Systemic Risk: Changing the Regulatory Perspective*

Jean-Charles Rochet
University of Zürich and Toulouse School of Economics

The article puts forward the view that the regulatory perspective on systemic risk should be changed drastically. The sub-prime crisis has indeed revealed many loopholes in the supervisory/regulatory framework for banks—in particular, the inability to deal with the too-big-to-fail syndrome and also the lack of resiliency of interbank and money markets. To a large extent, the contagion phenomena that took place in these markets were the necessary outcomes of the passive attitude of banking supervisors, who have let large banks develop a complex and opaque nexus of bilateral obligations. We propose two reforms: adopting a platform-based (instead of institution-based) regulatory perspective on systemic risk and encouraging a generalized move to central counterparty clearing.

JEL Codes: G21, L51.

1. Introduction

This article puts forward the view that the regulatory perspective on systemic risk should be changed drastically. Indeed, the sub-prime crisis has revealed many loopholes in the supervisory/regulatory system. But the main lesson that can be drawn from the actions taken (and statements made) by public authorities during this crisis is

*This paper was prepared as a commentary on the third session of the Second Financial Stability Conference of the International Journal of Central Banking, Madrid, Bank of Spain, June 17–18, 2010. It draws on my keynote address in the Annual Meeting of the Finnish Economic Association, Turku (February 5–6, 2009), as well as my presentations in the 54th Economic Conference of the Federal Reserve Bank of Boston, Cape Cod (October 21–23, 2009) and in the 4th annual meeting of the Swiss Finance Institute, Zürich (November 30, 2009). I thank the participants in these meetings for their useful comments.

that, in the future, any large financial institution that encounters financial problems can expect to be bailed out by public authorities on the grounds that it is too big to fail (TBTF) (alternative terms are too interconnected to fail, large and complex banking organization, or systemically important financial institution). The turmoil that followed the failure of Lehman Brothers in September 2008 has indeed led politicians to believe they had to commit to an unconditional support of any troubled financial institution whose failure might create major disruptions. Of course, this commitment is a disaster in terms of moral hazard and market discipline. From a forward-looking perspective, public authorities could not convey a worse message to market participants and bank managers.

A similar pattern emerged after the Continental Illinois bailout in 1984,[1] and at the time, it took more than five years for market discipline to be somewhat restored.[2] But this bailout was a single event, and the Comptroller of the Currency at the time tried to maintain, as much as he could, some ambiguity on which banks were really TBTF. Today there is no more ambiguity: all large financial institutions will always be rescued. Public authorities of G-20 countries have even agreed to publicly commit to a systematical bailout. Unless resolute reforms are undertaken, it will probably take a very long time to restore market discipline again. The situation is even aggravated by the fact that an indirect outcome of the crisis is an increased concentration of the banking systems of many countries, the surviving banks becoming even bigger than before and, in some countries at least, close to being too big to be bailed out.

Another major source of concern for public authorities is the complete lack of resiliency of interbank and money markets during the recent crisis. It is amazing to see how some shocks to the relatively small sub-prime market could lead to the complete dry-up of

[1]In May of 1984, Continental Illinois was bailed out by the U.S. federal government. It was only the seventh largest bank in the United States, but it was a money-center bank holding large deposits of hundreds of smaller banks. U.S. supervisors feared that its failure could propagate toward many of these smaller banks.

[2]Flannery and Sorescu (1996) show that banks' debt spreads only started reflecting default risks around 1989, after a regulatory transition toward letting market participants share the losses when a banking firm fails.

liquidity markets for more than a year. This paper argues that this lack of resiliency is due to a fundamental mistake in the way these markets were conceived. To a large extent, the contagion phenomena that took place on these markets were the necessary outcomes of the passive attitude of banking supervisors, who have let large banks develop an enormous and opaque nexus of bilateral obligations. In Rochet and Tirole (1996), Jean Tirole and I explored the theoretical justifications of such a decentralized organization of the interbank markets and found only one possible answer: market discipline. More precisely, we found that the only possible explanation why prudential authorities could have let banks organize the trade of their reserves vis-à-vis the central bank in an over-the-counter (OTC) fashion was the hope to promote what we called peer monitoring, i.e., the mutual surveillance of banks by their competitors. However, this hope was misplaced: the price to pay for this mutual surveillance—namely, the risk of contagion—was too heavy. Market discipline could only have worked if public authorities could have convinced market participants that they would not intervene if a systemic crisis occurred, which revealed not credible.

