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**Prudential Discipline for Financial Firms:
Micro, Macro, and Market Structures**

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Abstract

The recent global financial crisis reflects numerous breakdowns in the prudential discipline of financial firms. This paper discusses ways to strengthen micro- and macroprudential supervision and restore credible market discipline. The discussion notes that microprudential supervisors are typically assigned a variety of goals that sometimes have conflicting policy implications. In such a setting, the structure of the regulatory agencies and the priority given to prudential goals are critical to achieving those goals.

The analysis of macroprudential supervision emphasizes that this supervisor must be both bold and modest: bold in seeking to understand the sources and distributions of systemically important risks, and modest about what a supervisor can do without imposing overly restrictive regulations.

Finally, the paper argues that the primary responsibility for risk management must rest with firms, not with government supervisors. Unfortunately, systemic risk concerns have led governments to shield the private sector from the full losses that dull their incentive to discipline risk taking. This section of the paper suggests that deposit insurance reform, special resolutions for systemically important firms, and requiring firms to plan for their own resolution and contingent capital may all have a role to play in restoring effective market discipline.

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1. PRUDENTIAL DISCIPLINE FOR FINANCIAL FIRMS: MICRO, MACRO, AND MARKET STRUCTURES

Risk taking is an essential part of the financial system that contributes to economic growth around the world. Risk taking in the financial system is also crucial for the efficient allocation of risk within our societies. But this risk bearing should take place in the context of sound risk management. Individual firms must prudentially manage their own risks, and financial supervisors must prudently manage the risks posed by the financial system to society.

The consequences of inadequate risk management can be a financial crisis that spills over into the real economy. Several East Asian countries experienced the consequences of significant breakdowns in risk management at both the individual firm level and at the supervisory level in the late 1990s. Many Asian countries drew the conclusion from this experience that rapid increases in asset prices and/or debt may endanger financial stability. Subsequently, many supervisory authorities in Asia—including those in Hong Kong, China; India; Republic of Korea; and Thailand—tightened regulatory restrictions on residential mortgage lending to forestall rising price and debt levels (Vanikkul 2009).

The consequences of inadequate risk management are again being felt in recent years with the current global financial crisis. This time, the weaknesses were primarily in the risk management of firms in some developed countries, with the Asian financial sector having little direct exposure. However, just as the affected policymakers in Asia drew lessons from the Asian financial crisis, so too will policymakers in countries currently struggling with weakened financial systems draw lessons from the global financial crisis. Moreover, the lessons they draw from the current problems are likely to have an especially large impact on international standards, given that the crisis is occurring in the countries whose financial sophistication has led them to be leaders in such standard settings.

The purpose of this paper is to identify some of the breakdowns that occurred and evaluate some possible policy changes intended to strengthen financial sector risk management. The paper considers some alternatives to strengthen both micro- and macroprudential supervision. It also considers ways to strengthen market discipline at financial firms.

The paper's analysis of microprudential regulation notes that financial regulators are typically assigned responsibility for more than one policy goal. When these goals have conflicting policy implications, the policy option that is followed depends on the structure of the regulatory agencies and each agency's view of its primary mission. If avoidance of financial crises is a top priority, it is important that this be reflected in the overall structure of financial regulatory agencies, and it is especially important that the primary goal of the microprudential supervisor be prudential regulation.

The discussion of macroprudential supervision finds that macroprudential supervision was weak or absent in some of the key players. Many of the problems that arose could have been detected at an earlier stage by a macroprudential supervisor that conducted end-to-end reviews of systemically important markets, starting with the initial underwriting and continuing through to the ultimate risk holders. In at least some cases, it may have been possible to take supervisory action that would have reduced the ultimate extent of financial instability. However, this section also makes the point that we should not expect too much of macroprudential supervision. As Cho (2009) noted, an agency with a broad mandate to deal with systemic risk issues is unlikely to be able to maintain political independence. By the time it is clear that market developments are moving to create significant risks of financial instability, it is likely that these development moves are also providing substantial benefits to politically important constituencies. These constituencies are unlikely to quietly accept the judgment of an agency that is not subject to political review. Yet if political considerations are brought into the discussion, prudential concerns will not always be the highest priority. Thus, this section concludes that macroprudential supervisors should be bold in seeking to

understand the risks in the financial system and modest about promising an end to financial instability.

Both the micro- and macroprudential discussions also highlight the potential benefits of greater cross-border cooperation among supervisors. Such cooperation is essential if prudential supervisors are to have an adequate understanding of financial institutions and markets that operate across borders.

Although the structure and powers of the micro- and macroprudential supervisors are important, sound risk management starts at the firm level. A prerequisite for sound risk management at the financial institution level is that the institution's owners and managers bear the costs of bad management and receive the benefits of sound management. If the government bears most of the risk of loss, not only will the managers lack adequate incentive to manage the risk, but the government is likely to insist on playing a major role in the firm's risk management. The problem with having the government take over risk management is that many efficiency gains that arise from a market-based economy will ultimately be lost if risk management is outsourced to the government.

Unfortunately, the recent crisis is likely to have the exact opposite effect on private incentives to manage risk. The recent experience has been that governments will step in to provide bailouts if the troubled firm is sufficiently large or interconnected. The problem of how to reverse both the perception and reality that the government is bearing the risk is a difficult problem. The analysis in this section considers a number of alternatives, including deposit insurance reform, special resolutions, financial institution-prepared "shelf bankruptcy" plans, and contingent capital. It concludes that all these alternatives are likely to have a role to play in restoring market discipline.

The paper is organized as follows: The first section discusses the importance of financial regulatory structure; the second and third sections discuss micro- and macroprudential regulatory structures, respectively; the fourth section discusses issues in establishing effective market discipline structures; and the last section concludes the paper.

1.1 Importance of Regulatory Structure

Most of the current debate about regulatory structure has focused on the issue of whether to consolidate financial regulatory agencies into fewer agencies, or possibly only one agency. Čihák and Podpiera (2006) pointed out several possible advantages of integrating financial sector supervision, including greater supervisory efficiency, economies of scope, improved accountability, elimination of duplication and turf wars, and a more level playing field. They also noted some possible disadvantages of integration, including diseconomies of scope, the potential for losing key staff, and objectives that are poorly communicated or not well-specified.

One possible explanation for many of the breakdowns in financial supervision in the United States (US) is that its fragmented financial regulatory system led to duplication in some areas and a lack of coverage in others. An obvious implication of this sort of analysis is that countries should adopt a single regulatory body, at least for the purposes of prudential supervision. However, Hsu and Liao (2009) pointed out that the structure of the microprudential regulators is not necessarily the central issue because the unified regulatory structure of the United Kingdom (UK) also encountered serious problems.

An alternative approach is to recognize that a hierarchy of objectives of the financial supervisor is even more fundamental to financial regulation than was suggested by Čihák and Podpiera (2006). Financial supervisors are typically assigned multiple goals, which may include some combination of prudential oversight, adequate disclosure, "fair" treatment of all consumers, and allocation of resources to favored sectors of the economy. These different goals will often have conflicting implications for the financial regulatory system. For example, policies intended to encourage credit flows to favored sectors may result in some financial

firms becoming more risky. Horvitz (1983) argued that the structure of the financial regulatory system plays a crucial role in resolving these conflicts.

Wall and Eisenbeis (1999) discussed two general methods of dealing with conflicting goals: internal and external resolution. Internal resolution arises when the conflicting goals are assigned to a single regulatory agency. In such cases, the conflict is addressed based on the priorities of the agency head, suggesting that the conflict will be resolved in favor of whatever the agency believes to be its primary mission. For example, if an agency believes that its primary responsibility is to support credit allocation, its policy decisions are very likely to favor credit allocation policies over that agency's prudential goals.

Internal resolution can lead to the wrong outcomes if the regulatory agency does not place sufficient priority on prudential regulation. One example comes from the UK in a recent report by the House of Lords Select Committee on Economic Affairs (2009a, 2009b). The report discussed the dual responsibility for conduct-of-business supervision and microprudential supervision of the Financial Services Authority. The chairman of the Financial Services Authority, Lord Turner, noted that "it is broadly speaking true to say that in retrospect we focused too much on the conduct of business and not enough on prudential" (House of Lords, Select Committee on Economic Affairs 2009b: 177). The House of Lords report (2009a: 34) concludes the discussion this way:

Regulatory bodies are subject to conflicting political pressures. There is a danger that, when a single institution has responsibility for conduct-of-business and prudential supervision, one will be emphasised at the expense of the latter. Institutional arrangements in the future must be designed so as to minimise this danger.

In pointing out this conflict, the House of Lords committee was rediscovering a fundamental concern with the structuring of regulatory agencies of all types.

