatripont et al. (2010).

34 If not actually integrated with the supervisory authority, the resolution authority should be represented at these discussions. They will have the greatest expertise regarding how to implement an ordinary resolution.
within its domain. Unless supervisors within a single country can agree on how to resolve a SIFI, there is little hope of making progress in the much more complex international arena.

The primary supervisor must also conduct a similar exercise with the international college of supervisors and simulate a resolution annually under varying stress conditions. This will have the same virtues as the domestic exercise, and here, too, the supervisors will need to develop modes of cooperation or make clear their intent to ring-fence the portion they control. This will enable the other key supervisors to anticipate what might happen and make appropriate preparations. Although these commitments will not be legally binding, the supervisor’s personal integrity will be on the line, so there will be a strong incentive to be candid.

The potential benefits from developing resolution plans are substantial:

(1) The process should reduce moral hazard by making it clear to creditors and counterparties that a SIFI can be resolved in such a way that it may impose losses on them without catastrophic consequences for the rest of the financial system. An indication that this might have a powerful effect can be inferred from Moody's reaction (Croft and Jenkins, 2009) to the “recovery and resolution plans” proposed in the U.K. It warned the British authorities that such an approach “would remove the necessity to support banks as banks would no longer be too interconnected or complex to fail. This could potentially result in rating downgrades where ratings currently incorporate a high degree of government support.” Of course, this benefit will be realized only to the extent that market participants believe a workable resolution plan exists and will be used. Equally importantly, they must believe firms that are not required to have resolution plans are credibly excluded from bailouts.
(2) Gaining approval for the resolution plan will cause SIFIs to simplify their corporate structures and make preparations so that less of the bankruptcy estate is consumed by a frantic, last-minute attempt to formulate and execute a resolution plan. These amounts can be quite substantial. The administrators of the Lehman bankruptcy (Cairns, 2009) have estimated that at least $75 billion was wasted because of the lack of any preparation for bankruptcy, and legal and administrative expenses have consumed another $1 billion of the bankruptcy estate by the first quarter of 2009 with no end in sight.

(3) Developing the plan may cause SIFIs to reduce their risk exposures because of greater awareness by the board of directors, more thorough analysis by supervisors, and greater discipline by creditors and counterparties.

(4) A credible resolution plan will level the playing field between SIFIs and smaller, less complex institutions so that profits and market share flow to institutions that provide the best services most efficiently rather than to institutions that benefit from the subsidy of an implicit guarantee.

Of course, resolution plans have both private and social costs in addition to the above benefits. Compliance costs will certainly increase significantly for SIFIs (and for supervisors, making it all the more important to provide them with adequate resources). But some of the upgrades in IT systems required should enable firms to manage their businesses more effectively, as well as facilitate a resolution. Resolution plans may also reduce the efficiency with which the SIFI can deploy its capital and liquidity, but often these efficiencies have proven

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35 In a private comment, Robert Eisenbeis has pointed out that just as the preparations for Y2K enabled a number of banks to deal more effectively with the shock of 9/11, this improvement in IT systems may have unexpected benefits.
illusory in a crisis, when they are most needed. To the extent that capital and liquidity will be ring-fenced by regulators of other lines of the conglomerate’s business (who believe their main duty is to protect the customers of the SIFI in their regulatory domain), they will be unwilling (or perhaps legally unable) to upstream capital or liquidity to a faltering parent.\footnote{In this sense, the Basel Committee’s long-time emphasis on consolidated regulation of minimum capital requirements may be deeply misleading. Similarly, the ratings agencies clearly misjudged the ability of AIG to upstream excess capital from their multiple insurance businesses to aid the holding company or a faltering affiliate. Jack Reidhill has noted that if the parent issues a guarantee on subsidiary borrowings, that subsidiary should never be considered a source of strength for the rest of the group.} Finally, a resolution plan may increase capital requirements and tax payments and lower profits to the extent that corporate simplification requires the elimination of entities used to engage in regulatory arbitrage and tax avoidance.\footnote{This is undoubtedly one of the major reasons that SIFIs have 2.5 times more subsidiaries than non-financial corporations of comparable size. Moreover, SIFIs have located a substantially higher proportion of their subsidiaries in tax and regulatory havens (Herring and Carmassi (2010)).} But this is a private cost, not a social cost.

With regard to social costs, resolution plans could limit potential economies of scale and scope. But there is little evidence in the academic literature that economies of scale and scope outweigh the diseconomies of scale and scope that have become evident in the recent crisis.\footnote{See, for example, Berger and Mester (1997). Although there are numerous empirical studies that attempt to quantify economies of scale, all are subject to criticism because of the paucity of relevant data. This is, of course, particularly true for enormous banks. But it does seem clear that scale economies cannot be the main driving force behind the creation of trillion dollar banks. A more robust and perhaps more relevant empirical regularity is that the compensation of senior executives tends to increase proportionately with scale (Frydman and Saks, 2007).} In any event, technology-intensive activities that involve heavy fixed costs and appear to offer genuine scale economies in some lines of business, can be ring-fenced and operated as separate units from which firms of all sizes could benefit. This would be much like the evolution of automated teller machines, which are now a shared network, but began as proprietary systems. By reducing leverage, resolution plans may increase the costs of
intermediation. But since excessive leverage is heavily implicated as a cause of the recent crisis, this may actually be a social benefit rather than a cost.

5. How commonly deployed resolution approaches measure up against criteria

Once the rapid resolution plan is in place, the authorities should be able to act much more quickly and effectively should resolution become necessary. This is an important advantage because delays in resolution increase the risk of systemic spillovers. Depositors and other short-term creditors and counterparties may lose access to their funds. Viable borrowers may lose access to their collateral and undrawn credit lines and the lack of clarity regarding positions vis-à-vis the insolvent financial institution may transmit problems to counterparties, who will be unable to hedge their exposures effectively because they will not know the amount of loss or the timing. This is quite likely to give rise to dislocations in wholesale markets as traders attempt to assess ultimate damage to counterparties.

Deposit insurance may play a critical role in preserving financial stability just before and during the resolution process. Although deposit insurance was originally envisioned as protection for unsophisticated depositors of modest means, it has now become a central feature of the safety net. This was demonstrated inadvertently by the British, who had previously prided themselves on deposit insurance that protected depositors of modest means, but included important safeguards to deter moral hazard – co-insurance above a low minimum with a low, total ceiling. The run on Northern Rock made clear that minimal consumer protection was not enough. The run threatened to become contagious, not because Northern Rock was large or interrelated to the rest of the financial system. Rather it was a run on the deposit insurance system, which, although adequate to protect low-income customers, was
completely inadequate as a component of the safety net. Depositors suddenly realized that they would suffer loss if they had more than a small minimum in a bank that failed. Concerns also arose regarding the exercise of the right of set-off and the possibility of having a payment delayed in the clearing and settlement process. This led the British to make significant changes in the structure of their deposit insurance which may increase moral hazard, but will made it a more effective component of the safety net.

On the other hand, countries that abruptly increased their deposit insurance after the crisis began often set-off an escalating competition in the provision of guarantees. This was particularly apparent within the euro area. So long as depositors had confidence that a country could meet its guarantee of deposits, depositors with large amounts of funds would move their funds to banks in countries that promised the most generous guarantees. This created destabilizing capital flows and led several countries to guarantee all deposits, an unsustainable position from which countries are finding it difficult to exit. This dynamic ultimately led to the near financial collapse of the Irish government, which had guaranteed all of the liabilities of its banks. Massive guarantees, moreover, can mask insolvencies and create larger systemic problems in the future.

It is critical that the resolution authority have the power to act quickly and decisively to allow continuation of systemically important services while the insolvency is being resolved. Pre-insolvency triggers for escalating regulatory intervention enhance the effectiveness of resolution policy. They provide powerful incentives for weak financial institutions to solve their own problems by either restructuring and recapitalizing or merging with a solvent institution.
Indeed, if a weak financial institution fails to take remedial action, it creates a strong presumption that it is economically insolvent and has negligible franchise value.

If resolution procedures can be initiated before actual insolvency, no losses need be allocated across creditors and systemic spillovers are much less likely to occur. And public subsidies will be completely unnecessary. Moreover, transparent rules for regulatory intervention remove the discretion from the regulatory authorities to play for time in hopes that deterioration will be self-correcting and it reduces the scope for political interference.

The U.S has led the way in setting pre-insolvency triggers for regulatory intervention with the Federal Deposit Insurance Corporation Improvement Plan of 1991. Yet the prompt corrective action measures set out in the legislation were largely ineffectual with regard to the large banks that have required bailouts. Precisely why this approach failed is unclear, but a number of hypotheses are plausible. First, some agencies, particularly the Office of Thrift Supervision failed to enforce the triggers. Second, the triggers may have been set too low. Markets may demand much higher levels of equity capital in times of crisis. Third, the market has become very cynical about reported book values and regulatory capital measures. Rapid repeated write-downs in the fall of 2007 raised questions about whether even management understood the true value of its assets. Moreover, Morgan Stanley, an esteemed expert on valuations, was willing to sell itself to Wachovia just two weeks before Wachovia became insolvent. It seems clear that pre-insolvency triggers must be reformulated in terms of measures that more accurately reflect market values if they are to be effective.

The result has been that whether countries rely on rules or discretion and regardless of what trigger was employed to trigger resolution procedures – cash flow insolvency, book value
insolvency, a judgment that the bank is being operated in an unsafe and unsound manner, a finding that the bank is likely to cause loss to depositors or FDICIA’s 2% equity-to-asset ratio -- resolution procedures tended to be initiated long after a financial institution became insolvent. Partly this may be because bad news tends to be concealed as long as possible. Managers are reluctant to share bad news with regulators because they fear that they will lose discretion for dealing with their institution’s problems, may experience a sudden loss of liquidity if the bad news becomes public, and may lose their jobs.\textsuperscript{39} When bad news finally materializes they will always insist that they are suffering a liquidity crisis, but are solvent if only they are given sufficient liquidity on reasonable terms.

Moreover, it is inherently difficult for outsiders to know the true condition of the financial institution whether they rely on external reports or on onsite examinations. Inevitably they discover problems with a lag and so it is very difficult to distinguish a weak financial institution from one that is likely to become insolvent. Given the uncertainty, supervisors will delay resolving a faltering financial institution in hope that it will bounce back. This partly reflects the incentives supervisors face. They tend to be judged by the failures that occurred on their watch rather than the costs of resource misallocations from letting an insolvent financial institution operate too long. Moreover, they understand that interference with the control rights of shareholders is sure to be challenged.