A logical consequence of this result, which we did not put forward clearly enough in Rochet and Tirole (1996), is that the current, decentralized, organization of interbank markets has a huge cost (contagion risk) but no benefit. Market discipline does not work for the interbank market, not only because of the strong likelihood of a public bailout in the event of a crisis but also because of the faulty conception of its industrial organization. Decentralized trading of bank reserves has a major drawback: it bundles liquidity risk with counterparty risk, which makes price discovery almost impossible.

The rest of this article is structured as follows. Section 2 reviews traditional justifications for prudential regulation of banks. Section 3 examines what is left of these justifications after the crisis. Section 4 illustrates the main issues with a discussion of the main concerns for the repo market. Section 5 shows that the traditional paradigm of banking theory has become obsolete. Section 6 advocates in favor of a generalization of centralized trading and systemic risk. Section 7 suggests a way to change the regulatory perspective on systemic risk. Section 8 concludes.

2. Banking Regulation: The Classical Doctrine

The traditional doctrine holds that prudential regulation of banks is essentially justified by two reasons:

- It protects depositors and limits the liability of deposit insurance funds.

  This is microprudential regulation, analyzed in detail by Dewatripont and Tirole (1994). Without going into detail, the important ingredients of an efficient microprudential regulation are independence and accountability of supervisors, use of market discipline, a lender-of-last-resort policy governed by the Bagehot principles, no injection of public money, and cost-minimizing resolution of failures. This doctrine is best illustrated by the U.S. Federal Deposit Insurance Corporation Improvement Act (FDICIA), which articulated very clearly the notion of prompt corrective action.
- It protects the banking and financial "systems."

  This is macroprudential regulation. It aims at avoiding contagious failures, spillovers, and major disruptions to the banking and financial system. It justifies renouncing all the principles stated above, i.e., introducing exceptions to FDICIA, possible intervention of the Treasury, liquidity injections by the central bank, and (temporarily?) abandoning the recourse to market discipline.

This duality between micro- and macroprudential regulations is well illustrated by the doctrine employed by the Bank of Canada (1995) in its lender-of-last-resort policies:

> For solvent financial institutions requiring . . . credit, the Bank can provide Emergency Lending Assistance (ELA). ELA is intended to overcome a market failure associated with financial institutions that have a significant share of their liabilities as "deposits" (fixed-value promises to pay, redeemable at very short notice) and whose assets are generally highly illiquid. The Bank of Canada Act requires that such lending be secured by collateral pledged by the borrowing institution. . . . The collateral eligible to secure credit from the SLF is the same as that eligible for intraday credit in the Large Value Transfer System. . . .

> It is the policy of the Bank to lend only to institutions that are judged to be solvent in order to mitigate moral hazard that can arise from such potential intervention, and to avoid damaging the interests of unsecured creditors.
>
> In conditions of severe and unusual stress on the financial system more generally, the Bank has authority to provide liquidity through outright purchases of a wide variety of securities issued by any Canadian or foreign entities, including non-financial firms. . . . In other words, the Bank has the authority to provide liquidity to a broad range of financial and non-financial institutions when the Governor of the Bank judges that such transactions are justified to safeguard the safety and soundness of Canada's financial system.

This is all very fine. Alas, the sub-prime crisis has shown that these doctrines were largely insufficient.

3. What's Left of the Classical Doctrine After the Crisis

One of the striking features of the sub-prime crisis was that shocks to the relatively small sub-prime market could provoke the distress of vital parts of the financial infrastructure, especially interbank and money markets. This overreaction was largely due to the uncertainty of market participants about the impact that a decline in real estate prices and the beginning of a recession might have on a sizable fraction of the assets held by large banks. These large banks are the main players in these liquidity markets, which are vital to modern economies.

