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Financial Stability Frameworks and the Role of Central Banks: Lessons from the Crisis

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Abstract

The depth and breadth of the ongoing financial crisis motivates a review of financial stability frameworks and within that the role of central banks in financial stability. This paper contributes in four ways. The paper reviews the tools that are typically at the disposal of central banks (including monetary policy). It then assesses the benefits and costs of an expanded role of central banks in financial regulation. The paper goes on to explore in detail the objectives, tools, and scope of financial regulation. Building on this prior analysis, the paper examines finally the design of regulatory structures. General principles that can inform the design of the structure are provided and strengths and weaknesses of existing structures reviewed. Two existing models are both characterized by a small number of agencies (the integrated model and the twin-peaks model). Since the optimal solution may be path-dependent and specific to the development of the financial sector in any given country, a number of hybrid models are also discussed.

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Contents	Page
Executive Summary	3
I. The Role of Central Banks in Financial Stability—Lessons from the Crisis	6
A. Monetary Policy	6
B. Provision of Systemic Liquidity	10
C. Lender of Last Resort and Resolution of Failing Institutions	11
D. Oversight of Payment and Settlement Systems	13
II. Costs and Benefits of a Role of Central Banks in Financial Regulation.....	14
III. Recent Debates on Financial Stability Frameworks	19
IV. Financial Regulation—Objectives, Tools, Scope	24
A. Why Regulate Financial Institutions?	24
B. How to Regulate Financial Institutions?	26
C. Who Should be Regulated?	31
V. Financial Regulation—Agency Structure	37
A. Principles.....	37
B. Comparison of Existing Structures	39
VI. Conclusions.....	54
References.....	56
Figures	
1. Developed Europe: Bank Losses	63
2. Developed Europe: Overall Loss to Credit Ratio	64
Boxes	
1: Originate and Distribute and Systemic Risk.....	34
2. Financial Stability Frameworks Across Countries	41
3. Special Considerations for Government Sponsored Entities	49
4: International Considerations	53
Appendixes	
I. Some Preliminary Empirical Analysis	60

EXECUTIVE SUMMARY

The depth and breadth of the financial crisis has given fresh impetus for authorities around the world to rethink existing financial stability frameworks. Such revision needs to start from reconnecting with the objectives of financial regulation. With hindsight, there has been a collective failure to address a key objective—mitigation of systemic risk.

- Central banks and supervisory agencies have not put enough energy into the development of macroprudential tools that can, alongside monetary policy, be used to address the build-up of exposures to aggregate risks.
- Treasury departments have been slow to introduce and adjust the scope of special resolution regimes that mitigate the systemic impact of failure and that can address moral hazard incentives arising from implicit safety nets.
- Prudential supervisors have not developed and applied heightened prudential standards for large and complex institutions whose failure can have a major disruptive effect on financial markets.
- Central banks have not always been successful in promoting systemically robust procedures for the clearing and settlement of trades in rapidly-evolving financial markets. The example highlighted by the crisis is a lack of a robust infrastructure for credit derivatives.
- The overall framework does not appear to have been fully conducive to achieving its objectives, often leaving ill-defined the responsibilities and tools of central banks in their pursuit of financial stability.

More effective mitigation of systemic risk requires completion of the set of tools that can be used in the pursuit of financial stability. However, this begs the question of who should be charged with applying these tools; and more generally, which regulatory structures are conducive to successful mitigation of systemic risk? An important issue within that—highlighted by the actions taken by central banks since the onset of the crisis—is that of the proper role of the central bank in the overall framework.

This paper is an attempt to clarify some of these issues. It first reviews the role of central banks in the mitigation of systemic risk, using the tools that are typically at their disposal—monetary policy, provision of aggregate liquidity in money markets, lender of last resort (LOLR), and oversight of clearing and settlement systems. In addition, the paper offers a comprehensive review of the costs and benefits of a more formal role of central banks in financial stability, including a more formal and expanded role in financial regulation.

The analysis suggests that an expanded role of central banks that goes beyond the tools already typically at their disposal, may enhance the overall effectiveness of financial regulation, allowing synergies to be exploited between existing and new regulatory tools to mitigate systemic risk.

- An expanded role in financial regulation can harnesses central banks' incentives to mitigate systemic risk. It can harness their expertise in macro-financial analysis to inform the design and use of macroprudential tools. It can harness knowledge of the infrastructure supporting trading in financial markets in crisis management. It can also enhance access to information and complete central banks' toolsets in risk reduction.
- An expanded role in financial regulation can also come with costs. However, contrary to the received wisdom that emphasized potential conflicts between prudential and monetary policy, the lessons that are now being drawn from the crisis point to potential synergies between monetary policy and financial regulation. These complementarities may come into sharper relief as both monetary and prudential policies are revised to take greater account of the need to mitigate systemic risk.
- More effective use of all available tools may reduce the frequency of crises and can reduce their impact, reducing the chance that political pressures are brought to bear on the central bank during crisis situations.

The paper goes on to analyze from first principles the objectives, tools, and scope of financial regulation, taking account of both consumer protection objectives and the objective to mitigate systemic risk. Using these elements, the paper finally addresses the question of agency structure. It establishes general principles for the design of the overall agency structure and reviews existing and evolving financial stability frameworks across countries.

It is noted that, in line with a trend away from more fragmented models, two existing models reduce the number of agencies down to two: (i) the single integrated regulator model, where an integrated regulator operates alongside the central bank; and (ii) the twin-peaks model, where the central bank is the prudential and systemic risk regulator and operates alongside a conduct of business regulator.

A twin-peaks model harnesses the incentives and expertise of central banks in systemic risk mitigation and reduces the need for inter-agency coordination in this regard. This model may therefore become more attractive relative to the integrated structure, when agency design is geared more explicitly towards the mitigation of risk—such as through the introduction of new macroprudential tools that could be used alongside monetary policy to contain macro-systemic risks; through enhanced regulation and special resolution regimes for systemically-important institutions; and through a more integrated approach to the oversight of payment and settlement systems.

A number of hybrid approaches are also discussed that offer different degrees to which a central bank takes on a supervisory role, different ways in which systemic risk mitigation is operationalized within the agency structure, and different relationships between the central bank and the conduct of business regulator.

These hybrid models offer different profiles of benefits and costs that are usefully studied in the context of an application to countries that differ in the development of the financial sector. Moreover, radical reform of financial stability frameworks can be disruptive and may not always be the preferred option. In some cases, incremental changes can be made instead to address weaknesses, for example by clarifying the interests of each agency and by operationalizing inter-agency cooperation where it is needed.

If the central bank is given a stronger role in financial stability, including a stronger influence on the financial regulation of individual institutions, as well as a more clearly defined role in their resolution, these powers need to be complemented by robust mechanisms that ensure transparency and a high degree of accountability of the central bank's actions in safeguarding financial stability. In addition, the overall framework needs to clarify that ultimate responsibility for quasi-fiscal costs incurred in the resolution of financial institutions needs to rest with the treasury.

Finally, while the design of national frameworks can contribute to the success of financial stability policy, success also depends on a number of other factors, including intellectual clarity on the way financial markets respond to regulatory and monetary policy as well as the quality of leadership, and the resources assigned to central banks and supervisory agencies.

The remainder of this paper first covers the role of central banks in financial stability (Section I) and the benefits and costs of an expanded role in financial regulation (Section II). It goes on to sketch out current debates on financial stability frameworks in a number of countries (the United States (U.S.), the United Kingdom (U.K.), Germany, and the Euro area) (Section III). Stepping back, and starting from first principles, Section IV turns to an analysis of the key questions that need to be addressed in designing the regulatory framework:

- Why regulate financial institutions?
- Who needs to be regulated?
- How—using which tools—should regulation be conducted?

Building on this analysis the question of agency structure—by whom should regulation be carried out?—is addressed (in Section V).

I. THE ROLE OF CENTRAL BANKS IN FINANCIAL STABILITY—LESSONS FROM THE CRISIS

A. Monetary Policy

The recent crisis has reopened the debate about whether and how central banks should take into account developments in asset prices, leverage, and credit growth. As this crisis has shown, by aiming to achieve—and by achieving—a narrow price stability objective, central banks may come to neglect developments in credit growth and asset prices. They may then miss a build-up of credit and leverage in the system that, over a longer horizon, proves unsustainable.

The Bank for International Settlements (BIS) has argued for a long time that the financial system is inherently procyclical and thus chronically prone to bubble-like behavior (Borio and Shim, 2007 and Borio and White, 2004). As the BIS has pointed out, on this as well as on many other occasions, very rapid credit growth led to increases in asset prices above fundamental values, which in turn fuelled a boom in consumption and investment (White, 2008).² In all of the cases of the Great Depression in the U.S., Japan in the 1990s, and East Asia from 1997, the crisis was preceded by rapid credit creation which manifested in higher asset prices and thus higher collateral values that led to further increases in credit.³

While these mechanisms are now increasingly well understood, at the present juncture we are still some way from a consensus about what, if anything, central banks can do to solve the problem: some have for a long time advocated shading of the interest policy—‘leaning against the wind’—to counter an increase in asset prices and acceleration of credit. Others (e.g., Bernanke and Gertler, 2001) have argued that:

- using interest rate policy in this way may not be powerful enough to dampen the upswing of asset prices and leverage, and that if it were used it would create costs for the central bank’s other objectives;
- asset bubbles are not easily detected and their impact on the economy not easily assessed; and
- interest rate policy that leans against the wind is costly relative to the cost of dealing with the fall-out ex post.

² In open economies, moreover, the increase in credit and the resulting consumption boom tends to be underpinned by capital inflows and an over-appreciation of the (real) exchange rate relative to its fundamental level, further relaxing borrowing constraints (Korinek, 2008). As a result of both increases in asset prices and exchange rates, leverage increases while the quality of credit deteriorates.

³ White (2008) counts the 2001 bursting of the tech bubble as a crisis that should have been prevented by policymakers. However, Mishkin (2008) argues that stock market bubbles pose a risk to the economy only if they are underpinned by a financial accelerator channel that involves assets used as collateral for bank credit.

However, if monetary authorities behave in this way, they are effectively writing a ‘put’ that enables financial markets to sell the ‘financial mess’ to the authorities ex post. To be certain, it must be right for the authorities to offer some such (monetary) insurance, all the more so when market failures lead to an endogenous downward spiral of falling asset prices and tightening credit, adversely affecting real activity and overall welfare (Diamond and Rajan, 2006). However, there are a number of important qualifiers.

- Firstly, it can hardly be efficient for this insurance not to be priced. It is commonplace in financial markets for whoever writes a put to receive a premium upfront. When such a premium is not collected, this creates incentives for financial firms to over-extend themselves, reaping inflated rewards along the way. In short, the expectation of a (monetary) bail-out creates moral hazard.
- Secondly, what is clear from the ongoing crisis is that it is by no means always easy or costless for monetary authorities to clean up the fall-out ex post. Monetary policy may lose its effectiveness in “cleaning up the mess,” when the unwinding of financial imbalances adversely affects or puts in doubt the solvency of the banking system, as was the case during Japan’s lost decade and the U.S. Great Depression, and is evident since the breakdown of interbank markets and the inability of banking institutions to raise capital during the most recent crisis. Moreover, as the nominal zero bound is approached, monetary policy can fall into a liquidity trap; a situation when real rates remain positive despite efforts to ease monetary conditions. In these cases there may be no other choice but a costly fiscal bailout.
- Thirdly, the unwinding of financial imbalances entails costs for central banks’ key macroeconomic policy objectives, which are compounded by limited effectiveness of monetary policy. When the effect of frozen credit markets on the economy cannot be countered effectively by monetary policy, this may lead aggregate demand to collapse and unemployment to increase sharply. Moreover, the ability of monetary policy to attain its price stability objective may become seriously impaired. This may take the form of greater variability in inflation outcomes, as policy becomes focused on sustaining the financial sector. It may also involve persistent deflation that puts further pressure on the balance sheets of debtors, thus deepening the downturn.

As a result no doubt of the recent experience, central banks are reviewing the contribution that monetary policy can make to counter the build-up of financial imbalances, by thinking through how monetary policy can take greater account of developments in credit, leverage, and asset prices. Central banks (including the Federal Reserve (Fed)⁴ and the Bank of England (BOE)⁵) have also called for a closer investigation of macroprudential tools that

⁴ See Mishkin (2008).

⁵ See Gieve (2008), Tucker (2008) and King (2008).

could have a more targeted effect on the financial sector and that could be used in addition to the interest rate to respond to the challenges posed by financial cycles.

There are already a number of proposals as to how a countercyclical regulatory tool could be designed. For example, Goodhart and Persaud proposed to calibrate capital buffers above Basel minima to the loan growth at each individual firm.⁶ Another approach is to introduce a dynamic provisioning framework, such as the one the Bank of Spain has operated since 2000.⁷ A maximum leverage ratio is a further tool that might constrain the build-up of financial imbalances.⁸ At the time of writing, the question of which of a number of potential tools may be most promising, is debated actively by the Financial Stability Forum (FSF)⁹ as well as by the Basel Committee. There is widespread agreement that there is a need to encourage the build-up of buffers in good times so that they can be drawn upon in bad times. This not only helps reining in the growth of credit and leverage as financial imbalances build up; it also protects the core of the financial system when such imbalances unwind.

Notwithstanding, such countercyclical prudential measures pose a number of practical difficulties. They need to balance the objective to counter financial excesses with a need for a dynamic financial sector, capable of supporting the growth of the economy. And while there are advantages of designing policy rules upfront—reducing supervisory discretion and introducing pre-commitment—such rules may have their limitations and may need periodic updating in order to avoid the risk that they be arbitrated; and more generally to ensure that they keep pace with developments in the financial sector. At times, policy rules may also need to be complemented by discretionary actions that respond to developments in particular markets.¹⁰

Macroprudential policies may be most successful in the presence of an overall policy framework that fosters complementary use of monetary and macroprudential policies.¹¹ The policy framework can benefit, if it can harness the central bank's institutional **expertise** in

⁶ *Financial Times*, June 4, 2008 and Brunnermeier et al (2009).

⁷ See Caruana (2005) for further analysis.

⁸ This tool is in place for commercial banks in the U.S. and Canada. A number of countries across Eastern Europe and Asia have also made attempts to use prudential measures to limit the growth of credit, including through maximum loan to value ratios and variations in reserve requirements. Borio and Shim (2007) provide a survey, identifying 18 countries where prudential rules have been used in this way.

⁹ A meeting of the G20 in London on April 2, 2009 decided to re-establish the FSF as the Financial Stability Board (FSB).

¹⁰ This point is discussed further by Turner (2009), pgs. 60–1.

¹¹ Borio and Shim (2007) list 18 cases across Europe and Asia where countries have pursued measures designed to stem accelerating credit growth. In all but two cases (Korea and Norway) these actions were implemented by the central bank, rather than by a separate supervisory agency.

assessing macroeconomic conditions and macro-financial risks, which can inform the design and continued review of macroprudential policies.

The policy framework can benefit also from harnessing central banks' **interest** in ensuring the effectiveness of macroprudential measures. Closer analysis suggests that central banks have incentives to ensure effective application of macroprudential policies, for three reasons:

- An unwinding of financial excesses can have substantial costs for a central bank's macroeconomic policy objectives, including price stability and growth.
- If prudential tools are not applied effectively, monetary policy may need to take a bigger burden in countering the build-up of imbalances in financial markets, with attendant costs for the central bank's other objectives, such as price stability.
- The unwinding of financial excesses can compromise the effectiveness of monetary policy.

There is an important question also as to whether the success of macroprudential tools can be assured when these operate in the absence of complementary monetary policy. Incentives to circumvent countercyclical regulations may prove too strong when accommodative monetary policy fuels the demand for credit.¹² These considerations point to the need for central banks to rethink the role of monetary policy in contributing to the success of financial stability policies, not just by softening the impact of the unwinding of financial imbalances, but also by containing the build-up of these imbalances. As advanced countries emerge from the current period of quantitative easing, the question arises as to how and to which extent existing monetary policy frameworks need to be adjusted, so that future frameworks can take more explicit account of financial stability objectives.¹³ A number of options are being discussed:

1. Monetary policy **objectives** could include financial stability as an explicit secondary objective to complement the primary objective of price stability.
2. Monetary policy **targets** could take explicit account of certain asset prices or developments in credit markets. For example, while most monetary authorities focus

¹² The experience in Spain provides an example that even where macroprudential stabilizers (such as dynamic provisioning) appear effective in protecting the banking system, unsustainable financial imbalances can still build up in the household and corporate sectors.

