

REGULATING SYSTEMIC INSTITUTIONS*

JEAN-CHARLES ROCHET

*Professor of Economics,
Toulouse School of Economics, 21 allée de Brienne, Manufacture des Tabacs,
31000 Toulouse, France; e-mail: jean-charles.rochet@tse-fr.eu*

The subprime crisis has revealed many loopholes in the supervisory/regulatory framework for banks. The most dramatic of these loopholes is certainly the Too Big To Fail (TBTF) problem: As a consequence of the way central banks and Treasuries have managed the crisis, any large financial institution that encounters financial problems in the future can expect to be bailed out by public authorities on the ground that its resolution could provoke a systemic crisis. This article proposes a solution to the TBTF problem, based on an Industrial Organization approach. Instead of simply downsizing large financial institutions or imposing stricter regulations based on newly developed measures of systemic risk exposures, I propose to reform in depth the organization of interbank and money markets. (JEL: G21, L51)

1. Introduction

This article puts forward a simple reform that could lead to the elimination—once and for all—of the Too-Big-To-Fail (TBTF) problem. This TBTF problem is not the only reason for reforming in depth the financial supervisory/regulatory system in the US and elsewhere, but it is probably the most frightening. I believe its solu-

tion should be at the top of the regulatory agenda¹.

The current financial crisis has revealed many other loopholes in the supervisory/regulatory system. However the main lesson that can be drawn from the actions taken (and statements made) by public authorities during this crisis is

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¹ This view seems to be shared by Chairman Bernanke, who states in a recent speech (2009) that “the belief of market participants that a particular firm is considered too big to fail has many undesirable effects. For instance, it reduces market discipline and encourages excessive risk-taking by the firm. It also provides an artificial incentive for firms to grow, in order to be perceived as too big to fail. And it creates an unlevel playing field with smaller firms, which may not be regarded as having implicit government support. Moreover, government rescues of too-big-to-fail firms can be costly to taxpayers, as we have seen recently. Indeed, in the present crisis, the too-big-to-fail issue has emerged as an enormous problem”.

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 TBTF** (alternative terms are Too Interconnected To Fail², Large and Complex Banking Organization or Systematically 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 bail-out in 1984³, and at the time, it took more than five years for market discipline to be somewhat restored⁴. But this bail-out was a single event, and the Comptroller of the Currency of the time tried to maintain, as much as he could, some ambiguity on which banks were really TBTF⁵. Today there is no more ambiguity: all large financial institutions will always be rescued. Public authorities of G20 countries have even agreed to publicly commit to a systematic bail-out. 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 be Too Big to Be Bailed out.

In a premonitory book, Stern and Feldman (2004) rightly identified TBTF as a major regulatory issue⁶ and proposed a whole range of policy measures in order to fix it. The reform proposed here is complementary to their policy recommendations, but I view it as a priority. It is in some way radical, but fits very well into the general movement toward relying more on central counterparty clearing for interbank trading and derivatives markets.

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 subprime market could lead to the complete dry-up of 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 contagions 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 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, name-

² Perhaps a more appropriate wording is *Too Politically Connected To Fail*.

³ In May of 1984, Continental Illinois was bailed out by the U.S. federal government. It was only the 7th 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. The Comptroller of the Currency engineered a rescue that bailed out not only bank depositors but also uninsured creditors of the bank holding company. When called to testify by the Congress, the Comptroller admitted that other large banks might warrant similar support. Congressman McKinney uttered the now famous phrase: "Mr. Chairman, We have a new kind of bank. It is called too big to fail. TBTF and it is a wonderful bank." (Hearings before the Subcommittee on Financial Institutions, 1994, cited by Morgan and Stiroh, 2005)

⁴ 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.

⁵ See Morgan and Stiroh (2005)

⁶ Their point of view was criticized (before the crisis) by Mishkin (2005). The abstract of his paper claims that: "Stern and Feldman overstate the importance of the too big to fail problem and do not give enough credit to the FDICIA legislation of 1991 for improving bank regulation and supervision."

ly 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 defend forcefully enough in Rochet and Tirole (1996), is that the current, decentralized, organization of interbank markets has a huge cost (contagion risk⁷) but no benefit. Market discipline does not work for the interbank market, not only because of the strong likelihood of a public bail-out in case 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 plan of the rest of this article is the following. Section 2 reviews traditional recommendations about the division of labor across regulatory agencies. Section 3 examines what is left of these recommendations after the crisis. Section 4 is the core of the paper: it defends the view that public authorities should protect markets not banks. Section 5 presents, in a non technical way, the theoretical analysis of the choice between centralized trading and systemic risk; Section 6 concludes.