Confronted with this freezing of money markets, central banks did what they could to substitute these failing markets. They organized several kinds of lending facilities and de facto provided the intermediation of a large part of liquidity flows among banks and also between banks and some non-banks. In parallel, public authorities all over the world injected large amounts of capital and provided a whole spectrum of guarantees to financial institutions, in the hope of restarting these vital liquidity markets. These (largely improvised) interventions were very costly and only partially succeeded in restarting liquidity markets and restoring confidence. But the important message is that the justification for public intervention

was not so much avoiding contagious failures but rather maintaining the integrity of some parts of financial infrastructure that are deemed "vital" to the economy.

As for the future, envisaging less costly ways to maintain financial stability should be on the top of the reform agenda. In particular, it would be disastrous to let market participants consider that all large financial institutions will always be rescued (and their creditors insured) if they are again in a situation of financial distress. Taxpayers of most countries will not be willing to accept a second dose of the sort of blanket guarantees that governments have committed to provide to large financial institutions in the hope of maintaining financial stability.

As I already argued, the main issue is how to improve supervision of systemically critical firms and to strengthen the resilience of the financial system to the unwinding of such a large firm. This implies that any "systemically important" firm must receive especially close supervisory oversight of its risk taking, risk management, and financial condition, and be held to high capital and liquidity standards.

This poses the major difficulty of identifying these TBTF firms. What criteria should be used to determine when a firm (not necessarily a bank) is TBTF and when it is not? The paper by Chen Zhou (2010), presented in this session, proposes new statistical measures of systemic risk building on previous contributions by Adrian and Brunnermeier (2009) and Goodhart and Segoviano (2009). Another interesting approach is the methodology proposed by Tarashev, Borio, and Tsatsaronis (2009) for the allocation of systemwide risk to each individual institution, in line with its systemic importance. This methodology combines statistical risk measures with the Shapley value, a widely used solution concept in cooperative game theory. This approach could be used to provide guidelines for defining which firms should be subject to an alternative regime as systemically important, and the process for invoking that regime. A more pragmatic solution could be to adapt the procedures used for invoking the so-called systemic risk exception under FDICIA.

Another important question is which agency should decide which institutions are systemic. Many central banks around the world already have an explicit statutory basis for their oversight of critical payment and settlement systems. As I argue in more detail below, a

natural corollary is that these central banks should also be in charge of systemic risk supervision and, in particular, should decide which institutions are systemic and which are not. This is not the current situation in the United States, where the Federal Reserve does not have explicit oversight authority for systemically important payment and settlement systems. Reforming this might be reasonable.

The main lesson that can be drawn from the behavior of public authorities during the sub-prime crisis is that protecting financial infrastructure—i.e., the institutions that support trading, payments, clearing, and settlement—has become the fundamental reason behind macroprudential regulation and supervision. The aim here is not only to make the financial system as a whole more resilient but also to reduce the need for future government intervention. I claim that this requires a drastic change in the regulatory/supervisory perspective.