¹³ Progress in the early identification of financial imbalances is a condition for such a revision of policy to be useful. Such progress might build on research by Borio and Lowe (2004) who have found that it is possible to predict banking crisis episodes fairly well based on misalignments—measured by deviations from historical trend growth—in two indicators, namely equity prices and the ratio of private sector credit to GDP. This method may work fairly well as long as there is high correlation across asset markets. Both the IMF and a number of central banks around the world have, over the past year or so, stepped up their research efforts to better understand macro-financial linkages.

- on a price index that excludes all asset prices, it has been suggested that certain asset prices—that are known to be related to collateralized credit, such as house prices—could be included (Brunnermeier et. al., 2009). Alternatively, secondary targets, such as the European Central Bank’s (ECB’s) monetary pillar, could be revised to more strongly reflect developments in credit rather than or—in addition to—monetary aggregates. This would open up the possibility of placing additional weight on these developments in a judgmental way.
3. The **horizon** over which the policy target is meant to be met could be extended.¹⁴ Current inflation targets are often set over relatively short horizons (often two years), while financial imbalances typically take longer to build up. An extension of the policy horizon to the medium-term would allow a stronger emphasis on risks to the policy target further down the road.

B. Provision of Systemic Liquidity

Since the onset of the financial crisis in August 2007, central banks have provided liquidity in interbank and other wholesale markets. Central banks have amended aspects of their monetary operations to relieve liquidity stress. They have, for example, reduced the penalties associated with banks missing their reserves targets and reduced the discount rate at which banks could access standing facilities. When banks became reluctant to lend to each other, central banks increasingly interposed themselves between banks that were short liquidity and those that were long. Central banks also changed the terms of open market operations, increasing the maturity of liquidity provision, and extending the type of collateral accepted in these operations to more illiquid and credit-risky securities. Some central banks also needed to expand the set of their counterparties in order to ensure that liquidity could flow where it was most needed. While many of these actions were initially taken with the aggregate amount of reserves provided to the system kept constant, banks have since expanded their balance sheet, blurring the distinction between systemic liquidity provision and unconventional monetary policy.

The role of the central bank as provider of market liquidity during times when financial markets have become disorderly and illiquid, has been referred to as that of the market maker of last resort (MMLR). Buitert (2008) compares the effectiveness of these policies during the crisis across a number of central banks, including the ECB, the BOE, and the Fed. However, the phenomenon of central banks providing liquidity to the banking system and wider financial markets in crisis times is not new. The Bank of Japan took similar action during the early 1990s, when the collapse of asset prices put bank balance sheets under stress. Central banks throughout Latin America have provided systemic liquidity in response to a number of banking crises in the region since the mid-1990s (Jacome, 2008).

¹⁴ As suggested by Borio and White (2004), and Mishkin (2008).

Central banks take these actions to contain the impact of a realization of systemic risk on the financial system and the economy. But the containment of banking crises does not come free. Provision of liquidity in interbank markets against credit-risky collateral can, in the longer run, put central banks' balance sheets at risk. It also complicates the implementation of (conventional) monetary policy, as the central bank needs to sterilize ever larger amounts of liquidity and communicate the distinction between its monetary policy stance and the objectives of liquidity provision. In small open economies in particular, systemic liquidity provision can lead to a sharp depreciation of the exchange rate and, in the longer run, increase inflation (Jacome 2008).

Since the realization of systemic risk and its containment through liquidity provision is costly for central banks' objectives, central banks have an **interest** in reducing the frequency of systemic liquidity stresses. This implies an interest in the regulation of key private liquidity providers (such as commercial banks) and the regulation of markets whose collapse might lead to solvency and liquidity stress at these institutions.

C. Lender of Last Resort and Resolution of Failing Institutions

In their capacity as LOLR, central banks have traditionally extended credit to individual banks who see an outflow of liquidity and are unable to finance this in interbank money markets.¹⁵ The experience also highlights how—as an extension of their role of LOLR—central banks tend to become involved in the resolution of individual systemically-important institutions that are under particular liquidity stress. This includes important deposit takers (e.g., Northern Rock), but can go beyond this class to take in those institutions whose failure is disruptive to broader financial markets (e.g., Bear Stearns and AIG).

In these cases, since the beginning of the crisis, central banks have provided emergency liquidity assistance until a more permanent solution was found—as did the BOE in the case of Northern Rock—or have supported a private solution with a line of credit—as did the Fed in the case of JP Morgan Chase's takeover of Bear Stearns. Later, they also acted as a bridge bank, taking temporary control of the failing institution, as did the Fed in the case of AIG. Through these actions, central banks become intimately involved in the negotiation of a permanent resolution that involves a private bidder, or (ultimately) public capital support and nationalization.

It is now becoming more widely accepted that a central bank's de-facto role as LOLR and as an agent in the resolution of systemically important financial institutions gives them an interest in the regulation and supervision of these institutions.

¹⁵ The set of banks eligible to receive individual support typically includes all major deposit-taking institutions. In the U.S. this has in March 2008 been extended to U.S. investment banks, through establishment of the Primary Dealer Credit Facility and the Term Securities Lending Facility.

Closer analysis suggests that this interest is linked to four separate considerations:

- **Assessing solvency.** Central banks will only be called upon to lend when the market has stopped extending credit, typically as a result of uncertainty over the long-run viability of the institution. The main way of obtaining knowledge that goes beyond what is known by the market is through supervisory information on individual firms.
- **Gauging systemic impact.** Access to supervisory information helps the central bank gauge the systemic impact on other institutions and the broader economy of the failure of a stricken institution, and can help form a judgment on whether or not to intervene. The difficulties in gauging the systemic impact of institutions have been clearly shown up in the cases of Bear Stearns, Lehman, and AIG.
- **Moral hazard arising from the safety net.** Central banks provide liquidity support to individual institutions. This may create moral hazard incentives when institutions expect to receive assistance. Therefore, central banks have an interest in the prudential liquidity regulation and the effectiveness of supervision of institutions they may need to lend to as a last resort.¹⁶
- **Potential loss of reputation.** Because of their role as a “fire-brigade,” central banks face reputational costs from any—real or perceived—mistakes in the handling of crises. This means that they have some “skin in the game,” creating an interest in reducing the frequency of crisis events. This translates in an interest in the prudential regulation (capital and liquidity) of systemically important financial institutions, as well as their effective supervision.

Failures of regulatory agencies in the prudential control of institutions can also affect the reputation of these agencies. This in turn can prompt a review of prudential policies—e.g., as conducted by the Financial Services Authority (FSA) in the wake of the failure of Northern Rock and by the Securities and Exchange Commission (SEC) in the wake of the failure of U.S. investment banks such as Bear Stearns. However, in these cases, a central bank’s reputation is put on the line even if it is not the supervisor of the failing institution, because of its role in resolution of systemically-important institutions and the potential for mistakes in that role.¹⁷ This implies that central banks have an **incentive** to reduce the frequency of

¹⁶ As the *Financial Times* put it on 10 July 2008, “the problem is that the Fed has little power to regulate the brokers. A promise to lend to them in need without adequate means to ensure that they are prudently managed is entirely unsatisfactory for the Fed”. Ratnovski (2009) formalizes the incentives for banks to gamble for a liquidity bailout and discusses policies to reduce these incentives, including liquidity requirements and greater information about the solvency of the individual firms.

¹⁷ For example, the BOE had to defend its actions in the case of Northern Rock in front of a parliamentary committee that sought to establish whether it might have been possible to resolve Northern Rock more effectively, by taking early action to facilitate a private sector sale, see Treasury Select Committee (2008). The Fed, likewise came under pressure to explain its decisions in the cases of Bear Stearns and Lehman. And it later

(continued)

having to act in crisis situations. This incentive can be harnessed in the design of the overall financial stability framework, through giving them influence on the prudential control of systemically-important institutions.

D. Oversight of Payment and Settlement Systems

Traditionally, central banks have played a role in the design and oversight of systemically-important payment and settlement systems, and have striven to reduce counterparty credit risk inherent in these systems. There have been important successes in recent years in addressing systemic risk in national and international payment and settlement systems.¹⁸ Due in no small part to these initiatives, the main payment and settlement systems in developed economies have proved remarkably resilient to the stresses put on them during the crisis.

Since 2005, there has also been an effort on the part of central banks, led by the Federal Reserve Bank of New York, and industry participants to reduce counterparty credit risk in bilaterally cleared “Over-the-Counter” (OTC) derivatives markets, most notably markets for credit default swaps (CDS).¹⁹ However, success here has been slow, and in 2007 there was a rise in the backlogs of unconfirmed trades, amid a further increase in the gross exposures created in the market. Shortcomings in the infrastructure for OTC markets, notably the absence of a central counterparty,²⁰ are thought to have contributed substantially to the likely systemic impact had Bear Stearns been allowed to fail (Bernanke, 2008a). They were also an important concern in the decision as to whether Lehman and AIG could be allowed to fail.²¹

This points to the need for banks to have formal powers of oversight over systemically-important clearing and settlement **systems**. But they may also need a stronger lever over **users** of such systems if progress in system design relies on the cooperation of users (members) of (new or existing) systems. In the absence of formal powers over system users, central banks have so far relied mainly on moral suasion. However, their hand could be

needed to defend itself against the perception that bonus payments at AIG could have been prevented while AIG was under the Fed’s control.

¹⁸ Noteworthy developments are: the rise of Real Time Gross Settlement (RTGS) and Delivery versus Payment (DvP) for national payment and settlement systems, respectively; and the introduction of Payment versus Payment (PvP) in the settlement of foreign exchange transactions via CLS.

¹⁹ See Committee on Payment and Settlement Systems (2007). Prudential regulators, including the UK FSA have also been involved in this effort. Clearing procedures are more generally of interest both to regulators of securities markets and to central banks.

²⁰ At the time of writing, efforts to create a central counterparty have intensified, both in Europe and in the U.S.

²¹ In the event, while the settlement of CDS contract written on Lehman’s default has been unexpectedly smooth, the failure of Lehman has caused losses at financial institutions around the world, some of which might have been lower in the presence of a central counterparty, which may have insisted on a more robust margining of contracts. This consideration may also apply to the case of AIG, since AIG was an important provider of protection for credit risky securities.

strengthened through giving them enhanced influence over the prudential regulation and supervision of these institutions.²²

II. COSTS AND BENEFITS OF A ROLE OF CENTRAL BANKS IN FINANCIAL REGULATION

The discussion in the previous section points to a number of synergies between the tools already typically at the disposal of central banks and an expanded role in financial regulation. This means that an expanded role of central banks in financial regulation may come to increase the **effectiveness** of financial regulation. Before turning to potential costs, it is useful to collect some of the benefits that the analysis has highlighted so far.

- The realization of systemic risk is costly for central banks. This creates **incentives** on their part to reduce the frequency of systemic crises, using macroprudential tools to reduce macro-systemic risk and microprudential tools to reduce the frequency and impact of crises at individual systemic institutions.
- A role in financial regulation can harness central banks' **expertise** in macro-financial analysis that can in turn inform the design of macroprudential tools. This role in macroprudential policy can also be viewed as completing the central bank's **tool set** when both monetary policies and macroprudential policies are used in complementary ways.
- A central bank's **expertise** in financial infrastructure is useful in crisis management and can be harnessed in the development of microprudential tools that reduce the systemic impact of failure, by encouraging the use of systems that pose less systemic risk. A role in the design of such microprudential tools would further complete the **tool set** in the oversight of systemically-important payment and settlement systems.

Received wisdom holds that a regulatory role of the central bank brings potential **costs**. A comparison of benefits and costs of an expanded role of central banks in financial regulation needs to take full account of these potential costs. A number of arguments have been advanced and each therefore merits careful consideration.

Potential conflict with the LOLR. Goodhart (2000) suggested that the central bank may have the resources and discretion to sustain an insolvent institution under its supervision even when it should be resolved.²³ While a potential concern in principle, the crisis experience may put in doubt its practical validity.

²² Austria is an example where the central bank has formal authority in payment system oversight that includes strong powers over system users. According to the central bank law, if an operator or participant does not comply with the regulations issued by the Austrian National Bank in this field, the Austrian National Bank can threaten and impose sanctions both on operators of payment systems and on system participants.

²³ Turner (2009) echoes this point in its discussion of potential drawbacks of assigning prudential responsibilities to the central bank (page 92).

- When the crisis broke in the U.K. in 2007, the BOE believed Northern Rock to be solvent but immediately made public its LOLR-support of Northern Rock. While, because of the stigma attached to receiving support, emergency lending can benefit from being kept secret, the BOE believed that a covert operation was likely to be leaked, creating further dislocations in the market.²⁴ This means that a secret LOLR operation may not be feasible at all and is certainly unlikely to be feasible for any extended period of time.
- Once the decision to support an institution is in the public domain, events have shown the behavior of the authorities to be subject to an enormous amount of scrutiny by both elected representatives and the public at large, making it risky for a central bank to engage in an improper use of LOLR.
- It is unclear in any case whether an extended LOLR operation in favor of an insolvent institution is desirable from the point of view of the central bank, since it has to be concerned with the implications for its own balance sheet of sustaining an insolvent institution.
- The proposed conflict between supervision and LOLR also neglects a number of aspects that give rise to synergies between supervision and resolution. As set out above, supervisory information helps gauge the systemic impact of failure as well as the impact of last resort lending on the central bank's balance sheet. A role in resolution also gives central banks incentives to adopt a tough supervisory stance *ex ante*. This arises both because central banks have an interest in protecting the integrity of their balance sheet, and because they will seek to avoid reputational costs from any mistakes in handling a crisis. Such incentives may sharpen their eyes in the supervision of individual systemic institutions.

Potential conflict of interest with monetary policy. Goodhart and Shoenmaker (1995) suggested that microprudential objectives may conflict with the macroeconomic objectives of a central bank and may come to compromise the conduct of monetary policy. In particular, when the banking system is under stress, the monetary authority may be hesitant to impose the appropriate degree of tightening through concern for the solvency of the banks it supervises.²⁵ However, there are a number of counters:

- While monetary policy must not be concerned about bank solvency *per se*, it needs to be concerned about the impact of strains in the banking sector on the supply of credit to the economy, and the effect this can have on the outlook for output and inflation.

²⁴ See Treasury Select Committee (2008).

²⁵ Buiter (2008) has reiterated this argument in relation to the Fed. "It listens to Wall Street and believes what it hears...the Fed is too close to the financial markets and leading financial institutions, and too responsive to their special pleadings, to make the right decisions for the economy as a whole" (pg. 599–600).

All else equal, a policy of monetary easing will therefore often be appropriate in response to strains in the banking system, and this will hold irrespective of whether or not the central bank is the supervisor of individual institutions. Indeed, in response to the ongoing financial crisis, central banks around the world have reduced interest rates, motivated in part by a desire to counter the effect on the economy of dried-up credit markets.

- A supervisory role may create benefits in informing the central bank's response to banking sector stresses. According to the Fed, "during the recent financial turmoil the ability of the Fed to obtain information directly from key institutions and from supervisory reviews has been invaluable for understanding financial developments and their impact on the economy", Bernanke (2008a). The desirability of access to supervisory information has recently also been underscored by other central banks, such as the ECB, in particular to inform the monetary response to crisis situations. Empirical research confirms that access to supervisory information confers an advantage in assessing the outlook for output and inflation.²⁶
- In sum, the concern that a supervisory role may compromise the conduct of monetary policy does not appear fully compelling.²⁷ In addition, as set out in detail in Section I, a number of considerations imply that the central bank's role in monetary policy can create important benefits for macroprudential policies, that are related to both central bank's incentives and their expertise.

Potential reputational risk for monetary policy. Goodhart (2000) raises the concern that if a central bank is responsible for both prudential supervision of individual institutions and monetary policy, it is possible that highly visible failure in the former may undermine confidence in the latter. While influential, the crisis experience suggests that this concern can also be overstated.

- In the case of the supervision and resolution of an individual institution, the type of judgment that needs to be made, the people (staff) involved, and the processes followed in formulating policy, are different from the decision over the course of monetary policy. The cases of Bear Stearns, Northern Rock, Lehman, and AIG have illustrated this and it is plausible that the public is able to appreciate the differences,

²⁶ Peek, Rosengren and Tootell (2003).

²⁷ Some have noted difference in the speed of policy easing across advanced economies in response to the financial crisis. However, the determinants of these differences are difficult to establish. Differences may have been due to differences in the macro-economic data faced by different central banks. They might also have been due in part to differences as regards whether or not the central bank has a supervisory role. But even if this could be established, it is not clear whether differences in the decisiveness of monetary easing may have been due to biases arising from a potential conflict of interest between supervision and monetary policy or due to better access to supervisory information and a better understanding of the interaction between financial stresses and the macroeconomic outlook.

in particular when monetary policy is delegated to an institutionally separate monetary policy committee.