2. The division of labor across regulatory agencies

2.1 International Comparisons

Prior to the subprime crisis, several papers had compared institutional arrangements for the supervision of the financial sector and examined the impact of specific regulatory and supervisory practices on the performance of banking sectors. Among these papers are Goodhart and Schoenmaker (1995), who examine the super-

visory role of central banks in 24 different countries, and Llewellyn (1999) who studies the scope of supervisory powers for the financial authorities in 123 countries. More recently, building on a rich data set drawn from a World Bank survey (covering 107 countries) Barth, Caprio and Levine (2001) oppose two competing views on regulation: the helping-hand approach, which considers that regulation endeavors to correct market failures, and the grabbing-hand approach, which considers that opportunistic governments use regulation to support their constituencies. They test these theories on their data set. Their empirical results are more in line with the second interpretation. As a consequence, they advocate in favor of encouraging regulatory and supervisory practices that improve transparency and corporate governance. Using the same data set, Barth, Dopico, Nolle and Wilcox (2002) find that the countries where the central bank has the monopoly of supervisory responsibilities are typically characterized by small banks, large government ownership in the banking sector and high entry costs into banking. However they do not find any significant impact of the country's choice of integrated versus fragmented supervision on the performance of the country's banking sector.

Kane (2004) discusses cross country differences in the design of the safety net for bank depositors and stresses the importance of incorporating accountability and disaster planning into this design. Freytag and Masciandaro (2007) analyze the movement toward a single financial authority (distinct from the central bank) that has occurred in many countries, including Norway (1986), Denmark (1988), Sweden (1991), UK (1997), Korea (1997). They contrast this with the organizational set-up in other countries, where supervisory powers are shared among several authorities. They argue that this multi-authority model is often associated with a powerful central bank, whereas the opposite is true for countries with unified supervision. Di Noia and Di Giorgio (2001) examine whether or not banking supervision and monetary policy tasks should be given to separate agencies. They provide some evidence on the comparison of economic performance of countries where such a functional separation is in

⁷ As I explain below, systemic risk has roughly two components: contagion risk, which is largely an artifact of the faulty organization of interbank markets and systematic risk, which is due to macroeconomic shocks and can be reduced by macro-prudential measures aimed at reducing pro-cyclicality of regulatory requirements and correlation of banking exposures.

place as opposed to countries where the central bank is in charge of both monetary policy and banking supervision. They find that inflation is significantly higher and more volatile in countries with a single agency.

Just before the crisis, the Financial Stability Institute (FSI) undertook a survey of 125 countries about the evolution and current state of institutional arrangements for financial sector supervision in 2006. Half of the 125 countries experienced a change in either the domicile of their banking supervision authority or the level of integration of supervisory functions across major sectors of the domestic financial system, or both. However, the FSI survey finds that there is still a majority of countries where central banks are responsible for banking supervision (83 of the 125 countries). Over the last 20 years, there was a significant decline in the number of banking authorities domiciled within the Ministry of Finance and an increase in the number of banking authorities domiciled in a separate supervisory agency. In some regions the direction of change is towards greater integration of financial sector supervision, particularly in Europe and Latin America. However non-integrated authorities remained the dominant category in 2006. The shift towards greater integration of financial sector supervision is often associated with moving the banking supervision authority outside the central bank. However, most central banks have recently created a financial stability department. Supervisors are typically supposed to use memoranda of understanding (MOUs)⁸ and informal contacts to deal with cross-sector and cross-border issues. However many respondents to the FSI survey regarded the harmonization of supervisory approaches across financial sectors and the lack of a consistent regulatory framework across financial sectors as key challenges for supervisors.

2.2 *The Costs and Benefits of Integrated Supervision*

Barth, Dopico, Nolle and Wilcox (2002) classify the theoretical arguments for and against a single banking supervisor. It seems that the main benefit of integrated supervision is to avoid gaps that can arise with a regime based on several agencies, and thus to limit regulatory arbitrage possibilities by banks. This view is shared by Chairman Bernanke (2009): "we must ensure a robust framework – both in law and practice – for consolidated supervision of all systemically important financial firms organized as holding companies. The consolidated supervisors must have clear authority to monitor and address safety and soundness concerns in all parts of the organization, not just the holding company. Broad-based application of the principle of consolidated supervision would also serve to eliminate gaps in oversight that would otherwise allow risk-taking to migrate from more-regulated to less-regulated sectors. A consolidated supervisor may also benefit from economies of scope and scale and be in a better position to curb the behavior of big banks."

