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A PROPOSAL OF A NEW APPROACH TO FINANCIAL SUPERVISION

AFTER THE 2007-2008 FINANCIAL CRISIS

Relatore

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Introduction

The 2007-2008 financial crisis highlighted a number of criticalities related both to the markets functioning and to the regulatory and supervisory framework. The main objective of this research is to propose, in light of such criticalities, a new conceptual approach to financial supervision focused on systemic financial risk and systemically relevant financial institutions. The financial crisis has provided empirical confirmation that systemic risk has not a sectoral nature anymore and, specifically, that commercial banking and depository functions are not as “special” as they used to be. Traditional analyses of systemic risk are largely related to the balance sheet structure of commercial banks and to the financial fragility due to the peculiar features of depository banks’ balance sheet (illiquid long-term assets versus liquid short-term liabilities, bank runs and contagion phenomena). However, the return of the universal banking model and the growth of financial conglomerates, the exponential development of securitisation techniques and the substantial elimination of bank runs through deposit insurance schemes seriously question commercial banks specialness. Moreover, the subprime crisis has introduced two significant novelties: “wholesale bank runs”, to which also non-depository financial institutions are subject, and the extension of safety net to non depository financial institutions. Depository banks may still have a systemic relevance, but for different reasons and dynamics, which are not confined to commercial banking functions any more and involve the insurance, securities and hedge funds business. The hypothesis supported in this research is that systemic risk has not mainly a depository banking nature any longer and has assumed, more broadly, a financial markets nature. The subprime crisis events are supportive of this view: all three “traditional” financial sectors – depository banks, investment banks, insurance companies - have received some type of public support, especially in the second phase of the turmoil, as the crisis assumed a systemic nature after the failure of Lehman Brothers on September

15, 2008. The rescue, both in the US and in Europe, of many financial institutions of different size, core business and legal form on the one hand and the failure of Lehman Brothers on the other hand indicate that the choices of authorities were neither determined by the nature of core business nor by the legal structure of distressed institutions. Moreover, bailouts have been cross-sector but selective. The most evident example of such selective approach is offered by the different behaviour of the US authorities and the US Treasury with regard to Bear Stearns and Lehman Brothers. The former avoided bankruptcy with the support of the Federal Reserve, which first made the discount window available to primary dealers and then facilitated the acquisition of Bear Stearns by JP Morgan Chase. Instead, Lehman was not bailed out and its failure – the largest failure in the US financial history – transformed a prolonged financial crisis in a systemic crisis, which ultimately involved the real economy as well. Interestingly, Lehman Brothers was much larger than Bear Stearns, thus the too-big-to-fail doesn't seem to provide effective interpretation tools or, at least, it was simply not followed by the authorities. Moreover, the cross-sector approach to bailouts has shed light on the uncertainty and “ambiguity” of the principles followed by governments and authorities in dealing with financial crises. Support to non-depository institutions may have the undesirable side effect of letting the market believe that a public protection is likely to be offered to all large financial institutions (too-big-to-fail doctrine): moral hazard could induce firms to take more risk than they would in absence of a public intervention presumption. Besides, the extension of the safety net to non-depository institutions clearly indicates that the authorities believe that depository institutions are not the only serious source of systemic risk any longer. Depository banks lose their specialness also with regard to the safety net protection, given that investment banks and insurance companies are admitted to benefit of it as well (basically through liquidity provision).

Overall, the framework for public intervention needs to be clarified, since current arrangements probably create a “destructive ambiguity”. A reform of regulation and supervision is

necessary to ensure that a level playing field is maintained and that investment banks, insurance companies and, generally, all non-depository financial institutions “pay a price” - for example in terms of heavier regulation - for the access to the safety net and to any type of public support. Since systemic risk is not confined to depository banks anymore and, contrary to traditional theories, also the insurance and securities sectors may pose systemic threats, the key for a reform of supervision (and regulation) should be systemic relevance of financial institutions. Financial institutions of any sector may be systemic (including hedge funds): regulation and supervision should be reorganized accordingly, with a cross-sector approach.

It is therefore crucial to create a new conceptual framework based on the new nature of systemic risk and on Systemically Relevant Financial Institutions (SRFIs). The identification of SRFIs is a complex task: the objective of this work on this point is not to elaborate in details the technical procedures to select SRFIs, but to underline the importance of adopting a functions-based approach instead of an institutions-based approach. This perspective is coherent with the view that systemic risk does not stem from a specific category of financial institutions but from the systemic impact of functions performed, regardless of the legal nature and core business of intermediaries.

The new proposed model of financial supervision is based on SRFIs. The subprime crisis showed that there is neither an optimal nor a superior financial supervisory architecture. An extremely intense wave of reform of supervisory models took place in a high number of countries in the last twenty years, especially after the institution of the Financial Services Authority in the UK. Such wave of reforms has been largely explained with the economies of scale rationale and financial cross-sector integration (the so-called “blurring effect”). The latter was made possible by the removal of legal barriers and substantially transformed what was traditionally regarded as a tripartite market into a substantially unique market, despite the persisting relevant differences across sectors. A large number of studies have focused on supervisory structures, stressing the importance of

adapting the architecture of controls to new market structures and dynamics. However, no supervisory structure was able to prevent the subprime systemic crisis, neither in the US (a complex mix of functional, sectoral and by objectives approach), nor in the UK, Germany, Belgium, (single regulator outside the central bank), nor in Ireland (single regulator within the central bank), nor in France, Italy (sectoral/by objectives approach), nor in the Netherlands (twin peaks model). All these models have in common a functional mismatch regarding the role of central banks and the preservation of systemic financial stability. In fact, substantially all countries have assigned to the central bank the task of ensuring macro-financial stability, even in countries where they don't have, or have recently lost, direct supervisory functions on the banking and financial markets. However, if central banks do not dispose of micro-prudential supervision on SRFIs the risk of pursuing an objective without adequate instruments might arise. In the proposed financial supervision model the central bank has micro-prudential supervisory powers on SRFIs on a cross-sector basis: all SRFIs would fall under the central bank umbrella, regardless of their legal nature and type of business. Such supervisory structure has advantages but also drawbacks. Significant problems might arise from the combination of monetary policy and micro-supervisory functions, which might lead to accommodative monetary policy to preserve the micro-stability of supervised entities. However, the traditional drawback due to the implicit extension of the safety net to non-bank financial institutions has been *de facto* removed by authorities' behaviour during the subprime crisis. On balance, the costs of potential distortions might be lower than the costs of systemic crises, which are often accompanied and exacerbated by a destructive ambiguity in the policy choices on bailouts: a "constructive certainty" appears preferable.

A relevant risk which would arise with the central bank *ad hoc* supervision of SRFIs is moral hazard: such risk might be tackled through stricter regulation of SRFIs, for example on capital and leverage ratios and on off-balance-sheet activities. Besides, an *ad hoc* regulation of SRFIs would be

coherent with their special systemic status: just as commercial banks were regarded as special financial institutions and thus deserved a specific regulatory regime, SRFIs need to be subject to specific rules since they are the new special financial intermediaries.

The research is divided in three chapters. The first chapter provides an overview of the 2007-2008 financial crisis, with a detailed analysis of the policy responses in the US and Europe, which were substantially based on four pillars: recapitalizations, debt guarantees, assets disposal and increase of deposit insurance coverage. The aim of this section is to underline criticalities and inconsistencies in the approach to the financial crisis followed by governments and supervision authorities and to stress the need for a clarification of the public intervention mechanisms and the opportunity of a new approach to financial supervision and regulation. The heart of the new approach should be systemic risk and systemically relevant financial institutions: therefore, chapter two turns to a detailed analysis of traditional theories on systemic risk and traditional approach to financial regulation. A new perspective on systemic risk and a methodology for the identification of SRFIs are proposed. Finally, chapter three introduces the new financial supervision model based on SRFIs and suggests a few areas of interventions for the creation of a specific regulatory regime for SRFIs. Some proposals on international supervision and regulation of SRFIs are also presented.

I would like to express my sincere gratitude to my supervisor, Professor Roberto Pardolesi, for his support and the useful suggestions he provided me in our talks, especially as the financial crisis exploded in fall 2008 and a deep rethinking of financial supervisory and regulatory issues appeared inevitable. His comments stimulated me to try to identify and focus on some structural problems, rather than on apparent causes and solutions (obviously, the responsibility of the success or the failure of this attempt is totally mine).

I am extremely grateful to my co-supervisor, Dr. Carmine Di Noia, Deputy Director of Assonime, who had already supported me in previous research and offered me a precious contribution by reviewing and discussing this work; his suggestions were very useful also for the organizational structure of the research.

I am deeply indebted to Richard Herring, Professor of International Banking at the Wharton School, University of Pennsylvania (Philadelphia), who offered me the privilege of spending 15 months of my doctoral period as a Visiting Scholar at the Wharton Financial Institutions Center and of co-authoring with him two papers.

A special, grateful thought goes to Professor Fabio Gobbo.

Chapter 1

The 2007-2008 financial crisis: selective cross-sector bailouts and the need of a new regulatory and supervisory approach

Introduction

The financial markets turmoil caused by the 2007-2008 “subprime crisis” highlighted a number of criticalities related both to the markets functioning and to the regulatory and supervisory framework. It is possible to divide the analysis of the subprime crisis into two different phases: the line should be drawn at the bankruptcy of Lehman Brothers on September 15, 2008, which was preceded by the rescue of Fannie Mae and Freddie Mac on September 7 and immediately followed by the bailout of AIG on September 16. These three events rapidly transformed a prolonged financial crisis into a systemic financial crisis. The first phase was characterized by significant write-downs, liquidity crises and the drying up of structured credit finance. In the second phase capital and leverage became the main issues, the interbank market substantially froze, lack of confidence among banks and financial institutions caused a wholesale panic which restrained lending both on the interest rate side and on the quantities side. Governments had to step in both in the US and in Europe, either with homogeneous national plans or with a case-by-case approach: the four main strategies adopted were recapitalizations, guarantees on liabilities, assets disposal and raising of deposit insurance coverage. The rescue, both in the US and in Europe, of many financial institutions of different size, core business and legal form on the one hand and the failure of Lehman Brothers on the other hand pose a number of structural questions, since the different choice of authorities and governments is clearly not related to the nature of business, nor to the legal structure of distressed institutions. In fact, all three “traditional” financial sectors have received some type of support: depository banks, investment banks (Bear Stearns, Carnegie) insurance companies (AIG, Aegon, Ethias). However, bailouts have been selective: in some countries governments selected a list of banks eligible for public recapitalization (e.g. France, Ireland and UK) or liabilities guarantee (e.g. Ireland), potentially creating a competitive distortion within the same sector; in the US Bear

Stearns received the Federal Reserve support, while Lehman Brothers was let fail, despite being much larger.

The bailout of investment banks and insurance companies is likely to have increased the uncertainty about the principles followed by governments and authorities in dealing with financial crises. Support to non-depository institutions may also have the undesirable side effect of letting the market believe that a public support is granted to all large financial institutions (too-big-to-fail doctrine): moral hazard could induce firms to take more risk than they would in absence of public support presumption. Besides, the extension of the safety net to non-depository institutions clearly indicates that the authorities believe that depository institutions are not the only serious source of systemic risk any longer. Depository banks lose their specialness also with regard to the safety net protection, given that investment banks and insurance companies are admitted to benefit of it as well (basically through lending of last resort).

The framework for public intervention needs to be clarified, since current arrangements probably create a “destructive ambiguity”. A reform of regulation and supervision is also necessary to ensure that a level playing field is maintained and that investment banks, insurance companies and, generally, all non-depository financial institutions “pay a price” (for example in terms of heavier regulation) for the access to the safety net and to any type of public support. The key for such reform should be systemic relevance of financial institutions: in fact, systemic risk is not confined to depository banks anymore, contrary to traditional belief that insurance and securities do not pose systemic threats. Financial institutions of any sector may be systemic (including hedge funds): regulation and supervision should be reorganized accordingly, with a cross-sector approach.

1.1 Overview of the subprime crisis

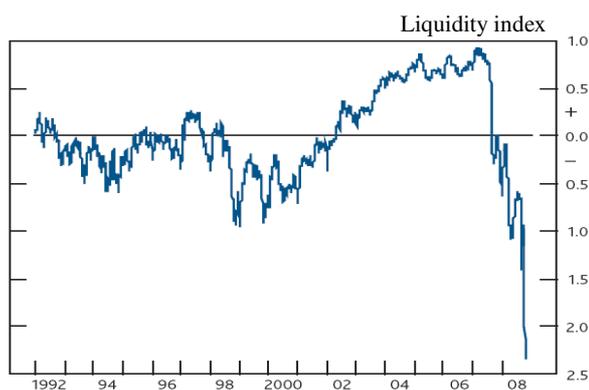
The financial markets turmoil caused by the 2007-2008 “subprime crisis” highlighted a number of criticalities related both to the markets functioning and to the regulatory and supervisory framework. As underlined by Lannoo (2008), it is possible to divide the analysis of the subprime crisis into two different phases: the line should be drawn at the bankruptcy of Lehman Brothers on September 15, 2008, preceded by the rescue of Fannie Mae and Freddie Mac and the bailout of AIG (a *de facto* nationalization). These three events rapidly transformed a prolonged financial crisis into a systemic financial crisis. The first phase was characterized by significant write-downs, liquidity crises, largely due to lack of confidence and reputational issues, and the drying up of structured credit finance. In the second phase capital and leverage became the main issues, the interbank market substantially froze, lack of confidence among banks and financial institutions caused a wholesale panic which produced its consequence on the interest rate side but also and especially on the quantities side. Finally, governments had to step in both in the US and in Europe, either with homogeneous national plans or with a case-by-case approach: the four main strategies followed were recapitalizations, guarantees on liabilities, assets disposal and raising of deposit insurance coverage.