For these reasons, once the decision to intervene is taken, the resolution choice is often open bank assistance leaving the management in place, which is essentially a form of forbearance. This may be accomplished by guaranteeing liabilities or assets, purchasing assets

\textsuperscript{39} Dick Fuld,, Chairman and CEO of Lehman Brothers, may have suffered from all of these problems as well as concern over dilution of his significant ownership of the firm.
or providing subordinated debt which is to be repaid when the institution is restored to health, while providing generous liquidity support. The advantage is that it delays (perhaps indefinitely) politically unpopular regulatory interventions and may avoid the expenditure of deposit insurance reserves. Moreover, it preserves the flow of services to the institution’s customers. Sometimes it works. Unfortunately, unless it is accompanied by strong pressures to accomplish financial and operational restructuring, forbearance often leads to larger losses. If the problem is not self-correcting, losses continue to accumulate and may even accelerate if the managers take greater risks in an attempt to escape insolvency.\footnote{A recent reflection of this tendency was Lehman Brothers’ increase in its bets on subprime products as it neared insolvency or LTCM’s increase in convergence trades as spreads widened.} This exacerbates the misallocation of resources and increases the risk of systemic spillovers. Often liquidity assistance must be increased, guarantees must be expanded and strengthened to the point that it is no longer plausible that the government will be repaid. Moreover, the maintenance of subsidized excess capacity may spread losses to other banks. In the worst case, non-performing assets rise relative to tax capacity and the government loses credibility and control. The increased losses ultimately must be allocated across creditors or absorbed by taxpayers.

Judged against the criteria for good resolution policies (see Table 4), open bank assistance is unlikely to lead to \textit{ex post} efficient outcomes and certainly does not encourage \textit{ex ante} efficient outcomes because all creditors are protected. It is usually effective in limiting systemic spillovers in the short run, but often at the cost of larger systemic problems in the longer run. Although this leads to quick, predictable results (at least in the short run), it fails to protect taxpayers since they finance the open bank assistance.
Probably the most frequently used resolution tool is a subsidized merger between the insolvent bank and a larger, presumably better managed bank. This avoids the awkward problems of government ownership and control of a bank and, in a purchase and assumption, it protects all creditors and counterparties. Since the merger must be accomplished over a very brief period, potential buyers have little opportunity to undertake thorough due diligence and so there is some concern that the subsidy is unnecessarily high. Often governments try to reduce this uncertainty by providing the buyer with a put option that is usually limited in time and amount. The downside is that this approach may reinforce a market presumption that no creditor will suffer loss in future resolutions. This undermines market discipline and exacerbates moral hazard. Often these shot-gun mergers make large, complex institutions even larger and more complex and sometimes they seem ill considered. Perhaps the most bizarre recent example was an attempt to subsidize a merger between Wachovia and Citi. This kind of merger may undermine the reputation of the supervisors if the “stronger” financial institution proves to be weak as well.

Judged against the criteria for a good resolution process (see Table 4), subsidized mergers are likely to lead to ex post efficient outcomes if the merger partner is wisely chosen. By protecting all creditors and counterparties, however, subsidized mergers do little to promote ex ante efficient outcomes. So long as the merger partner is able to absorb the insolvent financial institution without difficulty, this approach limits the cost of systemic spillovers. Of course, because taxpayers provide the subsidy, this approach does not protect taxpayers from the costs of a bailout. The approach does lead to a quick and predictable result.

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41 The acquirer may purchase the entire bank or just the liabilities and a subset of the assets.
Nationalization has all the disadvantages of a subsidized merger combined with additional disadvantage of state control. State-owned banks (SOBs)\textsuperscript{42} are likely to behave differently from privately owned banks (POBs). POBs maximize shareholder value subject to risk constraints, but SOBs have murkier, political objectives and thus are likely to allocate resources differently. They will have different governance as well. In POBs shareholders elect the board that oversees management. While the model is not perfect, at least there is some clarity about how governance should operate. Compensation is largely determined by the market and tends to provide strong managerial incentives (although these can produce dysfunctional results). In SOBs politicians appoint the board that oversees management. Compensation is determined largely by civil service standards or patronage, both of which tends to provide weak managerial incentives to increase the value to taxpayers (the real shareholders). Thus SOBs are likely to do whatever they do less efficiently than POBs. By maintaining excess capacity in the financial system and, often, underpricing risk, SOBs are likely to undermine the profitability of the remaining POBs. Worst of all, SOBs are more likely to experience crisis and incur greater fiscal costs to resolve (Caprio and Martinez, 2000).

Judged against the criteria for a good resolution process (see Table 4), the option of nationalization performs poorly. Because of the likely misallocation of resources it is likely to lead to inferior \textit{ex post} outcomes. By protecting all creditors and counterparties against loss, it undermines \textit{ex ante} efficiency. It does limit the cost of systemic spillovers in the short term, but it is likely to exacerbate the potential for systemic spillovers in the long run, by undermining market discipline, sustaining excess capacity in the financial system and by generating larger

\textsuperscript{42} In Kaufman’s (1999) acronym employed in his insightful paper “Helping to Prevent Banking Crises: Taking the ‘State’ Out of State Banks.”
losses. Experience has shown that SOBs are very costly to taxpayers, but nationalization does lead to quick, predictable results.

The resolution option of chartering a bridge bank and a bad bank receivership is gaining increasing popularity. It was introduced in the U.S. in 1987, but has been subsequently adopted (with variations) in Korea, Taiwan, Japan, the United Kingdom, and Germany. A bridge bank is a temporary bank established and operated to acquire some or all of the assets and liabilities of an insolvent institution until final resolution can be accomplished. The charter has a limited life to ensure that it does not become a back-door nationalization. Like a purchase and assumption or nationalization, this approach permits continued operation of systemically important functions and limits the disruption of financial markets. It allows customers continued access to banking services, but controls risk and maintains the franchise value of the bank until a final disposition can be arranged. It provides time to design and implement an optimal resolution and allows potential buyers time to perform a thorough due diligence.

Unlike a purchase and assumption or nationalization, it maintains market discipline to some extent. Insured depositors have uninterrupted access to their funds, but uninsured depositors and other creditors may have the value of their claims reduced. Although the resolution authority does not protect uninsured creditors from credit risk, it does mitigate liquidity risk by paying out the estimated value of their claims as quickly as possible.

The infrastructure for a successful bridge bank operation requires not only the legal power to intervene quickly and decisively, but also the kind of information generated in a good rapid resolution plan. But many critics have raised concerns about this approach.43 These

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43 See Skeel (2011) and the references contained there.
include issues of due process and judicial oversight, equal treatment of creditors, the ability of the resolution authorities to manage the bridge bank (or to hire effective management) and the lack of transparency in the resolution process. Some have also raised the concern that unless the systemic risk exception is invoked (which absolves the resolution authority from choosing the resolution approach that is least costly to the deposit insurer), the approach may lead to subsidies to SIFIs.44

Nonetheless, evaluated against the criteria for a good resolution process (see Table 4), the bridge bank approach ranks relatively well. It is likely to lead to _ex post_ efficient outcomes because it provides time to find the highest bidder for assets and the bank franchise. To the extent that losses are allocated to uninsured creditors it enhances _ex ante_ efficient outcomes and reduces moral hazard. It may fail to retain the absolute priority of claims depending on the criteria under which some claims are transferred to the bridge bank and others are left behind in the receivership. By maintaining systemically important operations and services, this approach should minimize systemic risk and, unless the systemic risk exception is invoked, it protects taxpayers from loss. And it provides quick, predictable results.

The United States has long recognized that separate procedures should apply to banks. The FDIC has been given the objectives of ensuring that depositors have prompt access to insured deposits (and, to the extent possible, to other funds as well) and to ensure that the systemic threat of a failure is contained.45 The FDIC has a broad range of powers to repudiate contracts and transfer positions to other banks as well as options for dealing with a bank

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44 There have also been concerns expressed that the insurance agency’s concern with protecting depositors at least cost may it to sell the institution’s assets too cheaply. This issue is under litigation in the WAMU case.  
45 See Kaufman and Seelig (2002) for an excellent analysis of the importance of maintaining the liquidity of bank deposits to minimize the spillover damage from bank failures.
failure\textsuperscript{46}, which includes liquidation, arranging a purchase and assumption transaction with another institution, establishing a conservatorship, providing open bank assistance or creating a 'bridge bank', the option that is most likely to be applied to a SIFI (Bovenzi, 2002).

Despite these powers, the FDIC has been virtually powerless to deal with the failing U.S. banks that could be called SIFIs, because this would have required cooperation with bankruptcy courts and with other regulators that have oversight of parts of the group that comprise the SIFIs. This degree of cooperation is simply without precedent. Indeed, state insurance supervisors and the Securities Investor Protection Corporation have expressed their unwillingness to cede their powers to the FDIC. Instead they insist on guarding the clients and customers they are required to protect. Moreover, there is no established mode of cooperation between the FDIC and bankruptcy courts.

The Dodd-Frank Act, under Title II, expands the powers of the FDIC to become a resolution agency capable of dealing with SIFIs (whether they are banks or nonbanks). The FDIC would be empowered to shape many aspects of the resolution process, including the timing of closures and the choice of reorganization, liquidation or a pre-packaged resolution. The FDIC would have the power to wipe out shareholders (except for residual value) and to allocate losses or protection from losses across and within creditor classes with the flexibility to maintain an orderly resolution.

In addition, the FDIC will have the ability to maintain critical, systemically important services and to select management while the SIFI is in the resolution, reorganization or bridge

\textsuperscript{46} The FDIC is required by law to choose the method of resolution of the insured depository institution that is least costly to it (although there is a complicated procedure for creating a systemic risk exception). Resolution by the FDIC is further constrained by the Domestic Depositor Preference Act of 1993, which gives foreign depositors the status of general creditor.\ldots
institution phase. Moreover, the agency will have power to claw back funds that had been inappropriately transferred before the failure (which could of course include funds transferred internationally) and to avoid any second guessing by the courts. They would also have access to have a pool of funds - collected from the SIFIs, not taxpayers\textsuperscript{47} - to cover losses not allocated to depositors or other creditors deemed necessary to prevent systemic risk. Finally, they recognize the necessity of coordinating with other foreign jurisdictions that may be affected by their intervention. This will be very different from the current FDIC in terms of the scope of its domestic and foreign powers.\textsuperscript{48}

Some experts prefer a judicial restructuring to a bridge bank approach. They stress the importance of due process, judicial review and judicial precedent to ensure that all creditors are treated fairly. They also believe that bailouts are much less likely to occur during bankruptcy proceedings and that a restructuring is much less likely to diminish competition. Although bankruptcy for banks has virtually always turned out to be liquidations, several scholars have proposed changes to the bankruptcy law that would permit a restructuring overseen by the bankruptcy courts.\textsuperscript{49} They note that debtor-in-possession financing can provide liquidity while a restructuring plan is devised. Jackson and Skeel (2010) propose, in addition, a reduction in the safe harbor provided for qualified financial transactions by recognizing the difference between transactions collateralized by monetary assets and other

\textsuperscript{47} It is unclear that this strategy will help contain a crisis since it would directly transfer losses from an insolvent SIFI to other SIFIs.
\textsuperscript{48} Kroener (2010) and Cohen and Goldstein (2009) make strong arguments for expanding the powers of the FDIC to deal with SIFIs.
derivative contracts that are executory in nature. Their aim is to improve incentives for monitoring by counterparties.