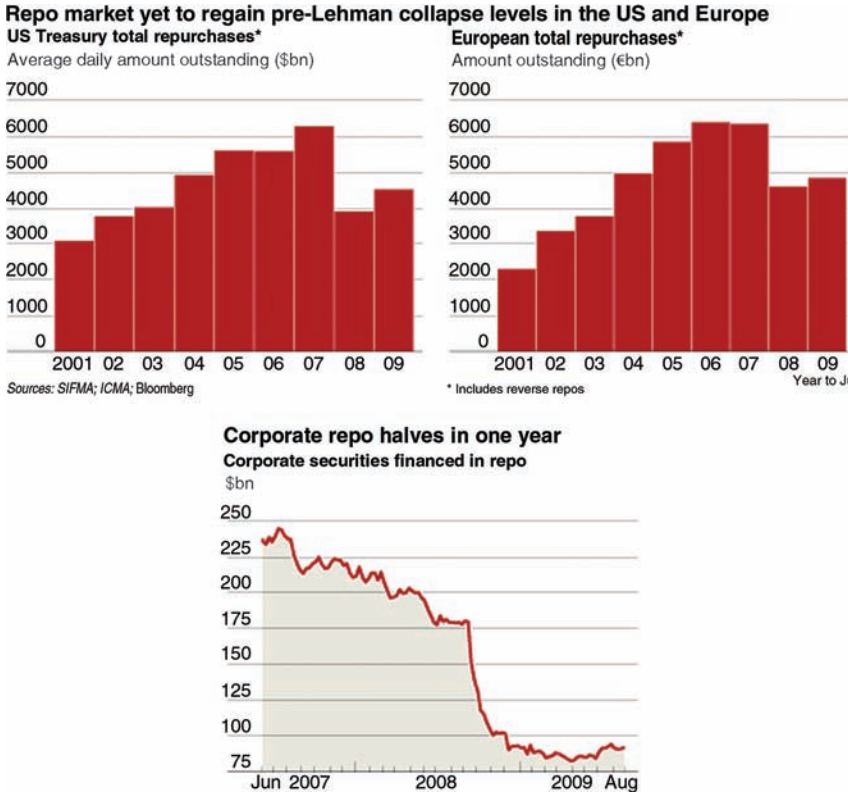
4. An Illustration: The Repo Market

A repo is a sale of securities coupled with an agreement to repurchase the securities at a specific price on a later date. Repo markets perform essential functions: first, they provide secured investments to cash investors on the money market; second, they allow the borrowing and lending of securities; and third, they indirectly boost liquidity on crucial financial markets such as debt markets (especially Treasuries) and derivatives markets.

To avoid the collapse of these markets during the crisis, central banks have taken extraordinary actions. For example, the Federal Reserve has established temporary facilities such as the Primary Dealer Credit Facility (PDCF) and the Term Securities Lending Facility (TSLF) to provide liquidity to market participants. Other central banks like the European Central Bank and the Bank of England have agreed to lend to more counterparties and have enlarged the scope of eligible collateral. However, these facilities have not prevented a sharp reduction in the activity of these repo markets, as illustrated by figure 1, taken from *Financial Times* (2009).

In the United States, a very popular form of repo is the triparty repo, in which an intermediary (a clearing bank) facilitates transactions by providing operational services (custody of securities, settlement, valuation of collateral) and, more importantly, extending

Figure 1. Impact of the Crisis



intraday credit to market participants. On average, more than $1.7 trillion was exchanged in this way in the United States every working day of the first quarter of 2010.

There are several reasons why this market poses several threats to financial stability (Federal Reserve Bank of New York 2010). For one, the U.S. market is completely dominated by only two clearing banks: Bank of New York Mellon and JP Morgan Chase, which are thus perfect examples of systemic institutions. Moreover, participation in this market is also very concentrated: the ten biggest dealer banks represent 85 percent of cash borrowing and 65 percent of security lending (with a typical position, for a large dealer, of around $200 billion). Moreover, the main actors are also big in other markets. For example, JP Morgan Chase is also the largest

OTC derivatives dealer in the United States (with a $79 trillion notional position at the end of 2009) and the largest manager of hedge funds (with $53.5 billion in assets under management at the end of 2009). The risk of contagion to and from the repo markets is thus enormous.

There are also other, equally important concerns (Federal Reserve Bank of New York 2010), such as the fact that this market relies on huge amounts of intraday credit. This is because all triparty repos are unwound each morning, even if most of them are renewed later in the day. Moreover, there is no regulatory oversight of this market. It is quite opaque, and some of its big actors are foreign and thus not directly supervised by U.S. authorities. This has led to many forms of inadequate risk-management practices by cash lenders and clearing banks, such as huge maturity mismatch, high leverage, and very loose collateral policies. Finally, there are no clear contingency plans for sharing losses and managing collateral in the event a large participant defaults.