- However, even if it were the case that failures in supervision can create reputational risks for monetary policy when central banks have a supervisory role, the implication is not necessarily that supervision and monetary policy are better conducted by separate agencies. This is because a central bank's concern for its reputation in monetary policy can create strong incentives to seek forceful implementation of supervisory standards. This may, in turn, lessen the frequency of crisis events. The proposed argument may therefore be more balanced than it first appears.

Potentially compromised independence. Some commentators warn that a central bank's role in the supervision and resolution of individual institutions could politicize the central bank, potentially impairing its independence from government. While an important concern, in particular when the central bank's position is less secure, this argument also faces a number of counters:

- The concern for policy independence from a formal role in financial stability neglects central banks' **de facto involvement**; including through their role in providing LOLR to individual institutions and their role in providing liquidity for the market at large—all of which can put the central bank under political pressure.
- The potential for a crisis to undermine a central bank's institutional independence may be fairly strong whether or not the central bank is given a formal role in financial stability. Against this, at the margin, a more formal role can tool up the central bank and enable it to reduce systemic risk, thus decreasing the likelihood of political interference in crisis situations.
- Where the bank's policy independence is less secure, rather than shielding it from a formal responsibility for financial stability, an alternative response may be to take steps to increase policy independence, by giving the central bank a clear mandate for both monetary and financial stability, and reaffirming its policy independence in law.

Concentration of power. Perhaps the most influential argument against a prudential role of the central bank has been that this can lead to an undue concentration of powers, in particular when the central bank also undertakes an independent monetary policy. While this is a relevant concern, the lessons being drawn from the crisis may also shift the perspective on this issue in a number of ways:

- The crisis experience puts a premium on the development of an overall policy framework that fosters complementary use of monetary and macroprudential tools. Synergies between supervision and monetary policies include the benefit of supervisory information for monetary policy; the benefit of a central bank's macro-expertise in informing the formulation of macroprudential policies; and the benefit of

a central bank's incentives that can strengthen the application of macro-prudential policies.

- The political economy of financial supervision is such that there are benefits to delegating authority to an independent agency, just as there are benefits to delegate monetary policy in this way. Politicians will be tempted to oppose disinflationary monetary policies on the part of central banks, especially in 'good' times. Likewise, politicians may oppose countercyclical macroprudential policies, particularly in 'good' times (Goodhart, 2008). These problems may be addressed by assigning responsibility for macroprudential policies to an independent agency.
- Similar arguments apply to the microprudential regulation of large and politically influential financial institutions. These institutions may have the incentives as well as the means to lobby politicians so as to ensure a softening of the regulatory constraints they are subject to. Political pressures brought to bear on regulatory agencies may become even stronger in an international context where governments face incentives to engage in a "race to the bottom" in fostering "self regulation" of financial firms. These problems show the benefit from assigning responsibility for prudential regulation of large and powerful financial firms to an independent agency.
- Political economy benefits can be achieved also by divesting power in an independent supervisory agency. However, the strength of the political pressures may be fairly strong, especially in good times and when there is international competition. A combined agency can benefit from increased clout and credibility in formulating macro- and microprudential policies, enhancing its ability to resist pressure brought to bear by politicians and the financial industry. That is, a concentration of power may be beneficial to achieve the joint policy objectives of financial and monetary stability.

In weighing the benefits and the costs of a role of central banks in financial regulation, it is useful to collect arguments and draw out some further implications.

Some of the perceived costs of such a role apply only where the central bank has a strong role also in monetary policy, and do not apply with equal force when the central bank's actions in monetary policy are heavily constrained, for example when the country is part of a currency union or the central bank operates a currency board. Contrary to the received wisdom, however, there may also be strong complementarities between monetary and prudential policies, and further political economy benefits may arise from a combination of powers. This means that a role of the central bank in financial regulation may have benefits for the effectiveness of financial regulation even if—and perhaps in particular when—the bank also conducts monetary policy.

Some of the perceived costs turn on conflicts of interest that arise from a supervisory role. However, a role in supervision also has important benefits for the central bank, including for monetary policy and in the management of crises at systemically-important institutions.

These benefits derive from the value of supervisory information and from control over the strength of supervision that systemically-important institutions are subject to.

On the other hand, some of the benefits of a central bank's role in financial regulation may not require a supervisory role, but could be realized by giving the central bank a role in regulatory design. This applies in particular to macroprudential policies and microprudential policies that reduce systemic risk from the use of insufficiently robust clearing and settlement processes.

Perceived costs are likely to be larger when the central bank becomes involved only *ex post* and *de facto*, rather than in response to a formal mandate that may reduce these costs. For example, a formal responsibility for prudential regulation may reduce the likelihood that the bank will be called upon to resolve a crisis. A more formal role in resolution may help clarify that the treasury needs to take ultimate responsibility for any quasi-fiscal costs incurred, reducing the concern that monetary independence is put at risk.

In weighing all benefits and costs, it may be possible for different countries to come to different conclusions. Country-specific circumstances may need to be taken into account carefully and will be reviewed in more detail in the context of options for the design of the overall regulatory framework (Section V). Where the central bank is given an expanded role in financial regulation, it is important to ensure these powers are complemented by robust mechanisms that ensure transparency and independent accountability of a central bank's actions in safeguarding financial stability. An example is the way the BOE's stronger role in financial stability is matched by a new legal objective of financial stability as well as greater accountability, as detailed in the next section, below.

III. RECENT DEBATES ON FINANCIAL STABILITY FRAMEWORKS

Partly in direct response to the ongoing crisis, there is incipient debate in a number of advanced economies and regions on how existing financial stability frameworks can be improved upon, and within that on the appropriate role of central banks. This section reviews the state—at the time of writing—of the evolving debates in selected countries and regions (the United States, the United Kingdom, Germany and the Euro area). While there are important communalities in the problems faced during the crisis and in the policy responses that are being proposed, there are also a number of differences that are worth highlighting, in part to motivate further conceptual analysis of financial stability frameworks that will be attempted in the following two sections.

In the U.S., the treasury issued a “Blueprint for a modernized financial regulatory structure” in March 2008. Motivating reform, the Blueprint points out that much of the existing regulatory structure was created more than 70 years ago, and that this structure now “grapples to keep pace with market evolutions” and “faces increasing difficulties in preventing and anticipating financial crises” (page 4). For example, the U.S. regulation of deposit-taking institutions is characterized by an ineffectual web of agencies, with five federal agencies needing to coordinate between each other in the regulation and resolution of

national banks, as well as with state authorities—e.g., with regard to the oversight of mortgage markets. Likewise, insurance regulation has remained the responsibility of the states, largely by historical accident.

The optimal structure the Blueprint envisages is intended to simplify and consolidate the existing regulatory structure. Its organizing principle is “regulation by objective,” distinguishing between:

- market stability regulation, to address overall financial market stability;
- prudential regulation, to address limited market discipline caused by explicit state guarantees (for banks and insurance firms); and
- business conduct (consumer protection) regulation, to address standards for business practices and products.

Under the Blueprint proposals, the Fed is to become the overall “market stability regulator.” This gives the Fed a formal responsibility for overall financial stability as well as “broad powers” focusing on the overall financial system. These powers include authority to collect information from individual institutions, to collaborate with other institutions in rulemaking and to take corrective action when this is required to preserve overall financial stability. The Blueprint also envisages for the Fed to have a more formal role in the oversight of payment systems, enabling it to “designate” such systems that it deemed systemically important, so as to subject them to formal oversight. A separate federal prudential regulator would oversee all deposit-taking institutions as well as insurance companies, both of which are envisaged to continue to enjoy explicit government guarantees. The conduct of business regulator would oversee market practices across the financial industry, including securities, insurance, and banking.

In the context of the unfolding of the crisis there has been further development and debate on a number of issues:

- **Scope of a special resolution framework.** The prompt corrective action framework, introduced in 1991 by the Federal Deposit Insurance Improvement Act (FDICIA) provides a special resolution regime for U.S. commercial banks. The Blueprint did not envisage the introduction of such a framework for investment houses and other financial entities whose disorderly unwinding can have a systemic impact on financial markets. The cases of Bear Stearns, AIG, and Lehman have brought the absence of such a regime into sharp relief. An intention to introduce such a regime for all systemically important institutions was announced in March 2009, in a joint statement by the U.S. Treasury and the Fed.
- **Scope of supervision.** The Blueprint did not envisage mandatory prudential supervision of investment houses. Events have shown this to be an important lacuna in the overall framework of supervision in the U.S. In practice, the Fed has, in March

2008, sought a memorandum of understanding (MOU) with the SEC that enabled it to gather information on investment firms. In the wake of the Lehman bankruptcy, and the sale of Merrill Lynch to Bank of America, the remaining two stand-alone investment houses, Goldman Sachs and Morgan Stanley, have been brought into the framework of supervision by the Fed, in September 2008, through the firms acquiring the status of bank holding companies.

- **Role of the central bank.** Under the Blueprint, there has been a concern over the balance of responsibility and powers afforded to the central bank. Most notably, the Fed is envisioned to forfeit its role as consolidated supervisor of bank holding companies. In a speech, the Chairman of the Fed pointed out that “holding the Fed more formally accountable makes sense only if the Fed’s powers are consistent with its responsibilities” (Bernanke, 2008b).

In the **U.K.**, in response to the experience in dealing with Northern Rock, the authorities issued a consultation paper in July 2008 to strengthen the U.K. framework for financial stability. The paper envisaged a strengthening of the role of the BOE in financial stability, giving it a formal statutory responsibility for financial stability and a leading role in the implementation of a special resolution regime for banks. The Banking Act 2009 now formalizes the role of the BOE in the resolution of financial institutions. It also introduces statutory powers for the central bank in its oversight of systemically-important payment and settlement systems. Greater powers on the part of the BOE will be associated with greater independent accountability: oversight of the BOE’s actions in financial stability will be provided by a new Financial Stability Committee (FSC) as a committee of Court (the non-executive supervisory board of the BOE). In addition, steps are being taken to improve the bank’s access to supervisory information; and the U.K. Treasury indicated that the BOE will be able to make “proposals” to the FSA as regards its framework for supervision and regulation.²⁸ The Turner (2009) review provides further discussion of how a macroprudential responsibility could be shared between the BOE and the FSA and how this could be operationalized.

In **Germany**, subprime-related losses (e.g., at Landesbanken, such as Sachsen LB²⁹ and WestLB,³⁰ as well as at IKB and Hypo Real), have led to debate on the supervisory framework and the effectiveness of the existing bank resolution framework. Bundesbank and BaFin have long shared a joint responsibility for banking supervision, but there had been a

²⁸ See Treasury (2008).

²⁹ Sachsen LB had sponsored Ormond Quay, which had to be supported by a line of credit of 17.3 bn euros. Sachsen LB was resolved through a takeover by LBBW, another Landesbank. See BaFin, Annual Report, 2007, page 23.

³⁰ WestLB’s two special investment vehicles (SIVs), Harrier Finance and Kestrel, were taken back on WestLB’s balance sheet, resulting in an expansion of around 21 bn euros by year-end 2007. See BaFin Annual Report 2007, page 23.

perception that the division of labor had lacked clarity and transparency, leading to potential duplication of effort, undue bureaucratic delay, and the danger that problems might fall through the cracks. A new MOU issued in Feb 2008 is meant to clarify the responsibilities of the two agencies and to improve inter-agency cooperation.³¹ The cases of IKB and Hypo Real also showed up the absence of a special resolution regime for banks.³² Finally, the cases of IKB and the Landesbanken raise the issue of how to best control (in part) privately owned, but publicly-sponsored or (in part) publicly owned financial enterprises.³³

In the **Euro area** as a whole, a report from a high-level group³⁴ issued recommendations intended to overhaul the European structure of financial regulation and supervision. While day-to-day supervision would remain with national authorities, the recommendations contain three new elements:

- a macroprudential authority (ESRC), chaired by the ECB and composed of members of the ESCB General Council—that is all EU member countries’ central banks—in addition to the European Commission and the chair of CEBS (Committee for European Banking Supervision);
- a microprudential authority (ESFS) comprising banking, insurance, and securities committees (CEBS, CEIOPS, and CESR); and
- a strengthening of the sectoral committees (CEBS, CEIOPS, and CESR) that promotes them to “authorities,” endowed with specific powers, to ensure the consistency of supervision across Europe.

³¹ According to the “Aufsichtsrichtlinie,” issued by the BaFin after negotiation with the Bundesbank, the Bundesbank is the only authority to carry out day-to-day supervision, conducting all aspects of both on-site and off-site supervision. This provides the Bundesbank with first-hand information. The BaFin retains the residual right to control enforcement actions brought against individual institutions. The MOU further envisages heightened supervision and enhanced cooperation as regards systemically important and problem institutions.

³² Under German law the authorities are currently limited to a straight liquidation of a bank or a bail-out that leaves shareholder interests in place. At the time of writing, a temporary change to this situation is being debated by lawmakers.

³³ IKB AG was founded in Düsseldorf in 1949 to grant industrial development aid to German small and medium-sized enterprises. It provided loans to medium-sized customers and helped disburse funds that were being granted under various development programs, including the Marshall Fund. In fulfilling this mission, IKB kept close cooperation with KfW, the main publicly owned banking entity that was tasked with financing post-war reconstruction and that later became the leading entity providing federally funded assistance programs to particular sectors and regions— including, after reunification, the Eastern Lander. Throughout its history IKB has kept a mission to provide loans to German medium-sized companies and close ties with the authorities, with KfW continuing to hold a 38 percent stake until the authorities decided to sell the bank to Lone Star Funds on 21 August, 2008.

³⁴ De Larosière (2009).

While these recommendations stop short of introducing a single European regulatory agency, they would bring significant change:

- The proposals amount to a strengthening of the ECB (as well as European central banks) in macroprudential regulation, creating a bridge between central banks' assessments of systemic risks and prudential regulation.
- While the report recommends against a responsibility of the ECB/ESCB for microprudential supervision, it envisages ECB/ESCB staff as participating in colleges of microprudential supervisors, as well as in relevant on-site inspections, ensuring a good flow of information between the ESRC and the micro-prudential supervisors.

These recommendations start from the premise that “overall cooperation between monetary and regulatory (authorities) will have to be strengthened, with a view to defining and implementing the policy mix that can best maintain a stable and balanced macro-economic framework” and that “macroprudential supervision cannot be meaningful unless it can somehow impact on supervision at the micro-level.”

However, the report also discusses specific arguments that point against a greater microprudential role of the ECB/ ESCB. For example, a number of European central banks have no competence in microprudential supervision and, as noted in the report, national regulatory structures are the purview of the member states. Moreover, the ECB has no role in the resolution of individual financial institutions. Instead, in the European Union, resolution remains a national competency, with national authorities (and not the ECB or other European institutions) bearing the fiscal implications of the failure of individual systemically-important institutions.

Finally, there is an **international debate** on financial stability frameworks and the role of central banks. A recent report by the **Group of Thirty (2009)**: “Financial Reform: A Framework for Financial Stability” offers a set of longer-term recommendations in response to the ongoing crisis. Among other issues, the report stresses the need to improve the effectiveness and quality of prudential regulation and supervision. It recommends that:

- Countries should reevaluate their regulatory structures with a view to eliminating unnecessary overlaps, gaps in coverage and complexity, removing the potential for regulatory arbitrage, and improving regulatory coordination.

The report also notes that recent events provide impetus for recognizing a financial stability role for central banks, and that such a role needs to carry with it adequate authority and the tools necessary to carry out this mission:

- Where not already the case, central banks should accept a role in promoting and maintaining financial stability. The expectation should be that concerns for financial stability are relevant not just in times of financial crisis, but also in times of rapid credit expansion and increased use of leverage that may lead to crises.

- In countries where the central bank is not the prudential regulator, the central bank should have: (i) a strong role on the governing body of the prudential and markets regulator(s); (ii) a formal review role with respect to proposed changes in key prudential policies, especially capital and liquidity policies and margin arrangements; and (iii) a supervisory role in regard to the largest systemically-significant firms, and critical payment and clearing systems.

IV. FINANCIAL REGULATION—OBJECTIVES, TOOLS, SCOPE

National and international debate on frameworks for financial stability and questions raised about the appropriate role of central banks in these frameworks motivate closer analysis of a number of important questions from first principles:

- Why regulate financial institutions? What is the rationale for intervention?
- Who needs to be regulated? Which types of financial institution need to be subject to regulatory control?
- How should regulation be conducted? What tools should be employed?

Stepping back to address these prior questions helps to prepare a discussion of regulatory structure—that is, which regulatory structures are conducive to achieving the goals of regulation?—that will be set out in the following section, below.

A. Why Regulate Financial Institutions?

The rationale for financial regulation rests ultimately on **two objectives**: the desire to mitigate systemic risk and the desire to protect consumers (investors).