External resolution arises when the conflicting goals are assigned to different regulatory agencies. If a conflict arises, the agencies may either quietly reach an agreement on the relative priorities of the two goals or publicly disagree and seek support from the political authorities. An example from the US policy debate over bank loan loss provisioning illustrates external resolution when appeals were made to the political authorities. The US Securities and Exchange Commission (SEC) is charged with setting accounting policies to help investors make informed decisions. The SEC believes that reported net income in each period should fairly reflect the results of the firm's operations in that period. The federal bank regulatory agencies, which are responsible for the prudential supervision of commercial banking organizations, believe that banks should build up loan loss reserves during good periods to cover losses that are likely to be incurred during weaker economic conditions. US banks in general—and in particular SunTrust, a large regional bank—were caught between the two regulators when the SEC ordered SunTrust to restate its prior years' financial statements to reduce its loan loss provisions. The bank regulatory agencies publicly protested the SEC's action, but SunTrust was effectively forced to obey the SEC. So far, the result has been that Congress has told the SEC to consult with the banking regulators on some accounting decisions, but has left ultimate power over US accounting rules in the hands of the SEC.¹

Viewing agency structure through the prism of goal conflicts suggests two questions that are especially important in designing supervisory structure: Which goal conflicts should be subject to internal resolution and which to external resolution? And, in the case of internal

¹Although this disagreement attracted some attention, Wall and Koch (2000) argued that both sides have overstated their case. Investors do not rely solely on accounting loans loss provisions when judging the value of a bank's loan portfolio. Similarly, if US bank supervisors think that banks' loan loss allowance is less than appropriate, the supervisors have ample power to require banks to hold more capital.

resolution, how to make sure that the regulatory agency follows the right priorities in resolving goal conflicts?² The answers to these questions will determine the extent to which the most important goals are achieved.

2. MICROPRUDENTIAL STRUCTURE

An agency with microprudential supervisory responsibility will affect the extent to which a number of public policy goals are obtained. For example, microprudential regulation will affect the ease with which new financial firms can enter the market and, thus, have an effect on competition. In deciding among these conflicts, there is a strong case for making prudential supervision the primary goal: Financial firms that are not operated in a prudent manner put at risk their capability to support society's other goals for the financial sector. This is not to suggest that a microprudential supervisor should not consider other goals when structuring prudential regulation. There is often more than one way to accomplish the goals of prudential regulation, and this choice should take into account the impact of alternative regulations on other goals. However, if forced to choose between what is required for effective prudential supervision and some other goal, prudential supervision generally should take priority.³

Microprudential supervisors may be assigned narrow or broad responsibilities across two dimensions: the number of goals assigned to the agency and the number of subsectors assigned to the agency. Both the set of goals and the set of firms may have a significant influence on the effectiveness of prudential supervision.

2.1 Set of Goals

An agency that is assigned a large number of goals may find that these goals distract it from effective prudential supervision. However, the assignment of responsibility for a large number of goals will not necessarily distract the agency from prudential supervision. The key is that if the agency is to be an effective prudential supervisor, it must view prudential supervision as its primary mission. Moreover, the assignment of responsibility for many goals allows the prudential supervisor to adopt a consistent set of policies and avoid having firms be told to follow mutually inconsistent policies by different supervisors. Instead, the cost may take the form of the other financial goals becoming subordinated to prudential regulation.

Although the assignment of other goals is not necessarily inconsistent with effective prudential supervision, assigning an agency with both prudential supervision and promoting a sector of the financial service industry is inviting trouble. A staff report of the US Senate Committee on Governmental Affairs (1977) discussed a common fundamental conflict when a regulatory agency is charged with both promoting and regulating an industry. The report argues that the goal of promotion typically dominates other policy goals, a tendency that can have undesirable outcomes. Many analysts believe part of the reason that the losses in the

² Wall and Eisenbeis (1999) argued that regulating the financial sector involves both internal and external resolution. Pure internal resolution would require that one agency have control over every regulatory goal that touches financial firms, including nonfinancial goals such as those related to employer-employee relationships. The resulting agency's mandate would be so broad as to dilute the level of expertise among the senior managers of the agency, undercutting one of the main reasons for forming a specialized agency. On the other hand, pure external resolution would require setting up a regulatory agency for every goal, such as an agency for every business conduct goal. The resulting proliferation of agencies would be hugely inefficient.

³ The superintendent at the Canadian Office of the Superintendent of Financial Institutions recently attributed the current strength of the Canadian banking system in part to having a mandate that is totally focused on solvency and that does not include other goals such as the competitiveness of the domestic financial system (Clark 2009).

US thrift industry in the 1980s were so large because the industry's prudential supervisor, the Federal Home Loan Bank Board, was also charged with promoting the housing industry.

Structures that subject prudential supervisors' operational decisions to political review are also likely to result in prudential goals becoming subordinated to other goals. The political authorities rarely owe their power primarily to promises to give prudential supervision priority over all other goals. Thus, for prudential supervision to take priority, it is necessary for this goal to be assigned to an agency that is operationally independent, even as it remains accountable to the political system. Indeed, this is so important that the Basel Committee on Bank Supervision (1997) identified operational independence as a precondition for effective supervision.⁴

Although it is important that the agency with microprudential responsibility have prudential supervision as its primary mission, it is also important that this mission not be defined too narrowly. In particular, assigning the microprudential supervisor an overriding goal of "no failures" is likely to prove costly and counterproductive. A microprudential supervisor with a goal of no failures is incentivized to impose draconian regulations that limit risk taking in an effort to prevent its financial firms from failing. Yet, risk taking is an inherent part of an efficient economy. Financial firms exist in large part to help allocate resources to their best use and to help manage society's risk. A financial sector that is overly limited in its capability to take risk not only cannot help society manage its risk, but also forces that risk into other parts of the economy. For example, if a financial institution's capability to lend to finance purchases is overly constrained due to concerns about credit risk, that may force such lending onto the books of suppliers, even when suppliers are less able to manage credit risk. Thus, it is important that prudential supervisors be tasked with making sure that firms are managing their risks in a prudent way, not with preventing financial firms from taking risks.⁵

2.2 Set of Firms

Prudential supervisors may be assigned broad responsibility for most or all financial firms, as is the case with the Australian Prudential Regulatory Authority and the Japan Financial Services Authority. Alternatively, they may be assigned responsibility for a particular sector of the financial services industry. The advantage of assigning only one industry sector to an individual prudential supervisor is that the supervisor can build substantial depth in the types of risks being taken by that industry.

Significant problems exist with a microprudential regulator being assigned responsibility for a small subsector of the financial services industry, however. The microprudential regulator's size, power, and prestige depend upon that single subsector. If that industry encounters financial problems, both the industry and its prudential supervisor are threatened. If the supervisor openly acknowledges the problem, there is a risk that policymakers will restructure the industry and eliminate the need for the regulator. As such, the agency will be tempted to exercise forbearance and hope that the problem is cured over time. If the

⁴ Although operational independence is important for the long-run effectiveness of prudential supervision, political authorities will sometimes allow tougher prudential policies that conflict with some other goals. The International Monetary Fund (2009) noted that the Bank of Thailand's legal subordination to the Ministry of Finance at the time the report was drafted could lead to interference or delays in regulatory actions. However, that report also noted that the Bank of Thailand had tightened restrictions on consumer and mortgage lending. Similarly, Panagariya (2009) noted that the Bank of India also lacked operational independence but could resist government efforts to accelerate financial deregulation.

⁵ Although exactly what structure would best create an incentive for the supervisor to accomplish these goals is not obvious.

problem can no longer be hidden, the regulator has an incentive to support high-risk investments by the industry as it “gambles for resurrection.”⁶

The assignment of authority over a broad portion of the financial services industry has two additional advantages. First, it allows for the sharing of information and expertise among supervisors of different sectors of the financial services industry. Second, it facilitates the sharing of information between supervisors in different countries. Mismatches in responsibility across countries may reduce communications across countries and the ability of supervisors in each country to fully appreciate what they are learning from cross-border exchanges.

The set of firms may also be too narrow in one other important dimension: All the affiliates in a group should be subject to consolidated prudential supervision. Wall (1986) and Mayes, Nieto, and Wall (2008) noted that the parents of large financial groups do not operate groups such as mutual funds, in which each holding is managed separately. Instead, the primary purpose of forming such groups is to exploit economies of scale and scope that could not be obtained by arms-length bargaining. As such, groups operate as integrated entities sharing such vital services as information technology, risk management, and liquidity management. In many groups, there are few subsidiaries that could operate independently of their affiliates. Thus, in order to understand the risk management and exposure of individual subsidiaries, such as insured commercial banks, it is essential that the prudential supervisor have consolidated authority over the entire group.⁷

Milo (2007) discussed the benefits of consolidated supervision for the Philippines. She noted that the Philippines has a long history of permitting universal banking and has nine universal banks that constitute a large share of its banking system. The bank supervisor, Bangko Sentral ng Pilipinas, has moved in the direction of consolidated supervision of banking groups. However, Milo (2007: 11) noted that “its application is still rudimentary because existing laws preclude its full implementation.”

The importance of consolidated supervision of an entire group raises the difficult problem of the foreign operations of domestic groups and the domestic operations of foreign groups. The home country supervisor can obtain some information from the group about its foreign operations. However, there is also much that the home supervisor can learn about the foreign subsidiaries from the host country supervisors. The host supervisor will typically be even more dependent upon the foreign supervisor for an understanding of the condition of the parent corporation. The dependence of home and host supervisors has a variety of implications, some of which are discussed in the following sections. One important implication for domestic supervisory structure is that any agency overseeing prudential supervision must view prudential supervision as its primary responsibility. An agency that engages in prudential supervision as a secondary priority is likely to not only fail in its domestic obligations, but also in its international obligations to assist in the prudential supervision of financial firms operating across borders.