It is difficult to evaluate judicial restructuring proceedings against the criteria for a good resolution (see Table 4) because we have had very little actual experience with judicial restructuring (versus liquidation) of banks. Thus, it is very difficult to know whether it would lead to \textit{ex post} efficient outcomes. Certainly court supervised liquidation could be as efficient as liquidation by an agency receivership, although it may well be more costly. It is also difficult to determine whether judicial restructuring would be efficient \textit{ex ante}. It would be likely to allocate loss among creditors according to priority, but courts tend to leave incumbent management in place at least temporarily, which may have a less favorable impact on incentives. The judicial process would excel in maintaining the absolute priority of claims. Troubling questions arise about the ability of courts to limit systemic spillovers. This has not been their focus and they have virtually no infrastructure to negotiate a harmonized cross-border resolution. The experience of Lehman Brothers does not lead one to be optimistic about the amount of going-concern value that can be preserved internationally. On the other hand the judicial procedure should excel in protecting taxpayers from the cost of a bailout and it will, in principle, lead to predictable outcomes although it may take a very long time to do so.

With regard to liquidation, the threshold question is does the bank have sufficient going concern value to restructure? If not, it should be liquidated, which can be accomplished by the resolution authority acting as receiver or a court appointed administrator. In principle, the receiver should have a full range of options for liquidating assets and assets should be sold as quickly as possible without driving down prices in a disorderly market. Unfortunately, this
process may cause systemic spillovers if depositors lose access to funds and borrowers lose
access to credit.

Evaluating liquidation against the criteria for a good resolution process is relatively
straightforward. A well-designed liquidation process should yield *ex post* and *ex ante* efficient
outcomes. It will excel in maintaining the absolute priority of claims and protecting taxpayers
from the costs of bailouts. It is more likely to lead to systemic spillovers than any of the other
resolution procedures and it is unlikely to lead to quick, predictable results.

**6. Major Pitfalls in Deploying Resolution Tools**

Recent experience has shown that resolution approaches are subject to at least four
major pitfalls. First, implementing short-run, crisis-containment measures such as blanket
guarantees or massive liquidity support to insolvent financial institutions may undermine
structural reform. It is likely to diminish incentives to undertake needed restructuring and
increases the magnitude of the problem. This ultimately complicates the resolution process by
increasing the losses to be allocated.

The second pitfall is delaying resolution. The maintenance of excess capacity may
undermine the profitability of well-managed banks and may facilitate gambling for resurrection.
This will lead to an acceleration of losses in many ways including the Evergreening of loans,
excessive overhead expenditures, underpricing of risk exposures and even outright looting.
And this too, complicates resolution by massively increasing the losses to be allocated.
The third pitfall is deferring to shareholders who wish to delay issuing additional equity in order to avoid dilution. This kind of forbearance can lead to the extension of guarantees and generous liquidity support to facilitate the delay. Of course, the delay raises the potential costs of resolution, distorts competition and slows the necessary restructuring to facilitate recovery.

The fourth pitfall is recapitalization (or financial restructuring) without operational restructuring. The goal of recapitalization should be to restore sustainable cash-flow profitability. Recapitalization to the regulatory minimum won’t work if losses continue. Operational restructuring is painful, often requiring a refocused strategy, downsizing, repricing risk and improving internal controls. But these measures are essential for restoring profitability in the long run.

7. Problems in Cross-border Resolutions

This review of cross-border resolution problems will begin in the 1970s to emphasize the point that many of the problems experienced in the recent crisis could have been anticipated from past experience. We will proceed chronologically, starting with Herstatt and concluding with the major cross-border resolution in the recent crisis. The one exception to the chronological ordering is that we will conclude with Lehman Brothers, which is the largest bankruptcy in history and highlights many of the problems that can occur when the authorities lack appropriate resolution tools and a rapid resolution plan.

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50 Lehman Brothers provided a textbook example. The CEO refused to issue equity at a discount until it was impossible to recapitalize. He was concerned about dilution and, implicitly, the fact that new resources would strengthen creditors, not shareholders.
The failure of Bankhaus Herstatt (1974) showed that unanticipated action by a major central bank, in this case the decision of the Bundesbank and the German Federal Banking Authority, to close Herstatt in the middle of the clearing day in New York, caused spreads in the Eurodollar market to widen to unprecedented levels and left some banks rationed out of the market altogether. It also demonstrated that the power of the entity that can close a bank to choose when it will be closed can have a major impact on the allocation of losses (a point which other nations resented in the Lehman Brothers case). Herstatt also made clear that the impact of the failure of even a small bank can be amplified if it interrupts an important clearing and settlement process. In this case, the dollar/deutsche mark market, at the time the largest foreign exchange market in the world, came to a virtual halt for more than a month until the authorities and the New York Clearing House could restore confidence. Finally, the Herstatt case demonstrated the difficulties of applying judicial procedures to a bank. Judicial proceedings tend to move at a glacial pace – the Herstatt case took more than 35 years to settle – while markets move virtually at the speed of light.

BCCI (1991) demonstrated the enormous difficulties of dealing with the complex corporate structure, particularly when many subsidiaries have been established to evade regulatory oversight and considerable activity takes place in lightly regulated tax havens. BCCI also revealed the profound differences in resolution and bankruptcy policy and procedures across major financial centers. These included differences in: the objectives of the resolution process, which entity initiates the process, the treatment of foreign creditors, carve-outs, choice of laws to apply, choice of the insolvency jurisdiction as well as procedural details such as the right of set-off. Moreover it highlighted the significant differences between countries.
that follow a universal principle in bankruptcy in which all the assets are gathered in the
insolvency jurisdiction and then distributed to creditors in order of priority without regard to
the location or nationality of the claimant versus countries (most notably the U.S.) that follow a
territorial principle in which all domestic residents must be fully paid before assets can be
handed over to the central insolvency jurisdiction. It also revealed that a number of countries
that profess to adhere to the universal approach ring-fence the assets they can control in the
event of a crisis.

Barings (1996) revealed difficulties in achieving cooperation among functional
regulators in Britain and between home and host country supervisory authorities. It also
highlighted an important new source of contagion from exchange to exchange, which was
halted only by the rapid intervention of the government of Singapore. But perhaps most
importantly, the collapse of Barings revealed the problems in submitting a bank engaged in
active trading to bankruptcy procedures. When Barings entered administration, an automatic
stay was placed on all of its liabilities. This had immediate, unintended consequences.
Counterparties of Barings could not effectively hedge because they were uncertain of the
amount or the timing of their ultimate distribution from the liquidation or sale of Barings. It
also made clear that the value of a bankrupt entity could deteriorate rapidly if its trading
positions could not be actively managed. Indeed, the volume of trading decreased sharply in
markets in which Barings had been an active participant until it was sold to ING for £1 at the
end of the week. Partly as a consequence of the problems revealed in the Barings failure, the
International Swaps and Derivatives Association (ISDA) heightened its efforts to have close-out
netting laws adopted in an increasing number of countries. This meant that counterparties that
had adequate collateral could, in effect, close out and net their positions with the defaulting party and jump the bankruptcy queue. The policy was widely adopted in the belief that it would help sustain the liquidity of derivatives markets by avoiding the uncertainty for adequately collateralized counterparties exposed in the Baring administration.

**LTCM (1998)** revealed the darker side of close-out netting. LTCM made a strong case to regulators (and its creditors) that, if it failed to meet its margin calls and demands for additional collateral, its assets would be seized and sold by its counterparties. Since market conditions were already strained in the wake of the Russian default and LTCM’s counterparties held considerable illiquid collateral, the prospect of close-out netting raised the specter of selling illiquid assets into already thin markets causing prices to fall sharply. Thus the fire-sale losses on seized collateral might have caused failures at other institutions that held similar positions, the flight to quality would disrupt other, unrelated markets and counterparties that had not demanded sufficient collateral might themselves be in jeopardy of failure. Given the opacity of trading positions the lines of contagion were likely to be both direct – because of actual exposure to LTCM – and indirect – because of suspected exposure to LTCM or the holding of positions suspected to be like those of LTCM. The hospitality of the New York Fed and the enlightened self-interest of the major creditors led to what amounted to a prepackaged bankruptcy which eased market conditions. Nonetheless, what turned out to be a close brush with financial disaster should have been seen as a clear warning of the potential dangers in close-out netting. ISDA was, however, able to increase the number of countries that adopted its model laws and the range of assets over which close-out netting could be applied. Indeed
the widespread adoption of the ISDA model laws is probably the most successful international harmonization achievement over the last two decades.

In the recent crisis many of these difficulties were echoed and several more problems were exposed. We will consider four cross-border failures during the recent crisis: Fortis, Dexia, the Icelandic banking crisis and Lehman Brothers. In each case, resolution was, out of necessity, improvised. In some cases, the improvisation succeeded in limiting spillovers — but at substantial cost to taxpayers. In other cases, the resolution process protected domestic interests without regard to spillover effects in the rest of the world.51

**Fortis**52 was a financial conglomerate incorporated in Belgium, listed on both Euronext Amsterdam and Euronext Brussels, with substantial banking and insurance activities in Belgium, the Netherlands and Luxembourg (the Benelux countries). In May 2007, Fortis joined with the Royal Bank of Scotland and Bank Santander in a complex transaction to acquire ABN-AMRO for €71 billion. After outbidding Barclays Bank in this hostile takeover battle, the trio planned to divide ABN AMRO’s activities among them. Fortis was to acquire the domestic Dutch business of ABN AMRO as well as its private banking and asset management operations for a price of €24 billion, at a time when the market capitalization of Fortis was around €40 billion. The deal, together with a €13 billion equity issue, was approved by Fortis’ shareholders in August 2007. In addition to the acquisition of ABN-AMRO, Fortis was weak as it appeared to have a €40 billion CDO/RMBS portfolio based on U.S. mortgages. Thus overleveraged and with a weak balance sheet, difficulties began to surface at Fortis by June 2008. At that time Fortis announced a new equity issue and cancelled its dividend payment. Both steps were in

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51 The remainder of this section draws heavily from Chapter 3 of Claessens, Herring and Schoenmaker (2010).
52 Sources: Dewatripont and Rochet (2009) and Basle Committee on Banking Supervision (2010).
contradiction to earlier promises, and this led to a sharp drop in the Fortis share price. Liquidity became a serious concern amid growing uncertainty in the market as to whether Fortis would be able to execute its plans for ABN-AMRO.

Fortis was systemically important in three countries — Belgium, the Netherlands, and Luxembourg — because of its large presence in each country as well as its role as a clearing member at several exchanges. The Benelux countries have had a long history of cooperation in monetary affairs and so the preconditions for a cooperative resolution process were as strong as in any other three countries one could name.