Mitigation of systemic risk

Failures of financial institutions can have an impact on other financial institutions and wider financial markets. But even in the absence of outright failures a weakened financial system can have an impact on the economy at large. Since institutions may not internalize the costs of these impacts in their risk choices, financial regulation is needed to mitigate systemic risk. It is useful to distinguish a macro- and a micro-dimension of systemic risk.

Macro-systemic risk arises when the financial system becomes exposed to aggregate risk. The financial system becomes exposed in this way when the risks taken by institutions are correlated across institutions. In this case, the crystallization of risk can weaken the financial system as whole and lead to a deleveraging process that involves a curtailment of credit to the economy at large.

Micro-systemic risk arises when the failure of an individual institution has an adverse impact on the financial system as a whole. This can arise through a number of channels. For example, the failure of one institution can lead to losses for financial institutions that are

exposed to the failing institution. The failure of the institution may also affect other institutions that rely on the failing institution to provide credit. In the presence of asymmetric information, the failure of one institution can finally result in a loss of confidence in and a run on similar institutions, even if these institutions are fundamentally sound.

Macro-and micro-systemic risks are often linked. For example, the realization of aggregate (correlated) risks can increase micro-systemic risk, by increasing the probability of failure of any given institution. The realization of correlated risk can also affect the impact of the failure of a given individual institution, since borrowers may find it harder to replace existing credit relationships when the whole financial system is under stress. But micro-systemic risk from the failure of an individual institutions can also arise in the absence of a realization of aggregate risk, when the failing institution is critical for a well-functioning financial market.

Protection of consumers

Protection of consumers (investors) is needed in financial markets because financial markets are subject to informational problems that may put sellers of financial products (savings products, insurance) at an advantage, relative to the buyers of such products. This may require rules on the way financial products are described (e.g., in policy forms for insurance contracts) or constraints on the set of permissible investments (e.g. by pension funds).

In wholesale markets, likewise, issuers of securities typically have an informational advantage over buyers of securities. This may require rules on the disclosure of information (e.g. in prospectuses for securities). While in wholesale markets the need to protect investors may be less strong, rules that govern the trading of financial securities can still be justified, for example to prevent and penalize market abuses, such as insider trading, and financial fraud, e.g., Ponzi schemes.

Another important component of consumer protection in retail markets is asymmetric information on the financial health of the provider of the financial product, in particular when the pay-off to the customer is contingent on the continued financial health of the seller (e.g., in the market for deposits and insurance).

Relationship between core objectives

This raises the issue as to the relationship between the two objectives of financial regulation—mitigation of systemic risk and consumer protection.

A **difference** is that the goal of consumer protection is broad, ranging across a large number of retail and wholesale markets. The objective of systemic risk mitigation is narrower. This means that a large number of measures across retail and wholesale market, that are justified from the point of view of protecting consumers and investors, may not have a material effect in reducing systemic risks.

Consumer protection and systemic risk mitigation are often **complementary**. For example, robust deposit insurance schemes are useful to protect the economy against a generalized run

on deposit-taking institutions (reducing systemic risk). However, deposit insurance is useful also from the point of view of protecting consumers, and it may be desirable for such insurance to cover isolated failures of relatively small institutions as well, even if the systemic impact of the failure of these institutions may be minimal. In wholesale markets, measures to increase transparency may benefit the efficiency of financial markets as a whole. They can also result in enhanced market discipline brought to bear on financial institutions and reduce systemic risk.³⁵

Consumer protection and mitigation of systemic risk can also **conflict**. Measures taken to protect particular market participants (customers or investors) may sometimes have unintended consequences, increasing systemic risk.

- Measures taken to improve access to retail mortgages can increase macro-systemic risk, especially when these measures are taken in good times.
- Measures that are intended to protect depositors, such as requiring higher levels of bank capital, can reduce the availability of credit to the economy, especially in bad times when banks face funding constraints.³⁶ Capital requirements can also reduce the provision of liquidity in financial markets, particularly when volatility is high.³⁷ Both effects can contribute to macro-systemic risk
- Restrictions on the ratings of securities that can be held by investment funds (such as pension funds) can protect investors in these funds; but asset sales in response to ratings triggers can exacerbate deleveraging processes and may contribute to macro-systemic risks.³⁸

B. How to Regulate Financial Institutions?

Leaving aside monetary policy, the tools available to regulate the financial sector can be grouped into **four sets of tools**.

- **Prudential regulation.** This traditionally takes in capital and liquidity regulation, directed at institutions. Early remedial action is a prudential tool that applies heightened oversight to weakened institutions.
- **Resolution tools.** The traditional range of resolution tools include the provision of LOLR by central banks and mandatory insurance schemes for deposits and other

³⁵ The example is Pillar 3 of the Basel II framework that mandates enhanced disclosure for banking firms, to reduce asymmetric information and strengthen market discipline brought to bear by unsecured creditors.

³⁶ Nier and Zicchino (2008) provide evidence and an overview of the theory.

³⁷ A formal model of this effect is offered by Brunnermeier and Pedersen (2009).

³⁸ Turner (2009) provides further discussion.

retail products. Special resolution regimes are an important addition to the basic toolset.

- **Oversight of clearing and settlement systems.** This applies regulation to the processes and systems that are used to manage the post-trade relationship between parties of financial contracts.
- **Conduct of business regulation.** This takes in a range of interventions to regulate the activities of financial market participants, aiming to correct informational asymmetries in retail and wholesale financial markets.

It is useful to draw out how each of these tools can contribute to the pursuit of the objectives of financial regulation, including both consumer protection and the mitigation of (macro- and micro-) systemic risks.

Prudential regulation

In principle, prudential tools can be used both to control the probability and to control the impact of a realization of systemic risk, even though they are not generally used in this way.

From a macro-systemic point of view, a key objective is to control the impact of a crystallization of aggregate risk on the financial system and the economy as a whole, since the costs of these impacts are unlikely to be internalized by individual institutions in their private risk management. Moreover, macro-systemic may be compounded by a time-inconsistency problem that arises when—typically as a result of an overexposure to aggregate risks—a large part of the financial system has been weakened.³⁹ Lack of capital and the inability of financial intermediaries to find additional sources of private capital may then leave no alternative to the use of public sector funds. This in turn may create moral hazard, leading institutions to discount further the potential realization of macro-systemic risk. A prudential tool that encourages a build-up of capital buffers in good times and that can be drawn upon when the system is under stress is an example of a prudential tool that controls the impact of macro-systemic risk. At least in principle, prudential tools may also be used to control the probability of a realization, by affecting the correlation across institutions of risks taken on balance sheet and penalizing exposures to particular aggregate risks.

From the perspective of micro-systemic risks the objective is to control both the probability and impact of the failure of a potentially systemic individual institution, since not all costs of the impact are likely to be internalized by individual systemically important institutions in their private risk management. Moreover, the costs associated with the impact may lead authorities to rescue individual systemically important institutions by injecting public funds, when institutions are “too big to [let] fail” To avoid moral hazard incentives arising from a

³⁹ This problem has been referred to as “too many [institutions] to [let] fail.” It is described formally by Acharya and Yorulmazer (2007).

payoff of the type “heads we win, tails you lose,” prudential regulation is needed to control the probability of failure of systemically important institutions. However, again, prudential tools are not generally used in this way. For example, Basel rules aim to achieve the same probability of failure across all banking institutions, irrespective of their micro-systemic impact.⁴⁰ Current prudential standards are also rarely used to control the systemic impact of the failure of institutions. An example for a potential change is the use of microprudential tools to affect changes in clearing and settlement processes.

From the perspective of consumer protection, prudential regulation is finally needed to protect consumers (and deposit insurance funds) from undue risks taken by banking (and insurance companies) that may be exacerbated by a mis-pricing of explicit government guarantees—such as are in place in many countries for retail deposits and life insurance contracts.

Resolution tools

Among the resolution tools, **special resolution regimes** are increasingly recognized as a key tool in the mitigation of systemic risk. These regimes can reduce the impact of the failure of individual systemic institutions that can arise in a disorderly bankruptcy. By lessening the impact of failure, special resolution tools also reduce the chance that authorities have no choice but to inject public funds if they seek to avoid the impact of the failure of a systemically important institution on the financial system as a whole. Special resolution regimes can therefore play a key role in correcting the moral hazard created by the implicit safety nets that are created by the systemic impact of an institution (“too big to [let] fail”). By reducing public outlays, special resolution regimes can limit expectations of public support that might otherwise compromise market discipline.⁴¹

One model that is currently in place is the process for dealing with insolvent commercial banks under the U.S. FDICIA. This gives the Federal Deposit Insurance Corporation (FDIC) a number of resolution options, including the authority to set up a bridge bank that allows key functions of the failed institutions to continue while a resolution of the failed institution (e.g., a private sector sale or the orderly unwinding of the institution) is prepared. Special resolution regimes that are clearly set out in law can also provide strong commitment to protect only specific parts of the capital structure (e.g., retail deposits) and let losses be borne

⁴⁰ In some countries (including the U.K.), under Basel I the capital targets above the Basel minimum that were prescribed by supervisors differed across institutions. Under the new Basel II approach, Pillar 2 (supervisory review) in principle allows a similar approach, since it is meant to capture risks not captured under Basel I. Systemic risk is not explicitly mentioned as an example, however. Supervisors may in any case use their discretion to subject systemically-important institutions to closer supervision, e.g., through intensive on-site supervision and a larger number of supervisory staff assigned to these institutions. See Turner (2009) for further discussion.

⁴¹ Research has documented the detrimental effect of support expectations on market discipline. See for example Nier and Baumann (2006).

on others (e.g., shareholders and unsecured creditors), including through setting up a “bad bank.”

Special resolution regimes may not be fully effective in controlling the probability of individual failures and they may not be fully effective in resolving crises that affect a large number of institutions at the same time. As a result, special resolution regimes may need to be complemented by prudential tools to mitigate systemic risk.

Oversight of clearing and settlement systems

Oversight is applied to the clearing of the obligations arising from trading in wholesale financial markets—often involving a central counterparty that interposes itself between both parties to the trade—as well as to trade settlement, involving securities settlement systems and large value payment systems, where final settlement of cash obligations is ultimately achieved by transfers of reserves across a central bank’s books.⁴² From the point of view of mitigating systemic risk, oversight of clearing and settlement in wholesale markets is useful to reduce the impact of the failure of an individual institution on the processes and systems supporting wholesale markets, which can—depending on the design of these processes and systems—in turn affect other financial institutions. From the point of view of protecting consumers, retail systems also need to be subject to oversight. A credit card scheme is an example of clearing and settlement in retail markets.⁴³

Conduct of business regulation

Conduct of business regulation is necessary to regulate trading activity and products offered in financial markets. From the point of view of customer protection, it is needed in retail markets, where such regulation can establish standards for disclosure of information pertaining to financial products and standards for sales practices in general, or constrain the set of permissible investments undertaken by investment funds (e.g., pension funds). From the point of view of investor protection more broadly, it is also required to regulate activity in wholesale markets, e.g., to encourage disclosure of information in securities’ prospectuses and discourage insider trading. It may more generally be applied to enable detection of fraudulent activity that may come to generate losses for consumers in retail markets or investors in wholesale markets (e.g., Ponzi schemes).⁴⁴

⁴² Manning, Nier, and Schanz (2009) discuss the central bank’s role in clearing and settlement and the policy issues arising in this sphere.

⁴³ The failure of major retail systems can also affect the settlement of obligations in a range of markets, whose functioning is important for the economy as a whole.

⁴⁴ Fraud on the part of the staff of financial institutions may be able to “bring down the bank.” Perhaps the best known example is the case of Barings Bank, which collapsed in 1995 after one of the bank’s employees lost £827 million (US\$1.4 billion), speculating primarily on futures contracts. Shareholders and managers of financial institutions should generally have good incentives to prevent fraudulent activity that result in gains for employees at the expense of shareholders. Despite this, regulation of the processes in place to reduce the

In the context of weaknesses in the “originate and distribute” model, conduct of business regulation may also have been applied to loan standards used by mortgage originators, and to examine conflicts of interest faced by rating agencies and distributors of securitized assets. These weaknesses have come to hurt a range of investors in wholesale markets. But these weaknesses may also have contributed to the build-up of macro-systemic risk (see Box 1). Moreover, in particular in crisis times, the conduct of participants in certain markets may sometimes contribute to the vulnerability of systemically important institutions. Securities regulators (such as the FSA and the SEC) can introduce measures to reduce this impact. The main example highlighted by the crisis is restrictions on the short-selling of securities. These were introduced by securities regulators when in the wake of the Lehman collapse, a number of vulnerable institutions became subject to strong sales pressures in stock markets.

In sum, each of the four sets of tools may be useful for systemic risk reduction, as well as to protect consumers of financial services, even though this might be to varying degrees. In any case, both manner and scope of application should be informed by the objective at hand. For example, while conduct of business regulation is used mainly with consumer and investor protection objectives in mind, such regulation may on occasion be useful to mitigate systemic risk. As set out further above, some measures to protect consumers and investors may also sometimes have adverse implications for systemic risk, which may need to be borne in mind. Prudential tools have likewise not typically been used with the explicit goal of systemic risk reduction. However, they are widely seen as having significant potential in this regard.

- A countercyclical capital buffer for financial intermediaries is an example of a macroprudential tool that can complement monetary policy through reducing macro-systemic risk.
- Tight prudential requirements and early corrective action can be applied to systemically-important institutions, so as to reduce micro-systemic risk associated with the failure of these institutions, and make for more sparing use of resolution tools.
- Prudential regulation can be used to provide incentives for the use of robust clearing and settlement processes, reducing the micro-systemic risk associated with the failure of individual institutions.

Interestingly, each of the ways in which prudential regulation may develop in order to provide effective mitigation of systemic risk can be viewed as a **hybrid** between the

incidence of such losses may be needed, especially for institutions that are potentially systemic. The new Basel II framework encourages banking supervisors to step up the oversight of these processes, so as to reduce the incidence of “operational risk”. Oversight of operational risk, more broadly defined, is a particular focus also of the oversight of payment and settlement processes in which commercial banks are involved, see Manning et al (2009).

traditional application of prudential tools and a different existing tool (monetary policy, resolution, and oversight).

C. Who Should be Regulated?

Which types of financial institution and markets need to be subject to regulation? This question is traditionally approached by examining the functions or types of financial services offered by financial institutions, with the main “textbook” categories being “banking,” “insurance,” and “securities services.” However, the evolution of financial services provision has meant that these categories are in flux. The question as to which type of institution and market may need to be caught by the four tools (and their hybrids) discussed above, may best be framed by asking more broadly, which kind of financial institution might pose a threat to the two objectives of financial regulation: mitigating systemic risk and protecting customers and investors.

Systemic risk mitigation

The question of which markets or institutions need to be regulated to ensure effective regulation of systemic risk is difficult to answer. It can be approached by further developing the distinction between macro-systemic risk and micro-systemic risk.

Mitigating macro-systemic risk

At the heart of macro-systemic risks are leveraged (and correlated) exposures to macroeconomic or aggregate risks. Often the realization of risk will be manifest in changes in asset prices that are tied to aggregate developments.⁴⁵ When the development in prices is favorable, the holder of the leveraged position may be tempted to increase leverage as well as the dollar exposure to the underlying asset. In this situation the provision of further leverage can cause an upward spiral in asset prices (a bubble). However, a leveraged exposure is vulnerable to a reversal in asset prices. In particular, a reversal increases the likelihood that the leveraged position will default. A default is associated with the offloading of the asset, which in turn can create a downward spiral in the asset price (a bust). Importantly, it also puts pressure on the solvency of the **providers** of leverage, in particular when, as is often the case, the providers of leverage are themselves leveraged financial institutions such as commercial or investment banks.⁴⁶

Examples of prices that capture aggregate risks are house prices, stock prices, exchange rates, and interest rates. Leveraged exposures to each of these have been associated with systemic banking crises. The Great Depression in the U.S. is an example where leveraged exposures to the stock market have contributed to the boom and subsequent bust. The Japanese crisis of

⁴⁵ Aggregate risks can also be present in the absence of price information.