⁶ The claim is not that a regulatory agency overseeing many sectors of the financial sector would never exercise forbearance; such an agency would also have some incentives to forbear. However, there is a difference between a broad agency that risks being rebuked by policymakers for inadequate supervision and a narrow agency that risks being abolished by policymakers.

⁷ Some subsidiaries may also be subject to prudential supervision by another supervisor. For example, an insurance subsidiary of a large banking group may be subject to prudential regulation, both by an insurance supervisor and the consolidated supervisor. But, the consolidated supervisor must be able to examine and, when necessary, regulate the insurance subsidiary.

3. MACROPRUDENTIAL STRUCTURES

Macroprudential supervision arises out of a combination of rather old practices and new perspectives. An important element of the old practices is the role of central banks in preserving financial stability. Padoa-Schioppa (2003) argued that the role of central banks in financial stability is part of their “genetic code.” He noted that European central banks acted as lenders of last resort by the end of the nineteenth century. Along those lines, the US Federal Reserve was created in large part to provide the US with a lender of last resort after the 1907 panic. Central banks’ power to act as lenders of last resort also allowed them to exercise some influence over banks’ behavior by (implicitly) threatening to deny such loans.

Central banks’ role in preserving financial stability was augmented with the addition of statutory responsibility for bank supervision. The Federal Reserve obtained microprudential supervisory powers over some commercial banks when it was created, and over banking groups starting in 1956. Ryback (2006) noted that central banks often became bank supervisors in many parts of the world as countries adopted banking laws in the second half of the twentieth century. The result was that macroprudential agencies were given authority over microprudential regulation.

Ryback (2006) argued that macroprudential regulation has reemerged as a separate concern over the last 10–15 years for several reasons. The first factor in the reemergence was the Asian financial crisis of 1997–1998, which demonstrated that a nation’s banking system could be exposed to a shock that is not readily observable by looking at individual banks. In that case, the banks were indirectly exposed to foreign exchange risk as a result of the corporate customers borrowing in foreign currencies, even though their receipts were largely in the domestic currency. Second, central banks came to appreciate that their capability to meet monetary policy goals depended not only on the stability of the banking system, but also on developments in the nonbank financial sector, especially the bond markets. Third, the shifting of microprudential responsibility from central banks to newly created regulators brought into the open central banks’ continuing responsibility for financial stability. For example, Laker (2006) noted that the creation of the Australian Prudential Regulation Authority led the Reserve Bank of Australia to create a financial stability area to conduct analysis and research on financial stability issues.

The current round of financial instability has forcefully reemphasized the weakness of the older approaches. A strong bank sector is a necessary condition for financial stability, but it is not a sufficient condition. Weaknesses in the nonbank financial sector are both a potential direct threat to financial stability from its own impact and an indirect threat to stability through its impact on the banking system.

Given the desire to reduce the costs of financial instability and restrict moral hazard, there is increased interest in creating a macroprudential supervisor. This supervisor would have new powers to examine and regulate previously less-regulated financial firms, possibly combined with some regulatory power over firms already subject to microprudential supervision.

This section analyzes the role of macroprudential supervision in managing systemic risk. The messages are twofold: There is much that can and should be done, but there are limits, and promising to do too much could be worse than doing nothing. This section starts with some ideas on what is relatively easy, continues with a discussion of the more difficult tasks, and concludes with some warnings about the current limits of what is feasible in macroprudential supervision.

3.1 Macprudential Information Gathering

Central banks are already gathering and processing some publicly available information as part of their regular financial stability reviews.⁸ This analysis is likely to improve over time as economists develop a better understanding of the causes of financial instability.

Macroprudential authorities should obtain broad powers to examine the financial system to better understand linkages within the system and potential weak spots. One of the first responsibilities of a macroprudential supervisor should be to address weaknesses in the financial system that could turn what should be an isolated problem within the financial sector into a systemic problem. That is, the macroprudential supervisor should make sure that the financial plumbing system is in good order. This system includes payment and settlement systems, which are already a concern of the central banks in many countries. But it also includes issues associated with the infrastructure for all types of financial transactions. For example, during much of this decade, market participants had huge backlogs of trade confirmations in the credit default swap (CDS) markets. If left unaddressed, this could have further added to the recent turmoil in financial markets. Fortunately, financial supervisors were able to force market participants to address this problem, although in some cases their leverage for doing so came from their microprudential authority over important dealer firms.⁹ A macroprudential supervisor should have the authority to conduct thorough reviews of systemically important markets, including firms not subject to microprudential regulations, and impose regulations as necessary to address weaknesses.

A second area in which macroprudential supervision could improve on current practice is by developing a clear understanding of the major markets from the first transaction through to the ultimate bearer of the risk.^{10,11} The US residential real estate market provides an excellent example of how such an end-to-end analysis of markets could have identified weak practices that would combine to create a systemic problem.¹²

The story begins in 2000, with a dramatic relaxation of the lending standards in the US residential real estate market.¹³ Many of these loans depended upon continuing housing price appreciation for their repayment. If prices ever stopped rising, the holder of the mortgage was much more likely to take losses. Ashcraft and Schuermann (2008) noted that these high-risk mortgages were then packaged together, cut into tranches of varying seniority, and sold as private label residential mortgage-backed securities (RMBSs). Some of the more risky tranches of these RMBSs were also packaged together, sliced into tranches of varying seniority, and sold as collateralized debt obligations.

The more senior parts of these private label RMBSs and collateralized debt obligations (typically rated AAA) were often bought by US and European bank-sponsored vehicles such

⁸ Central banks issuing such reports included the Bank Negara of Malaysia, Bank of Canada, Bank of England, Bank of Indonesia, Bank of Japan, Bank of Korea, European Central Bank, Hong Kong Monetary Authority, Monetary Authority of Singapore, People's Bank of China, Reserve Bank of Australia, and Reserve Bank of New Zealand.

⁹ See US Government Accountability Office (2007) for a discussion of supervisory efforts to reduce processing backlogs in the CDS market.

¹⁰ Issues related to cross-border relationships are discussed in the following section.

¹¹ Garcia (2009) discussed some critical weaknesses in microprudential supervision.

¹² One could view this approach as agreement with the Turner (2009) comment in a speech that "regulators were too focused on the institution-by-institution supervision of idiosyncratic risk" during the recent crisis. It is also consistent with his recommendation that "in [the] future, regulators need to do more sectoral analysis and be more willing to make judgements about the sustainability of whole business models," at least in those cases where the business model depends upon unsound practices.

¹³ Gerardi et al. (2009) showed that although subprime credit scores improved somewhat through the 2000s, other risk factors increased substantially, including the fraction of loans with low documentation, and high leverage.

as structured investment vehicles.¹⁴ These bank-sponsored vehicles funded their assets with a thin cushion of equity and longer-term debt. But the vast majority of the funding came from the asset-backed commercial paper (ABCP) market. Investors in the commercial paper market are looking for a high degree of safety first and return second. If the safety of their investment comes into doubt, they will not roll over their investment. To satisfy these risk-averse investors, most bank-sponsored vehicles were backed by explicit or implicit promises that the sponsor would provide liquidity support if that became necessary.

Standard & Poors (2009) noted that problems arose when US residential real estate prices started turning down in late 2006 and 2007. Many borrowers, especially those who purchased the real estate as an investment, started defaulting almost immediately on their loans. As default rates climbed, investors in ABCP began to doubt the quality of the assets backing many bank-sponsored vehicles and started withdrawing from this market. Arteta et al. (2009) noted that as these vehicles lost access to the ABCP market, they turned to their sponsors for US dollar-denominated loans to provide liquidity. Gorton (2009) showed that the margin demanded on repurchase agreements using asset-backed securities also dramatically increased which further reduced the banks' liquidity.

US banks had access to additional dollar funding from domestic sources.¹⁵ European banks often lacked such access and turned to the US dollar London InterBank Offered Rate LIBOR market to obtain such funding. However, as Arteta et al. (2009) noted, the LIBOR market was not deep enough to accommodate their needs, especially given growing credit-quality concerns related to several of the borrowers. The result was a dramatic widening in the spread of LIBOR over the comparable maturity of overnight indexed swaps.

A macroprudential supervisor that observed rapid growth in the use of new residential mortgage instruments to systemically material levels could have examined the process from loan origination through to the purchase by domestic investors. As discussed by Demyanyk and Van Hemert (2008), if that had happened in the US, a review at the origination level should have noted the growing dependence of many loans on home price appreciation to provide the borrower with a means of repayment. An examination of a sample of the no-document loans should have turned up the fact that many of these loans were living up to their names as "liar's loans." That is, in many cases, borrowers were making material misstatements on their loan applications. A review of the securitization process should have revealed that, in many cases, the processors were focused on maximum throughput of loans and conducted few or no quality checks on the loans. Finally, it might also have raised questions about some of the practices used by the ultimate holders of some RMBSs (in particular, their reliance on vehicles that were funded primarily with ABCP with little capital).¹⁶

¹⁴ An interesting question is why banks in Asia had little exposure to these "toxic" securities, especially given their high ratings by the ratings agencies. Gruenwald and Tan (2009) suggested several possible reasons, including natural conservatism—or, more likely, conservatism that grew out of the lessons of the Asian financial crisis. They also suggested a reason that I find plausible: ample investment opportunities in the region. Many of the banks in Europe that got caught with large exposures were suffering from weak investment opportunities at home, particularly in Germany. Finally, they also suggested that luck deserves some of the credit.