In 2009, the Federal Reserve Bank of New York asked a group of senior U.S. bankers to make recommendations for addressing these concerns, and subsequently published a white paper on the issue (Federal Reserve Bank of New York 2010). The most important of these recommendations were as follows: to perform an automatic substitution of securities when a repo is renewed, in order to reduce the need for intraday credit; to improve risk-management practices of dealers and clearing banks; and to improve transparency, notably by mandating the disclosure of aggregate statistics on collateral and haircuts.

But even if these measures are implemented, they will eliminate the main issues: first, the two clearing banks are too big to fail; second, the risks taken by large banks in other markets can spill over to the repo market (and vice versa); and finally, there will still be a risk of a run on a large dealer at the slightest suspicion of its solvency.

5. The Need for a New Paradigm in the Theory of Banking

The classical model of banking (Diamond and Dybvig 1983) is inadequate for describing the activities of large modern banks. Let us briefly recall the main features of this model, which was very influential in developing our understanding of commercial banking:

- Banks transform short-term retail deposits into long-term opaque loans.
- The socially optimal degree of maturity transformation depends on the preferences of households (which determine the liquidity insurance needs of depositors) and on the technology of firms (which determines the investment needs of borrowers).
- Maturity transformation generates an intrinsic instability of banks, which calls for some form of regulation.
- Bank runs can be prevented by an adequate combination of deposit insurance, solvency regulation, and microprudential supervision.

As shown very clearly in Duffie's (2010) book (*How Big Banks Fail and What to Do about It*), this is not how big banks live and die nowadays. We need to build a different model, along the following lines:

- Dealer banks intermediate the "backbone" markets for securities and derivatives.
- They invest in marketable securities (as opposed to opaque loans) and also provide a whole bundle of services to investors (collateralized lending, asset management, brokerage services, etc.).
- Transformation is used to provide more liquidity to investors (but how much is too much?).
- The sources of fragility of these banks are different: ill-designed market infrastructures and excess transformation.

Indeed, modern runs on a bank take different routes (Duffie 2010): wholesale deposits (as in the Northern Rock case), novation (see a definition of this term below) demands by the counterparties of the bank on OTC contracts (as in the case of Bear Stearns), and flight of prime brokerage clients (as in the case of Morgan Stanley). New sources of fragility have appeared: collateral triggers after downgrades (as in the case of AIG Financial Products) and ultimately loss of clearing/settlement privileges (as in the case of Lehman Brothers).

In fact, the risk of contagion in interbank markets is largely due to two difficulties: the default externalities generated by the existing

complex nexus of OTC transactions, and the legal uncertainty about loss-sharing rules in the event a large participant defaults, which provides an incentive to run at the slightest suspicion of problems.

The proposed remedies are too radical (like the Volker rule) or difficult to implement, such as the "living wills" (Herring 2010), additional regulatory requirements for firms identified as "systemic," the international harmonization of resolution procedures (Avgouleas, Goodhart, and Schoenmaker 2010), and finally the international cooperation between supervisors (which is unlikely to be effective when needed, as illustrated by Dewatripont, Rochet, and Tirole 2010).

We propose simpler (but more radical) ways to solve these difficulties:

- Adopt the central counterparty clearing (CCP) model for all "vital" market infrastructures.
- Change the regulatory perspective (platform based instead of institution based).

These two proposals are now discussed in turn.

6. Generalizing Central Counterparty Clearing

Many commentators have argued that the lack of transparency of interbank exposures on money markets and derivatives has played a major role in the propagation of the crisis. OTC transactions are typically very opaque and can be a major source of systemic risk. U.S. Secretary Geithner has fostered the development of central clearing platforms for credit derivatives. Along the same lines, Pennacchi (2009) discusses deposit-insurance-related reforms that would improve the efficiency of the financial system. The first reform he identifies is "to mitigate TBTF by reducing counterparty risk via centralized clearing (and possibly exchange-trading) of derivatives." See also Bernanke (2009): "To help alleviate counterparty credit concerns, regulators are also encouraging the development of well-regulated and prudently managed central clearing counterparties for OTC trades."