⁴⁶ Bordo and Jeanne (2003), Korinek (2008), and Brunnermeier et al (2009) provide theoretical treatments of these phenomena. See also Schwartz (2002) for a discussion of policy options.

the 1990s was associated with leveraged exposure to both real estate and stock markets. The recent Icelandic crisis is an example of a carry trade—leveraged exposures to a fall in the exchange rate—gone wrong.⁴⁷ Increases in interest rates have resulted in increased borrower default rates on many occasions.⁴⁸

Declines in asset prices can cause output costs through wealth effects; but output costs are larger when the bust is associated with pressure on the balance sheet of intermediaries (e.g., banks)—that in turn can lead to a seizing-up of credit to the economy at large. The latter effect can be prompted by depositor panics (e.g., during the Great Depression and Savings and Loans crisis in the U.S.), or be associated with solvency pressures that lead to a drying-up of wholesale funding, as in the case of the Icelandic banks. It can also arise in the absence of bank failures when solvency pressure weighs down banks and leads them to focus on their capital buffers, rather than provide new funding to the economy at large, as was the case in Japan during the 1990s.⁴⁹

This suggests that important **leveraged providers of leverage** need to be caught by regulation that seeks to mitigate macro-systemic risk. To further define the scope of macroprudential regulation, there would appear to be three key aspects: the size of the balance sheet, leverage, and the share of the balance sheet that provides a leveraged exposure to a number of macro-economic risks.⁵⁰ All but the smallest commercial banks are likely to fall under any such definition, but investment banks may also be caught by macroprudential regulation, to the extent that they are important providers of leverage in financial markets.

For these institutions, macroprudential regulation is needed because private risk management conducted by leveraged providers of leverage can fail to take into account the external effects of their collective (correlated) exposures to aggregate risk.⁵¹ In addition, monetary policy can

⁴⁷ In a carry trade a local currency asset is funded in a foreign currency, typically to take advantage of lower funding costs. Foreign currency funding can lead to an overappreciation of the local exchange rate, which makes this type of leveraged position vulnerable to a depreciation of the local currency.

⁴⁸ Ahead of the U.S. Great Depression, the Japanese lost decade and the recent crisis, interest rates are thought to have been unusually low while imbalances built up, exposing borrowers to a tightening of rates.

⁴⁹ In the Japanese case, the “evergreening” of loans to insolvent borrowers is thought to have been undertaken in order to postpone the realization of losses and its effect on bank capital.

⁵⁰ The build-up of vulnerabilities to macro-systemic risks is not easily detected in real time. Macro stress tests offer a potential diagnostic tool. They may also help decide which group of “leveraged providers of leverage” is most vulnerable to any particular macroeconomic scenario.

⁵¹ Adrian and Shin (2008) describe how risk management that relies on value-at-risk can increase rather than decrease these exposures, since it may indicate balance sheet capacity in boom times, leading to further expansions of balance sheets.

affect the extent to which these institutions expand their balance sheets and may then become exposed to the realization of macro-systemic risk.⁵²

In principle, financial regulation could in addition aim to affect the “buy side”, and constrain total leveraged exposures taken by households and firms,⁵³ as well as on the part of funds that invest on the behalf of households.⁵⁴ Regulation of leveraged providers of leverage in financial markets (the “sell side”), has the advantage that it more directly protects the core of the financial system. However, regulation of the “buy-side” may complement the overall approach when the “buy side” is contributing to the force of the deleveraging processes that may ultimately hurt the core of the system.

The most recent crisis and previous systemic crises share the feature that macro-systemic risk was brought on by leveraged exposure to aggregate risk. The substantial role of securitized funding of U.S. mortgages has meant that pressures on balance sheets were felt by the ultimate leveraged providers of leverage, rather than by the originators of mortgage credit to U.S. households. The ultimate “leveraged providers of leveraged exposures to a correction in the U.S. housing market” included investment and commercial banks in the U.S. and elsewhere, who held exposures in their trading books and in off-balance sheet vehicles. These institutions may need to be caught by macro-systemic regulation, but already fall under the suggested scope of macro-systemic regulation, as they are important leveraged providers of leverage in any case.

⁵² Research by Adrian and Shin (2008) suggests that balance sheets of both investment banks and commercial banks respond to monetary policy action.

⁵³ See Turner (2009) for a discussion of tools that could be used to constrain household indebtedness.

⁵⁴ Large funds may also pose micro-systemic risks, depending on their investment strategy and liquidity profile, as discussed further below.

Box 1: Originate and Distribute and Systemic Risk

Differences in the provision of funding through intermediaries on the one hand and through securitization on the other, raises the issue whether under the latter model other types of institutions may also need to be subject to regulatory controls from the point of view of mitigating macro-systemic risk.

Weaknesses emerged in the originate and distribute business model across the value chain, including loan origination—by mortgage brokers, certification of credit quality—by rating agencies, and distribution—by banks and investment houses, of securitized assets. Lack of risk control by the ultimate providers of funding (banks and investment houses) appears to have contributed further to the weakness of the model. When the credit risk held in off-balance sheet structures was re-intermediated by sponsoring banks, and assets held in banks' trading books turned illiquid, this resulted in extraordinary liquidity demands that led central banks around the world to act as MMLR, providing systemic liquidity. The potential for a breakdown of securitized credit markets can therefore contribute materially to systemic risk.

The development of the originate and distribute model also raises the issue as to whether the development of financial markets had gone too far. In financial markets, retention of balance sheet exposure to credit risk is the traditional incentive scheme that underpins the business model of banks as “delegated monitors” of credit risk (Diamond 1984, Diamond and Rajan, 2006). Alternative incentive mechanisms are concerns for reputation and the preservation of future business opportunities. The crisis experience has shown that in boom times, the desire to realize current profit opportunities may prevail over concerns about reputational risks. This raises the issue whether a model where at no stage in the value chain—origination, certification and distribution—an exposure to the underlying credit risk was meant to be retained on balance sheet was ever going to be sustainable, or whether incentives can be introduced along the value chain that may yet revive this model.

Since neither mortgage brokers nor rating agencies or mortgage distributors were meant to carry significant leveraged exposure themselves, the appropriate tool to address failures in the securitization process would not have been prudential regulation, but an enhanced form of conduct of business regulation that could have challenged the underpinnings of the “originate and distribute” business model.

Mitigating micro-systemic risk

From the point of view of mitigating risks that arise from the potential impact of the failure of an **individual institution** on financial markets and institutions (micro-systemic risk), a somewhat different subset of financial institutions matters—even though there may in practice be significant overlap. Both the probability of failure and the impact of a failure of an individual institution on the broader financial system is determined by a number of factors that can be taken into account in the assessment of the systemic threat posed by any particular institution.

- **Leverage**—With limited liability of equity claims, for a given profile of risks taken on balance sheet, the probability of failure is higher for an institution that is more highly levered, i.e., has more debt (fixed claims) in its liability structure.⁵⁵
- **Illiquid balance sheet**—Illiquid balance sheets arise from a combination of long-term and illiquid asset and short-term (wholesale) funding. This combination may increase both the probability, and the speed and impact of failure. Institutions that rely on the ability to roll over short-term funding to finance their balance sheet are at risk of withdrawal of their funding. This can in turn threaten a disorderly unwinding of positions held. Short-term funding of illiquid assets is a key characteristic of commercial banks. But investment banks can show similarly illiquid balance sheets, making them vulnerable to wholesale runs.⁵⁶ Hedge funds are more difficult to assess in this regard. On the one hand, relatively long lock-up periods for investments in hedge funds may mean that hedge funds can often be closed down and unwound over a period of time. On the other hand, they may be vulnerable to margin calls on the additional credit provided by their prime brokers.
- **Size**—In general, the size of the impact of failure is proportional to the size of an institution's balance sheet. Size determines the dollar value of financial claims that the institution holds and that would need to be disposed of upon closure or that the institution may choose to dispose of by fire sales to stave off failure. The size of the impact is related also to the extent of future credit extensions and credit commitments (off balance sheet) that other market participants may rely on. This will again correlate with the size of the institution.
- **Asset correlation**—For tradable assets, the impact of an offloading of assets into the market will be larger the more correlated the positions of the failing institutions are with those held in the market. An unwinding of positions will hurt other institutions when the failing institution holds positions that are also held by other institutions.⁵⁷ By contrast, an unwinding of contrarian (or neutral) positions may not have a

⁵⁵ Partnerships with unlimited guarantee will less often pose a threat to financial stability.

⁵⁶ Off-balance sheet structures created in the run-up to the crisis were likewise characterized by illiquid balance sheets, often funding long-term assets in short-term markets, by issuing “asset-backed commercial paper”. While off-balance sheet vehicles were unregulated, whether or not U.S. money market funds can pose systemic risk may depend on the regulations this type of fund is subject to, including importantly the degree to which maturity transformation is permitted. Life insurance companies and pension funds are examples of types of funds that do not ordinarily engage in maturity transformation, since claims on their assets tend to be long-maturity and predictable. Their actions may still have a systemic impact when the investment rules they are subject to result in forced selling.

⁵⁷ Brunnermeier et al (2009) offer new techniques to measure the extent to which this is the case for any given institution. See also Acharya and Richardson (2009).

detrimental effect and may instead increase at the margin the value of positions held by other institutions.⁵⁸

- **Interconnectedness**—Institutions that constitute a critical node in the web of exposures created in financial markets pose a bigger threat to financial stability.⁵⁹ The failure of institutions, claims on which are held largely by retail customers—such as traditional life insurance companies, will not have an impact through this channel.⁶⁰ But the examples of monoline insurance providers and AIG show that insurance companies can, by virtue of their (other) activities in financial markets, form such critical hubs.
- **Substitutability**—Some institutions may be critical to the functioning of financial markets not because other institutions are financially exposed to the institutions, but because other market participants rely on the continued provision of the services the institution provides. In financial markets, the key example is an existing credit relationship that may be difficult to replace or can only be replaced after a lapse of time. Limited substitutability of services will also arise when financial institutions play a critical role in the clearing and settlement of trades.

The impact of the failure of a given institution on financial markets is a function not just of the characteristics of the institution, but also of the ability of the **financial infrastructure** to support the default of an individual institution, and to facilitate the orderly unwinding of positions. This means that the type of institution that needs to be caught by tools that strive to mitigate micro-systemic risk may be a function not just of the characteristics of the individual institution, but a function also of the evolving resilience of major parts of the financial infrastructure that a failure of the institution can impinge upon.

⁵⁸ Hedge fund failures provide a good example. The failure of Amaranth advisors in 2006 was absorbed easily by the market despite its substantial size, since it was holding contrarian positions in natural gas futures, betting that the price of gas was going to fall from March 2007 to April 2007. Long Term Capital Management (LTCM) placed bets on a compression of spreads. These bets were blown out of the water by the Russian default in 1998 and a subsequent rise in spreads across all major bond markets. An unwinding of LTCM's position would have further increased spreads, hurting the market at large.

⁵⁹ A growing literature models and assesses empirically the network effects arising from interconnected financial institutions. Nier et al (2007) explore how the degree of interconnectedness of the system as a whole affects financial stability. They also assess the strength of liquidity effects that arise when banks hold similar assets and fire-sales of one institution leads to markdowns for other institutions.

⁶⁰ The case of HIH, one of the largest insurance companies in Australia, is sometimes used as an example of an insurance company that posed systemic risks. The collapse of HIH did, in fact have an adverse effect on the economy, but this was because of its near monopoly status as the supplier of insurance to the construction and medical sectors. The collapse of HIH had virtually no impact on other financial institutions or financial markets (Herring and Carmassi, 2007).

For instance, as regards national large value payment and settlement systems, as well the settlement of foreign exchange transactions, advances made over the last decade or so, may mean that the impact of an institutions' failure on these systems poses somewhat less of a threat today than in the past. On the other hand, weaknesses in the financial infrastructure underpinning growing OTC markets have meant that the impact on these markets was critical for the assessment of the systemic threat posed by any given institution—as evidenced in the cases of Bear Stearns, Lehman, and AIG.

The systemic importance of any given institution can change also as a result of **business decisions** taken by the institution. When an institution grows or shrinks in size and takes on or abandons new business lines this can alter its systemic importance. Both the potential for institutions to change and for market infrastructure to evolve implies that a periodic reassessment of the contribution of any particular institution to systemic risk may be needed. The assessment of systemic risk posed by individual institutions may evolve also as new tools are developed and as more information is collected to enable use of these tools in systemic risk assessment.

Customer protection

All financial markets are subject to informational asymmetries that can be exploited by those providing financial services. A licensing regime that entails the regulation of the activities that financial services providers engage in—as opposed to prudential regulation of the institution—may therefore be warranted for **all significant financial services providers**.⁶¹ The degree to which detailed behavioral standards need to be developed and enforced may vary with the intensity of the underlying informational problems and may be different for retail and wholesale markets. Where providers of financial services have a significant retail business and where the customer relies on the continued health of the institution (retail banks and savings institutions, insurance companies), regulation of activities may need to be complemented by prudential regulation and mandatory insurance of these retail products.

V. FINANCIAL REGULATION—AGENCY STRUCTURE

A. Principles

The question which regulatory structures are conducive to achieving the goals of financial regulation has long been a difficult policy issue. This is so, not least because the problem is multidimensional: the structure needs to assign two objectives (consumer protection and mitigation of systemic risk; assign four sets of regulatory tools (and hybrids); and be sensitive to the differential scope of consumer protection and systemic risk mitigation.

It is likely that no single structure will be optimal for all countries, regardless of the state of development of the financial sector and other contextual circumstances. For any given set of

⁶¹ This is in line with the recommendation by the Paulson Blueprint, see Department of the Treasury (2008).

circumstances, it is also possible that more than one solution may be capable of approximating the optimal structure. It is unlikely, nonetheless, that any—arbitrary—structure will be equally conducive to achieving the goals of financial regulation. It is useful therefore to start by establishing some general properties of well-functioning regulatory structures, as follows.

1. **Ensure all objectives are assigned.** Any regulatory structure needs to ensure that both systemic risk reduction and consumer protection are assigned to an agency.
2. **Ensure internal consistency of objectives.** A good structure should ensure that each agency has an internally consistent set of objectives, so that synergies can be realized and internal conflicts avoided.
3. **Assign conflicting objectives to separate institutions.** If there is a potential conflict of objectives, it may be desirable to have this conflict be transparent by assigning the objectives to separate agencies. Formal mechanisms for the resolution of conflicts may be useful.
4. **Assign tools commensurate with objectives.** A reasonable structure should strive to put required tools in the hands of those agencies who are tasked with the relevant objective. This creates clear accountability and increases effectiveness in the pursuit of objectives.
5. **Create synergies across tools.** Assigning similar tools to one agency can create synergies, but care should be taken that this does not result in conflicting objectives.
6. **Create synergies across regulatory scope (institutions).** Assigning all institutions that are relevant to the same objective to one organization can increase availability of information. It also ensures even application of tools across those institutions and reduces the chance that problem cases fall through the cracks.
7. **Reduce the potential for inter-agency frictions.** This can be achieved by reducing the number of agencies, where possible, and create strong mechanisms for inter-agency cooperation where necessary.
8. **Ensure consistency with pre-existing objectives.** When objectives and tools are assigned to pre-existing institutions, new objectives need to be consistent with extant objectives and tools complementary to existing ones.
9. **Reduce duplication.** Duplication arises when more than one agency is involved in the same activity. For every dollar of total resource spent, duplication can be reduced by assigning resources to a smaller number of agencies.⁶²

⁶² It is sometimes argued that “two pair of eyes” are useful in supervision. But “two pair of eyes” can also be created within an organization, by assigning a greater number of staff. This will in general also be more

10. **Reduce compliance costs on the industry.** Administrative and compliance costs tend to be higher when institutions need to deal with several agencies.

In addition, the structure needs to be sensitive to the state of development of the financial system as well as the pace of its evolution in any given country. Conversely, the pace and path of this evolution may be affected in no small part by the regulatory structure itself. Finally, consideration needs to be given to the political economy of financial regulation, and within that the relationship between regulatory agencies and treasury departments and more generally, the *body politic*.

Where weaknesses are identified, a radical overhaul of the regulatory structure will bring both benefits and costs, and will need to be thought through thoroughly. In some cases, incremental changes to existing structures may be possible, to fine-tune the structure to new developments in the provision of financial services, or to introduce patches to address identified weaknesses.

B. Comparison of Existing Structures

It is instructive to apply these principles in the context of a critical analysis of the existing and evolving regulatory structures across countries—taking account also of their relationship to payment system oversight, crisis resolution and monetary policy. In this regard it is useful to start with a comparison of regulatory structures that share the same number of agencies (in addition to the treasury and the deposit insurance fund). This comparison can hold constant considerations that may argue for a smaller or greater number of agencies. The two main examples of structures that are comprised of two agencies (in addition to the treasury and a deposit insurance fund) are the **single integrated regulator model** and the **twin-peaks model**.

Single integrated regulator model

The single integrated regulator model was established in many countries in response to changes in the financial sector. Until the mid 1990s, in the overwhelming majority of countries, regulation and supervision was organized along institutional (sectoral) lines. Separate licensing and regulatory regimes were in place for the banking, insurance, and securities industries, with central banks often taking the role of the regulator of commercial banks.

Over the last two decades, there has been a push in many countries to consolidate the regulatory structure with a view to reducing the number of agencies involved in regulation and thus to create cross-sectoral synergies in the regulation of the financial sector. As a result, some 30 countries have moved to a new model of a “single integrated regulator.”

efficient, since it leads to better flow of information across all relevant staff. When there are competing objectives, separation of resource across different agencies may be more useful.