¹⁵ In a development that was not widely appreciated at the time, a substantial fraction of the US banks' funding came from a collection of US government-sponsored enterprises called the Federal Home Loan Banks, according to Ashcraft, Bech, and Frame (2009). The Federal Home Loan Banks are restricted to making loans to their members, and membership is restricted to US chartered depository institutions and some insurance companies.

¹⁶ Although there are many issues that a macroprudential supervisor could have eventually identified in the mortgage market, it is less clear that this identification could have happened in time to prevent the recent turmoil. As often happens in boom markets, standards slipped over time, and it is often difficult to say at what point standards have become excessively weak. However, even if stronger regulation had been put in place too late to prevent the crisis, it might have changed market practices in time to reduce the scale of the problem.

Following transactions through to the ultimate bearer of risk may also reveal concentrations of risk that would not be readily observable. For example, a review of the credit guarantee market (i.e., CDS plus similar contracts) might have revealed American International Group, Inc. (AIG)'s net position and the extent to which different counterparties had become exposed to AIG. Although the exposure of any individual counterparty to AIG might not be a cause for concern, the aggregate exposure of banks should have raised concerns about AIG's capability to honor its commitments in the event of a large drop in credit quality.¹⁷

Just as a microprudential supervisory focus is inadequate for understanding the risks to stability in an interconnected domestic financial system, a domestic focus to macroprudential supervision is also inadequate for understanding the risks to stability posed by an interconnected global financial system. The effectiveness of macroprudential supervision will be greatly enhanced to the extent that the supervisor understands the connections between domestic and international markets and institutions.

The chain of events leading from mortgage loans in the US to the dramatic widening of LIBOR spreads in 2007 helps to illustrate this point. A domestic macroprudential supervisor in the US would have noted the dramatic rise in private label RMBSs, and an examination should have revealed some weaknesses in the underwriting.¹⁸ But a US macroprudential supervisor would also have observed that a substantial fraction of these RMBSs were being held by foreign investors, which could be taken to imply that these RMBSs would not pose a threat to US financial stability. The potential for these foreign investors to suddenly place greatly increased demands on the US dollar LIBOR market would not have been directly observable. Similarly, a macroprudential supervisor of a country whose banks were buying these RMBSs would have seen the buildup of holdings and their funding with very little capital and ABCP. But most of these RMBSs were highly rated, and these banks individually had access to lines of credit and the LIBOR market. The macroprudential supervisor could not have understood the dependence of the ratings on US residential property appreciation without a review of the US mortgage market. Nor could the macroprudential supervisor necessarily have seen that many European banks were holding their mortgage backed security investments in similar structures so that if one of them lost the confidence of the ABCP market, likely most or all of them would need alternative sources of US dollar funding.

Although macroprudential supervision done right requires a view across country boundaries, a global supervisor with such scope is unlikely to be created anytime soon. This implies that macroprudential supervision cannot reach its potential unless national supervisors work with each other. Not only must they share information, but they will also sometimes need to coordinate reviews of individual markets in order to trace the flow of financial risks from the original borrower to the ultimate holders of the risks. When additional regulation is deemed desirable, supervisors may also have to coordinate the adoption of new regulations to limit the capability of institutions and markets to avoid regulation by moving to new markets.

International cooperation between microprudential regulatory agencies happens all the time, but it is subject to some important frictions. The microprudential supervisors from different countries often have somewhat different mixes of missions that can inhibit their ability to work together. The difference in missions can be solved if countries agree that their

At a minimum, a better understanding of what had been going on in the marketplace might have helped policymakers formulate more effective responses when the problems were revealed.

¹⁷ Concern should not be limited to concentrations in exposure to an individual institution. Brunnermeier et al. (2009: 24) drew a distinction between financial institutions that are "individually systemic" and financial institutions that are "systemic as part of a herd." They specifically discussed the case of highly leveraged hedge funds that are individually not of great concern, but whose correlated fluctuations may be systemic. Rosengren (2009) similarly emphasized that macroprudential supervision needs to look across institutions.

¹⁸ Private label refers to RMBSs that are not issued by Federal National Mortgage Association (Fannie Mae), Federal Home Loan Mortgage Corporation (Freddie Mac), or Government National Mortgage Association (Ginnie Mae).

macroprudential supervisor should have financial stability as a primary mission. Further strengthening their incentive to work together is past experience, which demonstrates that the stability of one country depends crucially on that of others, not only through direct financial links, but also indirectly through investor perceptions.

3.2 Macroprudential Regulation

There are some clear opportunities for a macroprudential supervisor to improve the regulation of the financial system. A macroprudential supervisor can extend powers already used by microprudential regulators to improve the financial systems' plumbing. A macroprudential supervisor can also bring a valuable perspective to the writing of microprudential regulations, such as the development of capital requirements that increase during good periods to build a cushion to absorb losses during weaker periods.

However, when promoting macroprudential supervision in the current environment, one must take care not to oversell its capabilities. Policymakers must be disabused of the idea that the existence of a macroprudential supervisor will guarantee that a country will never again suffer from financial instability. Most countries have had microprudential regulation of banks for decades, and some have had it for more than a century. But banks are still managed by humans who make mistakes, and banks sometimes fail. So, many governments have developed deposit insurance, special resolution regimes, and other techniques to manage the spillover from these failures to the broader society. In some important respects, macroprudential supervision is new and it will also be run by humans. Some instability is unavoidable, and potential spillovers will have to be managed. Expectations that the macroprudential supervisor will prevent financial instability are worse than misleading; such expectations will change incentives in ways that are likely to result in significant damage to the financial system.

3.2.1 Difficulty of Regulating Popular Innovations

A particular problem for macroprudential regulation is innovation, both in the form of new instruments and the expanded use of old instruments by new clienteles. The risks and the benefits of existing instruments when used in the normal way by long-standing clienteles are likely to be understood by the suppliers, users, and regulators. Moreover, these instruments have likely been tested in the legal system, and the relevant rules have largely been determined. However, there is likely to be a substantial amount of learning about innovations. In particular, the various types of risks associated with these instruments and their users may not be well understood until they have been tested by a more challenging environment. As a result, if such innovations are introduced during benign economic conditions, they may grow to the point where they raise systemic concerns without having their weak points tested.

Subprime mortgages in the US are an excellent example of an innovation that was appropriate for a limited set of mortgage loans.¹⁹ The problem with subprime is not that the loans existed. Instead, the problems were twofold: the set of borrowers given subprime loans was greatly expanded, and the risks of lending to less-credit-worthy borrowers were increased by layering risks (e.g., subprime loans were often made to buyers with little equity and little or no documentation supporting their loan applications).

A supervisor focused on macroprudential issues may not take an interest in such innovations until they grow to the point where the innovation poses a threat to financial stability. However, the fact that the innovation has grown so large that it could be systemically important suggests that the customers perceive the innovation to be valuable, and the suppliers of the product find it profitable. Many innovations also provide benefits to third

¹⁹ See Tanta (2008) for a discussion of how the subprime market evolved over time.

parties. For example, innovations that lower the cost of residential mortgages are likely to benefit the construction and residential brokerage industries. All these parties are likely to raise political objections if the macroprudential supervisor attempts to significantly raise the cost of using this innovation or place substantial limits on its use.²⁰

An excellent example of the problem of trying to stifle a popular innovation is that of money market mutual funds in the US during the late 1970s and early 1980s. Regulation Q limited the interest that US depository institutions (mostly commercial banks and savings and loan associations) could pay on small denomination deposits. Kane (1977) noted that as market interest soared above these minimum levels, less-wealthy individuals turned to money market mutual funds. The savings and loan associations that most benefited from the regulation would have liked to have gotten rid of money market mutual funds. However, political pressure from older, less-wealthy voters resulted in Congress ultimately repealing deposit rate ceilings, according to Kaufman (2006).²¹

Whether a macroprudential supervisor will be able to withstand such political pressure depends on its political power and that of those opposing the new regulations. However, the supervisor will not necessarily gain prestige from preventing crises. Suppose that the supervisor is right about the need for the regulation, and adoption of the regulation prevents the innovation from causing a period of financial instability. Those that opposed the action may respond by claiming that a lack of instability shows that the regulation was unnecessary.

3.2.2 Pressure to Overregulate Innovations

A macroprudential supervisor that recognizes the political difficulty and costs of stopping innovations after they become systemically important is likely to be tempted to try to stop innovations before they become so popular. In this case, the problem is not of underregulation but of overregulation.