The coordinating supervisor was the Belgian Banking, Finance and Insurance Commission (CBFA) which remained lead supervisor of Fortis, despite the importance of the growth in Dutch activities after the acquisition of ABN-AMRO. Fortis’ weakness proved fatal after the Lehman failure and subsequent market meltdown. By September 24 2008, interbank lending to Fortis had collapsed and significant deposit withdrawals were starting to take place. The crisis was managed by each of the three nations acting separately most of the time. When Fortis was initially recapitalized, the Belgian, Dutch and Luxembourg governments provided capital injections of € 4.7, 4.0 and 2.5 billion to Belgium’s Fortis Bank, Fortis Bank Netherlands, and Fortis Bank Luxembourg respectively — but not to the Fortis Group as a whole. However, this agreement failed to calm the markets, obliging the National Bank of Belgium, as home central bank, to keep providing massive Emergency Liquidity Assistance to Fortis in the next days.
A second round of negotiations then followed, and on October 3, the Dutch government bought the Dutch business of Fortis as well as its ABN-AMRO business for a combined total of €16.8 billion. In addition, the Dutch government took over the €50 billion funding of Fortis Bank Netherlands from Fortis Bank Belgium. While the Dutch parts of Fortis were essentially nationalized by the Dutch government, the solvent Belgian/Luxembourg banking parts were sold (75% stake) to BNP Paribas. In December 2008, the Brussels Court suspended the sale to BNP and decided the sales to the Dutch government and the Belgian government, and the subsequent sale to BNP had to be submitted for shareholder approval in order for these sales to be valid under Belgian Law.

Shareholder approval was obtained for the BNP-deal, after renegotiating the sale to BNP. The decision of the Brussels Court was later overturned by the Belgium Court of Appeals, which decided that no shareholder approval was needed.

The Fortis rescue and dismemberment served to foster stability in the Belgian and Dutch banking systems. Nevertheless, the lack of full regulatory cooperation increased uncertainty about large cross-border banks in Europe and increased the cost of the rescue operation.

The cooperation among the Benelux authorities started as expected though not covering the entire group. The governments were willing to engage in burden sharing for the parts of Fortis within their respective countries, but not for the rest of the holding company. Later on domestic objectives got the upper hand with the Dutch focused on returning ABN-AMRO to Dutch control, and cooperation broke down despite a long-standing relationship in
ongoing supervision. The case also showed the problem that supervisors face if they do not have effective resolution powers overriding shareholders’ rights.

Dexia\textsuperscript{53} was created through a merger of Crédit Communal de Belgique and Crédit Local de France. The holding company of the Dexia group was based in Belgium. The French subsidiary, Crédit Local de France, had bought a monoline insurer in the U.S., Financial Security Assurance (FSA). Dexia also had a significant presence in Luxembourg.

Dexia’s main business has been financing local authorities. During 2008, Dexia experienced difficulties in financing long-term assets with short-term funds, and there were also problems with structured products in its U.S. subsidiary, FSA.

Dexia was systemically important in Belgium. By contrast, it was not systemically important in France and Luxembourg, but it was the major bank for local authorities in France and Luxembourg, which made it politically important.

Dexia’s vulnerabilities appeared after the Lehman failure and subsequent market meltdown. On September 30, 2008, Dexia increased its capital by €6.4 billion. A combination of Belgian and French public and private sector investors each invested €3 billion, and the Luxembourg government invested €376 million. A week later on October 9, 2008, Belgium, France, and Luxembourg reached agreement on a joint guarantee mechanism for its new financing. The burden-sharing was done on a voluntary basis and based on the proportions of share ownership held by the public authorities and institutional investors in each of the three countries. The burden was shared as follows: 60.5% by Belgium, 36.5% by France and 3% by

\textsuperscript{53} Van de Woestyne and Van Caloen (2009) and Basel Committee on Banking Supervision (2010).
Luxembourg. On November 14, 2008, the Belgian and French governments gave additional guarantees for the sale of the U.S. subsidiary, FSA. The guarantee was to cover possible losses up to $4.5 billion, with 62% of the guarantee from Belgium and 38% from France. This $4.5 billion tranche was the first loss tranche for the portfolio amounting to $16.2 billion.

The bailout of Dexia fostered short-term banking stability in the three countries and prevented pressure on the financing of local authorities. It also fostered the wider stability of the European banking system in the short term. The Belgian, French, and Luxembourg authorities cooperated effectively in providing joint support to Dexia. The shared exposure of Belgium and France to the U.S. subsidiary provided an effective incentive for cooperation. The burden sharing was done on a voluntary basis by the three countries.

The Icelandic banking system\(^ {54} \) experienced a deep financial crisis when its three major banks all collapsed in the same week in October 2008. After the Icelandic banking system was deregulated and privatized in the 1990s and early 2000s, banking quickly became a large part of the economy. This occurred in a country where neither the government nor the private sector had sufficient understanding of risk management processes and banking supervision was clearly inadequate for a sector that had become such a large part of an economy. Over the course of the next few years, the banking system grew to about ten times the size of the economy — and then it began suffering mounting liquidity problems.

Four factors combined to make the Icelandic banking system more fragile than its counterparts abroad. First, unlike many other nations with an outsized banking system, such as

\(^ {54} \) Sources: Basel Committee on Banking Supervision (2010); Danielsson and Zoega (2009); and Special Investigation Committee (2010).
Switzerland, the Netherlands, and the United Kingdom, the institutional experience of running a modern banking system in Iceland spanned less than a decade, not centuries. Second, the banks had invested significant portions of their funds in their own shares and in each other’s shares. This shared capital, financed by the banks themselves, did not provide protection against losses as it was intended to do. Third, there were widespread accusations of political favoritism when the banks were privatized; their senior management and boards were typically composed of Icelandic citizens with little or no experience in international banking. Finally, given the size of the country and the tight political connections between the private sector and the political superstructure, supervision was weak. These factors were complicated by the fact that because of its EEA membership, Iceland essentially had the same banking regulations as other EEA/EU countries. Iceland, therefore, is more an example of the failure of supervision than the failure of regulation.

The reasons for the failure of the Icelandic banks are in many ways similar to the difficulties experienced by many financial institutions globally. These reasons include the seemingly unlimited access to cheap capital, excessive risk-taking, and lax standards of risk management. The crucial difference in Iceland is scale. In many countries with troubled banks, the problems have been confined to a segment of their banking system, and the aggregate assets of the banks have been much smaller relative to GDP. In those countries the government has had adequate resources to contain the fallout from individual bank failures. This was not the case in Iceland.
A unique feature of the Icelandic financial system was the high level of internet savings accounts that Icelandic banks had in the U.K., and later in the Netherlands and other European countries. The banks had originally relied on the wholesale market to fund themselves, but when this became more difficult, they decided to attract deposits by offering high-interest deposits in Europe. Kaupthing and Landsbanki, the two largest banks in Iceland, both pursued this strategy. Kaupthing, with its Kaupthing Edge, chose to hold these accounts in a subsidiary, so they were supervised by the host countries — with the exception of Kaupthing Edge in Germany. By contrast, Landsbanki offered its Icesave accounts through local branches of the Icelandic bank, meaning they were primarily regulated, supervised and insured in Iceland. Icesave started in the U.K and its deposits there grew to over £4 billion. Later, Landsbanki sought funds in other jurisdictions, most notably the Netherlands, where it raised €1.7 billion. Under the EU’s Second Banking Directive, the host country supervisors had no powers to supervise the solvency of these branches.

The three Icelandic banks were clearly systemic in their home country, but not so in the host countries. As concerns about the Icelandic banks increased in September 2008, the Icelandic government purchased a 75% stake for €600 million in Glitnir Bank, the smallest of the country’s three large banks. But the partial nationalization of Glitnir served to undermine confidence in the Icelandic banking system and the Icelandic state. The government and the banks had repeatedly claimed that all of the three main banks were liquid and solvent. The failure of Glitnir undermined confidence in the other two banks and in the government’s ability to assess the condition of its banks.
The immediate effect was to cause credit lines to be withdrawn from the two remaining banks. There was also a run on Landsbanki’s Icesave branches in the U.K. and the Netherlands. Both Kaupthing and Landsbanki had significant operations in the U.K., and U.K. and Icelandic authorities had been in discussion on how to solve the difficulties facing these two banks. The U.K. authorities used a clause in its antiterrorist laws to freeze the assets of Landsbanki in the U.K., which then triggered the bankruptcy of the remaining Icelandic bank, Kaupthing. Discussions were also held with other supervisors from EU countries in which Kaupthing was operating (Basel Committee, 2010).

In 2008, the Icelandic government had prepared emergency legislation granting it widespread powers to maintain the domestic operations of the banks. This legislation, which was passed by the Icelandic Parliament on October 6, 2008, created “new banks” from the ruins of the old ones to hold domestic deposits and loans. Meanwhile, the foreign operations were left in “old banks” which were put in administration and were on their way to formal bankruptcy. This has created legal issues having to do with equal treatment of domestic and foreign deposit holders. This has undermined the EU Deposit Insurance Directive, which requires equal treatment of domestic and foreign depositors of a bank, including its branches, but not its subsidiaries. After passing the legislation in early October, the Icelandic Financial Supervisory Authority (FME) took control of Landsbanki and Kaupthing, leaving the foreign supervisors and depositors in the cold. The FME also put Glitnir Bank into receivership after Iceland abandoned its decision to buy a stake in the bank.
The collapse of the three banks had a major impact on the Icelandic economy. But given the relatively limited size of these Icelandic banks, there was no impact on banking stability in Europe or beyond. Depositors in Iceland got preferential treatment, however, which rankled European supervisors.

The Icelandic crisis reveals how limitations on national resources and supervisory capacity can diminish the effective home country supervision and resolution. Effective cooperation between home and host country supervisors was absent. Notwithstanding EU legislation, Iceland protected only its domestic depositors.

**Lehman Brothers** was the fourth largest investment bank in the U.S. It was more than twice as large — and twice as complex — as Bear Stearns, which had agreed to a subsidized, shot-gun merger with JPMorgan Chase in March of 2008 after it became unable to meet calls for additional collateral. According to the Basel Committee on Banking Supervision, the Lehman Brothers Group consisted of 2,985 legal entities in 50 countries, and many of these entities were subject to host country national regulation as well as supervision by the U.S. Securities and Exchange Commission.55

In 2006 Lehman had made a deliberate decision to embark on an aggressive growth strategy and to take on greater risk by substantially increasing its leverage and making concentrated bets on commercial real estate, leveraged lending, and private-equity-like

55 This is an unusually clear example of the law of unintended consequences. The EU threatened to force the large American investment banks to form holding companies in Europe if they did not submit to consolidated supervision by a competent authority. Although it had no prior experience, the SEC somehow convinced the EU that it was a competent supervisory authority and the five largest investment banks became voluntary Consolidated Entities subject to Basel II capital rules. When they measured their required capital under Basel II the five CSEs discovered that they had considerable excess regulatory capital and quickly doubled their leverage, which was surely not what the EU intended.
investments. These undertakings were far riskier than many of its traditional lines of business because instead of simply brokering transactions, the firm would be holding substantial amounts of risk on its balance sheet. And these risks were financed largely by short-term repurchase agreements often totaling hundreds of billions of dollars per day. In the words of one Lehman employee, they had shifted from the “moving business” to the “storage business” (Valukas (2010, vol. 1, p. 44)). Lehman had, in essence, taken on the risk profile of a commercial bank without the benefit of the bank safety net. When the sub-prime crisis erupted, Lehman’s management saw it as an opportunity to double-down on their bets, and they consistently violated their declared risk appetite and risk limits to position themselves for a market rebound.\footnote{Lehman exceeded its risk limits by margins of 70% with regard to commercial real estate and 100% with regard to leveraged loans (Valukas, 2010, p. 50).}

In 2008, just after the demise of Bear Stearns, Lehman announced its first loss since going public in 1994, but the firm was able to raise $6 billion in new capital. Secretary of the Treasury Paulson, in a private communication to the CEO of Lehman, warned that this was not enough and that if Lehman were to announce a loss in the third quarter without having a buyer or a definitive survival plan in place, its existence was in jeopardy (Valukas, vol. 1, p.5). However, the Treasury Department did nothing to prepare for such an eventuality by seeking statutory power to intervene — even though it knew it lacked such power.