When the model was introduced in the U.K. in 1997, the pace of adoption around the world accelerated (Box 2).⁶³ The model is characterized by the following elements:

- **Integrated regulator:** this takes in the securities markets regulator, the (market conduct) regulator of pension and mutual funds, and the regulator of insurance companies and commercial banks.
- The **central bank** and its monetary policy and financial stability functions (LOLR and payments oversight) is separate from the integrated regulator. But there is an MOU (as well as a Standing Committee and mutual board representation) to ensure an effective division of labor as well as close cooperation between the authorities.

The single integrated regulator model is commonly thought to provide a number of **benefits**. By reducing the number of agencies, it reduces the need for inter-agency coordination across sectoral lines (banking, insurance, and securities), which may sometimes be difficult to achieve. In a number of countries, the model was adopted to accommodate a trend towards financial conglomerates that combine a banking business with other financial business such as investment banking, asset management, and insurance. The main advantage of the single integrated regulatory model is that there is a single point of regulatory contact for all firms, including financial conglomerates. This can save firms in compliance costs. The single regulator model also assembles two important sets of tools—prudential regulation and conduct of business regulation—in one hand. And it can foster a level regulatory playing field across sectoral lines.

From the point of view of mitigating systemic risk, a level regulatory playing field is useful to avoid regulatory arbitrage across sectors, which can lead to a build-up of risk in more lightly regulated parts of the financial industry. However, if financial regulation accommodates the creation of large complex financial institutions this raises the issue of whether a level regulatory playing field is the right yardstick to determine the strength of prudential control that systemically-important institutions are subject to.⁶⁴ Rather than applying the same prudential standards as for any other institution, more stringent

⁶³ As Herring and Carmassi (2007) point out, the U.K.'s role as a major financial center ensures that supervisory initiatives taken in the U.K. engage the interest of financial institutions and supervisors elsewhere.

⁶⁴ A trend towards financial conglomerates can increase opportunities for risk-taking behavior by financial institutions and can make financial institutions too complex to manage, to monitor and to resolve. In response to these challenges, some commentators in the United States have questioned the U.S. Gramm-Leach-Bliley Act of 1999. This Act removed the separation of commercial and investment banking that had been introduced by the Glass-Steagall Act of 1933, in response to the U.S. Great Depression. There is currently active debate as to whether setting up new boundaries between banks and investment banks is an appropriate response to the recent crisis or whether this may go too far, see for example Turner (2009).

supervisory standards may need to be developed for those institutions that pose a greater systemic threat.⁶⁵

Box 2: Financial Stability Frameworks Across Countries

The SIR model (or close variants) has been adopted by a number of countries, including Norway (1985); Denmark (1988); Sweden (1991); Switzerland (1993);⁶⁶ U.K. (1997); Korea (1999); Japan (2000); Hungary (2000); Latvia (2001); Austria (2002); Germany (2002);⁶⁷ Finland (2003);⁶⁸ UAE (Dubai) (2003); Belgium (2004); and Poland (2008). In addition, Canada (1987) has adopted a partial model comprising only banking and insurance, and retaining a separate securities regulator, while in Mexico (1999) the separate regulator covers banking and securities, but not insurance. The main advantage of the SIR model is that it is an integrated supervisor for all financial institutions (“one stop supervision”). As Briault (2002) notes: “the U.K. FSA has benefited from economies of scale; a unified management structure and a unified approach to standard setting, authorization, supervision, enforcement, consumer education, and financial crime.”

Despite these advantages, the lessons that emerge from the crisis have brought some of the potential **weaknesses** of the integrated (SIR) model into sharper focus:

- Conduct of business regulation may be more publicly visible and politically popular than prudential regulation, and may tend to consume a more than proportionate share of the time of the integrated supervisor’s management and resources (Kremers et al 2003; Herring and Carmassi 2007). High visibility of both success and failure in conduct of business regulation has been evidenced during the crisis, for example in the case of the Madoff fraud. Concerns that integrated regulators may underinvest in prudential regulation relative to conduct of business regulation have not been dispelled by shortcomings in the SEC’s approach to the prudential regulation of investment banks. The FSA has acknowledged that its “balance between conduct of business regulation and prudential regulation ... now appears [to have been] biased towards the former” (Turner, 2009, page 87). In an internal review, the FSA has pledged to “reassess the balance of resource committed to conduct of business

⁶⁵ It may be possible to implement such a change when the integrated regulatory model is the starting point. Some of the proposals made by Turner (2009) are a step in this direction. The Swiss authorities have already made attempts to do this, e.g., by going beyond Basel II standards, in an effort to contain systemic risk arising from UBS and Credit Suisse.

⁶⁶ The Swiss regulatory model initially retained a separate insurance regulator. The model has become fully integrated in 2009.

⁶⁷ In Germany, the integrated regulator (BaFin) and Bundesbank have joint responsibility for the prudential supervision of banks. See section II. for further explanation.

⁶⁸ As in Switzerland, in Finland full integration was achieved in 2009, when the new Financial Supervisory Authority (FIN-FSA) took on supervision across all sectors, including also insurance.

regulation relative to prudential regulation,” and to “give greater priority to the task of supervising individual firms,” including through changes to its organizational structure (FSA, 2008).⁶⁹

- The single integrated structure has not been adopted with macroprudential objectives in mind. As a result, responsibility for macroprudential policies is often not clearly assigned, and accountability for macro-financial outcomes is lacking. For example, the central bank tends to be responsible for providing a macro-systemic overview—often promulgated in a Financial Stability Report—but the tools (other than the interest rate) to address macro-financial imbalances are vested in a separate agency that may—with macro management not otherwise part of its remit and culture—be slow to respond to changes in these conditions. And while both agencies could in principle cooperate to achieve the desired policy outcome, this cooperation may sometimes be difficult to achieve. What is more, neither agency is fully responsible if such cooperation fails. This reduces the incentives on the part of both agencies to invest in systemic risk reduction through macroprudential policies.
- As regards crisis resolution, there is a heavy onus on the effectiveness of inter-agency cooperation, meant to be achieved by MOUs—sometimes in conjunction with a Standing Committee and mutual Board membership. As argued above, central banks need access to supervisory information to perform their role in crisis management effectively. In tripartite arrangements, MOUs may not always provide for a sufficiently free flow of information, with supervisors often retaining discretion over what information is released and when. Existing safeguards may also fail to give the central bank sufficiently strong control (if any) over the early remedial action taken by the supervisory authority.
- In the single integrated structure, the oversight over systemically-important payment and settlement systems is vested in the central bank, while prudential authority over users of such systems is vested in the separate integrated agency. As a result, central banks lack formal powers to influence users’ choices between those payment and settlement systems that offer a high degree of systemic resilience versus those payment and settlement modes that give rise to systemic risk. As noted, the crisis has highlighted insufficiently resilient clearing and settlement arrangements in OTC markets. But the issue is more general and affects the ability of central banks to influence use of secure systems for foreign exchange (through continuous linked settlement, CLS), as well as of potentially competing domestic systems. Moreover, in part because of the separation between oversight and prudential regulation, today’s prudential standards do not generally take account of heightened counterparty credit

⁶⁹ The desire for greater focus on prudential regulation and conduct of business regulation, respectively, is cited in the Paulson blueprint as a reason against recommending this model for the U.S., see Department of the Treasury (2008).

risk that arises from the use of insufficiently robust clearing and settlement arrangements.

- The integrated model fails to harness the central bank’s incentives in mitigating systemic risk and the benefits that these incentives may entail for the effectiveness of regulation. As set out above, central banks have incentives to reduce macro-systemic risks, since a realization of systemic risk affects a central bank’s macro-objectives. Central banks also have incentives to reduce the moral hazard arising from LOLR support, through effective liquidity regulation. To the extent that central banks are involved in crisis resolution, they finally have incentives to reduce the frequency of crises at individual institutions. While the integrated regulator could be given an objective to mitigate systemic risk, additional institutional incentives may help in anchoring the objective in the culture of the institution. Institutional incentives may be important particularly in the pursuit of systemic risk mitigation, since crises occur rarely and success manifests in the absence of crisis, making it quite hard to devise pay incentives that condition on regulatory success.

The twin-peaks model

An alternative model that takes some of these challenges into account while preserving key benefits of an integrated model is—a version of—a twin-peaks approach.⁷⁰ As in the SIR model, and in contrast to the traditional, more fragmented institutional structure, there are (only) two agencies, a conduct regulator and a systemic risk regulator, the latter integrated in the central bank.

- **Systemic risk regulator.** This takes in prudential regulation of all potentially systemic institutions, and oversight of systemically-important payment and settlement systems. These functions are assigned to the **central bank**.
- **Business conduct regulator.** This takes in conduct of business regulation across all sectors of financial services (banking, insurance, and securities services), including both wholesale (regulation of exchanges) and retail activities.

There are a number of versions of this approach that differ in the detail. For example, it needs to be decided which of the two authorities should be the prudential supervisor of smaller insurance companies that—while not strictly of systemic importance—will still need to be

⁷⁰ Herring and Carmassi (2007) identify two versions, one of which is close to the model described here. The other was adopted by Australia, where the micro-prudential supervisor, the Australian Prudential Regulation Authority is located outside the central bank—that retains a macroprudential objective—and another independent authority, the Australian Securities and Investment Commission, performs conduct of business regulation. Using the classification developed here, this model is more aptly characterized as a “hybrid” model between the two alternatives (SIR and twin-peaks). See below for further discussion.

supervised from the point of view of consumer protection.⁷¹ The approach that has been adopted by the Netherlands in 2002, has this function with the central bank.⁷² Versions of the approach adopted in Bulgaria and South Africa have insurance regulation outside of the central bank.

A key element of the twin-peaks model as defined here is a prudential role for the central bank. In this regard many countries can be viewed as operating a version of the twin-peaks approach, including France; Italy; Portugal; and Spain, as well as many emerging market economies, even if in some of these countries conduct of business regulation is not consolidated in a single agency. An MOU between the two agencies is useful, to clarify an understanding of the respective roles and responsibilities and to facilitate discussion of issues that are of common interest, such as when the conduct of business of particular types of institutions contributes to systemic risks.⁷³

The **benefits** of this model largely mirror the potential costs of the single integrated regulator outlined above. First, each agency is focused on one objective, mitigation of systemic risk on the one hand and consumer protection on the other. This reduces the risk that these objectives may compete within an agency. Second, the twin-peaks approach lends itself to the complementary use of macroprudential policies and monetary policy in countering the build-up of financial imbalances. Third, with respect to the supervision and resolution of systemically-important institutions, the potential for institutional frictions and need for inter-agency coordination is reduced. Fourth, the twin-peaks model can foster prudential approaches that help internalize the systemic risks arising from the use of insufficiently robust payment, clearing, and settlement systems. Fifth, the model ensures that existing central bank incentives to mitigate systemic risk are brought to bear on the strength of the pursuit of this objective, through financial regulation.

Potential **weaknesses** of the twin-peaks model include the possible costs of a greater role of central banks in financial regulation, that were reviewed in detail above (in section II.) These costs, if relevant, suggest that under twin-peaks the central bank may be doing “too much”. A different potential weakness of twin-peaks arises since prudential regulation of systemic institutions and conduct of business regulation across all markets are assigned to different agencies. Since conduct of business regulation pursues broad consumer protection objectives,

⁷¹ Congruence of goals (consumer protection) argues for assigning this responsibility to the market conduct regulator. Congruence of tools (prudential regulation) argues for housing all prudential supervision with the prudential and systemic risk regulator.

⁷² Austria created a single integrated regulator (FMA) in 2002. In the wake of the crisis at BAWAG, there have been changes to the relationship between the single regulator, FMA, and the Austrian National Bank which now move the Austrian model closer to the Twin Peaks approach. Since January 2008 the law charges the Austrian National Bank with all aspects of the supervision of banks and financial conglomerates. However, the FMA still has all enforcement powers.

⁷³ There is such an MOU in the Netherlands between the central bank (DNB) and the market conduct regulator (AFM).

rather than systemic risk reduction, this division makes sense most of the time. It can become a weakness however, when certain types of conduct of business regulation are needed to complement effective systemic risk reduction by the central bank. From this point of view, under twin-peak the central bank may on occasion be doing “too little.”⁷⁴ A third potential weakness is that systemically-important financial services providers that are subject to both prudential regulation and conduct of business regulation may have two points of regulatory contact rather than a single one. While this may create a greater burden on these institutions, it is a burden that may be justified if there is greater effectiveness of systemic risk reduction under the twin-peaks model relative to the integrated approach.

By its nature, a discussion of regulatory frameworks needs to rely in the main on conceptual arguments and it is the strength of these arguments that needs to be weighed in the context of any potential review of national frameworks. Nonetheless, some preliminary and partial evidence on the relative performance of the integrated model and the twin-peaks model during the crisis is presented in Appendix I.

Hybrid models

The optimal framework is likely to be country-specific and needs to take into consideration a number of factors. One is the level of financial development and the (expected) evolution of the financial sector. Another is the distribution of financial sector assets within each sector (banking, insurance, and securities). In this regard, the existence of large government-sponsored entities creates additional challenges, which are further explored in Box 3, below. A third important consideration is the degree of conglomeration across functional lines.

Where the financial system is composed of a handful of large complex financial institutions that cross functional boundaries (banking and insurance) as in the Netherlands, it may make sense for the central bank to become the prudential regulator of all banks and insurance companies. This is because, to preserve economies of scale and scope, it would not make sense to entertain a separate prudential agency outside of the central bank.

Hybrid models—three agencies

Where the financial system has a large number of relatively small banking institutions, in addition to a set of large leveraged institutions that are potentially systemic—such as in the U.S.; Germany; and Japan—it may be less practical for the central bank to be the prudential regulator of all banking institutions. In these cases it may be workable to establish a second prudential supervisor—such as the FDIC—that is tasked with the supervision of the large fringe of institutions that, because of a low degree of systemic threat, may not merit a heightened degree of oversight by the central bank. This frees resources at the central bank to focus its oversight on those institutions that can pose micro-systemic risks, in line with its

⁷⁴ Both the case where the central bank is doing “too much” and where it is doing “too little” are further explored below, in the context of hybrid models.

objective to guard overall financial stability. The central bank may also retain a role in the design of prudential regulation for the (banking) system as a whole, in order to ensure effective mitigation of macro-systemic risk.

A disadvantage of involving the central bank in the supervision of individually systemic institutions may be that systemically-important institutions are identified by implication. Common knowledge as regards which institutions are regarded as potentially systemic and which are regarded as less important poses a particular problem for a regulatory regime that relies on “constructive ambiguity” with respect to resolution actions taken by authorities. However, market expectations of public support may be fairly high for the largest institutions in any case—reducing the force of market discipline and increasing moral hazard—and these expectations have also by and large been confirmed by government actions during the crisis.⁷⁵

Openness about the authorities’ assessment of the potential for systemic risk may also raise less of a concern in a regulatory regime where the benefit to an institution of being regarded as systemically-important is reduced by tighter prudential standards—such as those recently introduced in Switzerland for UBS and Credit Suisse,⁷⁶ more intrusive supervision of these institutions, and the application of a special resolution regime, that may reduce further any moral hazard that might otherwise prevail.

One way of operating this model is for the central bank to take exclusive responsibility for the supervision of potentially systemic institutions. Another approach is to have “two pairs of eyes” with the central bank in the lead for a list of institutions deemed potentially systemic, and a separate prudential supervisor retaining a role as a residual supervisor of all institutions. In both cases, it may be useful to assign powers to the central bank to “designate” as systemically-important any institution that fits internal criteria—as discussed above—much in the same way that banks can be given powers to designate systemically-important payment systems.⁷⁷ This makes it feasible to operate a dynamic and flexible

⁷⁵ This is perhaps with the exception of Lehman, where the market’s expectation might have been disappointed. Nier and Baumann (2006) provide evidence of the detrimental effect of public support expectations on market discipline.

⁷⁶ Around the end of 2008, the Swiss regulator FINMA strengthened capital adequacy requirements and introduced a minimum leverage ratio, for Credit Suisse and UBS only. The Swiss leverage ratio defines the proportion of Tier 1 capital to total assets and is set at a minimum of 3% at the consolidated level. For the calculation of this new parameter, the balance sheet is adjusted for a number of factors, including the deduction of the Swiss domestic loan book. The Swiss authorities also decided to introduce a more general leverage ratio, which will come into effect at a later date.

⁷⁷ Designation of payment systems is envisaged in the Paulson Blueprint, Department of the Treasury (2008).

approach where the central bank is able to expand or contract its focus as institutions take on or abandon new business lines and their systemic impact changes.⁷⁸

Hybrid models—three agencies (ctd.)