Suppose that for a particular innovation, the errors of under- and overregulation are of roughly equal magnitude in terms of their impact. The impact of these errors on the macroprudential supervisor will not be equal. Errors in the form of underregulation may become observable in the form of financial instability and lead to widespread criticism of the macroprudential supervisor. On the other hand, errors in the form of overregulation that prevent an innovation from succeeding will not be readily observable because the beneficiaries of the innovation will not be able to see the benefits they might have received.²²

Examples of market innovations that were at one time controversial, yet proved to be highly successful, are the markets' foreign currency swaps and interest rate swaps. These swap contracts exploded onto the scene in the early to mid-1990s, and were not all that well understood by many supervisors. We might never have obtained the benefits from these

²⁰ A presentation by Miyoshi (2006) made this point in a more general setting. Miyoshi pointed out that the analytic framework for macroprudential regulation is underdeveloped, as are the assumptions used in stress tests. Given these weaknesses, Miyoshi's presentation showed that it can be difficult to get regulated institutions and the public to accept tighter regulation.

²¹ Although this is a good example of the political difficulty of dealing with popular innovations, this discussion is not intended to imply that Regulation Q rate ceilings should have been maintained.

²² This asymmetry of the impact is not unique; microprudential regulators have long faced a similar but less severe problem. However, the mistakes of overregulation by microprudential supervisors are likely to be more observable than those by a macroprudential supervisor. The microprudential supervisor's ability to constrain innovation is limited to the set of domestic firms that it regulates. Other firms, both foreign firms and those with a different domestic supervisor, may not be so constrained. This allows potential customers to see the value of the innovation and allows these other firms to gain market share at the expense of those subject to the regulation. However, a macroprudential supervisor that has the ability to supervise all aspects of the financial system will not face competition from other domestic supervisors. If the macroprudential supervisors reach a global agreement to stifle an innovation, the innovations' benefits also will not be observable in foreign markets.

contracts if supervisors had taken the attitude that any innovation that was growing fast and not well understood needed to be shut down.

3.2.3 Wrong Expectations May Create Moral Hazard

A further danger to macroprudential regulation is that to the extent it increases investors' confidence there will not be periods of significant financial instability. It also increases investors' incentives to take more risks. The impact of investors' concern about financial instability on their actions is illustrated by their actions in the last several years. In 2006, many investors appear to have believed that there was at most a trivial risk of financial instability in the developed countries. This lack of concern, combined with low real interest rates, led many investors to seek higher returns. In some cases these returns were obtained by investing in higher-risk assets and in others by investing in highly leveraged portfolios of seemingly safe assets funded largely with shorter maturity debt. Many of these positions proved dangerous to their holders' financial condition as markets became unstable. As a result, many investors have sought to shift their portfolios into safer assets and fund their positions with more equity and longer maturity debt.

Although some reduction in concerns about financial instability would be supportive of economic growth now, it is not in the interest of a macroprudential supervisor to encourage a rapid return to the risk-taking attitudes of 2006. Yet the very act of creating a macroprudential supervisor could move attitudes in that direction for two reasons. First, some (probably less sophisticated) investors may believe that the macroprudential supervisor will use its regulatory powers to stop potential systemic risk before it causes financial instability. Second, other (probably more sophisticated and more cynical) investors may believe that the creation of a macroprudential supervisor that oversees all parts of the financial system signals a willingness by the government to extend the safety net to any part of the financial system that might threaten financial stability.

4. MARKET DISCIPLINE STRUCTURES

The underlying basis of sound financial institutions and a sound financial system is sound risk management by financial firms. Neither microprudential supervisors nor macroprudential supervisors can oversee all the risk management decisions that are made by financial firms. Pillar 3 of the Basel II Capital Accord recognizes the importance of market discipline in contributing to sound risk management at the firm level. Pillar 3 correctly recognizes that increased disclosure can enhance the market's capability to identify higher-risk banks, but it does not address the market's incentive to exert such discipline. Market participants will price only the risks that they believe they are bearing. Unfortunately, what market participants often observe is that governments will step in to prevent the collapse of financial firms deemed too big to fail (or even too interconnected to fail), with the side effect of protecting many types of claims from taking any losses. What is required for effective market discipline is a credible system of imposing losses on the firms' investors.

Arguably the single most devastating case of inadequate market discipline due to an expectation of a bailout is that of the Reserve Primary Fund, a money market fund that historically provided shareholders with ready access to their investment at a constant value of US\$1.00. Accordingly, the Reserve Primary Fund also historically invested in conservative assets, as reflected in its high ratings by both Moody's and Standard & Poor's. However, the SEC says that in 2007 and 2008, the fund began to invest in commercial paper issued by Lehman, Merrill Lynch, and Washington Mutual—all of which subsequently failed or were acquired on distress terms. The US SEC (2009: 14–15) quoted an exchange of e-mail on 12 September 2008 between an employee of Moody's and the Reserve Primary Fund's chief investment officer. The e-mail from Moody's asked about "Reserve's view of the [Lehman] credit." The response from the chief investment officer was that they were "ok holding what

we own,' and that he believed that Lehman would, if necessary, be assisted by the federal government." In effect, the chief investment officer said that he felt comfortable holding the high return Lehman commercial paper because he believed the government was bearing the risk. At the time of Lehman's failure, the Reserve Primary Fund held US\$785 million in Lehman commercial paper that became worthless. Shortly thereafter, the Reserve Primary Fund was unable to uphold investors' expectations of being able to quickly redeem their shares at a \$1.00-per-share value. According to Acharya et al. (2009: 6), the result of the Reserve Primary Fund's failure was that it

created uncertainty about all money market funds, causing a massive run on the system. Since money market funds are the primary source for funding repos and commercial paper, this was arguably the most serious systemic event of the crisis. The government then had to guarantee all money market funds.

Thus, expectations of a government bailout undermined the Reserve Primary Fund's incentive to engage in sound risk management and exposed the global financial system to systemic problems.

Although exposing market participants to the risk of loss is critical to obtaining market discipline, there is a reason why governments around the world have often elected to engage in bailouts. Governments often feel that they are being forced to pick the lesser of two evils: (i) withdraw the charter, impose losses on creditors, and deal with the resulting financial instability; or (ii) exercise forbearance and/or bail out the distressed firm. The problem from the supervisory perspective is that the supervisors had not been provided with tools to handle failure in a way that would preserve financial stability before the problems arose.

Thus, in order to reverse market expectations that some financial firms are too interconnected to fail, countries must develop and implement credible policies that allow critically undercapitalized financial firms to "fail" without adverse consequences to the financial system. The purpose of this section is to discuss the weaknesses in current systems for dealing with failing financial institutions and some possible solutions.

4.1 Deposit Insurance

Although market discipline depends on some creditors and counterparties of financial firms being exposed to risk, effective market discipline does not depend on all depositors, creditors, and counterparties being exposed to risk. Indeed, exposing some creditors to the risk of loss may be counterproductive to the extent that it weakens the credibility of the government's commitment to resolve failing financial firms without a full bailout of creditors. In particular, exposing depositors with relatively low balances to risk does not add much to effective market discipline and weakens the credibility of commitments not to bail out all creditors. Few small depositors are likely to contribute to informed market discipline because few have the sophistication to understand the financial condition of a large, complex bank. When threatened with loss, the reaction of retail customers is likely to be to withdraw from their bank (if possible) or exert political pressure for a bailout. Moreover, discipline from these depositors is typically not necessary because systemically important banks are generally dependent upon their capability to trade and enter into credit relationships with large and relatively sophisticated counterparties.

Although many countries have deposit insurance, some of these systems contain significant flaws that have undermined their capability to confine protection to small depositors.²³ In the case of Northern Rock in the UK, the capability of de jure deposit insurance coverage limits

²³ See Eisenbeis and Kaufman (2007) for a summary of deposit insurance systems in the European Union (EU).

to limit de facto coverage was overwhelmed by two important flaws. First, UK deposit insurance included coinsurance whereby the guarantee covered all of the first 2000 pounds sterling (£), but only 90% of the next £33,000. Second, the UK system did not promise that depositors would have prompt access to their insured balances but instead permitted delays of up to three months with provisions for a further three-month delay. Such a delay would impose substantial hardships on depositors who needed access to their deposits to pay expenses such as rent, utilities, and groceries. As a result, small depositors at Northern Rock engaged in a well-publicized run on the bank and exerted effective pressure for a bailout of the entire bank.²⁴

The deposit insurance problem is in some ways the easiest problem to fix. Deposit insurers have formed international groups to share their experiences and solutions. One of these groups, the International Association of Deposit Insurers, is developing and publishing principles for sound deposit insurance systems. Although a relatively new system, the Malaysia Deposit Insurance Corporation has been one of the more important contributors to the International Association of Deposit Insurers.

4.2 Special Resolution Regimes for Financial Institutions

If losses are to be imposed on uninsured investors at failed systemically important firms, the supervisors must have a credible mechanism for restructuring or winding down the firm without increasing financial instability. One common mechanism for restructuring and winding down firms is corporate bankruptcy.²⁵ Bankruptcy courts are designed to provide due process to the claims on different groups of creditors. This approach is workable when payments on the claims can be suspended while alternative methods of restructuring or liquidating the firm's longer-term assets are evaluated. However, a large part of the business of almost all systemically important financial firms is the payment of old claims, the receipt of funds that generates new claims, and entering into new financial contracts on a daily basis. If counterparties cannot be sure of their status, they will refuse to deal with a bankrupt financial firm, and that firm will be forced to stop operations almost immediately.