During the first phase of the crisis it is possible to identify two extremely relevant events: 1) in the UK the bank run on Northern Rock in September 2007 was the first one in the country since 1866 (Overend & Gurney) and 2) in the US, in March 2008, Bear Stearns was the first non-depository financial institution to benefit of the Federal Reserve support since the 1930s. In both cases the institutions appeared affected by a liquidity crisis and not by solvency problems, or, at least, they were not legally insolvent. Llewellyn (2008, p.24) observed that Northern Rock was not legally insolvent, even though it was insolvent on a business base (“borrowing from the Bank of England at the penalty rate of at least 6.36% exceeded the bank’s average rate of interest on assets of

around 6%”). The different meanings that the concept of insolvency may assume testify how difficult it can be to draw the line between illiquidity and insolvency and to apply the Bagehot doctrine.

With regard to Bear Stearns, Christopher Cox, Chairman of the SEC, stressed the fact that reputational issues and loss of liquidity were at the roots of the crisis: “The fate of Bear Stearns was the result of a lack of confidence, not a lack of capital. [...] the firm had a capital cushion well above what is required to meet supervisory standards calculated using the Basel II standard. Specifically, even at the time of its sale [...], Bear Stearns' capital, and its broker-dealers' capital, exceeded supervisory standards. Counterparty withdrawals and credit denials, resulting in a loss of liquidity - not inadequate capital - caused Bear's demise”.¹ Lack of confidence was also at the heart of the Northern Rock crisis, as indicated by the behaviour of Northern Rock depositors in the aftermath of the Bank of England support to the bank on September 13, 2007. The central bank intervention exacerbated informational opacity and reputational problems, reinforcing fears and causing the run on the bank on September 14.

Figure 1. 1. Financial market liquidity^a



Sources: Bank of England (2008b, p. 8) . a) The liquidity index shows the number of standard deviations from the mean. It is a simple unweighted average of nine liquidity measures, normalised on the period 1999–2004. The series shown is an exponentially weighted moving average. The indicator is more reliable after 1997 as it is based on a greater number of underlying measures. The recent fall in the indicator is largely due to a sharp decline in the interbank market liquidity measure.

¹ Cox to Wellink, Chairman of the Basel Committee, on sound practices for managing liquidity in banking organizations (March 20, 2008).

The sudden contraction of the structured finance market in the third quarter of 2007 caused a collapse of liquidity which started in that sector but then reached the interbank market and the whole financial system (see Figure 1.1). Bank credit default swap (CDS) rates, which had already consistently risen in the period August 2007- 12 September 2008, substantially doubled in the period September 15, 2008 – October 14, 2008 and decreased in the following period to levels nearer to pre-September-October values (Figure 1.2). The peak for CDS spread was particularly high for the US investment banks (see Figure 1.3).

Figure 1.2. Indicators of financial market stress (credit default swap rates in basis points)

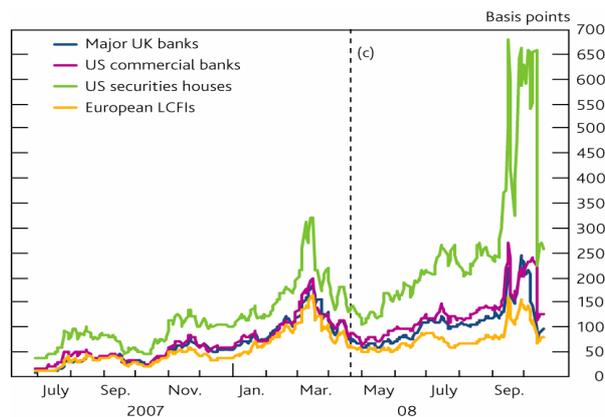
	Routine: before August 2007		Turmoil: Aug 2007 to 12 Sep 2008		Crisis: 15 Sep to 14 Oct 2008		Latest observation: 11 Nov 2008
	Average	Standard deviation	Average	Standard deviation	Average	Standard deviation	
Bank credit default swap rates ¹							
United States	21	6	158	97	271	60	157
Euro Area	13	4	79	33	170	24	140
United Kingdom	10	3	97	33	177	33	128
Three-month Treasury euro dollar spread	39	22	125	38	321	81	210
Three-month EURIBOR- EONIA swap index spread	6	1	62	16	118	41	166

1. An average of 5-year credit default swap rates on bank's senior debt.

Source: OECD calculations.

Source: OECD (2008a, p. 49).

Figure 1.3. Credit Default Swaps premia ^{(a)(b)}

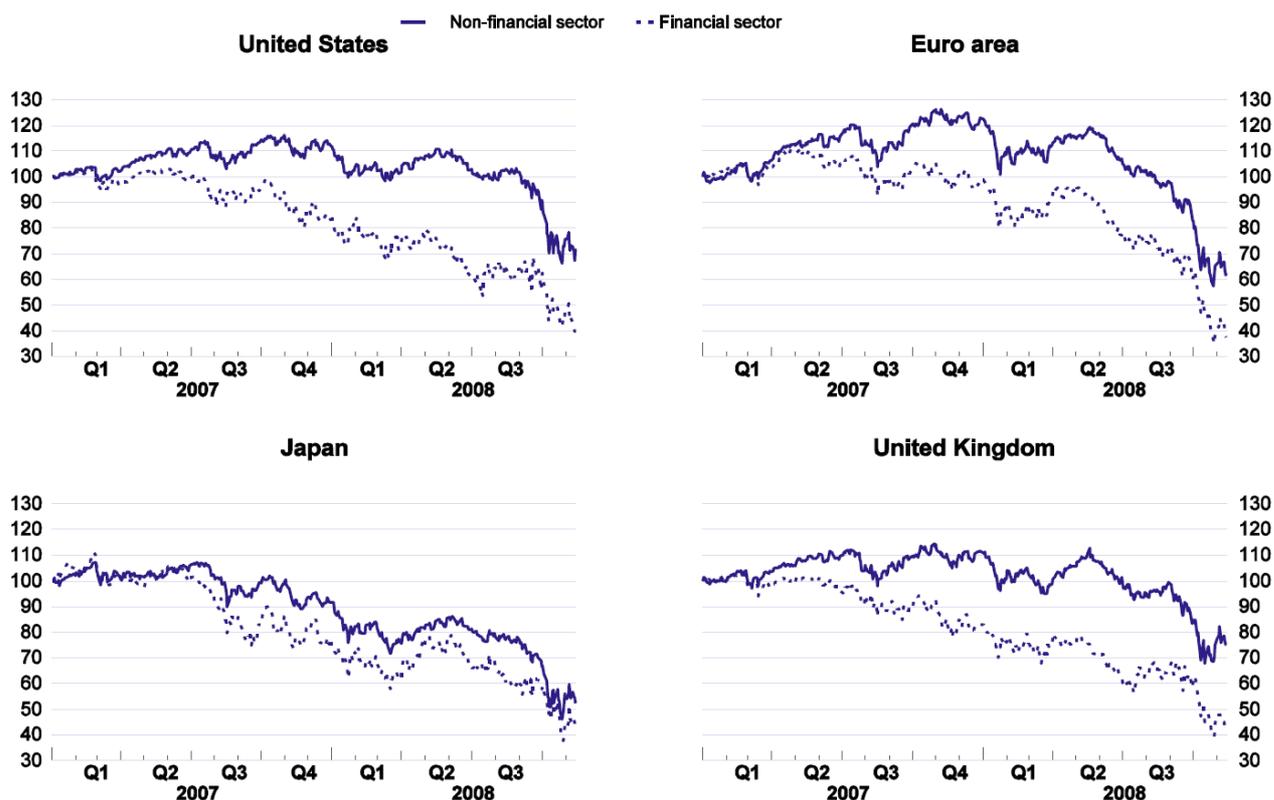


Sources: Bank of England (2008b) on Bank of England, Markit Group Limited, Thomson Datastream, published accounts.(a) Data to close of business on 20 October 2008; (b) Asset-weighted average five-year premia; (c) April 2008 Report.

The originate-to-distribute model and the spectacular growth of securitization have considerably weakened the traditional assumption on illiquidity of bank assets. The high complexity and scarce transparency of structured finance products, the increasing level of off-balance-sheet activities and risk-shifting strategies turned out to jeopardize the stability of the financial system. Moreover, a key weakness turned out to be excessive leverage: not only were financial institutions overleveraged, but such over-leverage was largely “hidden” and non-transparent, due to massive use of off-balance sheet entities, for example through Structured Investment Vehicles (SIVs), which borrow short-term through commercial paper and invest in long-term asset-backed securities. The response to over-leverage was the attempt to raise capital, which however turned out to be insufficient to cover losses, and the attempt to get rid of troubled assets: this latter step, however, produced a vicious circle, furtherly depressing the value and liquidity of those products and causing more write-downs, thus reducing the value of assets and in turn worsening undercapitalization criticalities. Estimation of write-downs at the end of September 2008 amounted to approximately \$600 billion, of which around \$320 billion in US banks and \$230 billion in European banks (concentrated in Swiss and UK banks, \$55 billion and \$62 billion respectively; Bloomberg

estimates, see OECD 2008a). Share prices of financial firms plummeted worldwide since the beginning of 2007 and the drop was more serious compared to the non-financial sector (see Figure 1.4).

Figure 1. 4. Share price indices: financial vs non-financial sector (1 January 2007 = 100)

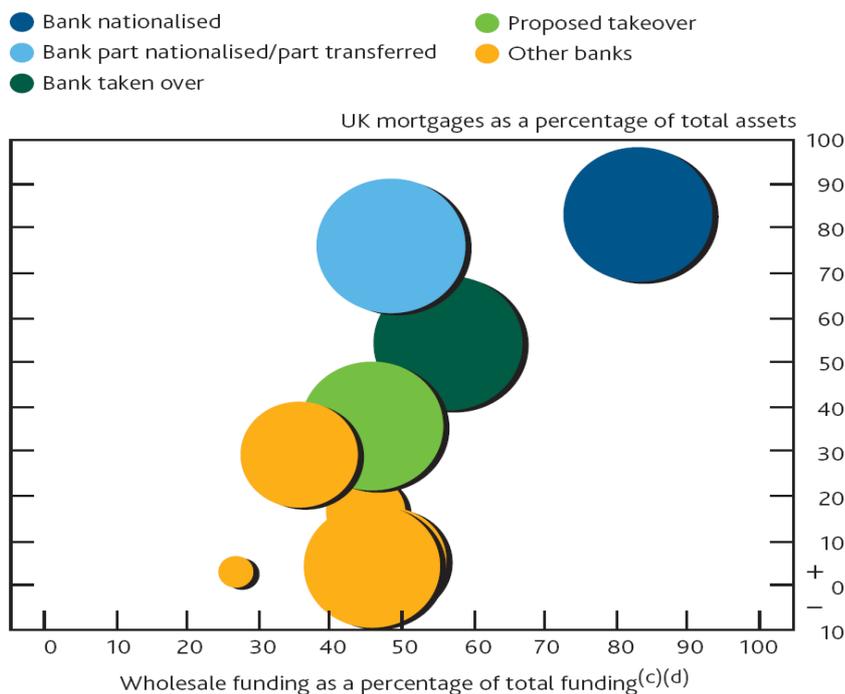


Source: Datastream (OECD 2008a)

Leverage and capital adequacy became the key issues, and the Basel framework appeared to be ineffective to prevent excess of leverage and showed its weaknesses with regard to its procyclicality nature. It is particularly interesting to observe that some financial institutions had an extremely high leverage ratio, measured as total debt on equity, despite being compliant with the risk-weighted capital requirements.

Beyond the “classical” depositors bank run (Northern Rock), there was a “wholesale bank run” phenomenon, which significantly contributed to the tightening of interbank lending. The type of business model adopted by financial institutions played an important role. Specifically, an imbalance between medium/long-term investments and short-term wholesale funding can make intermediaries particularly exposed to a tightening of the wholesale funding conditions: for example, Northern Rock was highly exposed to interest rate risk and at the end of 2006 had a 300% loans-deposits ratio, a 7% liquidity-assets ratio and a 66% of its funding sources in the wholesale markets (Masala, 2007). A combination of this wholesale funding fragility and large exposures to structured credit was particularly intense in investment banks. Figure 1.5 clearly shows, with regard to UK banks, that the most drastic measures had to be taken for banks which combined a high exposure to both mortgages as a percentage of total assets and wholesale funding as a percentage of total funding. A study by the ECB (2008c, pp. 139 and ff.) on a group of 11 Large and Complex Banking Groups (LCBGs) in the euro area found that in the second quarter of 2007, right before the beginning of the turmoil, most LCBGs had a deposit-to-loan ratio below unity and financed 15% of their credit supply through wholesale funding, which rises to 30% if one outlier is excluded.

Figure 1. 5. Major UK banks' equity prices, mortgage lending and wholesale funding dependency



Source: Bank of England (2008b, p. 30). (a) Data to close of business 20 October 2008. (b) The size of the circles is proportional to the extent of equity price falls since 2 July 2007. (c) Wholesale funding reliance equals debt securities in issue and interbank deposits as a proportion of debt securities in issue, interbank deposits, customer deposits and Tier 1 capital. (d) Wholesale funding dependence was calculated at end-June 2008.