Lehman Brothers did not succeed in finding a merger partner or in developing a survival plan. Instead it resorted to window dressing its monthly and quarterly reports by arbitraging
accounting requirements\textsuperscript{57}, and it overstated its liquidity by including “comfort deposits” that it held with its clearing banks in order to continue clearing operations with them.\textsuperscript{58}

Over the weekend of September 12-14, 2008, U.S. authorities met with CEOs of leading financial institutions from around the world to try to broker a merger for Lehman, or at least raise a fund to subsidize a merger for the troubled firm (as had been done for Long Term Capital Management in 1998). At one point on Sunday afternoon, Federal officials believed they had struck a deal with Barclays Capital Management, which would be subsidized by many of Barclays’ competitors, but the U.K.’s Financial Services Authority refused to waive the shareholder approval rights required in the U.K.. Thus with no buyer and, the authorities claimed, no way of funding Lehman\textsuperscript{59}, the head of the SEC instructed Lehman’s board to file for bankruptcy before the opening of markets in Asia, when it would be unable to meet its cash obligations. On September 15, 2009, at 1:45 a.m. Lehman Brothers Holding Inc (LBHI) filed for protection under Chapter 11 of the bankruptcy act, becoming the largest bankruptcy in U.S. history.\textsuperscript{60}

In many respects it is surprising that so many market participants expressed surprise when Lehman failed. But much of the surprise had to do with a perceived change in U.S. policy that would let a sizable financial intermediary go under. Many market participants believed that if the authorities had managed to find $29 billion to arrange a merger for Bear Stearns, they would also be willing and able to advance at least $60 billion to save Lehman. It is clear that the

\textsuperscript{57} Valukas (2010) gives a full account of the so-called 105 repo transactions that could be reported as sales rather than borrowings.

\textsuperscript{58} By September 12, 2008, two days after it reported $41 billion in its liquidity pool it actually contained less than $2 billion of readily monetizable assets (Valukas, vol. 1, p. 10).

\textsuperscript{59} The authorities claimed that they lacked legal authority to make a direct investment in Lehman and that Lehman’s assets were insufficient to support a loan large enough to avoid collapse.

\textsuperscript{60} For an alternative scenario, based on the assumption that FDIC powers under Title II of the Dodd-Frank Act, see FDIC (2011).
market was not surprised that Lehman was insolvent and had been so at several times during the summer. The administrators of the Lehman bankruptcy in the U.S. have estimated that at least $75 billion has been wasted because of the complete lack of any preparation for bankruptcy (Cairns, 2009).

The action that the U.S. authorities took could be interpreted as implying that the collapse of Lehman was not systemically important. But the intensive negotiations they arranged over the weekend suggest otherwise. Moreover, they claimed to have simply lacked the statutory authority to do anything else.

While the U.S. authorities refused to support LBHI, the parent company, they did support Lehman Brothers Inc (LBI) the U.S. broker-dealer subsidiary for another five days until it could enter the Securities Investor Protection Act trusteeship on September 19 when its prime brokerage activities, asset management business and a substantial portion of its client’s assets and obligations were sold to Barclays Capital Inc and others. This removed one of the chief systemic concerns in the U.S. The other concern, Lehman’s leading role in the opaque OTC derivatives market, turned out not to be a problem. Most derivatives were promptly closed-out and netted under ISDA Swap Agreements. Although counterparties were not necessarily happy with the prices they received, there were no knock-on effects attributable to the unwinding of the derivatives book.

The only domestic impact that could be labeled systemic was due to a “moral hazard” play by managers of the $62 billion Reserve Primary Fund, a wholesale money market fund that was forced to “break the buck” because of its outsized holdings of Lehman’s commercial paper
(which yielded a return sharply higher than its rating would warrant). News that the oldest money market mutual funds had seen the net asset value of its shares fall below a dollar started a run on other money market mutual funds, which led to dumping corporate commercial paper on the market to meet the demand for withdrawals.

The collapse of prices in the secondary market caused the primary market for commercial paper to shut down. Commercial paper is the primary mode of finance for much of corporate America and so the Treasury hastily provided insurance for money market mutual funds. (And to maintain parity, the Emergency Economic Stabilization Act temporarily increased the deposit insurance ceiling from $100,000 to $250,000).

Still many observers interpreted this as a successful application of bankruptcy rules to a large, complex financial institution (Ayotte and Skeel (2009) are a particularly good example). Apart from the unanticipated spillover to the wholesale money market and knock on effect on the commercial paper market, the U.S. had shown that the economy could function perfectly well without Lehman Brothers.

This relatively orderly outcome in the U.S. was in stark contrast to the chaos created abroad. The immediacy of the impact was in large part due to the highly integrated structure of the Lehman Group. Like many other global financial firms, Lehman managed substantially all of the cash resources centrally at the holding company. Since LBHI declared bankruptcy before cash could be swept out again to the subsidiaries, these subsidiaries found themselves suddenly illiquid and unable to continue operation. Bankruptcy proceedings were initiated in a variety of
jurisdictions including Australia, Japan, Korea, and the U.K.61 Because London was Lehman’s largest center of activity outside the United States, many of the problems showed up most vividly there.

The London subsidiaries, including Lehman Brothers International Europe, its largest broker/dealer in Europe, filed for bankruptcy and turned to PriceWaterhouseCoopers (PwC) for administration. Because there is no provision under British law for DIP (debtor in possession) financing, the administrators had to struggle to find money to maintain basic functions, including even the employee cafeteria. PwC was confronted with 43,000 trades that were still “live” and would need to be negotiated separately with each of the counterparties.

The integration of the group was such that a trade performed by one affiliate could be booked in another, without the client necessarily being aware that the location of the asset had shifted. Record keeping fell into disarray when LBHI filed for bankruptcy. At the time of filing, Lehman maintained a patchwork of over 2,600 software systems applications, many of which were outdated or arcane. These systems were highly interdependent, but difficult to decipher and not well documented. Moreover, most systems covering trading, valuation, financial accounting and other activities had been transferred to Barclays in the sale, and Barclays had integrated its own proprietary and confidential data into some of the systems.62 Thus many non-U.S. affiliates experienced enormous difficulties even in determining what their balance sheets were and who owed what to whom.

61 Some Lehman Brothers entities did not file for bankruptcy, however. For example, the Lehman Brothers bankruptcy estate operates a bank, today known as Aurora Bank FSB, which employs 1,700 people servicing over $100 billion in mortgages (Summe, 2010, p. 65)
62 In addition, the technology supporting the prime brokerage business was inadvertently sold to Nomura in the U.K., rather than Barclays, which acquired that U.S. business.
Although arrangements were ultimately negotiated with Barclays for access to some essential information, it was almost impossible to salvage much going concern value out of the rest of the group (with the exception of the sale of the foreign equity business to Nomura by PwC). In London, where much of the prime brokerage business had shifted, it was permissible to mingle client funds with the firm’s own funds, so several hedge funds suddenly became illiquid.

The fragmented data system impeded the salvaging of going-concern value from the remainder of the Lehman Group because different parts of a line of business lodged in different subsidiaries in various parts of the world had no way of reintegrating their line of business even if that business had been viable.

It is clear that significant value was destroyed by the lack of cooperation in the unwinding of the Lehman Group which may continue for a decade. The systemic impact of the bankruptcy of Lehman Brothers is difficult to sort out because it occurred amid a number of different shocks to the system. It took place, for example, just after Fannie Mae and Freddie Mac entered conservatorship, protecting all creditors and counterparties, but causing losses to both common and preferred shareholders. And Lehman fell just before the bailout of AIG two days later. The Dow Jones Industrial Average fell 150 points the day Lehman declared bankruptcy, but a considerable part of this may have been due to the apparent change in the rules of regulatory intervention. The explanations offered by Federal officials as to why they protected creditors and counterparties of Bear Stearns but not those of Lehman Brothers were neither consistent nor convincing. The run on money market funds and, subsequently, the
collapse of the commercial paper market were a direct result of the collapse of the value of Lehman commercial paper.

In many ways, the Lehman bankruptcy was unnecessarily disruptive. The firm was badly supervised and regulated, and benefited from widespread expectations (that turned out to be false) that its creditors and counterparties would be protected if worse came to worst. The U.S. acted unilaterally, providing liquidity for an orderly resolution for the U.S. broker/dealer arm of Lehman through a merger with Barclays Capital, but there was no cooperation offered in unwinding the Lehman subsidiaries in 49 other countries, including, most notably, the major operations in the U.K.

This lack of cooperation was by no means limited to the U.S. In no case above, despite the numerous Memoranda of Understanding pledging the sharing of information, did the primary supervisor share information in advance of the collapse with their colleagues in other countries. This undoubtedly reflects many of the same concerns we noted above within a country. The lead regulator is inclined to withhold bad information until the last possible moment because they fear losing discretion to deal with the problem and may be concerned that the leakage of bad news may set off a run.

8. The Challenges in Resolving Cross-Border SIFIs

Despite the long, troubling history of problems in resolving cross-border financial institutions, apart from the joint public sector/private sector initiative to fix the Herstatt
problem (stemming from differences in the timing of clearing and settlement practices across countries), no real progress has been made. That solution took nearly 30 years of effort, but proved resilient even during the most recent crisis. It involved increasing loss buffers in the U.S. Clearing House Interbank Payments System, the extension of clearing and settlement hours by several major central banks and, finally, the launch by the private sector of the Continuously Linked Settlement Bank that permits instantaneous clearing and settlement of foreign exchange transactions for major currencies.

The fact that such a small bank caused such a large problem that took three decades to fix, along with the international chaos that followed the Lehman bankruptcy suggests that it would be unwise to count on inspired supervisory innovations in the midst of a crisis to protect the world financial system.63

But despite the Group of Twenty (2009) Agreement on high level principles, we still lack a consensus, much less an implementable plan for resolving cross-border financial institutions. The Financial Stability Board (FSB) has been charged with producing such a plan and has formed a Cross-Border Resolution Group to focus on the issues, but despite considerable expertise and effort, the FSB was unable to meet the deadline set by the Group of Twenty. This suggests that a global solution is not likely in the near term.