An alternative model, also involving three agencies, was established in Australia, where there is a prudential agency that is separate from the conduct of business regulator, with both agencies outside of the central bank. Relative to the integrated regulator model, a separate prudential agency may sharpen the focus on prudential policies.

In cases where the authorities have settled on the single integrated regulator model, it may be possible to create a dedicated prudential department within the integrated regulator, alongside a dedicated conduct-of-business department. Some elements of this model are present in the new U.K. model—with management changes within the FSA that strengthen its prudential focus.

Under such a structure, an additional effort may be necessary to clarify the objectives and role of each agency, and to foster cooperation between central bank and prudential agency, in order to reduce any remaining potential frictions that might hamper cooperation and communication between them.

To strengthen cooperation in mitigating systemic risk, a specific effort may be needed to clarify the objective of such cooperation and to formalize and operationalize cooperation in ways that ensure an appropriate degree of influence on the part of the central bank on macroprudential policies, as well as on the microprudential policies that constrain individual systemically-important institutions.

Hybrid models—one agency

The scope of the operational linkages between central bank and potentially separate regulatory agencies also needs to take into account the overall development of financial markets. Many countries start with a “bank-based” financial system, where credit risk is held on the balance sheet of financial intermediaries. However, typically, as the financial market matures, corporate bond and equity markets gain greater importance, moving the system towards a “markets-based” system—with the U.S. often viewed as the country furthest along this spectrum. Both in the U.S. and elsewhere, financial markets have developed further to allow the trading of instruments that isolate the credit risk of larger (corporate and sovereign) borrowers (credit default swaps) and credit risky securities that bundle the credit extended to a large number of smaller creditors (securitization).

⁷⁸ It can be argued that, de facto, in the U.S. the Fed was able to “designate” all investment banks in the wake of the Bear Stearns takeover and after the Lehman failure, by drawing up an MOU with the SEC, quickly embedding Fed officials with all major broker-dealers and finally subjecting the remaining firms to supervision by the Fed, with the firms acquiring the status of bank-holding companies.

The crisis has shown that when financial innovation leads markets to grow rapidly, their institutional underpinnings may not keep pace. This can pertain to the clearing and settlement infrastructure of fast-growing markets (such as credit default swaps). Weaknesses have also been evident in the incentives structures underpinning fast-growing securitization markets, as further explored in Box 1.

Conduct of business regulation across the wide range of wholesale and retail markets can often be fully effective when pursued rigorously with the objective of protecting consumers and investors. When financial markets are evolving rapidly, however, the regulation of the activities and business models of financial market participants may become an important element in systemic risk mitigation, alongside the prudential regulation of systemically important institutions. A systemic risk regulator would therefore need to have the capacity to cooperate closely with the authority that is charged with conduct of business regulation. When the trading landscape is evolving rapidly, such inter-agency links are useful also to effect an integrated approach to the oversight of markets and the oversight of the associated post-trade infrastructure. They may finally be useful in crisis times, when an integrated response, involving all agencies, may be needed to contain the crisis.

These aspects may need to be taken into account when the starting point is the single integrated regulator, where conduct of business regulation is separate from the central bank (and its payment oversight function). It may also need to inform the overall design when the starting point is the twin-peaks model—where again, conduct of business regulation is conducted outside of the central bank (and its prudential function).

The establishment of operational linkages—e.g., through an MOU—between a central bank and the conduct of business agency is one way of addressing these issues. The limiting hybrid model is a full organizational integration of the central bank and the integrated regulator—including prudential, and conduct of business regulator. The attractiveness of this solution may depend both on the size of the financial market and its expected speed of development. In large countries with a well-developed financial market, the workload of the conduct of business regulator across all wholesale and retail markets may be so substantial that an organizational integration with the central bank may not be practical. Where financial markets are relatively small, but expected to develop fast, such as in certain emerging markets, there may be a stronger case for a full organizational integration of the integrated regulator and the central bank. Countries where versions of this model are currently in place include the Czech Republic and Singapore.

Box 3: Special Considerations for Government Sponsored Entities

A number of special considerations arise for financial institutions that are private, but partly publicly owned or otherwise sponsored by the government, such as the U.S. government-sponsored entities (GSEs) and IKB.

For these institutions, moral hazard incentives arising from an explicit or perceived safety net tend to be particularly strong. Weak market discipline is often integral to the business model of quasi-public institutions. A reduction in funding costs as a result of an explicit or implicit government guarantee provides a subsidy that enables these entities to pursue objectives that are desirable from the point of the authorities, but that would not otherwise be delivered by the market. An example is the desire to increase access to retail mortgages in the case of the U.S. GSEs.

Moral hazard arising from weak market discipline may sometimes be compounded by supervision that is structurally weak. Since the management of the sponsored institution enjoys an explicit or implicit backing by the government, this may weaken the position of the supervisory agency relative to the management. Weak supervisory discipline may be a problem in particular when the sponsored entities are subject to a tailor-made prudential regime.

The problem of weak market discipline, potentially coupled with less than fully effective supervisory control, may be difficult to overcome for publicly sponsored entities. While a full discussion of these difficulties is beyond scope, there would appear to be three main policy options. One way of addressing the issues is to nationalize government-sponsored entities. Public ownership ensures that the treasury can wield direct and strong powers in oversight and resolution, e.g., replace the management, and close, merge, split, and sell the assets of such an institution. A second option is to remove the implicit or explicit backing and relinquish, or find other ways of pursuing, the public policy objectives that these entities were meant to achieve. A third option is to hold on to these objectives and to accept that when these objectives are pursued through a private institution, this may create gambling incentives and can result in occasional losses to the treasury.

Integrating special resolution regimes into the overall framework

As noted above, alongside prudential supervision, a special resolution regime needs to play a key role in the overall regulatory framework. The crisis has shown, however, that so far, such resolution regimes have not been commonly viewed as an integral part of financial regulation. The absence of a special resolution regime has been felt in the U.K. in the case of Northern Rock, as well as in Germany, in the cases of Hypo Real and IKB. In Belgium, it has complicated the resolution of Fortis. Limited scope of the bank resolution framework in the U.S. has led to the disorderly bankruptcy of Lehman and contributed to the global systemic impact of its failure.

This raises the issue as to how to integrate such resolution regimes into the overall regulatory framework. First, what is the relationship between supervision and resolution? Second, what

is the appropriate role of the treasury? Third, what is the appropriate role of central banks in resolution? Finally, what do the answers imply for the design of the overall framework?

Special resolution regimes and supervision

As previously stated, prudential supervision and resolution are linked by a common objective, which is to minimize costs to customers, the financial system at large, and ultimately the public purse arising from the risk of insolvency of a financial institution. The example of the prompt corrective action framework for commercial banks in the U.S. highlights the benefits of an operational integration of supervision and resolution. Under this framework, there is a gradual progression of the intensity of intervention as problems develop at a financial institution. As long as a bank is well-capitalized—to a certain standard—the intensity of prudential supervision follows normal prudential standards. When this threshold is breached, supervisors are obligated to apply a number of additional tools to limit the risk of insolvency, e.g., by constraining the activities permissible to the firm. Only when these measures are unable to avert insolvency, the institution enters the resolution phase.

This suggests that there may be synergies between supervision and resolution that the overall regulatory structure should seek to preserve. Where the resolution authority is separate from the supervisory agency, safeguards need to be in place to ensure that the resolution authority is notified early of emerging problems at individual institutions. It may also need to become involved in the design of corrective action taken; and it needs to be given free access to all supervisory information about the failing firm, to be able to decide on the best course of action among the menu of available resolution options.

Such inter-agency coordination may not always be seamless. According to Herring and Carmassi (2007), there have been several incidents in the U.S. that have raised questions about how effective cooperation between a separate supervisor and the resolution agency (the FDIC) may be in practice. In 2001, the Office of Thrift Supervision banned the FDIC from participation in the examination of an insolvent bank. A similar problem occurred between the Office of the Comptroller of the Currency and the FDIC with regard to the First National Bank of West Virginia. In these two cases, the problems may have caused losses to the deposit insurer, Herring and Carmassi (2007).

Special resolution regimes and the role of the treasury

Special resolution regimes can offer the authorities a range of tools to reduce the impact a failing bank has on the system, without implicating public funds. For example, under the new U.K. regime, these include the forced (full or partial) transfer of the failing institution's assets or liabilities (deposits) to a third party, use of a partial transfer to create an insolvent "bad bank" while keeping critical functions running in a "good bank," creation of a bridge bank where the resolution authority itself takes temporary control of the failing institutions, and facilitating a private sector sale. However, there could be instances when it is judged that

a resolution needs to be supported by a significant commitment of public funds. In these instances, the treasury (and ultimately the taxpayer) needs to assume full fiscal responsibility.

This suggests that resolution regimes cannot operate without involving the treasury (the prime minister/president/parliament) at least on occasion. But this does not mean that the treasury will of necessity take a leading role in the resolution process. The treasury department itself may not necessarily have the expertise to conduct the resolution process effectively. It may also want to ensure that it has taken due independent advice before making public funds available to financial institutions, drawing on outside expertise to assess the costs (to the taxpayer and in creating moral hazard) and benefits (in terms of a reduction of costs to the financial system and the economy at large) of committing public funds. There will therefore typically be a role for a resolution agency that is independent of the treasury.

Special resolution regimes and the role of the central bank

Central banks have historically played a key role in the management of financial crises, lending to solvent, but illiquid institutions as a last resort, even if this role has rarely been formalized or buttressed by legal powers. The Fed was created in 1913 to manage recurring liquidity crises in the U.S. banking system. Likewise, one of the BOE's core purposes has long been the maintenance of financial stability and it has provided emergency liquidity on a number of occasions.

Central banks therefore have objectives that are consistent with a leading role in a special resolution regime. They can also deploy tools that are already in their domain (LOLR) to sustain financial stability. They can, in addition, draw on expertise in the analysis of financial stability, including the important ability to gauge the impact of a failure on markets, payment systems, and the financial infrastructure at large.

This suggests that there may be significant benefits in harnessing central banks in the operation of special resolution regimes for systemically-important institutions. Consistent with these considerations, the proposed framework for a special resolution regime in the U.K. assigns the BOE a leading role in the resolution process. As regards the role of the Fed in a special resolution mechanism, a number of commentators have expressed caution (e.g., Economist, 2008). The Fed itself initially pointed to the treasury as the appropriate agency to resolve non-bank financial institutions.⁷⁹ A more recent joint proposal of the U.S. Treasury and the Fed (made in March 2009) indicated that the Fed may be involved at least in an advisory capacity.

This highlights the need for a formal resolution framework that tightly governs the roles of the central bank and the treasury, ensuring that the latter assumes full fiscal responsibility for the resolution path chosen. Where the central bank, as a result of acting as a resolution agent,

⁷⁹ Bernanke (2008b).

puts its own balance sheet at risk, there needs to be legal obligation on the part of the treasury to recapitalize the bank—otherwise central bank independence might be put at risk.

Implications for the overall framework

This discussion suggests that a **twin-peaks** model of regulation can accommodate a special resolution regime straightforwardly, by providing the central bank additional powers in resolution, alongside its existing capability as LOLR and prudential regulator of systemically-important institutions. Care needs to be taken to clarify the roles and responsibilities of the central bank and the treasury in resolution.

A special resolution regime can—and should—be introduced also when the starting point is the **single integrated regulator** that is separate from the central bank (SIR model). However, in this case a number of additional issues need to be resolved, which turn on the relationship between integrated regulator and central bank in resolution.

- Placing the resolution authority with the **integrated regulator** facilitates a seamless operational integration of supervision and resolution in a prompt corrective action framework; though it poses the problem of how the integrated supervisor can harness the expertise of the central bank in gauging the systemic impact of a failure. It also raises the issue of how the regulator can harness the ability of the central bank to lend to a stricken institution if the resolution authority deems such temporary support desirable.
- Placing the resolution authority with the **central bank** poses the opposite benefits and costs. It preserves the ability of the resolution authority to gauge the systemic cost of failure, and to provide LOLR support, as necessary. However, it raises a question as to how best to integrate supervision and resolution, how to ensure appropriate influence on early corrective action, as well as access to information on the part of the central bank.

Moreover, under the single integrated regulator model, any of the two solutions may delicately affect the balance of “power” and “influence” between the two authorities. To preserve this balance, there may be a temptation to establish an independent resolution authority outside of both the central bank and the supervisor. However, this wastes **all** of the firm-specific information available at the supervisory agency, the central bank’s ability to gauge the impact of a failure on the system as a whole, and the tools already at the disposal of the central bank.

In sum, both the twin-peaks model and the integrated supervisory models are able to integrate a special resolution regime in principle. However, additional difficulties arise for the single integrated approach, which turn on the need for close interagency coordination and a shift in the balance of powers between agencies. At the margin, these may come to lessen

the resolve of policymakers to introduce such a regime⁸⁰ and could lessen the speed of reform.⁸¹

Box 4. International Considerations

It is worth exploring what implications a shift across countries towards a greater role for central banks in financial stability would have for international cooperation in the sphere of financial stability.

As noted by the U.S. Treasury Blueprint (page 5), inter-agency disputes among federal supervisory agencies have contributed to a prolonged process surrounding the development and implementation of the Basel II rules in the U.S. By the same token, international cooperation in the development of macroprudential standards and standards for the regulation of systemically-important institutions could be enhanced if in each country only a single authority was responsible (or in the lead) on these issues. Instead, the need to coordinate between central bank and separate prudential authority in a number of countries will sometimes slow down the process of international standard setting that is conducted under the auspices of the Basel Committee for Banking Supervision (BCBS).

A lead role for central banks could, in addition, foster the ease of dialogue between the BCBS and other committees. As noted, a more holistic approach to the oversight of settlement systems and the prudential regulation of their users would be desirable. This highlights benefits from close cooperation between the BCBS and the Committee for Payment and Settlement Systems (CPSS). Such cooperation could be fostered at the margin if the same institutions (central banks) were in the lead on both committees

A lead role for central banks might also help establish more effective supervisory and crisis management “colleges” to deal with issues pertaining to specific cross-border institutions. Given a growing integration of financial markets and institutions across countries, crisis management poses challenges particularly for European countries. Clearly, these discussions are difficult for a number of reasons, but again it might help at the margin if, in each country, a smaller number of institutions (central bank and treasury) were in charge.

A different experiment would be to assume the adoption of the integrated model by relevant countries and for the integrated regulator to be in the lead in all countries. This would imply the removal of central banks from BCBS. This might increase the potential for dialogue between BCBS and the International Organization of Securities Regulators (IOSCO), but given the absence of central banks from this dialogue, it may not follow necessarily that this would lead to stronger mitigation of systemic risk.

⁸⁰ The introduction of special resolution regimes also faces a number of important legal obstacles since special resolution regimes can affect the property rights of shareholders.

⁸¹ Jacome (2008) documents how the absence of special resolution regimes has reduced the effectiveness of crisis resolution in a number of Latin American countries since the mid-1990s. Interestingly, according to Jacome (2008), the introduction of special resolution regimes in the region was pioneered by Argentina, which alongside Brazil, is the only country in Latin America where the central bank is the main prudential regulator of banks. The special resolution framework empowered the central bank and helped in containing a banking crisis that was sparked by contagion in the wake of the Mexican devaluation in 1994.

VI. CONCLUSIONS

Over the past two decades, revisions to the monetary policy framework appear to have been successful in the combat of inflation in a number of countries. Over the same period, financial stability frameworks have not kept pace. These frameworks have left the role of central banks ill-defined, and financial sector regulation appears with hindsight to have lost sight of a key objective—mitigating systemic risk.

A revision of the policy framework needs to start with a close examination of the nature of systemic risk. A special effort is needed to complete the set of tools that can foster the objective of mitigating this risk, such as macroprudential tools that can be used alongside monetary policy to contain the build-up of financial imbalances, and special resolution regimes that can complement microprudential regulation of systemically-important institutions.

The analysis conducted in this paper suggests that an expanded role of the central banks that goes beyond the tools already typically at their disposal—monetary policy, LOLR, and payment oversight—could enhance the overall effectiveness of financial regulation, allowing synergies to be exploited with new regulatory tools to mitigate systemic risk.

- An expanded role in financial regulation can harness central banks' incentives, enhance their access to information and complete their toolsets in mitigating systemic risk. It can harness their expertise in macro-financial analysis to inform the design and use of macroprudential tools, and their knowledge of infrastructure in developing new microprudential tools.
- An expanded role in financial regulation also comes with costs. However, contrary to the received wisdom—that emphasizes potential conflicts between prudential and monetary policy—lessons that are now being drawn from the crisis point to potential synergies between monetary policy and financial regulation, in particular when the latter is geared more explicitly to the mitigation of systemic risk.
- More effective use of all available tools could reduce the frequency of crises and decrease its impact, reducing the chance that political pressures are brought to bear on the central bank in crisis situations.