Bernanke (2009) puts forward a similar proposal for repo markets:

> The Federal Reserve and other authorities also are focusing on enhancing the resilience of the tri-party repurchase agreement (repo) market, in which the primary dealers and other major banks and broker-dealers obtain very large amounts of secured financing from money-market mutual funds and other short-term, risk-averse sources of funding. For some time, market participants have been working to develop a contingency plan for handling a loss of confidence in either of the two clearing banks that facilitate the settlement of tri-party repos. Recent experience demonstrates the need for additional measures to enhance the resilience of these markets, particularly as large borrowers have experienced acute stress. The Federal Reserve's Primary Dealer Credit Facility, launched in the wake of the Bear Stearns collapse and expanded in the aftermath of the Lehman Brothers bankruptcy, has stabilized this critical market, and market confidence has been maintained. However, this program was adopted under our emergency powers to address unusual and exigent circumstances. Therefore, more-permanent reforms are needed. For example, it may be worthwhile considering the costs and benefits of a central clearing system for this market, given the magnitude of exposures generated and the vital importance of the market to both dealers and investors.

The guiding principle of central counterparty clearing is that after two parties have agreed on a trade, the clearing platform steps into each trade by acting as counterparty to each side. This is called novation, a mechanism by which the platform essentially becomes "the buyer to every seller and the seller to every buyer." This mechanism allows the netting of multilateral (not only bilateral) exposures but also the centralization of collateral, which introduces diversification effects, especially if there is some degree of cross-pledging between different types of markets.

To reduce the risk and possible consequences of a default by a clearing member or one of its customers, CCPs have developed several risk-management procedures. The primary protection is provided by *initial margin*, a deposit which clearing members are required to place in an account with the CCP. CCPs typically also make margin calls to ensure that they remain protected over time as prices change. They usually also have access to additional default

resources, such as mutual guarantee funds or insurance cover, and require clearing members to fulfill financial requirements to reduce the likelihood of default.

To protect themselves and the clearing house against client defaults, members are generally required to set a minimum level of margin for their clients according to rules set down by the clearing house. De facto, CCP failures have been extremely rare. Knott and Mills (2002) find only three cases: Paris in 1973, Kuala Lumpur in 1983, and Hong Kong in 1987.

In principle, CCPs mark to market positions daily. Thus they should be exposed only to the extent that a one-day price movement exhausts the entire margin of a clearing member. In practice, CCPs may be exposed over a longer period, as it may take time to decide whether a member should be declared in default and then to close out positions. Several studies have attempted to quantify the potential exposure of clearing houses over one or more days. Some of these models are purely statistical and pre-specify acceptable coverage levels in a purely exogenous fashion. By contrast, Fenn and Kupiec (1993) develop a model that aims at minimizing the total sum of margin, settlement costs, and the cost of settlement failure. Clearing houses need to trade off several objectives when they set their margins. Requiring high margins and good-quality collateral is costly to members. Marking positions to market and settling gains or losses, on either a daily or more frequent basis, also entails costs. To arrive at an optimal margin level, the clearing house must balance these costs against the potential losses resulting from a default of contracts.

By helping to manage counterparty risk and by providing netting services, CCPs allow market participants to economize on collateral, compared with what they would otherwise need to hold to ensure equivalent protection in bilaterally cleared markets. Regulators also often recognize the reduction in counterparty risk by allowing clearing members to hold less capital than if they were exposed directly to other market participants. Clearing members may also reduce the resources spent on monitoring individual counterparties, insofar as their actual counterparty is the CCP. Through the design of clearing members' margining and collateral requirements, CCPs reduce the probability of immediate propagation to solvent members of losses incurred by the insolvent one.

Moreover, a CCP clearly improves transparency, which explains why reforms are often resisted by those currently enjoying an information advantage (i.e., the major OTC derivatives dealers). As exemplified by the Lehman failure, when a major player in bilaterally cleared derivatives markets fails, it is not immediately apparent to the remaining market participants (who are absorbing the losses) how big the losses are and how the failed firm's counterparties are affected. The effects of this uncertainty can be devastating on market confidence, as illustrated by Bear Stearns, Lehman, and AIG. This uncertainty is mitigated by a CCP that has effective means of allocating losses and no incentive to use the information it holds for its own profits. This neutrality alleviates the information concerns of market participants. A CCP also increases operational efficiency, by centralizing the monitoring of trades and reducing potential for disputes.