In September and October 2008 the situation drastically worsened in the aftermath of the Freddie Mac and Fannie Mae bailout and the Lehman Brothers failure. Central banks repeatedly intervened with the whole range of instruments already at their disposal (substantially interest rates cuts and provision of liquidity) and also created a high number of new *ad hoc* tools to deal with the crisis (mainly extension of collateral accepted for refinancing and introduction of new liquidity facilities; see Table 1.1 for a chronology of actions taken by the Federal Reserve, the European Central Bank and the Bank of England²). Central banks also reacted with globally coordinated efforts, as in the case of the interest rate cut decided on October 8, 2008 or in the case of reciprocal currency swaps agreements. They extended the type of collateral accepted for refinancing operations

² On January 8, 2009 the Bank of England cut the interest rate to 1.5%, the lowest level in its 315-years history.

and introduced new liquidity facilities (especially the Federal Reserve and the Bank of England). It has to be underlined that in the US the Federal Reserve had already adopted an extraordinary measure in March 2008, when it decided to extend the access to the discount window to investment banks through the creation of the Primary Dealers Credit Facility. Another Fed's step to be stressed is the decision to buy commercial paper - to boost liquidity in that market - under the Commercial Paper Funding Facility created on October 7, 2008.

The range of tools available to central banks significantly differs across countries: in this perspective, it has to be underlined the striking difference between the Federal Reserve and the European Central Bank, with the former opening the discount window access also to non-depository institutions (initially to investment banks, but then also to insurance companies, namely in the AIG bailout, beginning in September 2008³) and the latter not even disposing of lending of last resort functions.

³ The juridical basis for the AIG rescue was section 13(3) of the Federal Reserve Act, on discounts for individuals, partnerships, and corporations: "In unusual and exigent circumstances, the Board of Governors of the Federal Reserve System, by the affirmative vote of not less than five members, may authorize any Federal reserve bank, during such periods as the said board may determine, at rates established in accordance with the provisions of section 14, subdivision (d), of this Act, to discount for any individual, partnership, or corporation, notes, drafts, and bills of exchange when such notes, drafts, and bills of exchange are indorsed or otherwise secured to the satisfaction of the Federal Reserve bank: Provided, That before discounting any such note, draft, or bill of exchange for an individual, partnership, or corporation the Federal reserve bank shall obtain evidence that such individual, partnership, or corporation is unable to secure adequate credit accommodations from other banking institutions. All such discounts for individuals, partnerships, or corporations shall be subject to such limitations, restrictions, and regulations as the Board of Governors of the Federal Reserve System may prescribe."

Table 1.1. Main measures adopted by the Federal Reserve, the ECB and the Bank of England

Date	Measures
FED	
12 Dec. 07	Term Auction Facility (TAF): available to all depository institutions in sound financial conditions and eligible to borrow under the primary credit discount window program. Broader range of collateral than for open market operations, to boost liquidity when unsecured interbank markets are under stress.
11 Mar. 08	Creation of the Term Securities Lending Facility (TSLF): up to \$200 bn of Treasury securities to primary dealers secured by a pledge of other securities, (including federal agency debt, federal agency residential-mortgage-backed securities (MBS), and non-agency AAA/Aaa-rated private-label residential MBS); 28 days term rather than overnight.
16 Mar. 08	Primary Dealer Credit Facility (PDCF): secured loans to primary dealers (discount window made available to non-depository institutions for the first time since 1930s). Broad range of investment-grade debt securities eligible as collateral. Eligible collateral includes tri-party repurchase arrangements with the major clearing banks.
14 Sep. 08	Broadening of eligible collateral under PDCF and TSLF; increase in the frequency and size of TSLF.
18 Sep. 08	\$180 bn increase (up to \$250 bn) of currency swap lines with other central banks (Bank of Japan, the Bank of England, Bank of Canada, European Central Bank, Swiss National Bank).
19 Sep. 08	Asset-backed commercial paper money market mutual funds liquidity facility (ALMF): loans to depository institutions and bank holding companies to finance their purchases of high-quality asset-backed commercial paper (ABCP) from money market mutual funds and boost liquidity in money markets.
24 Sep. 08	Extension of currency swap line arrangements to the central banks of Australia, Denmark, Norway and Sweden.
29 Sep. 08	Increase of swap limits with other central banks from \$290 bn to \$620 bn. Doubling of total TAF credit available (from \$150 bn to \$300 bn). Introduction of forward TAF.
06 Oct. 08	Payment of interest on depository institutions' required and excess reserve balances.
07 Oct. 08	Commercial Paper Funding Facility (CPFF): creation of a liquidity backstop to US issuers of commercial paper through a special purpose vehicle financed by the FED that will purchase three-month unsecured and asset-backed commercial paper directly from eligible issuers.
07 Oct. 08	Increase of TAF facility from \$300 bn to \$900 bn.
08 Oct. 08	(coordinated) interest rate cut from 2% to 1,5%.
13 Oct. 08	Unlimited amount of US dollars available through currency swap lines with the Bank of England, the European Central Bank, the Bank of Japan and the Swiss National Bank, to improve liquidity in short-term U.S. dollar funding markets.
21 Oct. 08	Money Market Investor Funding Facility (MMIFF): senior secured funding to a series of special purpose vehicles to facilitate an industry-supported private-sector initiative to finance the purchase of money market instruments and boost liquidity in money markets.
28 Oct. 08	Extension of temporary currency swap lines to the central banks of New Zealand (up to \$15 bn), Brazil, Korea, Mexico and Singapore (up to \$30 bn).
29 Oct. 08	Interest rate cut from 1,5% to 1%.
25 Nov. 08	Term Asset-Backed Securities Loan Facility (TALF): loans to holders of AAA-rated ABS backed by consumer and small business loans, to support the issuance of asset-backed securities collateralized by student loans, auto loans, credit card loans, and loans guaranteed by the Small Business Administration.
16 Dec. 08	Interest rate cut from 1% to a range of 0%-0,25%.
European Central Bank	
03 Oct. 08	Expansion of eligible institutions that can participate in Eurosystem open market operations based on standard tenders and in quick tenders, i.e. the tender procedure normally used for fine-tuning operations.
08 Oct. 08	(coordinated) interest rate cut from 4,25% to 3,75%.
15 Oct. 08	Expansion of the list of assets eligible as collateral in Eurosystem credit operations. Instruments added: marketable debt instruments denominated in other currencies than the euro; euro-denominated syndicated credit claims governed by UK law; debt instruments issued by credit institutions, including certificates of deposits (CDs) when traded on one of these accepted non-regulated markets; subordinated debt instruments if protected by an acceptable guarantee. The Eurosystem lowers the credit threshold for marketable and non-marketable assets from A- to BBB-, with the exception of asset-backed securities (ABS). Enhancement of the provision of longer-term refinancing and

Date	Measures
	provision of US dollar liquidity through EUR/USD foreign exchange swaps.
16 Oct. 08	€5 bn credit line to Hungary to cover Hungarian banks' acute shortage of euro.
06 Nov. 08	Interest rate cut from 3,75% to 3,25%.
04 Dec. 08	Interest rate cut from 3,25% to 2,5%.
Bank of England	
21 Apr. 08	Special Liquidity Scheme (£50 bn) to allow banks to swap temporarily their high quality mortgage-backed and other securities for UK Treasury Bills.
17 Sep. 08	Extension of drawdown period for the Special Liquidity Scheme.
03 Oct. 08	Extension of eligible collateral in weekly sterling three-month repo operations. New eligible collateral includes AAA-rated asset-backed securities and highly-rated asset-backed commercial paper.
08 Oct. 08	Special Liquidity Scheme raised to £200 bn. Debt guaranteed under the HM Government bank debt guarantee scheme eligible as collateral in: a) extended collateral sterling long-term repo open market operations; b) US dollar repo operations; c) the Special Liquidity Scheme. (coordinated) interest rate cut from 5% to 4,5%.
06 Nov. 08	Interest rate cut from 4,5% to 3%.
04 Dec. 08	Interest rate cut from 3% to 2%.
08 Jan. 09	Interest rate cut from 2% to 1,5%.

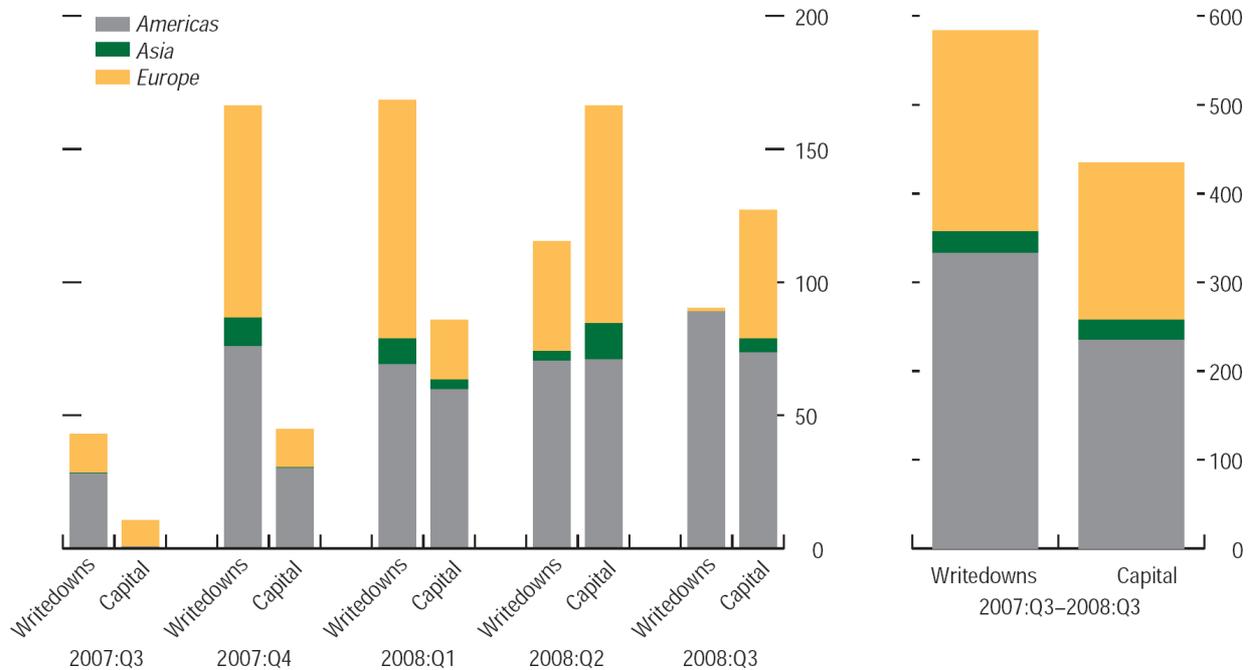
Source: author and Fabrizia Peirce (Assonime) on central banks' websites.

However, the massive and prolonged central banks' efforts to inject liquidity, ease strains in the interbank market and restore confidence in the financial system failed to solve the problem at its roots: solvency became the main concern, leading to widespread governments' actions in support of the banking system in the US and in Europe, mainly in the form of introduction or extension of public guarantee on bank liabilities (both retail and wholesale funding) or recapitalizations (banks did manage to raise capital, but not enough to counterbalance write-downs; see Figure 1.6)⁴. What initially appeared to be a liquidity crisis turned out to be a dramatic capital crisis.⁵ The role of governments and the opportunity of public intervention to prevent and manage financial crises became, once again, the key issue.

⁴ For an overview of central banks and governments intervention see IMF (2008b, pp. 9-10), Bank of England (2008b, p. 18) and Bank of International Settlements (2008).

⁵ The Governor of the Bank of England, Mervyn King, pointed out on October 21, 2008, that "massive injections of central bank liquidity have played a vital role in staving off an imminent collapse of the banking system. Such lending [...] can also serve to conceal the severity of the underlying problems, and put off the inevitable day of reckoning. I hope it is now understood that the provision of central bank liquidity, while essential to buy time, is not, and never could be, the solution to the banking crisis, nor to the problems of individual banks [...] Just as a fever is itself only a symptom of an underlying condition, so the freezing of interbank and money markets was the symptom of deeper structural problems in the banking sector." (King 2008, p. 3)

Figure 1.6. Banks writedowns and capital raised (US \$ bn, 2007:Q3-2008:Q3)

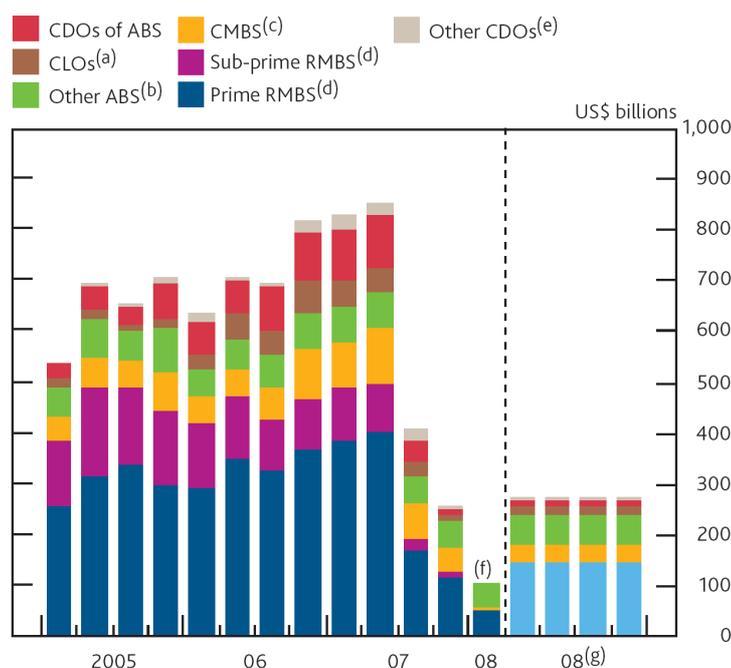


Source: IMF (2008b, p. 23) on Bloomberg L.P.