4.2.1 Domestic Firms

One solution to the problem of applying the corporate bankruptcy code to financial firms is the creation of a special resolution regime in which financial experts are given the authority and time to restructure the financial institution. In the case of large or complex financial firms, the authorities are likely to temporarily control the failed institution, as happens with bridge banks in the US. Immediately after withdrawing the charter of the failed bank, US authorities can charter a new bridge bank that is under the control of the deposit insurer. The bridge bank then steps into the shoes of the failed bank, receiving some of the assets, all the insured liabilities, some of the remaining liabilities, and some of the derivatives contracts from the failed bank. Those claims that are not transferred are paid out of the proceeds of the liquidation of the remaining assets plus the profit (if any) when the bridge bank is sold back into the private sector. The bridge bank then carries on the operations of the failed bank until those operations are either sold back into the private sector or wound down in an orderly manner.

In the US, the problem has been that the special resolution regime and bridge bank powers are limited to financial firms that are chartered as domestic insured depositories and certain

²⁴ See Milne and Wood (2008) for a discussion of the collapse of Northern Rock.

²⁵ See Bliss and Kaufman (2006) for a comparison of the US corporate bankruptcy regime with the special resolutions regime applicable to commercial banks.

government-sponsored financial firms.²⁶ All other financial firms are subject to the general bankruptcy code. Thus, had AIG failed, it would have been resolved by the bankruptcy court. Moreover, this limitation extends to those parts of US banking groups that do not have a commercial bank charter. This split treatment of banks and their affiliates is a problem because large financial groups tend to operate as integrated entities with most parts of the group depending on other parts of the group for vital services such as information technology, liquidity management, and risk management.

Although a special resolution regime would appear to be a straightforward solution to the problems posed by AIG, some important details remain. One unsolved detail is what the boundaries of special resolutions are. That is, which financial firms should be subject to special resolutions? This problem has two dimensions. First, should the special regime apply to all financial firms or only to some firms? And if so, to which firms? It is not at all clear that there are net benefits to imposing special resolutions on nonbank financial firms that are not systemically important. Yet if the special resolution is to be limited to systemically important firms, it is important that these firms be clearly identified so that the creditors of these firms understand what rules they are playing under. Doing so will require financial regulators to be much more precise about what is meant by a “systemically important” firm. It also raises questions about the impact on competition of having some firms in a financial sector designated as systemically important and others designated as not systemically important.

Another problem with deciding the boundaries of a special resolution is to decide which resolution regime should apply when a systemically important financial firm is part of a group with large nonfinancial operations. This issue would depend on the extent to which the financial and nonfinancial parts are operating as integrated entities. Separate resolution regimes may not be very efficient if the various subsidiaries depend on the same centralized provision of services (such as information technology) or have integrated management structures. But deciding whether to apply special resolutions to the nonfinancial operations on a case-by-case basis would again leave its creditors unsure about which regime will apply to them. An alternative is to incorporate the nonfinancial operations of these groups in the special resolution regime. However, the use of special resolution procedures for the nonbank parts would deprive creditors of the benefits of using normal bankruptcy proceedings. The special resolution regime may also create competitive disparities between firms operating under the bankruptcy code and those operating under the special resolution regime. Finally, the authorities running the special resolution regime may not have expertise in running nonfinancial operations.

An additional issue with special resolutions is whether the government should provide protection to some creditors to further reduce the risk of financial instability. If so, what criteria should be applied? And should it be paid out of general revenues or a levy on financial firms?

4.2.2 International Firms

The resolution of systemically important financial firms with cross-border operations faces all the problems associated with domestic firms plus the added problem that there is not a global system for resolving internationally active firms. Hüpkes (2004) discussed several difficult problems related to restructuring or winding down large and complex financial institutions (LCFIs) operating across national borders.

²⁶ Insured depositories are firms that are chartered to take deposits from the public and are insured by a government agency. This group includes federally insured commercial banks, industrial banks, savings banks, and savings and loan associations. The government-sponsored enterprises subject to special-resolution regimes include Fannie Mae, Freddie Mac, and the Federal Home Loan Banks. See Wall, Eisenbeis, and Frame (2005) for an analysis of the merits of special resolutions for Fannie Mae and Freddie Mac.

One of these problems is that misaligned incentives preclude global solutions. Hüpkes (2004) points out that regulators are accountable to national legislatures for solutions that are optimal on a national level. Their mandate to protect their own national markets and their local creditors will very likely take precedence over solutions that take a more global approach. Rosengren (2009) pointed out an implication of supervisors' accountability to national legislatures. Suppose that the home country supervisor puts the parent operation into a receivership and tries to operate the group as a bridge financial institution. The bridge institution is unlikely to be able to continue normal operation of the firm because host country supervisors will probably impose controls on the transfer of resources to protect creditors in their own countries. Similar problems may arise if the problem is at a systemically important subsidiary located in a host country.

Hüpkes (2004) noted that an LCFI may be too large for the host country (or even the home country) to save. Moreover, even if a country tries to preserve the operations located in its jurisdiction, those operations may depend upon vital services from the parent or subsidiaries located in other countries. If the parent cannot or will not supply these services, the subsidiary in a host country cannot continue.

The problems with resolving part or all of a cross-border LCFI have received some local and regional attention. Mayes (2006) discussed New Zealand's requirements that foreign-owned banking operations be run through subsidiaries and that these subsidiaries be capable of restoring operations within the value day if the parent cannot provide services. According to Mayes, Nieto, and Wall (2008), the problems with cross-border resolution are also being considered in the EU, in which the single passport for financial services firms precludes a New Zealand-type arrangement. However, at this point, it is fair to say that we are a long way from an international framework that would allow the orderly restructuring of a global LCFI in a way that would not have an adverse impact on financial stability.²⁷

4.3 Custom Tailored Failure Plans

The issue of how to maintain financial stability in the presence of a distressed global LCFI cannot be deferred until there is a workable global agreement that provides a general mechanism for resolution. An alternative is to work out tailored solutions for individual LCFIs.

Hüpkes (2004) argued that not all the functions of LCFIs are systemically important to all the countries in which they operate. She recommends that the systemically important functions in each jurisdiction should first be identified. The authorities can then work on arranging a replacement for the important functions or for the systemically important parts to be detached and run separately.

Hüpkes (2004) also recognized that both these alternatives also have problems. The authorities may not be able to arrange for another financial institution to provide timely replacement of some systemically important services of the failed LCFI. Further, detachment can run into a variety of legal problems, some of which have parallels in the problems with resolving the LCFI as a group.

Rajan (2009) proposed that instead of supervisors trying to resolve a complex financial group on their own, the group should be required to develop a "shelf-bankruptcy" plan to be used by the supervisors. He would require that financial institutions track and document their exposures. Rajan (2009: 79) notes that the requirement to develop such a plan would give institutions an incentive to "reduce needless complexity."

With only minor modifications, Rajan's (2009) proposal could be used to help implement Hüpkes' (2004) recommendation. First, financial institutions could be required to identify

²⁷ Even the countries of the EU have not yet adopted a single, efficient mechanism for the reorganization and liquidation of a cross-border banking group. See Garcia, Lastra, and Nieto (2009) for more information.

activities that they perceive as systemically important. Then the institutions could be required to provide more thorough plans for maintaining systemically important services. These plans could include an analysis of the extent to which replacement providers could step in a timely manner. The plans could also include detailed plans and supporting legal analyses for detaching other systemically important units.

A possible problem with Rajan's (2009) shelf-bankruptcy proposal, according to Thoma (2009), is that of the institution's incentives in preparing the plan. From the institution's perspective, the ideal plan would appear to resolve systemic issues in all its jurisdictions without requiring major changes in the institution's operations or structure. If the authorities ever tried to implement such a plan, however, they would quickly discover that it is unworkable and that the only feasible option is for the concerned governments to provide financial support.

Rajan (2009: 79) recognized the problem with financial firms' incentives and would require that "the mechanism would need to be stress-tested by regulators." However, the potential advantages of such stress testing go beyond dealing with the institution's incentive conflict. Such stress tests could provide a valuable mechanism to coordinate discussions among the various supervisors and deposit insurers in the home and host countries. These discussions could involve discussions of which operations in which countries are systemically important to those countries. The discussions could then consider which actions would be taken by the various authorities in the event of financial distress to keep the systemically important services in operation. Such discussions are unlikely to produce a definitive plan that could handle all contingencies, but they should facilitate quicker responses to distress with fewer unintended consequences.

Thus, a shelf-bankruptcy proposal has considerable potential and should receive careful consideration. This proposal is not a complete solution, and was not proposed as such by Rajan (2009), because the current version does not fully address incentives of the financial institutions preparing the plan (Thoma 2009) and the incentives of national supervisors to act in a globally efficient way (Hüpkes 2004). But shelf-bankruptcy plans could be a big step toward better preparing for the failure of an LCFI.