CCPs have proven to be resilient even under stressed market conditions such as the ones we are facing today and have showed their ability to ensure normal market functioning in the event of failure of a major market player. A case in point is the successful unwinding of the interest rate swap positions left open following the default of Lehman Brothers.

7. A Change in Regulatory Perspective: Protecting Platforms, Not Banks

The main objective of macroprudential regulation should be to protect platforms (i.e., vital parts of financial infrastructure), not individual banks! Many central banks are given the rather vague objective of "maintaining financial stability," which gives them too much discretion and opens the door to lobbying by large institutions and political pressure. This could be limited if central banks were given a more precise mandate. The one I propose here is to guarantee the integrity of a precise list of financial markets and infrastructures that are deemed "vital": interbank (both secured and repo) markets, money markets, and some derivative markets and large-value payment systems (LVPSs). To do so, it would be useful to learn from the experience of private clearing houses, which have developed sophisticated policies for protecting themselves against the failure of their participants.

Typically, private clearing houses distinguish between their members, who have a privileged status, and ordinary participants. In counterpart to their privileged status, the clearing members are supposed to implement a set of risk-mitigation policies, such as collateral and capital requirements and bilateral credit limits. For example, members are typically required to make an upfront deposit to a default fund intended to cover losses that exceed the defaulting member's margins. I believe central banks could adopt a similar policy and condition the direct participation of financial institutions to the "vital" part of the financial infrastructure on special requirements (such as solvency and liquidity requirements) that would go beyond the standard requirements imposed on deposit-taking institutions by microprudential regulators.

In effect, my proposal would aim at replacing the notion of "systemically important institution" with that of "systemically important platform." Such platforms would only be directly accessible to a group of "officially recognized financial institutions" that would have to comply with special regulatory requirements and would be directly supervised by the central bank. The status of "officially recognized financial institution" could be revoked by the central bank if these special regulatory requirements are not satisfied. A special resolution procedure would be created for these institutions, so that the central bank has the legal powers to close it down, or at least restrict its activities before it is too late. Again, this is line with the position recently expressed by Bernanke (2009):

> The United States also needs improved tools to allow the orderly resolution of a systemically important non-bank financial firm, including a mechanism to cover the costs of the resolution. In most cases, federal bankruptcy laws provide an appropriate framework for the resolution of non-bank financial institutions. However, this framework does not sufficiently protect the public's strong interest in ensuring the orderly resolution of non-depository financial institutions when a failure would pose substantial systemic risks. Improved resolution procedures for these firms would help reduce the too-big-to-fail problem by narrowing the range of circumstances that might be expected to prompt government intervention to keep the firm operating.

These "officially recognized financial institutions" would be the equivalent of existing "systemically important institutions," which have access to special liquidity assistance facilities and possible government guarantees in case of distress. But there would be an important difference: the central bank would choose who belongs to the club and who does not! If the advantages associated with membership far exceeded the costs, the threat of revoking the status would work as an important disciplining device. OTC markets would still be active, but since they would be penalized by regulation, it is likely that they would become small and therefore not in a position to jeopardize the entire system.

Traditional prudential regulation is targeted at financial firms (institutions based). The new regulation/supervision of systemic risk would instead be targeted at infrastructures (platform based). Each systemic authority would be mandated to guarantee (separately) the safety of the small number of infrastructures (exchanges, CCPs, LVPSs) that are deemed "vital" within its jurisdiction (political decision). This would have significant advantages:

- There would be no need to reinvent the wheel for regulatory requirements: it would be enough to adopt market best practice put in place by private CCPs.
- There would be less need for "living wills": loss-sharing procedures would be specified ex ante at the level of each platform.
- There would be less need for international cooperation of supervisors: each "platform" would have to be sound independently of what is going on elsewhere.
- This would eliminate the rationale for splitting or downsizing banks (thus preserving scale and scope economies).