The subprime crisis exploded in the fall of 2008 actually began in the first semester of 2007. The combination of the lax US monetary policy and the US real estate bubble had provided huge incentives to the proliferation of mortgage financing, especially to the so-called subprime borrowers, that is those mortgagors with extremely low credit merit, low or now documentations and a high loan-to-value ratio. The market of assets-backed-securities and particularly mortgage-backed-securities had consequently exponentially grown and, once the monetary policy started to become restrictive, the house bubble burst and defaults on these class of mortgages started to rise, the value of securities backed by those mortgages begun to deteriorate: the issuance of assets-backed

securities suddenly and progressively contracted starting in the third quarter of 2007 (see Figure 1.7).

Figure 1.7. Global issuance of asset-backed securities and collateralized debt obligations



- (a) Collateralised loan obligations.
- (b) 'Other ABS' includes auto, credit card and student loan ABS.
- (c) Commercial mortgage-backed securities.
- (d) Residential mortgage-backed securities.
- (e) 'Other CDOs' includes corporate and mixed-collateral CDOs.
- (f) 2008 Q1 data for CDO issuance were not yet published.
- (g) Full-year forecasts from Barclays Capital, Citi, JPMorgan Chase & Co. and Lehman Brothers, allocated evenly over four quarters. Light blue bars show total non-agency RMBS issuance.

Source: Bank of England (2008a) on Dealogic and Sifma.

The first alarm was raised by the loss announced on March 5, 2007 by Hsbc on a portfolio of purchased subprime mortgages in its US Consumer Finance subsidiary, Mortgage Services, which evidenced much higher delinquency than had been built into the pricing of these products. However, the first very significant event which is commonly regarded as the beginning of the turmoil is the

crisis of two Bear Stearns hedge funds in June 2007, the Bear Stearns High-Grade Structured Credit Fund and the Bear Stearns High-Grade Structured Credit Enhanced Leveraged Fund. Bear Stearns injected \$ 3.2 billion in the Bear Stearns High-Grade Structured Credit Fund, but despite the efforts to rescue them, the two funds could not avoid collapse and filed for bankruptcy on July 31, 2008 (Bear Stearns decided to liquidate both funds at the Cayman Islands). Bear Stearns shares price plummeted in the months following the blowing up of the two hedge funds, until the final collapse in March 2008.

The “official” beginning of the crisis dates back to August 9, 2008, as BNP Paribas suspended subscriptions and redemptions of three funds exposed to US ABS assets. At the end of July the first German financial institution was hit by the crisis as well: IKB was rescued by its main shareholder, KfW, and a group of public and private banks with a €3.5 billion fund. At the end of August the German Sachsen LB was sold by the State of Saxony to Landesbank Baden-Württemberg due to subprime related losses.

In the UK in September 2007 the combination of mortgages exposures and relying on wholesale short-term funding caused liquidity problems to Northern Rock, which had to request a liquidity support to the Bank of England. Rumours about financial distress of the institution and the news that the central bank had to step in triggered the first depositors’ bank run in the UK after more than 140 years (run on Overend and Gurney in 1866). Deposits withdrawal amounted to £1 billion, about 4-5% of total retail deposits. Interestingly, both Northern Rock and IKB had a significant reliance on interbank and capital markets for their funding, combined with a very high loans/deposits ratio (which implies low liquidity).

In December 2007 two major bailouts of off-balance-sheet entities were operated by two leading international financial players. On December 13 Citi bailed out 6 SIVs for \$49 billion and on December 25 HSBC set a bailout plan to rescue 2 SIVs for \$45 billion (IMF 2008a, p. 68).

On February 17, 2008 the UK Government decided to take Northern Rock into a period of temporary public ownership: this choice represented the first structural intervention of a government in the ownership structure of banks, and remained an isolated case until September 2008.

The collapse of Bear Stearns in March 2008 gave a structural acceleration to the crisis: the company was compliant with capital requirements, but suffered a loss of reputation which triggered a sudden deterioration of its liquidity pool, which fell from \$12.4 billion on March 12 to \$2 billion on March 13. Christopher Cox, the Chairman of the SEC, supported the view that the collapse of the company had to be attributed to reputational issues. It has to be noted, however, that the gross leverage ratio of Bear Stearns at the end of November 2007 was 32,8%; interestingly, the capital ratio was at 13,7% at the end of December 2007. The company was ultimately acquired by JPMorgan Chase, which announced the acquisition on March 16, 2008. The Fed stepped in to facilitate the deal through the establishment of a newly created vehicle, a Delaware LLC which took over a portfolio of \$30 billion in assets of Bear Stearns. The funding of the vehicle was provided for \$1 billion by JPMorgan in notes subordinated to the \$29 billion loan provided by the Federal Reserve Bank of New York. It has to be noted that the level of credit default swaps on Bear Stearns had been much higher than for the other US investment houses in the weeks of March 2008 preceding the final collapse. However, such difference, dramatically increased in the very last few weeks, had been constantly (even though not exceptionally) higher since 2007. Moreover, Bear Stearns had significantly increased its leverage, reaching approximately 30 at the end of 2007 (only the figure for Morgan Stanley being similar, among other investment banks, which however were all over-leveraged) and its liquidity pool at year end 2007 was the lowest as a percentage of equity (about 150%), again compared to the other investment banks.

The collapse of Bear Stearns induced the Federal Reserve to an historical innovation: the creation of the Primary Dealers Credit Facility, which extended the discount window to investment

banks, introducing a structural reform in the safety net arrangements. This was the first time since the 1930s that the FED offered liquidity support to a non-depository institution. This choice posed a moral hazard problem, since liquidity support was granted to institutions not subject to the burden of (depository) bank regulation.

In July 2008 IndyMac, a large US mortgage lender, was closed by the Office of Thrift Supervision and the Federal Deposit Insurance Corporation was named conservator. On July 13 the Federal Reserve authorized the Federal Reserve Bank of New York to lend to Fannie Mae and Freddie Mac in case of necessity: the GSEs were authorized to borrow from the discount window, which was therefore supplementing the Treasury's lending authority, announced the same day, along with a temporary authority for the Treasury to purchase GSEs equity. On July 23 Congress transformed the previously implicit Government's protection into an explicit guarantee. On September 7, 2008 Fannie Mae and Freddie Mac were placed into conservatorship by the Federal Housing Finance Agency.⁶ The US Treasury entered into senior preferred stock agreements with both GSEs with a maximum capacity of \$100 billion and the commitment to provide support if liabilities would exceed assets (negative net worth). The Treasury also agreed to purchase mortgage-backed securities of the GSEs and to provide a liquidity backstop to Fannie Mae, Freddie Mac and the Federal Home Loan Banks.

On September 15 Lehman Brothers Holdings filed for bankruptcy, after Bank of America and Barclays withdrew their offer on Lehman once it was clear that no public support would be made available to the investment bank. The approach chosen by the authorities was therefore opposite to that adopted six months earlier for Bear Stearns. Lehman Brothers had a \$691 billion balance sheet at November 2007: it was the largest bank failure in the US history. It was also the failure of a model of financial business: such model was structurally similar to the "traditional" model of

⁶ The Federal Housing Finance Agency (FHFA) was created on July 30, 2008 through the merger of the Office of Federal Housing Enterprise Oversight (OFHEO), the Federal Housing Finance Board (FHFB), and the GSE mission office at the Department of Housing and Urban Development (HUD). See Lockhart (2008).

commercial banking, with long-term illiquid assets and a high reliance on liquid short-term liabilities, combined with a very high leverage (total assets on equity capital). Moreover, Lehman was substantially performing a credit creation function through the re-hypothecation of collateral posted by hedge funds for Lehman's prime brokerage activities: as noted by De Grauwe (2008), this model of investment banking had assumed commercial banking features, with the notable difference that Lehman Brothers (like the other investment banks) was not subject to appropriate bank regulation. Lehman had a 24,6 leverage ratio at the end of May 2008, in decline with respect to 32,7 at the end of February 2008 and 30,7 at the end of November 2007. Moreover, its short-term ratio (short-term debt over assets) was 52,05% at the end of November 2007 and 54,59% at the end of February 2008, before dropping to 25,51% at the end of May 2008 (Zingales 2008). Such huge and rapid deleveraging may be regarded as an anticipation and a sign of the company's failure and also of the failure of a business model, as it would be soon confirmed by the end of independent investment banking in the US: on September 21 the approval by the Federal Reserve Board of Goldman Sachs and Morgan Stanley applications to become bank holding companies represented the end of the independent investment banking model, given that Merrill Lynch had been acquired by Bank of America on September 15 in a \$50 billion all-stock transaction.

On September 16, 2008, AIG was granted a \$85 billion secured loan by the FED, guaranteed by the firm assets and in return for a 79,9% equity stake: AIG was substantially nationalised. This was only the first step of a series of public interventions to prevent the failure of the largest insurance firm in the world. On October 8 the Federal Reserve Board authorized the Federal Reserve Bank of New York to borrow up to \$37,8 billion in investment-grade, fixed-income securities from AIG in return for cash collateral (securities previously lent by AIG's insurance subsidiaries to third parties). On November 10 the Treasury announced that it would purchase under the Troubled Assets Relief Program \$40 billion of newly issued AIG preferred shares and the Federal Reserve Board

authorized the New York Fed to establish for AIG a residential mortgage-backed securities facility (up to \$22,5 billion) and a collateralized debt obligations facility (up to \$30 billion). The AIG bailout was the second structural innovation after the opening of the discount window to investment banks: lender of last resort was substantially extended to the insurance sector.

On the whole, financial support offered to AIG by public authorities has been higher than \$150 billion. Such a massive bailout may be probably explained by the belief of the governments and the Federal Reserve that AIG was extremely likely to cause contagious systemic effects in case of failure, mainly due to its large exposure as a credit default swaps counterparty. The company was in the top 20 list of largest CDS counterparties in the world, and it sold protection through CDS for approximately \$370 billion to European banks. Interestingly, as noticed in the AIG 2007 annual report (American International Group 2008), European banks entered into these contracts with the primary aim of capital relief, not risk mitigation.

On September 25 the Office of Thrift Supervision placed Washington Mutual into the receivership of the Federal Deposit Insurance Corporation (FDIC). JPMorgan Chase acquired all deposits, assets and certain liabilities of Washington Mutual's banking operations from the FDIC for \$1.9 bn.

By the end of October some major European financial institutions had been seriously hit by the crisis and governments were forced to rescue them through capital injections: this was the case of Fortis, Dexia and Bradford & Bingley. The latter was nationalised by the UK government on September 29. The case of Fortis is particularly interesting because it has provided an empirical evidence of the home-host country complexity arising when a large financial conglomerate with significant cross-border activities experiences distress. On October 6 the German government, the German Central Bank, the German single financial regulator (BaFin) and senior representatives of

the German banking and insurance sector found an agreement to provide a €50 billion liquidity facility (€35 billion guaranteed by the German government) to the Hypo Real Estate Group.

The first half of October 2008 may be regarded as the start of a new approach in the management of the financial crisis by governments: case-by-case responses were substituted or complemented by national “general” plans. The US Congress approved the so called “Paulson Plan” on October 3, the British government launched its plan to support the financial system on October 8 and the October 12 Eurogroup meeting and the subsequent Ecofin council on October 15-16 indicated objectives and guidelines for the support to the financial sector in European countries. Next section turns to the analysis of national policy responses to the financial crisis, which had clearly assumed a systemic nature in the second half of September 2008.

Table 1.2. Chronology of the subprime crisis in the US and in Europe, by financial institution.

Financial institution	Date	Main Features
Unites States		
Bear Stearns	22 Jun. 07	Two Bear Stearns hedge funds exposed to the subprime mortgage sector are close to being shut down (Bear Stearns injects \$3.2 bn in one of them, the Bear Stearns High-Grade Structured Credit Fund). Both funds file for bankruptcy on July 31, 2008.
	Mar. 08	The company suffers from a deep liquidity crisis. JP Morgan purchases the Bearn Stearns Company Inc. The Federal Reserve Bank of New York lends \$29 bn, through a Delaware LLC. The loan is backed by a portfolio of \$30 bn in assets of Bear Stearns, held by the LLC. JPMorgan Chase agrees to provide a \$1 bn funding (to the LCC) through notes subordinated to the FED loan.
Fannie Mae Freddie Mac	13 Jul. 08	The Federal Reserve Bank of New York is authorized to lend to Fannie Mae and Freddie Mac, the Government Sponsored Enterprises (GSE), in case of necessity. Such lending facility supplements the Treasury’s rescue plan, which includes an increase in the line of credit available to GSE and temporary authority for the Treasury to purchase GSE equity.
	7 Sept. 08	Fannie Mae and Freddie Mac are placed into conservatorship. Senior preferred stocks purchase agreement between GSEs and Treasury (up to \$100 bn). In return, \$1 bn of senior preferred stock in each GSE and warrants on 79,9% of the common stock of each GSE