4.4 Contingent Capital

A substitute for resolving a firm in bankruptcy proceedings or through a special resolution regime is to recapitalize the financial institution before it fails. Historically, the responsibility for this recapitalization has largely fallen, directly or indirectly, on the government. An alternative is for the recapitalization to come from the private sector. However, private investors will generally participate only if their investment is expected to yield a positive return at the time it is made. This implies that it is generally too late to seek new private funds after a firm is clearly insolvent. However, investors probably would be willing to invest in such claims while the firm is still solvent, provided that the investors can expect to earn sufficiently high returns if the financial firm does well.

Culp (2002: 47) discussed a variety of structures that provide firms with contingent capital that would allow a distressed firm to continue operation. He defined contingent capital as a contract in which the "company pays an investor a fixed price or premium for the right (but not the obligation) to issue paid-in capital later." The requirement that systemically important financial firms issue contingent capital is at the heart of several recent proposals.

4.4.1 Margin Call

Hart and Zingales (2009) proposed that CDS prices be used to trigger regulatory demands for increased capital at large financial institutions. In particular, if the CDS price (price of protection) rises above some prespecified level, the institution would be told to raise additional capital within a fixed period of time. If the institution fails to raise the required

equity, the regulator would determine whether the firm's debt was at risk (i.e., whether it believed the CDS prices). If the debt was at risk, the regulator would replace the chief executive officer with a receiver (or trustee), wipe out the existing debt and equity, recapitalize the institution, and sell the institution back into the private sector.

As Hart and Zingales (2009) acknowledged, the plan to use a market-based trigger is related to prior proposals to use subordinated debt as a trigger for supervisory action, as summarized in Evanoff and Wall (2000). The most important differences are that Hart and Zingales (2009) used a CDS trigger instead of one based on subordinated debt, and that this new plan comes with an explicit warning from the supervisor to recapitalize the financial institution, or the institution is subject to being forced into resolution (bankruptcy or a special resolution regime).

The use of CDS prices is a new contribution, and a reasonable case can be made that the CDS prices have become better measures of a financial institutions' financial condition than subordinated debt prices. However, the addition of the explicit call for additional capital within a reasonable period of time is less of a change than it might appear. Under the older plans that relied on subordinated debt, financial institutions' managers and supervisors had an incentive to monitor the pricing of the institutions' subordinated debt. If the pricing of the debt suggested some market concerns about the institution, the managers would have been given a warning that they should consider the sale of new capital. Moreover, it seems highly likely that the institutions' supervisors would also have been calling for additional capital in their private conversations with the institutions.

What Hart and Zingales (2009) do not change from the prior plans is the reliance on the institution to raise additional capital or face resolution. Yet the primary reason for the recent interest in contingent capital is the great reluctance supervisors have had in forcing institutions into resolution. If the threat of resolution with losses to creditors is not credible to market participants, CDS prices will not provide a signal when the financial institution is in distress. Moreover, even if the CDS market signals the need to issue new capital, the institution may not issue the capital if it perceives that the supervisors are not prepared to resolve the institution.

4.4.2 Capital Insurance

A proposal by Kayshap, Rajan, and Stein (2008) gave financial institutions the option of replacing part of their capital with an insurance policy that is payable in the event of large losses to the financial system. In order for the policy to be able to pay off with certainty, the insurer would need to purchase Treasury securities that would be put into a custodial account for the duration of the policy.

According to Kayshap, Rajan, and Stein (2008: 454), the advantage of this plan over simply requiring financial institutions to hold more capital is that it can reduce the risk that the institutions' managers will try to put the excess capital to work "independent of how the financial sector subsequently performs." This is beneficial to the institutions' original owners because they would have to bear the full expected costs of any such resource misallocation by the managers.

The benefit of not giving the manager excess capital, however, could be defeated by the managers triggering payments in one of two ways: (i) the proposal could create moral hazard just like deposit insurance by providing a "heads the owners win, tails the insurer covers a large fraction of the losses" environment; or (ii) managers could manipulate the factors used to trigger the insurance payment so that their institutions receive the funds even if they are in good condition. The proposal by Kayshap, Rajan, and Stein (2008) addressed this risk by using a trigger that is based on losses in aggregate capital to financial institutions within some prespecified geographic region, excluding the institution that would receive the insurance payment.

Although the use of aggregate financial institution losses solves the moral hazard problem, it creates another problem in that the insurance provision could not be triggered by problems at one institution, no matter how important that institution is to financial stability. Thus, if the largest financial institution in a country dominated by two or three large institutions were to make a major risk management error not made by the others, no insurance payment would be triggered because the trigger excludes the institution that would receive the payment.

4.4.3 Reverse Convertible Securities

Convertible bonds are securities that convert into common stock at the option of the holder and are typically structured so that conversion is desirable when the firm is doing well. Reverse convertible securities are securities for which the conversion decision lies not with the holders of the securities, but with the firm's managers or is based on prespecified triggers. Reverse convertible securities may be used as a form of contingent capital by requiring the security to convert to common equity when a firm's equity capital is low relative to its risk exposure.

One of the first proposals to require financial institutions to issue reverse convertible bonds came from Stanton (1991: 182).²⁸ He proposed that US government-sponsored enterprises be required to issue subordinated debt that is "structured to convert automatically into common stock under specified circumstances." Stanton's example of this proposal used the net worth to total size ratio as a trigger for conversion. The advantages of this proposal are that it would reduce the cost of obtaining capital relative to requiring capital in the form of shareholder equity and that it would not dilute shareholder equity "until the capital cushion was clearly needed."

Flannery (2005) considered the case for requiring banks to issue reverse convertible debt. He noted that bank supervisors recognize the importance of market discipline from uninsured creditors, but he said that in order for this discipline to be exerted, banks must be allowed to fail, something that the supervisors have proven "very reluctant" to do with "systemically important" financial firms (Flannery 2005: 171). The supervisors could require higher equity capital levels to reduce the probability of distress, but bankers argue that this would raise their cost of funding and make them uncompetitive.

As a substitute for requiring higher equity capital levels, Flannery (2005) proposed that banks be required to issue reverse convertible debt. He said that it would provide four benefits: (i) it would protect depositors and taxpayers while providing a transparent method of automatic recapitalization, (ii) it would force shareholders to internalize the cost of the bank's risk taking, (iii) it would not immediately take from the bank the tax shield of issuing debt, and (iv) it would reduce the incidence of costly failures.

The trigger for the conversion in Flannery's (2005) proposal is the financial institution's capital ratio measure falling below some specified level, where capital is measured using its current stock price. His use of stock market prices in the trigger reflects concern about managers exploiting generally accepted accounting principles to avoid loss recognition.²⁹ If triggered, these notes would convert into equity at the current share price, so the conversion does not provide gains to either the shareholders or bondholders.

The Squam Lake Working Group (2009) proposed another version of reverse convertible securities. Its most important difference from Flannery's proposal (2005) is in the mechanism to trigger conversion. The Squam Lake Working Group (2009: 4) proposed that the debt convert only if both of two triggering events occur: (i) a declaration by the regulators that the "financial system is suffering from a systemic crisis," and (ii) the financial institution violating

²⁸ I am not aware of any prior proposal to mandate the use of reverse convertible securities.

²⁹ Implicit in this is also a belief, backed up by historical data in his article, that the prudential supervisors will not force sufficient writedowns in the value of the distressed bank's assets.

one of the covenants in the reverse convertible security. The group argued that the advantage of the first trigger is that it disciplines financial institution management risk taking. Conventional debt offers a source of discipline that would be undermined if it “conveniently” converted to equity whenever the institution was in distress. This way, the discipline of debt is retained unless the financial system is in distress. The second trigger addresses the problem that would arise if sound financial institutions were required to accept additional capital because of other institutions’ losses. If such conversion occurred, the Squam Lake Working Group (2009: 4) argues that it would “dull the incentive” of these well-managed institutions “to remain sound.”

The Squam Lake Working Group (2009) proposal also differed from Flannery’s (2005) in that it would have the debt convert to equity at a fixed quantity of equity shares instead of at a fixed value of equity. This reduces the risk that the debtholders would try to force conversion at too low a price. It would also reduce the extent to which the firm’s stock price would depend in part on the probability of conversion.

Although the Squam Lake Working Group (2009) viewed the inclusion of a “systemic crisis” trigger as an important improvement over Flannery’s solution (2005), its effectiveness in practice is questionable. If the supervisors view the distressed financial firm’s failure as a systemic event in itself, the requirement that the financial sector is in distress will be nonbinding. What it would do in practice is probably add uncertainty as investors tried to determine which firms are regarded as sufficiently “systemic” by themselves to trigger this clause, and which financial firms would be regarded as systemic only when part of a larger group of troubled firms.

The Squam Lake Working Group (2009) also discussed one important limitation of reverse convertible securities: these securities cannot guarantee that a financial firm will never fail. If a firm suffers losses in excess of its original common equity and its reverse convertible securities, it fails. This limitation applies more generally to all contingent capital proposals; these proposals can provide only a limited cushion against losses. Thus, contingent capital should be viewed as a mechanism to potentially significantly reduce the probability that a special resolutions procedure for systemically important firms would be triggered. However, contingent capital is still desirable to the extent that it lowers the probability of failure and is more efficient than special resolutions procedures.