The counterpart to this argument is that consolidation may give too much power to the single supervisor. In an empirical study published just before the crisis, Cihak and Podpiera (2006) find that integrated supervision is typically associated with a higher quality of supervision but that whether the integrated supervision is located inside or outside the central bank does not really matter for the quality of supervision. In any case my personal view is that we should be more concerned about the excessive power of Large and Connected Financial Institutions rather than that of the authority that is supposed to oversee them.

Barth, Dopico, Nolle and Wilcox (2002) also classify the theoretical arguments for and against having the central bank supervise the banks. Having the possibility to use supervisory information to act quickly and effectively in times of crisis is clearly a major benefit. Using data for 104 bank failures in 24 countries during the 1980s, Goodhart and Schoenmaker (1995) find that countries where the central bank is in

⁸ Dewatripont, Rochet and Tirole (2009) insists on the lack of cooperation between Belgian and Dutch authorities in the treatment of the ING and Fortis problems. They argue that MOUs revealed totally useless.

charge of banking supervision had fewer bank failures. On the cost side, conflicts of interest between financial stability and monetary policy are often mentioned as an argument against giving supervisory powers to the central bank. In fact this argument is not well articulated: in the absence of accountability problems, a single agency would be in a better position to trade-off between several objectives. It is because independence and accountability are absolutely necessary for supervisory agencies that a single objective for each separate agency is typically better than a single agency with multiple objectives.

2.3 Prudential Supervision: Micro Vs Macro

The traditional regulatory doctrine before the crisis held that prudential regulation of banks is essentially justified by two reasons:

- **protecting depositors and limiting the liability of deposit insurance funds:**

This is micro prudential regulation, analyzed in detail by Dewatripont and Tirole (1993). Without going into the detail, the important ingredients of an efficient micro-prudential 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 US FDICIA, which articulated very clearly the notion of Prompt Corrective Action.

- **protecting the banking and financial “systems”:**

This is macro prudential regulation. It aims at avoiding contagious failures, spillovers and major disruptions to the banking and financial system. It justifies renouncing to 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 macro prudential regulations is well illustrated by the doctrine employed by the Bank of Canada (1995) in its Lender-of-Last-Resort policies:

“The Bank of Canada has three distinct roles as a lender of last resort (LLR):

- *The Bank facilitates the settlement of payments systems by routinely extending overnight credit to participants in the Large Value Transfer System (LVTS) through the Standing Liquidity Facility (SLF), to cover temporary end-of-day shortfalls in settlement balances that can arise in the daily settlement of payments. The Bank provides overnight loans at the Bank Rate, an interest rate currently set at 25 basis points above the target overnight rate. The Bank is required by the Bank of Canada Act to secure all lending with collateral. Collateral is valued at market value less a discount. Discounts are applied mainly to protect the Bank from market risk.*

- *For solvent financial institutions requiring more substantial and prolonged 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 subprime crisis has shown that these doctrines were largely insufficient.

3. What's left of prudential doctrines after the crisis

One of the striking features of the subprime crisis was that shocks to the relatively small subprime market could provoke the distress of vital parts of the financial infrastructure, especially interbank and money markets. This over-reaction is 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 to restart liquidity markets and to restore 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 to maintain financial stability.

Chairman Bernanke (2009) has recently proposed a strategy for dealing with systemic risk, a strategy that comprises four elements: ad-

ressing the TBTF problem, strengthening financial infrastructure, limiting pro-cyclicality of regulatory policies and accounting rules, and finally creating a systemic risk regulator. The present paper does not address the third question but focuses on the three others and suggests that they could be addressed simultaneously by adopting what I call an “Industrial Organization approach” to the TBTF problem.

As I already argued, the main issue is how to find a way 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 “systematically 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? Also which agency should be given the authority to decide on this matter? A promising approach for solving the first question is the methodology proposed by Tarashev, Borio and Tsatsaronis (2009) for the allocation of system-wide 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.

As for the second question (which agency should decide on which institutions are systemic), many major 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 on which institutions are systemic and which are not. This is

not the current situation in the U.S, 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 is that protecting financial infrastructure, i.e. the institutions that support trading, payments, clearing, and settlement has become the fundamental reason behind macro-prudential 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.