63 See Cohen (2011) for an extended discussion of this point. The observation of Ernie Patrikis, former general counsel of the Federal Reserve Bank of New York, still rings true, “When faced with the prospect of bankruptcy at a multinational bank, it is the solemn duty of each bank supervisor to do all that can possibly be done to ensure that the adverse financial effects fall on no customer or counterparty of the bank. But failing that, they should fall in another jurisdiction.”
The experience of the European Union (EU), a relatively homogeneous group of countries, gives particularly clear insights into the problems that must be surmounted. Despite decades of pressure from the European Commission and the IMF, the members of the EU have not agreed about how to handle cross-border banking crises within the EU. Indeed, in the Fortis case, we saw that three of the most closely related countries failed to reach a cooperative solution with regard to a bank that was systemic in each county. Underlying the failures to achieve cooperation are differences in: supervisory objectives (see Table 5), access to information for prudential supervision (see Table 6), supervisory accountability (see Table 7), the remedial power of supervisors as an institution’s situation deteriorates (see Table 8), responsibilities in bankruptcy (see Table 9), deposit insurance schemes (see Table 10) and cooperation among the supervisory function, the deposit insurance function, and the crisis resolution function (Table 11).

Table 12 shows the actions taken by a broad range of deposit insurers during the crisis (and implicitly the difficulties a number of countries have had in rolling back the temporary increases in coverage). Table 13 shows these coverage levels as a percentage of GDP per capita, which indicates that in most countries coverage at such levels cannot be credibly maintained. Finally, Table 14 shows the variety of subsidies several leading countries deployed during the crisis. Virtually all of these differences would need to be harmonized to some extent to develop a reliable cross-border resolution mechanism. Moreover, even if the current EU effort to harmonize crisis resolution tools succeeds, it will only apply within the EU even though most of the largest EU banks have very significant holdings outside the EU.
Given that it is so difficult to harmonize resolution procedures, it is wise to attempt to minimize the number of failures or at least intervene before insolvencies become large because the larger the insolvency, the larger the losses to be allocated and the more difficult the resolution. Thus the Basel Committee deserves praise for attempting to raise the level and quality of regulatory capital. Many experts regard these moves to be much too timid, however, to have a substantial impact on reducing the probability of default (Admati, DeMarzo, Hellwig, and Pfleiderer (2011) and Miles, Yan, and Marcheggiano (2011)). The Basel Committee has also proposed that to count as regulatory capital, any such instruments must be capable of being converted into equity before official intervention. The Danes have already implemented bail-in rules and used them in the resolution of Amagerbanken imposing haircuts on senior creditors for the first time in modern European history (Alloway 2011).

Calomiris and Herring (2011) have developed an alternative proposal for convertible debt that emphasizes incentive effects rather than the ability to absorb loss or a signaling effect. Contingent capital (CoCo) alongside common equity would be a more effective prudential tool and less costly than a pure common equity requirement. CoCos can create strong incentives for the prompt recapitalization of banks after significant losses of equity, but before the bank has run out of options to access the equity market. The dynamic incentive feature of a properly designed CoCo requirement would encourage effective risk governance by banks, provide a more effective solution to the “too-big-to-fail” problem, reduce forbearance risk and address uncertainty about the appropriate amount of capital banks need to hold that may well change over time. The proposal requires that a large amount of CoCos be issued (relative to common equity), CoCo conversion should be based on a market value trigger
defined using a moving average of “quasi market value of equity ratio”, all CoCos should convert if the conversion is triggered, and the conversion ration should be dilutive of preexisting equity holders.

It is also important to focus on policies that are likely to limit the spillovers or at least bring greater transparency to paths of contagion that worry policymakers so much that they organize bailouts. A well-executed rapid resolution plan will go a long way in this direction, particularly if it succeeds in identifying and insulating the systemically important components of each SIFI so that they can be continued even if the SIFI fails. In addition, efforts to simplify the corporate and operational structure of SIFIs are critical. The regulators should have powers to ensure that no SIFI is too complex to fail. Their will to do so, however, seems open to question. And the regular meetings of regulatory colleges or crisis management groups that have been designated for the largest banks may provide a forum for additional cooperative behavior. At a minimum it should enable each country to anticipate what other countries are likely to do in the event of a crisis.

Another strong motivation for the authorities to provide bailouts is that insolvency may set off the close-out netting provisions in qualified financial contracts (QFCs). This is ironic because, as we saw in the Barings case, the original intent was to prevent systemic risk by enabling holders of QFCs to escape the bankruptcy queue so that their ability to hedge and conduct transactions would not be impeded. This proved to be a mixed blessing as we saw with regard to LTCM. William McDonough, former President of the Federal Reserve of New York,

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64 Hüpkes (2004) has long emphasized this point and so it is reassuring that she is part of the leadership team at the FSB.
testified at the Committee on Banking and Financial services that the government’s participation in the resolution of LTCM was motivated in part by the potential “rush of Long-Term Capital’s counterparties to close-out their positions, other market participants – investors who had no dealings with Long-Term Capital—would have been affected as well.” Nonetheless, when Congress revised the bankruptcy law in 2005 it expanded the scope of QFCs to include not just commodity and forward contracts, but also repurchase agreements, cross-netting provisions, credit swaps, interest rate swaps, and margin loans among other arrangements (Krimminger 2006). The result was that fear that close-out netting would be invoked motivated the Fed to undertake an extraordinary bailout of AIG, an entity over which they had no regulatory control.

The problem (clearly articulated by Edwards and Morrison (2004)) was that illiquid assets might well serve as collateral for repos and other sorts of swaps and many of the counterparties such as money market mutual funds or institutions hedging other positions would be obliged to sell the illiquid collateral quickly, driving down prices sharply. So by protecting QFCs from the resolution process, the government created a new problem – the prospect of a death spiral in the prices of illiquid securities. One solution to this problem has been suggested by Jackson and Skeel (2011) and Archarya et al (2010). The idea would be to distinguish between contracts that are collateralized by money market instruments, which would continue to be treated as QFCs, and contracts secured by less liquid assets, which would be subject to the stays in the resolution process. This approach would accomplish two objectives. First, it would avoid a downward illiquidity spiral in the event government intervention is necessary. Second, it would eliminate a degree of regulatory arbitrage that
takes place when a regulated institution repos an illiquid asset to a counterparty who cannot hold it thus reducing the capital required to hold such assets. This will not be an easy reform to accomplish, however, because ISDA has been highly successful in extending the scope of protection for QFCs in the law of many countries.

Similarly the Basel Committee seems intent on driving as many derivatives transactions as possible onto exchanges or clearing houses. Of course, in a sense this simply shifts the problem to a new locus, but it will be more transparent and these crucial nodes in the international financial system will need to be designated as SIFIs and carefully monitored. We have had some experience, however, in making clearing houses and exchanges virtually failure proof.65

Other experts have suggested bolder solutions. Huertas (2011), for example, has suggested the development of a sunshine bank structure modeled roughly after the securitization SPVs. Formal equity in the sunshine bank would be nominal, held by a trustee and not subject to first loss. The government in the jurisdiction in which the sunshine bank is headquartered appoints the trustee. The sunshine bank will have a full range of powers to conduct normal banking activities including trading. It could expand internationally, but only through branches.

Huertas (2011) notes that “The liability structure of the sunshine bank would follow a waterfall, similar to securitizations.” Deposits would be senior, then debt, the subordinated debt ... and finally a stub. The sunshine bank is fundamentally a collateralized deposit-taking

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65 Recall, for example, the efforts to make the Clearing House Interbank Payment System capable of surviving the simultaneous failure of its ten largest participants.
institution. The stub would be a perpetual, payment in kind (PIK), debt instrument, where the PIK is the residual income of the bank. The stub investor may be another corporation, authorized by the authorities to run the bank, but not another bank.

The sunshine bank would have to meet higher capital and liquidity requirements than ordinary banks and the stub investor must commit to buy any asset in the sunshine bank’s trading book that has not traded in the last ten days at the value assigned by the sunshine bank. The stub investor must also commit to assume a loan (or other non-marketable asset) at par as soon as the asset becomes impaired. Distributions to the stub investor would be permissible only if the sunshine bank exceeded minimum capital and liquidity requirements. Only the sunshine bank will be subject to supervision, not the stub investor.

If the stub investor fails to maintain capital and liquidity minimums in the sunshine bank, the trustee will revoke the license and delegate control rights to the resolution authority who will resolve the sunshine bank and all of its branches worldwide without compensation to the stub investor. (The stub investor, however, will continue to be obliged to buy impaired assets on demand.) Upon intervention, the resolution authority can impose a stay on payments of interest and principal on the mezzanine and senior debt, but deposits and other senior obligations will continue to be paid at maturity. Intervention shall not be deemed an event of default for derivative contracts and counterparties shall not be entitled to close out derivative contracts unless the sunshine bank defaults on a derivative contract. This structure will make the sunshine bank less likely to fail and safe to fail. The structure is designed to ensure
resolvability. In contrast, if the stub investor fails, it will be resolved by normal bankruptcy procedures. The public interest is in the sunshine bank, not the stub investor.

At the opposite end of the spectrum, some reformers have suggested that banks be required to operate entirely through subsidiaries. In the extreme case, the group could share only a brand. Subsidiaries would be banned from sharing funding structures. In effect, this means that each unit would have to improve its capital and liquidity position, get an independent credit rating and build a history as an independent issuer. Less radical variations would permit some interbank lending within the group, but still create a firebreak between each unit that would protect the group as a whole in the event of a crisis. Some critics assert that it would be difficult for a group to cut off a troubled subsidiary for political and reputational reasons. But others note that if countries will tend to ring-fence the operations they can control, we are in effect operating in a world of de facto subsidiarization while pretending to do otherwise. Indeed, if ring-fencing is the norm in cross-border insolvencies, the entire Basel approach to regulation and supervision needs to be reconsidered. If excess capital or liquidity in one country cannot be transferred to an affiliate (or parent) in another country in times of stress, the logical basis for consolidated regulation and supervision – the very cornerstone of the Basel approach – is open to question.

Yet there are some signs of convergence, at least with regard to resolution tools. At this point in addition to the U.S., Canada, Japan, Korea, and Taiwan, the U.K. and Germany have adopted some sort of variant of the bridge bank approach. Many of these countries had relied on a judicial process and found it easier to introduce new bridge bank regimes than to change
fundamental bankruptcy law to accommodate the special problems of international financial institutions. The U.S. is in an awkward position to lead further harmonization efforts, however, because it has a policy of discriminating against foreign creditors in two important regards: the depositor preference law which places all U.S. depositors ahead of all foreign depositors in the bankruptcy queue and the separate entity approach to liquidating branches of foreign banks in which all U.S. creditors must be paid before assets can be handed over to the foreign parent for distribution to other creditors.

Despite the lack of an implementable, concrete plan to deal with cross-border insolvencies, the Cross-Border Resolution Group of the Financial Stability Board (2011) has produced a number of recommendations for future progress in minimizing disorderly cross-border insolvencies. Among the most important of these are:

- Effective national resolution powers
- Framework for a coordinated resolution of financial groups
- Convergence of national resolution measures
- Mutual recognition of crisis management and resolution proceedings and/or measures
- Reduction of the complexity and interconnectedness of group structures and operations
- Planning in advance for orderly resolution
- Cross-border operation and information sharing
- Strengthening risk mitigation mechanisms
• Transfer of contractual relationships to other sound institutions or bridge banks

• Clear options for exit from public intervention.