4.4.4 Tier 1 and Tier 2 Reverse Convertible Securities

One way of viewing Tier 1 and Tier 2 capital is that their role is to absorb losses that would otherwise be taken by the institution’s creditors, or government guarantors, or both. Tier 1 capital should be able to absorb losses in the ordinary course of business. The use of debt in Tier 2 capital means that it cannot absorb losses in the ordinary course of business, but as the most junior form of debt, it should lose all its value before any other creditor or the government takes a loss.

Viewed from this perspective, the only Tier 1 or Tier 2 capital security capital that has fully achieved its purpose as a cushion to absorb losses is the common equity component of Tier 1 capital. The preferred stock component of Tier 1 capital has taken losses to the extent that dividends have been suspended at some institutions. However, for it to absorb losses beyond that point, it has to be converted to common equity.³⁰ Tier 2 capital has not absorbed

³⁰ In a few cases, preferred shareholders have been persuaded to convert to common shares. In some other cases, preferred stock dividends have been suspended and they do not cumulate while suspended. But the charter must be withdrawn before preferred stock can be written down. Moreover, if a distressed firm’s condition should improve sufficiently to allow it to pay dividends, preferred dividends will continue to have priority over common dividends. This raises the possibility that common shareholders will control the governance of the firm even though these shareholders have little prospect of receiving dividends in the foreseeable future.

losses because governments have not withdrawn the bank charters of systemically important banks.

However, both preferred stock and subordinated debt could fulfill their purposes if they were structured as reverse convertible securities. Such a conversion feature for the parent financial firm would work as follows:

- Preferred stock would be converted on terms consistent with its role as Tier 1 capital. The preferred stock would convert to common equity at the current market price of common stock, as proposed by Flannery (2005). This conversion need not trigger any immediate change in the governance of the firm.

The primary trigger for the conversion would be when the firm's tangible common equity ratio dropped below some threshold level. An additional fail-safe trigger would also be set using a capital adequacy ratio based on the market value of the firm's common stock. The purpose of the fail-safe trigger is to prevent institutions and their supervisors from thwarting the purpose of the tangible common equity by refusing to recognize losses in the asset portfolio. As such, the market value trigger would be set at a level at which the book value threshold should virtually always be violated before the firm falls below the market value threshold if the firm's accounting values are reasonably close to their economic value.

- Subordinated debt would convert on terms consistent with its role as an element of Tier 2 capital that should bear losses only in the event of "failure." As such, the subordinated debt would convert to common equity on terms intended to approximate that of a "prepackaged bankruptcy," without the bankruptcy court.

If conversion is triggered, it is done so at a fixed ratio that would give the former subordinated creditors 99% of the outstanding shares. A new board of directors of the firm would be elected within 30 days of the conversion. The existing board members could run for reelection, but the new shareholders would be allowed to nominate new board members that would appear on the election ballot. The existing management of the financial institution would be required to tender its resignation at the first meeting of the new board.³¹ The new board could accept the resignations without triggering any requirement that the firm make additional payments to the managers (such as change of control payments).

As with the preferred stock, the conversion of preferred stock could be triggered by either the firm failing a tangible common equity or a market trigger. The market trigger could be based on the value of the common equity test (in which all the preferred stock would first be converted to common equity), or it could be based on CDS pricing using a mechanism along the lines of that proposed by Hart and Zingales (2009). Again, the market value trigger would be a fail-safe mechanism that should only be triggered if the book values diverged greatly from market values.

An important element of this proposal that would need to be determined is how to set minimum regulatory requirements for common equity and reverse convertible securities. The proposal does require, however, that Tier 2 reverse convertible securities be issued in an amount at least equal to the minimum Tier 1 requirements so that the institution is adequately capitalized after the conversion. Note that this proposal would also permit Tier 1 and Tier 2 capital requirements to be set in a procyclical manner, as recommended by Brunnermeier et al. (2009) to further reduce the risk that an institution will become insolvent.

³¹ The bank supervisors would also be authorized to appoint interim managers after the conversion and before the new board meets if doing so would, in the supervisor's judgment, help to preserve the value of the bank.

One limitation of the Flannery (2005) and Squam Lake Working Group (2009) proposals is that they did not address the important difference between parent corporations and their subsidiaries. The conversion of reverse convertible debt into equity will reduce the proportion of shares held by the original owners.³² This change in ownership may be desirable from a prudential supervisory standpoint for the parent corporation in that it imposes costs on owners of firms that did not adequately manage risk. However, such a change in ownership may have an undesirable side effect on the subsidiaries in financial groups: reducing the rest of the group's incentives to work with that subsidiary. For example, if the group has central risk management, the risk managers may decide to transfer some risks out of subsidiaries that are wholly owned by the group and into a subsidiary that is only partially owned after the conversion of the reverse convertible securities.

A better alternative for implementing reverse convertible securities at a subsidiary level is to have the securities convert into the parent's common stock and have the parent then use the proceeds to purchase the subsidiary's stock.³³ This alternative would provide for an increase in the subsidiaries' common stock without weakening the link between the subsidiary and its group affiliates.

4.4.5 Summary

The previous analysis strongly suggests that neither microprudential regulation nor macroprudential regulation is likely to prevent large interconnected financial firms from suffering losses in excess of their capital. If such a firm becomes insolvent, the application of normal bankruptcy procedures risks creating financial instability. A special resolution regime would likely help, but it may not be adequate for firms with large cross-border operations. That suggests that there would be a high payoff for implementing procedures using private funds to recapitalize the financial institutions before insolvency.

There are several contingent capital proposals that would commit private investors to helping to recapitalize financial institutions. None of these proposals would prevent failure, but they would work to substantially reduce the probability of failure, both by providing additional funds and making investors more sensitive to failures in financial institutions' risk management. It is too early to endorse any one of these plans because important details remain to be developed for each plan. However, it is clear that further work on contingent capital should be a priority.

5. CONCLUSION

The recent turmoil in financial markets has provided many examples of why the structure of the microprudential, macroprudential, and market discipline is important. The recent experience serves as a reminder of old lessons in the area of microprudential regulation: the choice of regulatory structure is a crucial part of setting microprudential policy. If the structure of the prudential supervisor is based on something other than prudential regulation, prudential supervision is likely to receive lower priority than the other concern. For example, if microprudential supervisors are structured around subsectors of the financial system, especially small subsectors, the supervisor is likely to view preserving and expanding that subsector as more important than prudential supervision.

³² Except in the case where the original owners also own all of the reverse convertible securities.

³³ In order to avoid having any funds leaving the subsidiary, this transaction could be structured as the parent and subsidiary first swapping shares, and the securities holders then converting their claims into the parent's common stock.

The recent experience also demonstrated that macroprudential supervision is necessary. Ideally, the macroprudential supervisors that come out of the current experience will be both bold and modest. They will be bold in their determination to understand the major risks facing their financial system, going wherever necessary to understand the nature and distribution of the risks. Given the global nature of the financial system, this boldness must extend to being willing to work with other macroprudential supervisors around the globe.

But all concerned also need to be modest in their expectations of what can be done. Macroprudential supervisors cannot guarantee an end to all financial instability, and trying to attain such a goal could be worse than having no macroprudential supervisor. A macroprudential supervisor trying to prevent all instability will have an incentive to severely limit the financial system's capability to innovate and to take risk. This will prevent the financial sector from fulfilling its resource allocation responsibilities. Further, when incipient instability appears, the macroprudential supervisor (and likely its government) will be under greater pressure to engage in bailouts to prevent or limit the instability.

Finally, the market discipline structure is also important. Supervisors cannot observe (and certainly should not second guess) every financial decision made by systemically important financial institutions. The managers of financial institutions and their investors must have adequate incentive to manage their risk exposures to keep them within reasonable limits. In order for this discipline to occur, managers and investors must believe that they are at risk of loss from inadequate risk management.

The key to credibly placing managers and investors at risk is setting up procedures that would allow systemically important financial firms to fail without a significant adverse impact on the financial system or the real economy. In this respect, the importance of a sound deposit insurance has come to be more widely appreciated, most notably with the post-Northern Rock reforms in the UK. There is also increased recognition of the merits of special resolutions procedures for systemically important financial institutions, including in the US, which has special procedures for chartered banks but not for other financial firms.

Even these measures are not likely to be adequate for handling a failing financial institution with substantial cross-border operations, however. Thus, serious consideration should be given to two additional measures. One of these measures would be to better plan for the resolution of systemically important groups by requiring the financial institution to develop a plan for its own resolution. Such a plan would be useful both for its home supervisor and in coordinating the resolution plans of the institution's home and host supervisors. The other measure would reduce the probability that a financial institution would become insolvent by obtaining contingent capital commitments while that institution is healthy that would recapitalize the institution if it becomes undercapitalized. The terms on which the private sector would supply such contingent capital would impose a cost on higher-risk institutions. Moreover, if the conversion is properly structured, it could impose significant costs on the shareholders and managers should the institution become so weak that it triggers the conversion.

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