4. My proposal: protecting platforms, not banks

4.1 Giving a precise financial stability mandate to central banks

The **main objective of macro-prudential 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, as well as some derivative markets and large value payment systems. To do so, it would be useful to learn from the experience of private clearing houses, which have developed sophisticated policies for protecting themselves again the failure of their participants.

4.2 Generalizing Central Counterparty Clearing

Many commentators have argued that the lack of transparency of interbank exposures on mon-

ey markets and derivatives have 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. Secretary Geithner has fostered the development of central clearing platforms for credit derivatives. Along the same lines, a recent paper by Pennachi (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. Just last week, we approved the application for membership in the Federal Reserve System of ICE Trust, a trust company that proposes to operate as a central counterparty and clearinghouse for CDS transactions”.

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

My proposal would go further by extending the centralized model not only to derivatives and repo markets but also to unsecured interbank markets: I believe that more centralization could be an efficient way to stabilize interbank markets: for example banks would be offered the choice between a centralized market for liquidity, which would be insured and supervised by the Central Bank, and OTC transactions that would remain risky and, as such, associated with regulatory capital charges. As for money markets, it should be possible to move also toward more centralization. As Bernanke puts it (2009): “In light of the importance of money market mutual funds – and, in particular, the crucial role they play in the commercial paper market, a key source of funding for many businesses – policymakers should consider how to increase the resiliency of those funds that are susceptible to runs. One approach would be to impose tighter restrictions on the instruments in which money market mutual funds can invest, potentially requiring shorter maturities and increased liquidity. A second approach would be to develop a limited system of insurance for money market mutual funds that seek to maintain a stable net asset value.”

4.3 Central counterparty clearing: principles and risk management procedures

In its study on the safety and efficiency of derivatives markets, the Commission of the European Communities, (2009) states that “CCP clearing is the most effective way of reducing credit risk and is broadly feasible in all market segments” and rightly points that “the near collapse of Bear Sterns in March 2008, the default of Lehman Brothers on September 15 2008, and the bail-out of AIG on the next day highlighted the fact that OTC derivatives in general and credit derivatives in particular carry systemic implications for financial markets

The three institutions mentioned above were important players in the OTC derivatives market, either as dealers or users of OTC derivatives or both.”

The guiding principle of central counterparty clearing (CCP) 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 minimising 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.

4.4 The benefits of central counterparty clearing

By helping to manage counterparty risk and by providing netting services, CCPs allows market participants to economize on collateral, compared to 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. 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 they 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 Sterns, 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 op-

erational efficiency, by centralizing the monitoring of trades and reducing potential for disputes.

CCPs have proven to be resilient even under stressed market conditions and showed their ability to ensure normal market functioning in case 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. This was engineered by LCH.Clearnet, who operates SwapClear, currently the dominant provider of CCP clearing services for interest rate swaps. It is interesting to say a few words about the default management process of SwapClear, as described in the staff report of the Commission of the European Communities (2009). When a clearing member of SwapClear defaults, LCH.Clearnet conducts auctions for selling the defaulter's portfolio. All SwapClear members are required to bid in these auctions. If there are losses, they are allocated as follows:

- (i) the defaulting clearing members initial margin,
- (ii) the defaulting clearing member's default fund contribution,
- (iii) part of LCH.Clearnet's profits,
- (iv) other clearing members default fund contributions,
- (v) further fixed cash contributions from the other clearing members, and
- (vi) LCH.Clearnet's share capital.

This process proved its worth following the default of Lehman Brothers. Lehman's \$10 trillion portfolio of 66,000 trades across five currencies was replaced and less than 50% of Lehman Brother's initial margins was required to hedge the risk, manage and auction the position.

4.5 Giving the central bank the right to decide who belongs to the "club" and who does not

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 mitiga-

tion 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 supposed 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 micro-prudential regulators.

In effect, my proposal would aim at replacing the notion of "systemically important institution" by 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 Chairman Bernanke (2009): "The United States also needs improved tools to allow the orderly resolution of a systemically important nonbank 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 nonbank 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", who have ac-

cess to special liquidity assistance facilities and possible government guarantees in case of distress. But there would be an important difference: it is the central bank that 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.