These recommendations are all sensible and would, in fact, improve the stability of the international financial system if enacted. But in this area the difficulties are in the details. Although the FSB is accountable to the Group of 20, which certainly better reflects the allocation of economic and financial power than the Group of 7, it is much too large and diverse to make much progress on such a complex agenda. While a multilateral solution is desirable in the long run, it may be much easier to get there through bi-lateral negotiations between a pair of countries that have already achieved a degree of convergence in their approach to resolution and which are important international financial centers. In contrast to past banking crises, it is just possible that we have learned some important lessons from the most recent crisis, although the tuition was much too high.
References


Acharya, V., B. Adler, M. Richardson, and N. Roubini, 2010, “Resolution Authority,” Chapter 8 in ________________.


Note – this site is down, hopefully temporarily


King, Mervyn, 2009, “Speech Delivered at the Lord Mayor’s Banquet for Bankers and Merchants of the City of London at the Mansion House,” 17 June.


Figure 1

Government Intervention to Support the Banking System Equivalent to 25% of World GDP

<table>
<thead>
<tr>
<th>($ Trillions)</th>
<th>UK</th>
<th>US</th>
<th>Euro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Bank</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- “Money creation”</td>
<td>0.32</td>
<td>3.76</td>
<td>0.98</td>
</tr>
<tr>
<td>- Collateral swaps</td>
<td>0.30</td>
<td>0.20</td>
<td>0.00</td>
</tr>
<tr>
<td>Government</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Guarantees</td>
<td>0.64</td>
<td>2.08</td>
<td>&gt;1.68</td>
</tr>
<tr>
<td>- Insurance</td>
<td>0.33</td>
<td>3.74</td>
<td>0.00</td>
</tr>
<tr>
<td>- Capital</td>
<td>0.12</td>
<td>0.70</td>
<td>0.31</td>
</tr>
<tr>
<td>Total (% GDP)</td>
<td>74%</td>
<td>73%</td>
<td>18%</td>
</tr>
</tbody>
</table>


Notes: (1) Exchange rates used: FSR Euro / US dollar exchange rate of 0.710. Sterling / US dollar exchange rate of 0.613. (2) Money creation includes both monetary and financial stability operations.

Source: Haldane (2009)
Figure 2

Share of countries in banking crisis: 1800-2008
High income vs. Middle and Low income

Source: Qian, Reinhart and Rogoff (20110)
Figure 3

Initiation of Resolution Process

Diagnosis & Triage:
Examination & Statistical Evaluation

Problem FI
Non-Problem FI

Probable Insolvent FI
Weak FI

Viable FI
Non-Viable FI

Forbearance (Open FI: Assistance with Existing Management)
Assisted Merger with Healthy FI
Nationalization
Bridge FI (Temporary Regulatory Control)
Judicial Restructuring
Liquidation
Table 4
Summary of Trade-offs Among Resolution Approaches

<table>
<thead>
<tr>
<th>Resolution Approach</th>
<th>Forbearance (Open Bank Assistance with Existing Management)</th>
<th>Subsidized Merger</th>
<th>Nationalization</th>
<th>Bridge Bank with Bad Bank Receivership</th>
<th>Judicial Restructuring Proceedings</th>
<th>Liquidation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex post efficient outcomes</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>?</td>
<td>X</td>
</tr>
<tr>
<td>Ex ante efficient outcomes</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>✓</td>
<td>?</td>
<td>✓</td>
</tr>
<tr>
<td>Maintenance of absolute priority of claims</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>?</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Limit costs of systemic spillovers</td>
<td>✓ in short run</td>
<td>✓ in long run</td>
<td>✓ in short run</td>
<td>X in long run</td>
<td>✓</td>
<td>?</td>
</tr>
<tr>
<td>Protect taxpayers from costs of bailouts</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Quick, predictable results</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

✓ = performs relatively well against criterion
X = performs relatively poorly against criterion
? = uncertain
na = not applicable
Table 5
**Supervisory Objectives**
(Numbers indicate the Number of EU Countries that has each objective)

<table>
<thead>
<tr>
<th>Objective</th>
<th>Number of Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure Compliance with Relevant Laws and Regulations</td>
<td>17</td>
</tr>
<tr>
<td>Promote Financial Stability</td>
<td>18</td>
</tr>
<tr>
<td>Achieve the Orderly and Safe Functioning of the Financial System</td>
<td>13</td>
</tr>
<tr>
<td>Promote Confidence in the Banking System</td>
<td>6</td>
</tr>
<tr>
<td>Encourage Efficiency in the Banking System</td>
<td>9</td>
</tr>
<tr>
<td>Promote Banks' Ability to Compete</td>
<td>2</td>
</tr>
<tr>
<td>Protect Consumers and or Depositors</td>
<td>15</td>
</tr>
<tr>
<td>No Information</td>
<td>1</td>
</tr>
</tbody>
</table>


Table 6
**Access to Information for Prudential Supervision**
(Measured in number of EU countries)

<table>
<thead>
<tr>
<th>Reports Information</th>
<th>Adequate</th>
<th>Not Adequate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Countries</strong></td>
<td>25</td>
<td>2</td>
</tr>
<tr>
<td><strong>Onsite Inspections</strong></td>
<td>Annual</td>
<td>Every 2 Years</td>
</tr>
<tr>
<td><strong>Number of Countries</strong></td>
<td>13</td>
<td>11</td>
</tr>
</tbody>
</table>


Table 7
Supervisory Accountability
(Number of EU Countries)

<table>
<thead>
<tr>
<th>Independence</th>
<th>Is Operationally Independent</th>
<th>Shares Responsibility with the Government</th>
<th>Consults the Government</th>
<th>Is Partly Independent</th>
<th>Is Not Independent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Countries</td>
<td>11</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Style of Supervision</td>
<td>Takes a Gradual Approach</td>
<td>Requires a High Burden of Proof</td>
<td>Needs to Consult Government</td>
<td>Relies on Moral Suasion</td>
<td>Required to Delay Action</td>
</tr>
<tr>
<td>Number of Countries</td>
<td>4</td>
<td>2</td>
<td>9</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Right of Appeal</td>
<td>Supervisory Hearing</td>
<td>Ministerial/Independent Review</td>
<td>To a Court</td>
<td>Court Can Compensate Not Reverse</td>
<td>3rd Party Can Contest in Court</td>
</tr>
<tr>
<td>Number of Countries</td>
<td>11</td>
<td>8</td>
<td>27*</td>
<td>5</td>
<td>10**</td>
</tr>
</tbody>
</table>


Notes: * The court is a special administrative court in 10 of these countries.
** There was a right of appeal for 3rd parties in Germany and Luxembourg, but it is not clear that it still exists after legislative changes.

Source: Garcia et al (2009, p. 5)
### Table 8
Remedial Powers of Supervisors in a Deteriorating Situation

<table>
<thead>
<tr>
<th>Power/Measure</th>
<th>The Supervisor Can</th>
<th>Needs Government or Court Approval</th>
<th>The Supervisor Does Not</th>
<th>No Information Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issue Cease and Desist Orders</td>
<td>27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Levy Fines and/or Penalties</td>
<td>24 (fines are inconsequential in 3)</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Remove Managers</td>
<td>21</td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Demand stricter capital requirements</td>
<td>25</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Require a Remedial Plan</td>
<td>24</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Appoint a Special Inspector</td>
<td>20</td>
<td></td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Prevent Asset Transfers</td>
<td>27*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power to Require Shareholders to Support the Institution if Needed with Cash</td>
<td>15</td>
<td>1</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Impose Conditions on License</td>
<td>22</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Restrict Activities/Lending</td>
<td>25</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Restrict, Place Conditions on Business</td>
<td>27 (4 only when a breach of legal provisions occurs)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restrict Voting Rights</td>
<td>22</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Initiate Reorganization / Winding Up</td>
<td>18</td>
<td>1</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Appoint Conservator</td>
<td>14</td>
<td>6</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Revoke the License</td>
<td>23</td>
<td>8</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>


* In some countries, it is ultimately the judicial authorities who decide whether a transaction is detrimental or not to a credit institution.


Table 9
Responsibilities in Bankruptcy
(Number of EU Countries)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Supervisor</th>
<th>Government</th>
<th>Court</th>
<th>Creditors</th>
<th>Not Known</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can Impose a Moratorium</td>
<td>11 (6 directly, 1 with government approval(^1), and 4 with court approval)</td>
<td>5 (on the recommendation of the supervisor)</td>
<td>5</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Can Suspend Payments</td>
<td>15 (11 directly, 2 with government approval(^1) and 2 with court approval)</td>
<td></td>
<td>1</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>Revokes the License</td>
<td>19 (7 need approval from the government and 5 need approval from the court)</td>
<td>5 (as recommended by the supervisor)</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Can File for CI Bankruptcy(^2)</td>
<td>15 (1 needs government approval(^1))</td>
<td></td>
<td>0</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Can Close the CI</td>
<td>7 (1 needs government approval(^1))</td>
<td></td>
<td>0</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>Can Appoint Liquidator</td>
<td>12 (2 need government approval(^1))</td>
<td>1 (supervisor recommends)</td>
<td>22</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>


Notes: \(^1\) Government approval comes usually from the ministry of finance or the ministry of the economy.