Note that this perspective differs from "functional supervision": several activities can be performed on the same platform, while the same activity can be performed on several platforms.

8. Conclusion

This paper puts forward a change of regulatory perspective on systemic risk and suggests a reversal of the balance of power between large banks and supervisors. Instead of letting some banks grow

big and opaque enough to constitute a threat to the financial system, my proposal is to let the central bank, as the systemic risk supervisor, decide which banks are safe enough to be allowed as members of the financial "platforms" that are deemed vital for the economy: large-value payment systems, unsecured and collateralized interbank markets, and some derivative markets. The central bank would receive an explicit mandate for guaranteeing the continuity of these platforms and for regulating membership.

If the advantages associated with membership to these platforms far exceeded the costs, the threat of revoking the member status would work as an important disciplining device. OTC markets would still be active, but since they would be penalized by regulation, it is likely that they would become small and therefore not in a position to jeopardize the entire system.

References

Adrian, T., and M. Brunnermeier. 2009. "CoVaR." Staff Report No. 348, Federal Reserve Bank of New York.

Avgouleas, E., C. Goodhart, and D. Schoenmaker. 2010. "Living Wills as a Catalyst for Action." DSF Policy Paper No. 4.

Bank of Canada. 1995. "Bank of Canada Lender-of-Last-Resort Policies." *Financial System Review* 49–55.

Bernanke, B. S. 2009. "Financial Reform to Address Systemic Risk." Speech at the Council on Foreign Relations, Washington DC, March 10.

Dewatripont, M., J.-C. Rochet, and J. Tirole. 2010. *Balancing the Banks*. Princeton, NJ: Princeton University Press.

Dewatripont, M., and J. Tirole. 1994. *The Prudential Regulation of Banks*. Cambridge, MA: MIT Press.

Diamond, D., and P. Dybvig. 1983. "Bank Runs, Deposit Insurance, and Liquidity." *Journal of Political Economy* 91 (3): 401–19.

Duffie, D. 2010. *How Big Banks Fail and What to Do about It*. Princeton, NJ: Princeton University Press. Forthcoming.

Federal Reserve Bank of New York. 2010. "Tri-Party Repo Infrastructure Reform." White Paper.

Fenn, G. W., and P. Kupiek. 1993. "Prudential Margining Policy in a Futures-Style Settlement System." *Journal of Futures Markets* 13 (4): 389–408.

Financial Times. 2009. "Bank Runs Left Repo Sector Exposed." September 10.

Flannery, M., and S. Sorescu. 1996. "Evidence of Bank Market Discipline in Subordinated Debenture Yields: 1983–1991." *Journal of Finance* 51 (4): 1347–77.

Goodhart, C., and M. Segoviano. 2009. "Banking Stability Measures." IMF Working Paper No. 09/04.

Herring, R. 2010. "Wind-down Plans as an Alternative to Bailouts: The Cross-Border Challenges." In *Ending Government Bailouts as We Know Them*, ed. K. Scott, G. Shultz, and J. Taylor, chapter 7. Stanford, CA: Hoover Institution Press.

Knott, R., and A. Mills. 2002. "Modelling Risk in Central Counterparty Clearing Houses: A Review." *Financial Stability Review* (Bank of England) (December): 162–74.

Pennacchi, G. 2009. "Deposit Insurance." Paper prepared for the AEI Conference on Private Markets and Public Insurance Programs, Washington, DC, January 15.

Rochet, J.-C., and J. Tirole. 1996. "Interbank Lending and Systemic Risk." *Journal of Money, Credit, and Banking* 28 (4): 733–62.

Tarashev, N., C. Borio, and K. Tsatsaronis. 2009. "The Systemic Importance of Financial Institutions." *Quarterly Review* (Bank for International Settlements) (September): 75–87.

Zhou, C. 2010. "Are Banks Too Big to Fail?" DNB Discussion Paper No. 232.