5. A conceptual analysis of interbank lending and systemic risk

In an article published in 1996, Jean Tirole and I analyzed the trade-offs involved in the management of systemic risk on interbank markets. This section summarizes, in a non-technical fashion, the main conclusions of our analysis, which already contained the main elements of what I call today the "Industrial Organization approach" to the TBTF problem.

A first, important, remark is that systemic risk is a concern only in a decentralized environment in which banks incur credit risk in their mutual transactions. Like in many crises of the past, governments have tried to resolve the current crisis (ex post) by insuring most of interbank claims, rescuing distressed banks through discount loans, the facilitation of purchase-and-assumptions, nationalizations, and so forth. However, such policies do not provide proper (ex ante) incentives for interbank monitoring and may lead to substantial cross-subsidies from healthy banks to frail ones through a government-mediated mechanism. An alternative method of prevention of systemic risk would consist in centralizing banks' liquidity management. The Fed funds market could be organized as an anonymous double auction (to which the central bank could participate to manage global liquidity), in which each bank would trade with the central bank rather than with other banks. The central bank would then have better control over interbank positions and would further prevent systemic risk on the interbank market.

Last, bank transactions on derivative markets could be protected through sufficient collateral so that, again, banks would not grant each other credit. Whether the government is affected by a bank failure in a centralized system depends on the constraints it puts on banks, but, in any case, centralization, like insurance, eliminates systemic risk.

The current system of interbank linkages suffers from its hybrid nature: On one hand, banks engage in largely decentralized mutual lending. On the other hand, government intervention, voluntary or involuntary, destroys the very benefit of a decentralized system, namely, peer monitoring among banks. If one does not believe that the social value of the fine information that banks have or may acquire about each other exceeds the cost of systemic risk, then there is no particular reason to encourage decentralized interactions among banks. To stress the point that a decentralized operation of interbank lending must be motivated by peer monitoring, consider the following (alternative) plausible explanation of interbank lending: Some banks, perhaps due to their regional implantation, are good at collecting deposits, but have poor investment opportunities. In contrast, some other banks, such as the money center banks, have plenty of such opportunities or else are sufficiently large to afford the large fixed costs associated with complex derivative and other high-tech financial markets. It then seems natural for the former banks to lend to the latter. Yet, that a deposit-collecting bank should incur a loss when the borrowing bank defaults, as is implied by interbank lending, is not a foregone conclusion. If the relationship between the two banks involves a transfer of funds but no monitoring, the operation described above could be implemented in a more centralized, and probably better for prudential control, way. Namely, the deposit-collecting bank could pass the deposits on to the borrowing bank, while continuing to service them (in the same way a bank may continue to service mortgage loans it has securitized without recourse to other banks). The key difference with the interbank-loan institution is that the deposits made at the originating bank would, except to the eyes of the depositors, become deposits of the receiving

bank. So, if the latter defaulted, losses would be borne by the deposit insurance fund, and not by the originating bank. This shows that a mere specialization of banks into deposit-taking banks and actively investing banks by itself does not lead to the existence of decentralized interbank lending.

One of the key messages conveyed by Rochet and Tirole (1996) is that the flexibility afforded by decentralized interbank transactions can only be justified by a desire by banking regulators to promote effective peer monitoring by banks. However the current crisis has shown that the cost of encouraging this peer monitoring, namely allowing the possibility of a systemic crisis was far bigger than the potential benefit of this peer monitoring, especially given the impossibility for public authorities not to bailout large insolvent institutions. Therefore centralizing the payment system, the Fed funds market, and other markets in which banks currently have bilateral exposures would result in an equally efficient allocation of liquidity among banks and would facilitate prudential control.

6. Conclusion

Confronted with an unprecedented freezing of interbank and monetary markets after September 2008, central banks have reacted by assuming a large part of the intermediation of liquidity flows among banks, and de facto becoming the clearing houses for the unsecured and for the collateralized interbank markets. A natural question is when this “temporary” situation will cease and when interbank markets will “go back to normal”.

Similarly, governments have felt obliged to set up extremely wide bailout packages including public recapitalizations, purchase of toxic assets, and subsidized lending to distressed institutions. When is this “exceptional” situation supposed to terminate and what policies are supposed to be implemented, in the future, for dealing with TBTF institutions?

The response to these questions that is put forward in this paper may seem radical, but it is reasonably simple. These policies should be pursued but under very strict regulatory control.

The main idea is to reverse 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, thanks to the protection measures put in place by the platforms, these OTC markets would not anymore be in a position to jeopardize the entire system.

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