Financial institution	Date	Main Features
		(immediately received by Treasury upon entering into the agreement). Treasury purchase of GSE' MBS. Treasury secured lending credit facilities to Freddie Mac, Fannie Mae and the Federal Home Loan Banks.
Lehman Brothers	15 Sept. 08	After the failure of talks for sale to Bank of America and Barclays, Lehman Brothers Holdings Inc. files for Chapter 11. It is the largest bankruptcy in the US history (total assets at November 2007: \$ 691 bn).
Merrill Lynch Bank of America	15 Sept. 08	Bank of America Corporation acquires Merrill Lynch & Co., Inc. in a \$50 bn all-stock transaction.
AIG	16 Sept. 08	The Federal Reserve Bank of New York grants a up to \$85 bn loan to AIG. The loan has two years term and is collateralized by the assets of AIG, and of its primary non-regulated subsidiaries. The US government receives a 79.9% equity interest in AIG.
	08 Oct. 08	The Federal Reserve Bank of New York borrows \$37.8 bn in investment-grade, fixed-income securities from AIG in return for cash collateral (securities previously lent by AIG's insurance company subsidiaries to third parties).
	10 Nov. 08	The Treasury purchases \$40 bn of newly issued AIG preferred shares under the SSFIs program. The New York Fed establishes for AIG a residential mortgage-backed securities facility (up to \$22.5 bn) and a collateralized debt obligations facility (up to \$30 bn).
Goldman Sachs Morgan Stanley	21 Sept. 08	The Federal Reserve Board approves the request of Goldman Sachs and Morgan Stanley to become bank holding companies
Washington Mutual	25 Sept. 08	Washington Mutual placed into the receivership of the Federal Deposit Insurance Corporation (FDIC). JPMorgan Chase acquires all deposits, assets and certain liabilities of Washington Mutual's banking operations from the FDIC for \$1.9 bn.
Wachovia	29 Sept. 08	Citigroup announced to acquire banking operations of Wachovia Corporation in a transaction facilitated by the FDIC. The FDIC enters into a loss sharing arrangement with Citi, which will absorb up to \$42 bn of losses on a \$312 bn pool of loans. The FDIC will absorb losses beyond \$42 bn. In exchange, Citigroup offers to the FDIC \$12 bn in preferred stock and warrants.
	03 Oct. 08	Wells Fargo takes over Wachovia. The deal with Citigroup is superseded.
Citigroup	23 Nov. 08	State guarantee on a selected pool of assets, up to \$306 bn, composed by loans and securities backed by commercial and residential real estate. The guarantee is structured so that losses are covered by Citi up to \$29 bn. 10% of losses exceeding \$29 bn are absorbed by Citi, while the remaining 90% is to be sustained by the US Treasury (first loss up to \$5 bn) and then by the FDIC (second loss up to \$10 bn), with a loss-sharing agreement. In exchange, Citi issues \$4 bn and \$3 bn in preferred stock respectively to the US Treasury and the FDIC (8% dividend). Further losses will be covered by Citi (until 10%) and

Financial institution	Date	Main Features
		the Federal Reserve (90%) through a non-recourse loan. The guarantee allows Citi to apply a 20% risk-weighting to the covered assets. According to Citi, \$16 bn of capital are consequently freed. \$20 bn in senior preferred shares are issued to the US Treasury, with an 8% per annum dividend and the right for the Treasury of electing 2 directors if dividends are not paid for 6 periods (consecutive or not). On the whole, including the Capital Purchase Program, Citi issued \$49 bn in senior preferred shares to the Treasury.
Europe		
HSBC	5 Mar.	Hsbc announces that a portfolio of purchased subprime mortgages in the US Consumer Finance subsidiary, Mortgage Services, evidenced much higher delinquency than had been built into the pricing of these products.
BNP Paribas	9 Aug. 07	BNP Paribas suspends subscriptions and redemptions of three funds exposed to US ABS assets.
Northern Rock	14 Sept. 07	The Bank of England provides liquidity support to Northern Rock. The company suffers the first bank run in the UK since 1866 (Overend and Gurney).
	17 Sept. 07	Government guarantee on Northern Rock's existing deposits.
	17 Feb. 08	Government takes Northern Rock into temporary public ownership.
Roskilde Bank	11 Jul. 08	The Danish central bank grants to Roskilde Bank an unlimited liquidity facility, guaranteed by the Danish Bankers' Association (up to DKK 750 mln).
	24 Aug. 08	The Danish central bank and the Danish Bankers' Association decide to take over all assets and liabilities of Roskilde Bank, the eight largest bank in Denmark, to facilitate its orderly winding-up.
	29 Sept. 08	A large part of Roskilde Bank's branches are sold to Nordea, Spar Nord Bank and Arbejdernes Landesbank.
Fortis	29 Sept. 08	Belgium, Luxembourg and the Netherlands announce a total €11.2 bn capital injection in Fortis bank institutions in each country. (Belgium € 4.7 bn, the Netherlands €4 bn, Luxembourg €2.5 bn).
	03 Oct. 08	The Netherlands take over the Dutch Fortis assets, including Fortis' interests in ABN Amro (€16,8 bn). This transaction substitutes the €4 bn investment in Fortis Bank Nederland Holding N.V. previously announced.
	06 Oct. 08	Belgium: two government capital injections of €4,7 bn each to buy 100% of Fortis Banque Belgium and immediate sale of 75% of Fortis Banque Belgium to BNP Paribas in exchange for new shares in BNP. A Fortis portfolio of structured products to be transferred to a vehicle held by Belgium (24%), BNP Paribas (10%) Fortis Group (66%).
Bradford & Bingley	29 Sept. 08	Bradford & Bingley's business taken into public ownership. Bradford & Bingley's retail deposit business and its branch network transferred to Abbey National plc.
Dexia	30 Sept. 08	The governments of Belgium and France and existing shareholders subscribe a capital increase of Dexia for €3 bn each. The government of Luxembourg invests €376 mln in convertible bonds of Dexia

Financial institution	Date	Main Features
		Banque Internationale à Luxembourg S.A.
Hypo Real Estate	06 Oct. 08	The German authorities agree to provide financial support to Hypo Real Estate Group (€50 bn liquidity facility; €35 bn guaranteed by the German government).
RBS, HBOS, Lloyds TSB	13 Oct. 08	The UK government announces a £37 bn Tier 1 capital investment in RBS and, upon successful merger, HBOS and Lloyds TSB. Each institutions is expected to have a Tier 1 capital ratio in excess of 9% after completion of the operation.
UBS	16 Oct. 08	Transfer of up to \$60 bn of currently illiquid UBS assets to a special purpose vehicle, in charge of orderly liquidation. UBS injects up to \$6 bn of equity capital into the fund entity, to absorb first losses. The Swiss government provides a secured loan-term loan to the SPV. UBS commitment to strengthen capital base and to comply with best practices for compensation schemes and policies. The Swiss government subscribes mandatory convertible notes (€ 3,8 bn). The commitment is secured and commensurately compensated (coupons of 12.5 %); the government will not become a co-owner of the bank. Limits on executive pays.
ING	19 Oct. 08	The Dutch government subscribes €10 bn in non-voting core Tier-1 capital of ING.
Ethias	20 Oct. 08	The Belgian government announces a € 1.5 bn capital injection in the insurance company Ethias.
Carnegie	26 Oct. 08	Carnegie, a Swedish investment bank, enters into a loan agreement with the Riksbank, Sweden's central bank, which grants a SEK 1 bn loan to Carnegie.
	28 Oct. 08	The Swedish central bank provides a further SEK 1.4 bn loan and a credit facility of SEK 5 bn to Carnegie, which pledges securities for the loan agreements.
	10 Nov. 08	The Swedish National Debt Office (Swedish government's financial administration) takes control of Carnegie, granting a loan of SEK 2.4 bn, with an optional increase to SEK 5 bn. The agreement substitutes the previous loan offered by the central bank. Under the loan agreement the Debt Office takes over all the securities which Carnegie had provided for its liabilities to the Riksbank.
Aegon	28 Oct. 08	The Dutch government injects €3 bn core capital <i>via</i> its largest shareholder Vereniging AEGON.
Parex Banka	10 Nov. 08	The Latvian government nationalizes Parex Banka, the largest independent Latvian Bank (total assets: € 4.4 bn).
SNS Reaal	13 Nov. 08	SNS REAAL announces that it will issue € 750 mln of non-voting core Tier 1 securities to the Dutch State. The State may nominate two new members of the supervisory board. Coupon is the higher of 8.5% of the issue price or 110% of dividend on ordinary shares for 2009, 120% of dividend on ordinary shares for 2010, 125% of dividend on ordinary shares for 2011.
Commerzbank	08 Jan. 08	The government announces a capital injection of € 10 bn in Commerzbank. € 8.2 bn will be provided through silent participations,

Financial institution	Date	Main Features
		while ordinary shares will be issued for € 1.8 bn. The government becomes the major shareholder with a stake of 25% + 1 share.

Source: author and Fabrizia Peirce (Assonime) on websites of companies, governments and authorities.

1.2 Policy responses

The reaction of authorities and governments around the world was substantially based on four pillars: recapitalizations, debt guarantees, assets disposal and increase of deposit insurance coverage. This section provides an overview of the steps taken in the US and in Europe after the beginning of the systemic crisis on September 15, 2008 (see Table 1.4 on recapitalizations, debt guarantees and deposit insurance measures in selected countries).

In the US the Troubled Assets Relief Program (Tarp), included in the Emergency Economic Stabilization Act of 2008 (EESA) approved by the Congress on October 3, 2008, was initially focused on the purchase by the US Treasury of the so-called “toxic-assets”, that is assets whose value was related to the subprime mortgages market and had suffered a collapse in price and liquidity. The program had a \$700 billion capacity and was made available to any financial institution “including, but not limited to, any bank, savings association, credit union, security broker or dealer, or insurance company, established and regulated under the laws of the United States or any State, territory, or possession of the United States, the District of Columbia, Commonwealth of Puerto Rico, Commonwealth of Northern Mariana Islands, Guam, American Samoa, or the United States Virgin Islands, and having significant operations in the United States, but excluding any central bank of, or institution owned by, a foreign government.” Subsequently, the priority of the Treasury became recapitalization, for which \$250 billion had been allocated under Tarp. On

November 12, 2008, Paulson, Secretary of the Treasury, announced a new approach in the management of the TARP, which shifted the focus from the purchase of “toxic assets” to recapitalizations, also of non-bank financial institutions, with incentives for private capital and support of consumer credit. A major criticality related to the purchase of troubled assets was the methodology to be adopted for pricing: a too-high price would be ultimately paid by taxpayers, and a too-low price would probably not give a sufficient contribution to liquidity of financial institutions selling troubled assets. It is interesting to observe that the impact on capital strength and leverage of the assets purchase strategy and the capital injection strategy is different: if a bank has a leverage equal to 10 (assets on equity), then a purchase of 10% of total assets brings leverage down to 9, while a capital injection of the same amount would halve the leverage ratio to 5. Therefore, assets purchase may have a beneficial impact on liquidity of certain assets and the relative distressed markets, but the short-term impact of recapitalization on banks solvency is likely to be much more rapid and effective (see OECD 2008a, p. 49).

The US Treasury explicitly declared that recapitalization was its priority and offered capital injections in the form of senior preferred shares and warrants. The first 9 institutions to apply to the Capital Purchase Program (CPP) under TARP were: Bank of America Corporation (15 billion), Bank of New York Mellon Corporation (3 billion), Citigroup Inc. (25 billion), The Goldman Sachs Group, Inc. (10 billion), JPMorgan Chase & Co. (25 billion), Merrill Lynch & Co., Inc (10 billion), Morgan Stanley (10 billion), State Street Corporation (2 billion), Wells Fargo & Company (25 billion). Besides, \$ 125 billion were allocated to small and regional banks. As of December 9, 2008, the total amount had reached \$161 billion and the number of beneficiary institutions had risen to 88. With regard to the dividends policy, the general Tarp provisions indicated a 5% yearly dividend on preferred shares, with a step-up clause after the first 5 years, up to 9%. A step-up clause may be an

effective instruments to give recapitalized institutions the incentive to raise private capital and renounce to the public funds as soon as possible.

The US Treasury also established a Systemically Significant Financial Institutions (SSFIs) Program, whose terms left to the Treasury a high degree of discretion both in the case-by-case identification of SSFIs and in the determination of the form and conditions of the support offered (\$40 billion were allocated to AIG under this program). The SSFIs Program may be effective to underline the difficulty and the “ambiguity” arising when dealing with systemic relevance: in fact, the way the program is structured appears based on a “constructive ambiguity” approach. Unlike the broad-based Capital Purchase Program, Systemically Significant Financial Institutions are determined case-by-case, on the basis of the following criteria: “ 1) The extent to which the failure of an institution could threaten the viability of its creditors and counterparties because of their direct exposures to the institution; 2) the number and size of financial institutions that are seen by investors or counterparties as similarly situated to the failing institution, or that would otherwise be likely to experience indirect contagion effects from the failure of the institution; 3) whether the institution is sufficiently important to the nation’s financial and economic system that a disorderly failure would, with a high probability, cause major disruptions to credit markets or payments and settlement systems, seriously destabilize key asset prices, significantly increase uncertainty or losses of confidence thereby materially weakening overall economic performance; 4) the extent and probability of the institution’s ability to access alternative sources of capital and liquidity, whether from the private sector or other sources of government funds.” Moreover, the US Treasury granted itself a broad discretion with regard to the forms, terms, and conditions of any investment made pursuant to the program and the possibility to invest in any financial instrument, including debt, equity, or warrants, identified as troubled assets, after consultation with the Chairman of the Board of Governors of the Federal Reserve System and notice to Congress. It was also specified that

Treasury would require any institution participating in this program to provide Treasury with warrants or alternative consideration to minimize the long-term costs and maximize the benefits to the taxpayers. These mechanisms grant the government an extremely high degree of discretion not only in determining which institution may be deemed systemically significant, but also in the choice of instruments to be used to provide support to SSFIs. This program confirms on the one hand that the US government will be increasingly focusing on SSFIs, regardless of their legal nature; on the other hand it makes evident the need for a better clarification of criteria to determine systemic relevance of financial institutions. Besides, it may be interesting to note that, while the third condition substantially reflects the broad definition of systemic risk, the first and the second conditions are based on the direct and indirect contagious systemic risk dynamics and on the hypothesis of systemic risk propagation through exposures or suspected exposures similar to those of failing institutions. Overall, the adoption of such program provides a strong confirmation that the key for bailouts is systemically relevance and suggests that a clearer methodology to identify SSFIs should be adopted if “ambiguity” is considered destructive instead of constructive.