If a central bank is given a stronger role in financial stability, including stronger influence on the prudential regulation of individual institutions, as well as a more clearly defined role in their resolution, these powers need to be complemented by robust mechanisms that ensure transparency and independent accountability of the central bank's actions in safeguarding financial stability. Also, the framework needs to clarify that the treasury is responsible for any quasi-fiscal costs incurred in resolution.

Since radical reform has benefits and costs, it may not be the preferred option when incremental changes can be made to address weaknesses. Moreover, the optimal structure in any given country needs to be sensitive to the development and expected evolution of the

financial sector. Different models offer different profiles of benefits and costs and may be attractive depending on the starting point and the state of development of the financial sector.

The success of financial stability policy does not depend on the national policy framework alone. Other important factors include: intellectual clarity on the way financial markets respond to regulatory and monetary policy actions; the quality of leadership of central banks and supervisory agencies; and the staff resources made available to these agencies. Global financial stability also requires international cooperation and effective governance of the mechanisms that can foster cooperation. Nonetheless, effective national structures may be an important condition to ensure greater success in mitigating systemic risk.⁸² Therefore, further debate of the advantages and weaknesses of alternative structures would appear desirable.

⁸² This view is consistent with the conclusions reached in Group of Thirty (2008).

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Appendix I. Some Preliminary Empirical Analysis

A problem of small samples and other confounding influences makes it difficult to quantify the relative performance of different regulatory structures with precision in any empirical analysis. Nonetheless, the crisis events now offer more data than were hitherto available that can be used for a comparison of alternative structures.

This appendix presents some, necessarily partial and preliminary evidence. It starts from the idea that U.S. subprime related losses have fallen heavily on developed European countries. These losses represent foreign, rather than domestic exposures for all countries in developed Europe. These countries are fairly similar along a number of other important dimensions, such as overall governance and observance of the rule of law, the prevailing risk culture, the framework for the conduct of monetary policy, the overall level of financial development, the structure of the banking system, and the prevailing bank capital requirements. Minimum Basel I capital requirements were in place until the end of 2006 in all countries and none of these countries was operating an additional leverage ratio.⁸³

A candidate for differences across countries are differences in the supervisory approach, for example, the extent to which the supervisor is engaged in balance sheet analysis and the intensity of on-site inspections.⁸⁴ Given the absence of an international standard, bank liquidity requirements are a further candidate for differences across countries.

Figure 1 shows the aggregate loss as of Q2 2008 for each country within developed Europe where sub-prime losses have fallen on domestic institutions. It also assigns each of these countries to either the twin-peaks or the integrated (SIR) model, where possible. In this regard, in line with the definition in the main text, the main criterion used is whether the central bank is in charge of banking regulation. While Germany did receive losses, and therefore appears on Figure 1, we leave Germany unassigned, since, as explained in the main text, BaFin and Bundesbank share a joint responsibility for banking regulation.

Among all countries that have sustained losses, it would appear that countries where the central banks is the banking regulator (Italy; Netherlands; and France)—twin-peaks in this context—have fared relatively better than countries that had adopted the integrated regulator model (Belgium, Switzerland, and the U.K.) as regards total subprime losses sustained in this phase of the crisis (Figure 1).⁸⁵

⁸³ A transition to the new Basel II rules was ongoing from 2007 in many of the sample countries. As noted, Spain was operating a dynamic provisioning regime since 2000.

⁸⁴ See Turner 2009, page 89, for further discussion.

⁸⁵ Before it was broken up into separate Dutch and Belgian institutions, Fortis Bank was a Belgian legal entity, that was supervised on a consolidated basis by the Belgian Banking, Finance and Insurance Commission (BFIC). In addition, Fortis was subject to supplementary supervision as prescribed in the EU directive on the supervision of financial conglomerates. Such supplementary supervision is meant to cover areas such as the shareholding structure of the parent company, the reliability of directors and management, the organizational

(continued)

The comparison in Figure 1 ignores that **total** banking system assets may differ across countries. Where the number of banks and total banking system assets is relatively large, (such as in Germany) one would expect total subprime losses to be larger.⁸⁶ To correct for such an effect, in Figure 2 total losses are aggregated across both groups (twin-peaks and integrated model) for the whole of developed Europe and are scaled by total banking system assets. Figure 2 suggests that a difference across regulatory approaches remains.

In part related to sub-prime losses since the onset of the crisis (August 2007), there have been a number of (near) bank closures and operations designed to rescue individual institutions. Across the sample, these individual rescue operations have since October 2008 gradually been replaced by an effort to introduce more comprehensive solutions, involving insurance schemes and capital support. This opens up an additional comparison across the sample countries.

In the period spanning August 2007 and October 2008, among the countries that were operating the integrated (SIR) model, rescues of individual institutions had been undertaken in the U.K. (Northern Rock, Bradford & Bingley, HBOS⁸⁷, RBS⁸⁸); Denmark (Roskilde); Belgium (Dexia and Fortis); Switzerland (UBS); and Iceland (Glitnir, Landsbanki, Kaupthing).⁸⁹

In some of these cases (e.g., UBS), the weakness of the institution was related to U.S. asset-backed securities (sub-prime exposures) held on (or off) balance sheet. In other cases, the troubled institutions had grown leverage through acquiring other cross-border assets (e.g., RBS, Fortis) or had grown by taking on domestic assets (e.g., Northern Rock), increasing their vulnerability to a withdrawal of wholesale funding.

structure of Fortis, its investment policy, risk concentration and intra-group activities. This supplementary supervision was exercised jointly by the BFIC and the Dutch Central Bank (DNB), and was governed by their agreement 'Framework for the exercise of the supplementary supervision of Fortis dated February 28, 2002. Under the terms of this document, the BFIC was designated the coordinator of the supplementary supervision.

⁸⁶ In Germany, of the total loss (US\$56 billion as of Q2 2008), losses absorbed by the Landesbanken and IKB amounted to US\$36.2 billion, against US\$19.8 billion for other German institutions. The average loss ratio (losses/total assets)*100 for these two groups of institutions was 4.43 and 0.48, respectively, that is, higher by a factor of 9 for the former group. One potential explanation is that for the former group, market expectations of public support might have been high, reducing the force of market discipline.

⁸⁷ The takeover of HBOS by Lloyds TSB was announced on September 18, 2008 and required the U.K. authorities to waive competition rules.

⁸⁸ RBS received an injection of public capital that was announced towards the end of the period, on October 13, 2008, at a time when a more comprehensive plan had already been announced, on October 7.

⁸⁹ Dexia also affected Luxembourg and France, but was supervised by the Belgian authorities. The Austrian BAWAG failure had occurred before August 2007. The Austrian Erste Bank received a capital injection, announced Oct 30, 2008.

From October 2008, sample countries introduced comprehensive recapitalization and insurance plans, including those classified as twin-peaks (France; Greece; Italy; Netherlands; Portugal; and Spain).⁹⁰ However, over the period considered, August 2007 to October 2008, the efforts made to rescue individual failing institutions across this group of countries does not appear to have had comparable intensity.

Both the comparison of losses and the comparison of rescue operations across regimes are consistent with the hypothesis that a central bank's control of prudential regulation and supervision can have benefits for systemic risk mitigation, through more effective use of supervisory and regulatory tools.

This evidence should not be taken to indicate that crises and individual failures are impossible or even unlikely to happen when the central bank has full prudential control. There are historical episodes where a systemic crisis developed with the central bank having full prudential control; as well as a number of such episodes where the central bank had limited or no prudential control. The Asian crises in the late 1990s are an example where central banks had control over prudential regulation and supervision across the region. The Nordic crises during the early 1990s are an example of a systemic crisis where the integrated model was in place across much of the region (see Box 2)⁹¹. However, for lack of variation across regulatory regimes within the affected regions it is more difficult to use these past episodes to draw inferences on the marginal effect of central bank prudential control for the frequency or severity of the crisis. Moreover, for some of the past crises, rapid financial liberalization (including of markets for foreign exchange) are viewed as the root cause of the crises and these forces may come to overwhelm the marginal effect of regulatory structure.

A number of further caveats apply. For example, it is possible that the apparent relationship observed for the recent European experience between regulatory structure on the one hand and losses (or the occurrence of individual rescue operations) on the other is not causal and that there are drivers that are not controlled for in the analysis. Moreover, at the time of writing, the crisis does not appear to have come to a full stop. As the global economy weakens, this may create further stresses on the balance sheets of institutions, either in developed Europe or in other regions around the world. It is possible that these developments may yet come to shine a different light on alternative regulatory regimes.

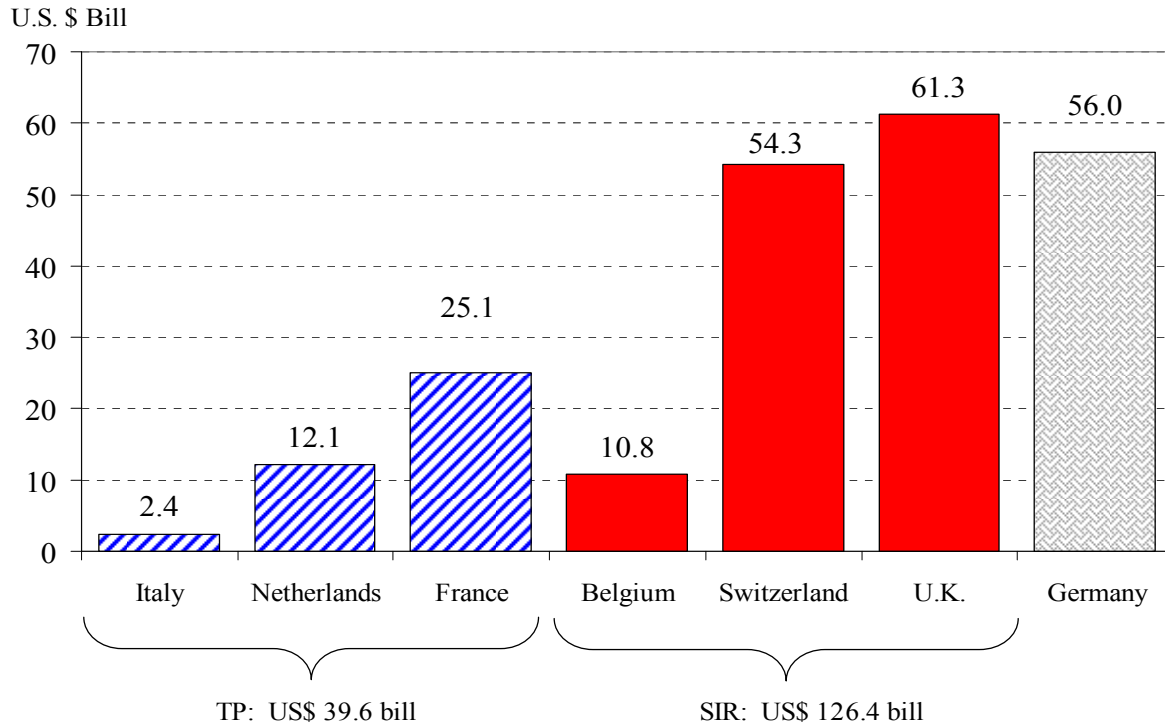
The empirical analysis presented in this appendix is therefore necessarily preliminary. It is also only partial, since it is not informative on all aspects that may affect the overall

⁹⁰ Under the plan set up in the Netherlands, the Dutch ING group accepted a capital injection on October, 19 2008. Aegon, a life insurer, also received a capital injection, announced on October 28, 2008. In France, a number of institutions accepted capital support under a comprehensive scheme by the end of 2008. In Portugal, a small private bank, BPN, was resolved in November 2008. It's difficulties appear to have been related to management irregularities.

⁹¹ At the time of the Nordic crisis, the Finnish model was not yet integrated. The Banking Supervision Office was part of the Ministry of Finance.

effectiveness of financial regulation. Further empirical analysis is needed and planned, using the crisis experience across countries as a laboratory.

Figure 1. Developed Europe: Bank Losses 1/

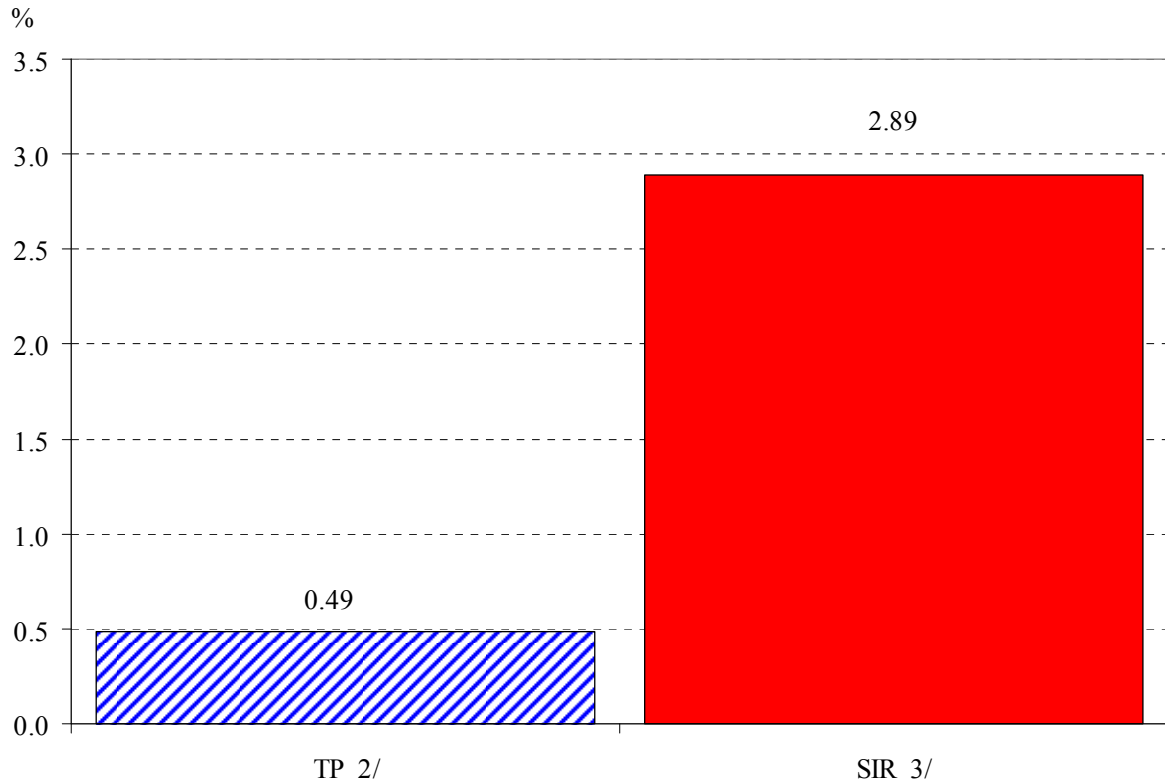


Sources: Bloomberg L.P./WDCI; Reuters; and "How Countries Supervise their Banks, Insurers and Securities Markets," Central Banking Publications, various issues.

1/ Period 2007Q2-2008Q2.

Banks by country: (1) **Italy** (1 bank): Unicredit SPA.; (2) **Netherlands** (3 banks): ING Group N.V., Rabobank, ABN AMRO Holding N.V.; (3) **France** (4 banks): Credit Agricole S.A., Societe Generale, Natixis, BNP Paribas, Groupe Caisse d'Epargne; (4) **Belgium** (2 banks): Fortis, Dexia S.A.; (5) **Switzerland** (2 banks): UBS AG, Credit Suisse Group; (6) **U.K.** (6 banks): HSBC Holding PCL, Royal Bank of Scotland, Barclays Plc, HBOS Plc, Lloyds TSB Group Plc, Alliance & Leicester; and (7) **Germany** (11 banks): IKB Deutsche Industriebank AG, Deutsche Bank AG, Bayerische Landesbank, Landesbank Baden, WestLB AG, Dresdner Bank AG, HSH Nordbank AG, DZ Bank AG, Landesbank Sachsen, Commerzbank AG, and Hypo Real Estate Holding AG.

Figure 2. Developed Europe: Overall Loss to Credit Ratio 1/



Sources: IMF International Financial Statistics (IFS), Bloomberg L.P./WDCI; Reuters; and "How Countries Supervise their Banks, Insurers and Securities Markets," Central Banking Publications, various issues.

1/ $(\text{Sum Total Losses} / \text{Sum Domestic Credit at end-2006}) * 100$.

2/ TP includes: France, Greece, Italy, Netherlands, Portugal, and Spain.

3/ SIR includes: Austria; Belgium; Denmark; Finland; Iceland; Luxembourg; Norway; Sweden; Switzerland; and U.K.