\(^2\) May sum to more than 27 because some countries give two bodies the authority to act.
Table 10

|----------------------------------|----------------------------------------------------------------------------------|

<table>
<thead>
<tr>
<th>Coverage Before September 2008</th>
<th>£20,000 or less (^2)</th>
<th>To £50,000</th>
<th>£50,000 to £100,000</th>
<th>Over £100,000</th>
<th>Has Coinurance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Countries</td>
<td>14</td>
<td>11</td>
<td>1</td>
<td>1</td>
<td>12 (^3)</td>
</tr>
<tr>
<td>Excludes (^4)</td>
<td>Deposit in Non-Member Currencies</td>
<td>High-Rate or Prejudicial Deposits</td>
<td>Govt. Deposits</td>
<td>Insider Deposits</td>
<td>Offsets Loans against Deposits</td>
</tr>
<tr>
<td>Countries</td>
<td>7</td>
<td>18</td>
<td>22</td>
<td>24</td>
<td>22</td>
</tr>
<tr>
<td>Payout</td>
<td>Depositors File Claim</td>
<td>1 - 3 Months</td>
<td>3 months + Extensions</td>
<td>One year or More</td>
<td></td>
</tr>
<tr>
<td>Countries</td>
<td>9</td>
<td>4</td>
<td>21</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Funding</td>
<td>Ex Ante / Mixed</td>
<td>Ex Post</td>
<td>State Back-up</td>
<td>Depositors Have Priority</td>
<td></td>
</tr>
<tr>
<td>Countries</td>
<td>16/5</td>
<td>6</td>
<td>13</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Finances</td>
<td>Has Target</td>
<td>Eligible - Deposit Base</td>
<td>Covered - Deposit Base</td>
<td>Risk-Bases Premiums</td>
<td></td>
</tr>
<tr>
<td>Countries</td>
<td>11</td>
<td>17</td>
<td>6</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Regular Premiums</td>
<td>&lt;=0.1</td>
<td>&lt;=0.2</td>
<td>&lt;=0.5</td>
<td>&gt;0.5</td>
<td></td>
</tr>
<tr>
<td>Countries</td>
<td>11</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Additional Funds</td>
<td>Extra Levies Permitted</td>
<td>Levies Not Permitted</td>
<td>Unlimited Borrowing</td>
<td>Limited Borrowing</td>
<td>No Borrowing</td>
</tr>
<tr>
<td>Countries</td>
<td>18</td>
<td>5</td>
<td>15</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>% Coverage Ratio(^5)</td>
<td>&gt;=1.0%</td>
<td>0.5 &lt;=1.0%</td>
<td>0.25&lt;=0.5%</td>
<td>0&lt;=0.25%</td>
<td>&lt;0</td>
</tr>
<tr>
<td>Countries</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Robustness Indicator(^6)</td>
<td>&gt;=80%</td>
<td>&gt;=60%</td>
<td>&gt;=40%</td>
<td>&lt;40%</td>
<td>Don’t Know</td>
</tr>
<tr>
<td>Countries</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Investments</td>
<td>EU Securities</td>
<td>Central Bank</td>
<td>Bank Securities</td>
<td>Other</td>
<td>Don’t Know</td>
</tr>
<tr>
<td>Countries</td>
<td>15</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Authority</td>
<td>Narrow: Pay-Box</td>
<td>Can Intervene</td>
<td>Can Cancel Insurance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Countries</td>
<td>19</td>
<td>10 (^7)</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DGS Actions since 1994</td>
<td>Has Made Payouts</td>
<td>Has Made No Payouts</td>
<td>Has Intervened</td>
<td>Has Not Intervened</td>
<td>Don’t Know</td>
</tr>
<tr>
<td>Countries</td>
<td>17</td>
<td>8</td>
<td>3</td>
<td>22</td>
<td>2</td>
</tr>
<tr>
<td>Administration</td>
<td>Government</td>
<td>Joint</td>
<td>Private</td>
<td>Separate Legal Entity</td>
<td>Not Separate Legal Entity</td>
</tr>
<tr>
<td>Countries</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>23</td>
<td>4</td>
</tr>
<tr>
<td>Board Composition</td>
<td>All Public</td>
<td>Mixed</td>
<td>All Private</td>
<td>Don’t Know</td>
<td></td>
</tr>
<tr>
<td>Countries</td>
<td>9</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: Cariboni et al. (2008), EU Commission (2007, 2008c), and Garcia (200).

Notes: 1Some countries have separate schemes for savings and cooperative institutions, but the data here refers only to schemes for commercial and universal banks. Germany has two schemes for banks, one public and one private. Hence the members sometimes sum to 28 rather than 27.
2Some central and eastern European countries have been allowed a grace period before meeting the €20,000 minimum coverage. 3Nine countries apply a haircut to all insured deposits: three apply it only above the minimum coverage level. 4The EU deposit insurance directive requires excluding from coverage deposits from credit institutions and those arising from money laundering. 5Percentage ratio of the size of the DGS fund to the total value of deposits eligible for insurance. 6Percentage ratio of the number of member banks whose deposits the fund could pay out (with limited borrowing) to the total number of banks.
Table 11
Cooperation among Supervision, Deposit Insurance and Crisis Resolution

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope</td>
<td>Branches and subsidiaries</td>
<td>Branches</td>
<td>Branches</td>
</tr>
<tr>
<td>Coordination of regulators</td>
<td>&quot;Colleges&quot; (home and host country supervisors)</td>
<td>No &quot;colleges&quot;. Resolution authorities act independently from each other and from supervisors. Implicit via principles of unity, universality and single entity (applies only to branches).</td>
<td>No &quot;colleges&quot;. Deposit insurers act independently from each other and from resolution authorities.</td>
</tr>
<tr>
<td>Information sharing</td>
<td>Information sharing within colleges is subject to minimum requirements, including formats.</td>
<td>Bilateral obligation to inform to Member States' prudential supervisors of branches, but is not specific about time, format and means.</td>
<td>No obligation to share information, but there is a need to inform depositors.</td>
</tr>
<tr>
<td>Time of Intervention</td>
<td>Defines minimum regulatory capital. (But Pillar 2 lacks a definition of &quot;triggers&quot;.)</td>
<td>There is no threshold for the initiation of bank of bank insolvency proceedings.</td>
<td>Compensation is to be paid when a deposit becomes &quot;unavailable&quot;.</td>
</tr>
<tr>
<td>Coordination of regulatory action</td>
<td>Lack of convergence of supervisory powers and disciplinary actions.</td>
<td>Differences on the definitions: which authority is responsible and the grounds for initiation.</td>
<td>Minimal convergence. There is no requirement for coordination.</td>
</tr>
</tbody>
</table>

Source: IMF, 2009

Table 12
Actions Taken to Increase Deposit Insurance during the Crisis
(based on initial actions taken)

<table>
<thead>
<tr>
<th>Full Depositor Guarantee</th>
<th>Deposit Insurance Coverage Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Permanent</td>
</tr>
<tr>
<td>Austria 6/</td>
<td>Albania</td>
</tr>
<tr>
<td>Denmark</td>
<td>Belgium</td>
</tr>
<tr>
<td>Germany 1/</td>
<td>Bulgaria</td>
</tr>
<tr>
<td>Greece 1/</td>
<td>Croatia</td>
</tr>
<tr>
<td>Hong Kong, SAR</td>
<td>Cyprus</td>
</tr>
<tr>
<td>Hungary 1/</td>
<td>Czech Republic</td>
</tr>
<tr>
<td>Iceland 1/</td>
<td>Estonia</td>
</tr>
<tr>
<td>Ireland 2/</td>
<td>Finland</td>
</tr>
<tr>
<td>Jordan</td>
<td>Indonesia</td>
</tr>
<tr>
<td>Kuwait</td>
<td>Kazakhstan</td>
</tr>
<tr>
<td>Malaysia</td>
<td>Latvia</td>
</tr>
<tr>
<td>Montenegro 5/</td>
<td>Lithuania</td>
</tr>
<tr>
<td>Mongolia</td>
<td>Luxembourg</td>
</tr>
<tr>
<td>Portugal 1/</td>
<td>Malta</td>
</tr>
<tr>
<td>Singapore 1/</td>
<td>Philippines</td>
</tr>
<tr>
<td>Slovakia</td>
<td>Poland</td>
</tr>
<tr>
<td>Slovenia</td>
<td>Romania</td>
</tr>
<tr>
<td>Thailand 3/</td>
<td>Russia</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>Serbia 5/</td>
</tr>
<tr>
<td></td>
<td>Spain</td>
</tr>
<tr>
<td></td>
<td>Sweden</td>
</tr>
<tr>
<td></td>
<td>United Kingdom</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Full depositor guarantee consists of guarantees covering all deposits or the majority of all deposits in the banking system. In the case of Italy, no actual coverage increase has occurred; however, Law N.190 passed in December 2008 as a result of the international crisis, gives the minister for economy and finance

Source: Report to the Financial Stability Board, by the Staffs of the International Association of Deposit Insurers and the International Monetary Fund, June 2010
## Table 13
Coverage Levels and Ratios Relative to GDP/Capita

<table>
<thead>
<tr>
<th>Full Depositor Guarantees</th>
<th>Deposit Insurance Coverage Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria 6/</td>
<td>Albania</td>
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<tr>
<td>Denmark</td>
<td>Belgium</td>
</tr>
<tr>
<td>Germany 1/</td>
<td>Bulgaria</td>
</tr>
<tr>
<td>Greece 1/</td>
<td>Croatia</td>
</tr>
<tr>
<td>Hong Kong, SAR</td>
<td>Cyprus</td>
</tr>
<tr>
<td>Hungary 1/</td>
<td>Czech Republic</td>
</tr>
<tr>
<td>Iceland 1/</td>
<td>Estonia</td>
</tr>
<tr>
<td>Ireland 2/</td>
<td>Finland</td>
</tr>
<tr>
<td>Jordan</td>
<td>Indonesia</td>
</tr>
<tr>
<td>Kuwait</td>
<td>Kazakhstan</td>
</tr>
<tr>
<td>Malaysia</td>
<td>Latvia</td>
</tr>
<tr>
<td>Montenegro 5/</td>
<td>Lithuania</td>
</tr>
<tr>
<td>Mongolia</td>
<td>Luxembourg</td>
</tr>
<tr>
<td>Portugal 1/</td>
<td>Malta</td>
</tr>
<tr>
<td>Singapore 1/</td>
<td>Philippines</td>
</tr>
<tr>
<td>Slovakia</td>
<td>Poland</td>
</tr>
<tr>
<td>Slovenia</td>
<td>Romania</td>
</tr>
<tr>
<td>Thailand 3/</td>
<td>Russia</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>Serbia 5/</td>
</tr>
<tr>
<td></td>
<td>Spain</td>
</tr>
<tr>
<td></td>
<td>Sweden</td>
</tr>
<tr>
<td></td>
<td>United Kingdom</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Permanent</th>
<th>Temporary</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>22</td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Full depositor guarantee consists of guarantees covering all deposits or the majority of all deposits in the banking system. In the case of Italy, no actual coverage increase has occurred; however, Law N.110 passed in December 2008 as a result of the international crisis, gives the minister for economy and finance

Source: Report to the Financial Stability Board, by the Staffs of the International Association of Deposit Insurers and the International Monetary Fund, June 2010
Table 14
Overview of Government Subsidy Measures
(as of early June 2009)

<table>
<thead>
<tr>
<th></th>
<th>Recapitalisation</th>
<th>Debt guarantee</th>
<th>Asset purchase</th>
<th>Asset guarantee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>PRO</td>
<td>SAA</td>
<td>PRO</td>
<td>SAA</td>
</tr>
<tr>
<td>Canada</td>
<td>PRO</td>
<td>SAA</td>
<td>PRO</td>
<td>SAA</td>
</tr>
<tr>
<td>France</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>○</td>
<td>●</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Japan</td>
<td>●</td>
<td></td>
<td>○</td>
<td>○</td>
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<tr>
<td>Netherlands</td>
<td>○</td>
<td>●</td>
<td>○</td>
<td>○</td>
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<tr>
<td>Spain</td>
<td>○</td>
<td>●</td>
<td>○</td>
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<tr>
<td>Switzerland</td>
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<tr>
<td>United Kingdom</td>
<td>○</td>
<td>●</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>United States</td>
<td>○</td>
<td>●</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

**PRO** = program; SAA = standalone action; ● = measures announced and in use; ○ = measures announced but not yet in use; ● = concerted action with other government(s).

1 Verbal commitment only, no formal program adopted.