Last but not least, the bailout of Citi on November 23, 2008 probably provides the most effective evidence of what the too-big-to-fail doctrine implies for governments and authorities: the intervention placed a guarantee on a selected pool of assets, up to \$306 billion, composed by loans and securities backed by commercial and residential real estate. The rescue package was structured so that losses are to be covered by Citi up to \$29 billion; 10% of further losses will be absorbed by Citi, while the remaining 90% is to be sustained by the US Treasury (up to the first \$5 billion) and then by the FDIC (up to \$10 billion), with a loss-sharing agreement. Further losses will be covered by Citi, up to 10%, and by the Federal Reserve for the residual 90% through a non-recourse loan. Citi maintained the income stream deriving from the guaranteed assets and was allowed through the guarantee to apply a 20% risk-weighting to the covered assets. According to Citi, \$16 billion of

capital would be consequently freed. The November 23 rescue included also a \$20 billion issuing of senior preferred shares to the Treasury, with an 8% dividend and the right for the Treasury to elect two directors if dividends are not paid for six periods (consecutive or not). Moreover, Citi was one of the 9 financial institutions which initially applied for recapitalization under the Capital Purchase Program. On the whole, Citi issued \$49 billion⁷ in senior preferred shares to the Treasury and became the institution to benefit the most of public recapitalization. Interestingly, Citi is the largest US financial institution, which might be interpreted as a sign that the too-big-to-fail approach plays a crucial role, given that three authorities simultaneously intervened to prevent its failure.

In Europe the wave of recapitalization began on October 8 2008, as the UK government announced a £50 billion plan to inject capital into banks and building societies. Eight UK institutions were indicated as eligible for the recapitalization program. Subsequently, only Royal Bank of Scotland (which had become the largest bank in the world in 2007 due to the acquisition of ABN Amro) and HBOS and Lloyds TSB (upon successful merger) accepted the government's capital injection, for a total consideration of £37 billion. The other five eligible institutions did not accept the government's recapitalization, often recurring to private resources for capital strengthening and emphasizing that they were not in need of public funds. One of the main criticalities emerging from selective bailouts is the stigma associated with public intervention: the market might consider public support as a sign of weakness of supported institutions and, in turn, this might add further stress to banks funding and contribute to deteriorate solvency conditions. The bank run on Northern Rock is a clear empirical example of how such perverse mechanism may work.

The other European countries soon adopted the same strategy, even though with different forms and instruments. On October 12 the Heads of State and Government of the euro area reached

⁷ Including the \$4 bn in preferred shares issued in return for the guarantee scheme of November 23, 2008.

an agreement to support banks through a strengthening of deposit guarantee schemes, government guarantee on bank debt issuance and capital injections (the plan was immediately endorsed by the European Council on October 15-16).

In France six financial banking groups were indicated as eligible to issue subordinated debt (regulatory capital) to the government for € 10.5 billion (out of a total €40 billion available for recapitalizations). In Germany a € 80 billion fund was created for recapitalization and €20 billion were allocated to assets purchase. On January 8, 2009 the German government announced a € 10 billion capital injection into Commerzbank, which would make the state the bank's major shareholder with a stake of 25% plus one share: it was a *de facto* nationalization. The Irish government injected € 5.5 billion in voting preference shares into the three largest Irish banks, while the Italian government didn't indicate neither a specific list of eligible institutions nor a specific or a maximum amount of funds available for recapitalizations. Support was made available to banks and banking groups through 1) preference shares and 2) bonds and other financial instruments computable as regulatory capital (it was not specified whether Tier 1 or Tier 2 capital and only listed banks and listed banking groups were indicated as potential beneficiaries). In Austria, Belgium, Luxembourg, Switzerland and in the Netherlands a number of financial institutions were recapitalized on a case-by-case base. Spain explicitly focused on assets disposal, creating a fund for the purchase of high-quality assets (based on the rating; in illiquid markets, however, the distinction between high-quality and low-quality assets might result particularly controversial, regardless of the rating assigned).

Such interventions have a cost for governments and taxpayers, which has to be added to the costs of output loss to determine the overall *direct* costs of a financial crisis. Costs, measured as a percentage of GDP, may turn out to be unsustainably high for small countries where large financial players are headquartered. An issue closely related to the costs of interventions is that of

remuneration of public support, which has been particularly controversial in Europe, with a trade-off between the need to respect the European anti-state aid legislation and the simultaneous need to avoid the imposition of excessive penalties on financial institutions and cause or reinforce a credit crunch. The European Commission and the European Central Bank published only in December 2008 their recommendations on the pricing and conditions for government recapitalizations of financial institutions (see Table 1.3). While the remuneration for government capital injections was clearly set in the US, the European situation appears more confused. Even the guidelines of the Commission and the ECB do not give precise information and only indicate a probable “corridor” for the rate of return⁸, which obviously depends also on the capital instruments used: while the Capital Purchase Program in the US was based on the issuing of preferred stocks and warrants, in Europe the type of instruments was left to the discretion of national governments to include any instrument computable as regulatory capital, from subordinated debt to ordinary shares.

⁸ See Table 1.3. Interestingly, the corridor estimated by the Commission (7%-9.3%) is different from that estimated by the ECB (6%-9.3%).

Table 1.3. Recommendations of the EU Commission and the ECB on recapitalizations, debt guarantees and assets disposal.

	Cost¹	Terms & conditions²
Recapitalization (ordinary shares, subordinated debt, hybrid instruments)	<p>EU Commission Current market rates in case of significant participation (at least 30%) of private investors to capital injection. In other cases below but not too distant from current market rates. entry level/basic remuneration of preferred shares and other hybrid instruments (adjustable upwards):</p> <ul style="list-style-type: none"> a) fundamentally sound banks: see ECB. b) not fundamentally sound banks: higher than sound banks, based on risk profile. <p>Entry level different on the base of type of capital instrument and risk profile, evaluated on capital adequacy, size of recapitalization³, current and pre-crisis credit default swaps (CDS) spread, rating⁴. Alternative pricing mechanisms accepted with Tier 1 capital remuneration above upper bound of the rate of return on ordinary shares.</p> <p>ECB Rate of return on subordinated debt: government bonds yield + 5 yrs CDS spread on subordinated debt + 2% annual add-on fee. Resulting estimated average: 6%.</p> <p>Rate of return on ordinary shares: government bonds yield + 5% annual equity risk premium + 1% annual add-on fee. Resulting estimated average: 9,3%.</p> <p>Rate of return on preferred shares and hybrid instruments (price corridor):</p> <ul style="list-style-type: none"> a) with features similar to subordinated debt: rate of return of subordinated debt (lower bound) + 1% add-on fee; b) with features similar to ordinary shares: close to rate of return on ordinary shares (upper bound). 	<p>EU Commission Public capital injection temporary and limited to minimum necessary. Objective: prevention and containment of credit supply restrictions. No undue competitive advantages, no aggressive commercial strategies against recapitalization. Clawback/better fortune clause. Restrictive dividend policy. Incentives for state capital redemption (e.g. add-on to the entry price, step-up clauses). Case-by-case Commission's evaluation of exit mechanisms. Regular review by the EU Commission. Six months after recapitalizations Member States submit to the Commission a report on the implementation of measures taken. Stricter requirements for not fundamentally sound banks: winding-up or restructuring plan, restrictive dividend policy, cap on executive remuneration and limits on bonus, increased solvency ratio compatible with financial stability, timetable for redemption of State participation.</p> <p>ECB Conditions for capital injections:</p> <ul style="list-style-type: none"> a) market situation of each institution: level of subordination and risk of instruments chosen for recapitalization, specific risk of beneficiary; b) effectiveness of recapitalization measures: proper financing to the economy, avoiding increase of pressures on financial system, negative impact on beneficiaries' attractiveness to investors and stigma on beneficiary institutions; c) interest of taxpayers: minimization of potential losses and equitable return on public investment; d) level-playing field among institutions: safeguards against market abuse and anti-competitive advantages; e) exit of recapitalization measures: terms to be set to ensure temporary nature of public intervention.
Debt guarantee	<p>EU Commission As close as possible to market price, reflecting beneficiaries' credit profile and risk profile.</p> <p>ECB Based on banks CDS spread:</p> <ul style="list-style-type: none"> a) maturity less than or equal to 1 year: flat fee of 0.5%. b) maturity exceeding 1 year: CDS spread + add-on fee of 0.5%. <p>The add-on fee can be lower in Member States where government guarantees may be collateralized.</p>	<p>EU Commission Amount and duration limited to minimum and necessary. Non-discriminatory, no undue anticompetitive effects. No indiscriminate coverage of all liabilities (in principle Tier 2 subordinated debt and interbank deposits excluded, or specific restrictions to be applied). Clawback/better fortune clause. Behavioural constraints: no aggressive expansion against guarantee, restrictions on commercial conduct, limitation to the size of balance-sheet, prohibition of conduct irreconcilable with the purpose of the guarantee (such as share repurchase and issuance of new stock options for managers), provisions for enforcement by State (including removal of guarantee in case of non-compliance).</p> <p>ECB</p> <ul style="list-style-type: none"> a) support to liquidity by improving the functioning of market for long term bank debt; b) preservation of level-playing field among financial institutions and avoidance of market distortions; c) consistency with the management of liquidity by the Eurosystem.
Assets disposal⁵	Valuation based on underlying risks ⁶ .	No undue discrimination as to the sellers, temporal scope ³⁸ , limited to the strict necessary, no undue distortions of competition.

¹ For the pricing of recapitalization see the Communication of the EU Commission of December 5, 2008 on the recapitalization of financial institutions in the current financial crisis and the recommendations of the Governing Council of the European Central Bank on the pricing of recapitalizations of November 20, 2008. For the pricing of debt guarantee see the EU Commission Communication of October 13, 2008 on the application of State aid rules to measures taken in relation to financial institutions in the context of the current global financial crisis and the recommendations of the Governing Council of the European Central Bank on government guarantees for bank debt of October 20, 2008.

² For terms and conditions of recapitalization see the Communication of the EU Commission of December 5, 2008 and the recommendations of the Governing Council of the European Central Bank on the pricing of recapitalizations of November 20, 2008. For terms and conditions of debt guarantee see the EU Commission Communication of October 13, 2008 and the recommendations of the Governing Council of the European Central Bank on government guarantees for bank debt of October 20, 2008.

³ The EU Commission values positively a recapitalization limited in size, for example amounting to no more than 2% of a bank's risk-weighted assets.

⁴ On December 12, 2008 the EU Commission approved modifications to the German financial rescue scheme which indicated for fundamentally sound financial institutions a basic remuneration at 7% for subordinated debt and 9,3% for "instruments with features like ordinary shares". These minima do not apply if private investors participate under the same conditions and to a significant extent in the capital injection. Financial institutions in distress should pay at least 10%. The French recapitalization scheme approved by the Commission on December, 8 2008 indicates an average remuneration of 8% (fixed rate for the first five years, then variable) for the subordinated debt securities classified as non-core Tier 1 to be issued for capital injections.

⁵ See the EU Commission Communication of October 13, 2008.

⁶ In the German rescue package for credit institutions, approved by the EU Commission on December 12, 2008, the remuneration for the liquidity made available through the risk assumption is at least equal to the 12 months Euribor plus 0,5% on the amount made available, plus a risk premium based on the beneficiary institution's CDS spread (at least the median of the five-years CDS spread in the last twelve months).

On the whole, a number of fundamental problems emerge with regard to the recapitalization strategy: which institutions should be eligible for support, and on which basis? Which capital instruments should be used, among those eligible for regulatory capital? Which costs and which conditions should be imposed on recapitalized institutions? How should the time horizon of public support be determined?

With regard to liabilities guarantee, in the US the EESA temporarily raised the limit of the federal deposit insurance coverage from \$100.000 to \$ 250.000 until December 31, 2009. On October 14 the Federal Deposit Insurance Corporation launched the Temporary Liquidity Guarantee Program, providing a 100% coverage to senior unsecured debt and non-interest bearing deposit transaction accounts, with an opting-out clause (after the first 30 days of automatic and free coverage, subsequently extended to December 5, 2008): institutions were given a choice between opting out or stay in the program and pay an extra fee for the coverage.

Ireland was the first European country to (autonomously) raise deposit insurance coverage: the risk of a cross-border flight of deposits towards countries with higher deposits protection induced a widespread raising of coverage limits in Europe (the EC Directive 1994/19 imposed a minimum coverage of € 20.000, but national implementations had led to a significant heterogeneity of the maximum amount covered).

All European countries opted for an increase of deposit insurance coverage, in some cases with the formal establishment of a new threshold, in other cases, notably in Germany, with a political declaration of unlimited deposits protection. The characteristics of non-deposit liabilities covered by guarantee schemes across countries present a high degree of heterogeneity: for example, the UK provided a guarantee up to £250 billion on certificates of deposit, commercial paper and senior unsecured bonds and notes. The Italian government decided to guarantee new banks' liabilities with maturity up to 5 years. Spain offered a guarantee up to €100 billion on new debt issued through commercial paper and senior bonds with maturity up to 5 years, with the possibility to extend the guarantee to interbank deposits. Sweden offered a state guarantee up to € 150 billion of new issues of short and medium term non-subordinated debt, with maturity up to 3 years (exceptionally 5 years for covered bonds) and made the guarantee available only to institutions with at least 6% Tier 1 capital ratio and at least 9% combined Tier 1 and Tier 2 capital ratio. Ireland placed a guarantee on retail and corporate deposits, inter-bank deposits, senior unsecured debt, asset covered securities and dated subordinated debt.

The European Commission published in October 2008 its recommendations on the pricing of government debt guarantee, while the European Central Bank made public its recommendations on December 19, 2008 (see notes to Table 1.3); the pricing method recommended by the ECB is based

on CDS spread for debt with maturity exceeding one year, (CDS spread plus add-on fee of 0.5%), while a flat fee of 0.5% applies to debt with maturity not exceeding one year⁹.

The wave of public guarantees also highlighted the critical issue of the treatment of foreign financial institutions' subsidiaries with systemic relevance: in this perspective, the rescue package approved by the Irish government appears particularly significant, since guarantees on liabilities were extended to the subsidiaries of six foreign banks. The problem of systemic relevance of foreign financial institutions, especially in small countries, seems a key weakness to be addressed in the process of redesigning the international framework of financial regulation. In fact, foreign institutions' subsidiaries may well be systemically relevant in the host country, but not systemically relevant in the home country: as a result, the home countries authorities might have no incentives for a support/guarantee/bailout, thus potentially imposing high negative externalities in the host country. A realignment of incentives is probably the key to deal with such pitfall¹⁰.

It is evident that guarantees on liabilities can be structured in many different ways: the protection may be limited to retail deposits or include interbank and wholesale debt as well. The conditions which determine what can trigger a public guarantee, the time span of coverage and the price that financial firms have to pay for it may differ as well. As in the case of recapitalizations, a series of questions arises: which institutions should be eligible for government guarantees? Which liabilities should be covered? How might moral hazard risks be prevented and managed? What should be the cost and which the conditions for protection to avoid undue distortions of competition? The purpose of this research is not to suggest an answer for each of these questions, but to focus on one specific structural issue: which category of financial institutions should be eligible for public support in case of distress, either through the safety net provisions or through different government interventions? Which have been the criteria followed in the subprime crisis?

⁹ Italy and Portugal, for example, have followed this methodology for the pricing of debt guarantee.

¹⁰ See Chapter 3 for a more detailed analysis of this issue.

And which should be the best criteria to adopt to deal with systemic financial crises and safeguard a regulatory and supervisory level playing field across financial intermediaries?

Table 1.4. Overview of state recapitalizations and guarantees measures adopted in 2008 to support the financial sector.

Country	Capital injection	Terms & conditions	State Guarantee		
			Bank deposit insurance	Bank debt or loans	Cost
UK	at least £50 bn in preferred, permanent interest bearing shares and/or ordinary shares available to 8 major institutions. Capital injections to be managed by a state-owned company ((UK Financial Investments Limited).	limits on dividends distribution, cap on executive pay, lending to homeowners and to small businesses at 2007 levels; schemes to help mortgagors meet their payments.	raised to £50,000	certificates of deposit, commercial paper and senior unsecured bonds and notes (up to £250 bn).	market conditions, based on CDS spread.
France	up to €40 bn in hybrid capital instruments (non-core Tier 1 capital, non-voting, not dilutive) through the Société de Prise de Participation de l'Etat or SPPE; €10,5 bn capital injection into 6 private banks .	limits on dividends distribution and cap on executive pay; credit institutions receiving support will maintain credit to SME and households; code of ethics. 8% dividend (average).	€70,000 to be raised if necessary	creation of a refinancing company for activities of the credit institutions (SRAEC). It will issue securities guaranteed by the State to make loans at above-market rates to credit institutions against collateral (up to €320 bn, including the guarantee on Dexia).	equivalent to the cost of funding in “normal” market conditions.
Germany	new financial market stabilization fund. €80 bn in equity or hybrid instruments, notably Tier 1 capital; preferential dividends or interest rights.	limits on dividends distribution and cap on executive pay (at €500,000) and behavioural commitment. For sound financial institutions basic remuneration from 7% to 9,3%; for institutions in distress minimum of 10%.	unlimited (political declaration)	€400 bn on new debt issues up to 36 months.	“an appropriate amount”
Italy	subscription or guarantee of new issues of non-voting privileged shares and other financial instruments computable as regulatory capital. Case-by-case intervention and only after the need of recapitalization is verified by the Bank of Italy.	commitment to credit support to households and SMEs; dividends policy coherent with adequate capital level; code of ethics, with provisions on executives compensation.	in addition to the existing guarantee (€103,291)	new bank liabilities with maturity up to 5 years; on loans granted by the Bank of Italy for emergency liquidity assistance to banks; banks' transactions to obtain securities eligible as collateral for refinancing.	market conditions, based on CDS spread.

Country	Capital injection	Terms & conditions	State Guarantee		
			Bank deposit insurance	Bank debt or loans	Cost
Spain			raised to €100,000	new debt issued through commercial paper and senior bonds with maturity up to 5 years. The guarantee might be extended to interbank deposits. (€100 bn).	market conditions, proportional to risk
Sweden	new stabilisation fund (€ 1.5 bn) for capital injection into banks in exchange for preferred shares with high voting rights to the Government.	cap on total asset growth; marketing restrictions; cap on executive pay.	raised to kronor 500,000 (€50,000)	up to € 150 billion of new issues of short and medium term non-subordinated debt, with maturity up to 3 years, exceptionally 5 years for covered bonds. Available only to institutions with at least 6% Tier 1 capital and at least 9% combined Tier 1 and Tier 2 capital.	market conditions based on CDS spread.
Ireland	€ 5.5 bn capital injection into the three largest banks in core Tier 1, voting, non-convertible preference shares.	Preference shares redeemable within 5 years at the issue price or after 5 years at 125% of the issue price. Fixed annual dividend at 8% for Bank of Ireland and Allied Irish Banks, 10% for Anglo Irish Bank.	unlimited	retail and corporate deposits, inter-bank deposits, senior unsecured debt, asset covered securities and dated subordinated debt. Initially seven domestic banks involved, subsequently guarantee extended to five foreign banks' subsidiaries.	Market conditions, adequate return for taxpayers, limit on balance sheet growth.
USA	Capital Purchase Program: up to \$250 bn in non-voting senior preferred shares and warrants. \$165 bn allocated to 88 financial institutions (as of December 9, 2008). Systemically Significant Failing Institutions Program: any financial instrument, including debt, equity, or warrants, that the Secretary of the Treasury determines to be a troubled asset. \$40 bn in preferred stocks and warrants allocated to AIG.	5% annual dividend on preferred shares; 9% after 5 years; limits on executive compensation including incentives to excessive risk-taking ; clawback provisions; no golden parachutes.	raised to \$250,000	all senior unsecured debt and non-interest bearing deposit transaction accounts.	Free coverage until Dec. 5, 2008. Then opting-out or fee: 0.75% on senior unsecured debt; 0.1% on non-interest bearing deposit transaction accounts.

Source: author and Fabrizia Peirce (Assonime)

1.3 Cross-sector and selective bailouts: the need of a new regulatory and supervisory framework

The rescue, both in the US and in Europe, of many financial institutions of different size, core business and legal form on the one hand and the failure of Lehman Brothers on the other hand pose a number of structural questions, since the different choice of authorities and governments is clearly not related to the nature of business, nor to the legal structure of distressed institutions. In fact, all three “traditional” financial sectors (depository banks, investment banks, insurance companies¹¹) have received some type of public support. In some countries governments selected a list of banks eligible for public recapitalization (e.g. France, Ireland and UK) or liabilities guarantee (Ireland), thus potentially creating a competitive distortion within the same sector¹². However, an even more interesting aspect is that also a cross-sector distortion took place, since support was extended to non-depository institutions, not subject to the same regulatory burden imposed on depository institutions in return for the safety net provisions. The bailout of investment banks and insurance companies is likely to have increased the uncertainty about the principles followed by governments and authorities in dealing with financial crises. Interestingly, public support to AIG in the US, to Ethias in Belgium, to Aegon in the Netherlands might be regarded as empirical evidence that the insurance sector as well can be a source of systemic risk, contrary to the traditional view according to which the specific balance sheet structure of insurance firms would make them not systemically relevant (reverse cycle of maturity transformation compared to banks, with long-term liabilities, marketable and liquid assets). A main channel through which a crisis hitting an insurance firm may propagate to the financial system and produce systemic consequences is the credit default swaps market, if the

¹¹ A crucial role in insurance companies' systemic relevance has been played by the credit default swaps market; see Mengle (2007) for an overview on credit derivatives.

¹² In Italy government capital injections through bank bonds computable as bank regulatory capital was made available only to listed banks and listed banking groups.

company is exposed as counterparty to a large amount of CDS contracts (this was clearly the case of AIG). The lack of transparency and appropriate supervision of OTC markets makes the evaluation of CDS exposures particularly complex; moreover, from a legal point of view complexity may be exacerbated by the fact that CDS contracts differ from typical insurance contracts because there is not necessarily a direct interest of the protection buyer, as in the case of naked CDS.

Therefore, the adopted approach to bailouts has been selective within-industry and cross-industry, within-border and cross-border. The too-big-to-fail doctrine doesn't seem able to provide a fully satisfactory interpretation of selective bailouts, even though size certainly plays an important role. The large majority of financial firms present in the list of the world top 30 financial institutions (banks, investment banks and insurance companies) by total assets (end of 2007) were rescued or at least were offered public support, with different approaches across countries and within the same country. However, other institutions which received public support fell out of this list: thus, a first issue is how big should a company be to be regarded as too-big-to-fail. In this perspective it has to be stressed that the too-big-to-fail approach is likely to be followed on a national base, because the costs of bailouts are ultimately paid by taxpayers and inevitably each government evaluates whether a financial institution might be too-big-to-fail for its domestic financial and economic system. This implies that even financial players which are not among the largest financial firms in the world may well result too-big-to-fail within national borders. However, there is evidence that bailouts can hardly be effectively analysed and understood merely on the base of the size of a financial institution in distress. In fact, in the US Lehman Brothers had a total balance sheet much higher than other financial institutions which were bailed out: for example, for the year 2007, Bear Stearns had total assets of \$395 billion, versus \$691 billion of Lehman Brothers. Baily, Elmendorf and Litan (2008, p. 69) underlined that the different behaviour of the Federal Reserve in the Drexel Burnham Lambert and in the Bear Stearns crisis was mainly due to the fact that "Bear was simply much more

interconnected with the rest of the financial system than was Drexel almost two decades ago". One might argue that also Lehman Brothers was largely interconnected with the financial system, and that due to these interconnections its failure might have well triggered or reinforced the systemic collapse post-September 15, 2008. However, such position is debatable: to what extent was the post-September 15 systemic crisis caused by the actual interconnections of Lehman and by actual exposures of other firms to Lehman? Or, to what extent did Lehman's failure cause a chain of reputational loss and lack of confidence among financial institutions not directly related to actual exposures? If the first hypothesis is embraced, then the resulting interpretation would be that the US authorities and government committed a dramatic mistake not rescuing Lehman Brothers. Otherwise, the too-big-to-fail doesn't explain the largest bank failure in the US history and the too-interconnected-to-fail approach might better explain the choice of not rescuing Lehman, even though such approach would not be sufficient to prevent systemic crises. Still, it might provide a more effective support for policy choices than mere size: systemic interconnections and systemic risk should be the crucial rationale behind public intervention.

Figure 1.8. Top 30 financial firms by total assets (2007).

Rank	Name	Total Assets mil USD 2007
1	Royal Bank of Scotland Group Plc (The)	3.807.892
2	Deutsche Bank AG	2.974.163
3	BNP Paribas	2.494.412
4	Barclays Plc	2.459.148
5	HSBC Holdings Plc	2.354.266
6	Crédit Agricole Group-Crédit Agricole	2.268.310
7	Citigroup Inc	2.187.631
8	UBS AG	2.019.173
9	ING Groep NV	1.932.151
10	Kabushiki Kaisha Mitsubishi UFJ Financial Group- Mitsubishi UFJ Financial Group Inc	1.839.095
11	Bank of America Corporation	1.715.746
12	Société Générale	1.577.745
13	JP Morgan Chase & Co.	1.562.147
14	Allianz SE	1.539.576
15	Mizuho Financial Group	1.507.333
16	UniCredit SpA	1.504.134
17	Banco Santander SA	1.343.905
18	HBOS Plc	1.336.299
19	Fortis	1.282.466
20	Credit Suisse Group	1.208.956
21	Industrial & Commercial Bank of China (The) - ICBC	1.141.722
22	Goldman Sachs Group, Inc	1.119.796
23	Sumitomo Mitsui Financial Group, Inc	1.081.277
24	American International Group Inc - AIG	1.060.500
25	AXA	1.047.564
26	Morgan Stanley	1.045.409
27	Merrill Lynch & Co., Inc.	1.020.050
28	Commerzbank AG	907.514
29	Dexia	889.981
30	Groupe Caisse d'Epargne	885.401

Source: Bankscope and Isis.

Support to non-depository institutions may have the undesirable side effect of letting the market believe that a public support will be granted to all large financial institutions: moral hazard could induce firms to take more risk than they would in absence of a public support presumption. Besides, the extension of the safety net to non-depository institutions clearly indicates that the authorities believe that depository institutions are not the only serious source of systemic risk any longer. Depository banks lose their specialness with regard to the safety net protection, given that investment banks and insurance companies are admitted to benefit of it as well (even though only partially, and mainly through lending of last resort). Beyond the extension of the safety net to non-depository and to non-bank financial institutions, another extremely significant novelty emerged in the subprime crisis was the occurrence of “wholesale bank runs”, to which also non-depository financial institutions are subject: the traditional fragility due to the combination of illiquid long-term assets and liquid short-term liabilities appears not to be a prerogative of depository banks any more

and concerns the investment bank model as well¹³, both for independent investment banks and for investment bank units within universal banks. Consequently, the basic question to be addressed seems the one about the specialness of depository banks: are depository banks still special? Are they still the prominent source of systemic risk?

A reform of regulation and supervision is necessary to ensure that a level playing field is maintained and that investment banks, insurance companies and, generally, all non-depository financial institutions “pay a price” - for example in terms of heavier regulation - for the access to the safety net and to any type of public protection.

It has to be emphasized that not only are bailouts selective ex-ante, that is in the choice of institutions which are deemed too-systemically-relevant-to-fail, but also ex-post: as previously analysed, bailouts can be arranged under very different terms and conditions, both within a country and across countries. Therefore, a crucial point is also at which conditions a public support is offered (or imposed). Generally, a clarification of the framework of public intervention seems desirable, and a number of questions should be addressed: what should trigger public intervention? Which institutions should be eligible for support in case of distress? In which form should support be offered? At which conditions? These issues require a review of the regulatory and supervisory regime and a discussion on the role of authorities and the mechanisms (and opportunity) of public intervention in financial crises. The proposal of this research is that the key criterion to be used to answer these questions should be systemic risk and systemic relevance of financial institutions.

¹³ On this point see, for example, De Grauwe (2008).

Chapter 2

Systemic risk: traditional views and a new perspective

Introduction

The nature of financial systemic risk has deeply evolved in the last three decades, in light of a number of structural legal and economic developments in banking and financial markets. Traditional analyses of systemic risk appear too focused on the commercial banking nature of systemic risk and specifically on financial fragility associated to the characteristics of depository banks balance sheet. In that conceptual framework, weaknesses which receive particular attention are those related to bank runs and to bank contagion. On the whole, the traditional view of systemic risk appears intrinsically related mainly, if not exclusively, to the balance sheet structure of commercial banks. The hypothesis supported in this research is that systemic risk has not mainly a commercial banking nature any longer and has, more broadly, a financial markets nature: in this perspective the subprime crisis has provided clear empirical evidence. Depository banks continue to have a systemic relevance, but for different reasons and dynamics, which are not confined to commercial banking any more and involve the insurance, securities and hedge funds industries. Therefore it is crucial to create a new conceptual framework for regulation and supervision based on the new nature of systemic risk and on Systemically Relevant Financial Institutions (SRFIs). SRFIs should be identified with a cross-sector and functions-based approach, instead of an institutions-based approach.

2.1 Systemic risk: a controversial definition

A consensus on an even broad definition of systemic risk is fundamental in order to proceed to the clarification of public policy role in dealing with financial crises. This choice is not economically neutral and it is a *condicio sine qua non* to redefine the public policy role. If it is not

possible to define systemic risk, then it is hardly feasible to judge whether a crisis is systemic or not, and consequently it is extremely hard to evaluate whether and in which form a public intervention is necessary or desirable.

Prevention and management of systemic risk is the main rationale at the heart of banking and financial regulation. The social costs of a systemic crisis are supposed to be higher than the private costs borne by single financial institutions, which might take more risk than it would be socially optimal, not taking into account the negative effects in terms of systemic spillovers. Consequently, an issue of negative externalities arises and a problem of underproduction of the good “financial stability” emerges as well¹⁴. The overall costs of a systemic crisis for the financial sector and potentially for the real economy may require a public intervention, in its different possible forms (lender of last resort, nationalization, recapitalization, support and coordination of a private bailout, etc.). However, it is important to note that, just as there is no unanimous consensus on the role of government and regulation in financial markets, there is no universally accepted position on the desirability of public intervention when a systemic crisis occurs.

A number of market failures has been indicated as calling for regulation of banking and financial markets vis-à-vis laissez-faire and free banking. Among supporters of regulation, the distinction between the public interest and private interest view has to be stressed.¹⁵ However, government and regulation failures suggest that the remedy itself is not unflawed. A cost-benefit analysis might be applied to episodes of financial crises and help to evaluate whether the costs of a non-intervention overwhelm the costs of intervening or viceversa. A useful tool might be a matrix with the payoffs referred to the costs for the whole economy (financial and real, direct and indirect) in four different scenarios, given by the dichotomy intervention-non intervention and systemic-non systemic risk (see Figure 2.1).

¹⁴ For an analysis of financial stability as a public policy goal and as a public good see Crockett (1997).

¹⁵ See Barth, Caprio and Levine (2006, pp. 21-46) for a detailed review of these two different approaches to bank regulation.

Figure 2.1. Costs of financial crises and role of authorities/government: systemic vs non-systemic scenario

	Failure/no intervention	Support/bailout		Hypotheses
Systemic risk	X	Y	→	$X > Y$
No systemic risk	Z	Q	→	$Q > Z$

Therefore, the first step should be the decision about the systemic or non-systemic nature of a financial crisis, the key being the definition of systemic risk. The estimate of costs is an extremely complex task, both ex-ante and ex-post. First of all, while there are market failures, public intervention, in turn, is not immune from failure. Besides, an important aspect, which makes estimation particularly complex, is that there is a wide range of possible public intervention instruments, capital injections and liabilities guarantees being only two of them. Other possible options are, for example, tax incentives for loan-loss write-offs, debt forgiveness and government-owned asset management company (see Calomiris, Klingebiel and Laeven 2005, pp. 25-75, for a detailed analysis of financial crisis policies, with case studies). Therefore the proposed cost-benefit matrix has a conceptual relevance, but the actual quantification of costs and benefits is extremely complex and goes beyond the scope of this research. The important aspect to be stressed here is that bailouts can be operated with a wide range of instruments, and even within the same category of instruments technical and operative details can make the difference. In this perspective, a very effective example is provided by the widespread recapitalization of banks and non-bank financial institutions after the failure of Lehman Brothers, both in the US and in Europe. The way in which recapitalizations are designed may produce extremely different consequences on the actual costs born by governments and, ultimately, by taxpayers; capital injections may assume an extremely

wide range of technical implementation details with regard to timing and conditions of redemption, dividends, type of capital instruments issued to the government, right of government to elect directors, etc..

Unfortunately, there is neither a unique widely accepted definition of systemic risk nor an automatic criterion to be used to decide when a crisis has a systemic relevance. The Group of Ten, for example, provided the following definition (G-10, 2001, p. 126): “Systemic financial risk is the risk that an event will trigger a loss of economic value or confidence in, and attendant increases in uncertainty about, a substantial portion of the financial system that is serious enough to quite probably have significant adverse effects on the real economy”.

According to Laeven and Valencia (2008, p. 5):

“in a systemic banking crisis, a country’s corporate and financial sectors experience a large number of defaults and financial institutions and corporations face great difficulties repaying contracts on time. As a result, non-performing loans increase sharply and all or most of the aggregate banking system capital is exhausted. This situation may be accompanied by depressed asset prices (such as equity and real estate prices) on the heels of run-ups before the crisis, sharp increases in real interest rates, and a slowdown or reversal in capital flows. In some cases, the crisis is triggered by depositor runs on banks, though in most cases it is a general realization that systemically important financial institutions are in distress.”

They also define bank runs as a monthly percentage decline in deposits in excess of 5%. However, the choice of the threshold may be controversial: for example, it may depend on the overall structure of a bank’s liabilities: the higher the reliance of the bank on deposits for funding, the worse the impact of a 5% withdrawal. If funding sources different from deposits amount to a significant share of total liabilities the effect is likely to be softened, and a wholesale bank run will become more relevant for the bank. Moreover, the degree of the impact is positively correlated with the leverage ratio. Consequently, even the quantitative identification of a bank run may not be a simple task.

Allen and Herring (2001, p. 6) define systemic risk as

“the risk of a sudden, unanticipated event that would damage the financial system to such an extent that economic activity in the wider economy would suffer. Such shocks may originate inside or outside the financial sector and may include the sudden failure of a major participant in the financial system; a technological breakdown at a critical stage of settlements or payments systems; or a political shock such as an invasion or the imposition of exchange controls in an important financial center. Such events can disrupt the normal functioning of financial markets and institutions by destroying the mutual trust that lubricates most financial transactions”.

Demirgüç-Kunt and Detragiache (2002, p.1381) define systemic crisis as “a situation in which significant segments of the banking sector become insolvent or illiquid and cannot continue to operate without special assistance from the monetary or supervisory authorities”. They classified as systemic the crises in which emergency measures had to be taken to assist the banking system (bank holidays, deposit freezes, blanket guarantees to depositors or other bank creditors), large-scale nationalizations took place and non-performing assets reached at least 10 percent of total assets, or if the cost of the rescue was at least 2 percent of GDP. It is important to note that 1) this definition refers only to banking crisis, because the study is focused on deposit insurance and 2) the systemic relevance is also identified on the basis of public interventions, which implies that it is determined not *per se*, but according to the reaction of governments and authorities. This logical mechanism adds complexity to the attempt of defining systemic risk. As noted by Caprio and Klingebiel with regard to *banking* crises (1996, p. 5):

“There is no objective, generally accepted definition of when a problem in the banking sector becomes systemic. Central bank governors tend to behave as though "they know a systemic problem when they see one" or as though a problem becomes systemic when those at the central bank think that an event could develop into a systemwide problem. [...] This uncertainty and the possibility of contagion suggest that a problem can have systemic implications even if only a small portion of banking system assets is impaired.”

According to Bordo, Mizrach and Schwartz (1995, p. 2) systemic risk is “a situation where shocks to one part of the financial system lead to shocks elsewhere, in turn impinging on the stability of the real economy, unless offset by intervention by the monetary authorities”. Following

Schwartz (1986), they also regard as “real” financial crises only banking panics or stock market crashes which push depositors to withdraw and investors to fear that loans will not be obtainable at any price. All the other shocks are believed to produce pseudo-financial crises.

De Bandt and Hartmann (2000, p.12; see Figure 2.2) distinguished between single systemic events, which affect only one institution or one market in the “second round effect”, and wide systemic events, which affect many institutions or markets in the “second round effect”. The failure (crash) of the institutions (markets) involved makes the systemic event “strong”, otherwise the systemic event is “weak”. This distinction applies both to single systemic and wide systemic events. They also make a distinction between the *horizontal* and the *vertical* view on systemic risk, with the former focused on the effects on the financial industry only and the latter on the consequences on the real economy as well.

Figure 2.2. A map of systemic risk

Type of initial shock	Single systemic events (affect only one institution or one market in the second round effect)		Wide systemic events (affect many institutions or markets in the second round effect)	
	Weak (no failure or crash)	Strong (failure of one institution or crash of one market)	Weak (no failure or crash)	Strong (failures of many institutions or crashes of many markets)
Narrow shock that propagates				
– Idiosyncratic shock	✓	✓ contagion	✓	✓ contagion leading to a systemic crisis
– Limited systematic shock	✓	✓ contagion	✓	✓ contagion leading to a systemic crisis
Wide systematic shock			✓	✓ systemic crisis

Note: ✓ means that the combination of events defined by the cell is a systemic event. The shaded area describes cases of systemic events in the narrow sense. Systemic events in the broad sense also include the cells with ✓ in the last row.

Source: De Bandt and Hartmann (2000)

Schwarcz (2008) notes that it is important to distinguish systemic risk, which should be prevented, and systematic risk, which is physiological and allows the good functioning of the markets (also through failures). He also underlines that the numerous definitions of systemic risk show several inconsistencies and underlines that systemic risk is not confined to banks any more and is related to the entire spectrum of financial markets. The proposed solution, based on a cost-benefit analysis, is the establishment of a liquidity provider of last resort.

Kaufman (2000) identifies three mechanisms through which a systemic crisis may occur. The first one is a large, unexpected and sudden exogenous shock which causes adverse consequences on the economy (e.g. sharp drops in assets or currency values, asset bubble burst, etc.); the second dynamics consists of a chain reaction among interconnected institutions, following the failure of one or few major banks; the third mechanism is based on the failure of a firm which leads to a risk reassessment by market participants of other firms deemed to have third parties risk exposures similar to those of the failed institution. The reassessment shock has to deal with a high degree of uncertainty about actual risk exposures: time is often necessary to acquire precise information, and the reaction is likely to be on the quantity side rather than just on the interest rate side: this means that lending is likely to dry up, because market participants are not willing to lend at any rate and, as a result, liquidity issues arise. Such reassessment ends up hitting both “guilty” and “innocent” institutions. However, Kaufman stresses that there is no historical evidence of contagious mechanisms turning solvent banks into insolvency: bank runs and contagion cause the failure only of institutions which were already in economic distress, potentially accelerating or worsening their crisis, but not being its real root.

Therefore, it is clearly extremely difficult to find a unanimous consensus about a definition of systemic risk. However, it is possible to identify some structural aspects of systemic risk which are common to the numerous definitions: an initial shock which hits one or more financial institutions

and/or markets and then propagates through different possible channels to the whole banking and/or financial system and produces negative consequences on the real economy as well.¹⁶ Measures such as non-performing assets or costs of crises in terms of GDP might serve to identify (ex-post) a systemic crisis and to estimate its impact on the financial and real sector. Even though some analyses make a broader reference to financial markets, it has to be underlined that definitions and studies on systemic financial risk are largely focused on the banking sector and specifically on commercial banks fragility due to their balance sheet structure and exposures to depositors bank runs and bank contagion mechanisms.

2.2 Traditional bank and financial regulation

A point which emerges from the literature on systemic risk is that systemic financial crises are generally, even though not exclusively, associated with a banking crisis. Historical evidence is supportive of this banking-focused approach. For example, the IMF (2008c) found that banking crises cause more severe and protracted economic downturns than crises originated in securities or foreign exchange markets. Coherently, bank regulation has been historically focused primarily - even though not exclusively - on financial stability and the prevention of systemic crises. Securities and insurance regulation has been more focused on consumers/investors protection and efficiency, while systemic risk stemming from these sectors has been perceived as limited. Consequently, different regulatory tools have been used in relation to different sectors in order to achieve different objectives, which does not imply, however, the absence of cross-sector effects. Banks have traditionally been considered as more vulnerable and as more probable potential sources of financial instability, given the specific nature of their balance sheet, with typically illiquid and medium-long

¹⁶ A number of studies have proposed methodologies for a quantitative modelling of systemic risk (see, for example, Bartram, Brown and Hund (2005) and Lehar (2005)).

term assets and liquid and short-term liabilities, and their involvement in the payments and settlement system. Different economic theories on banks specialness have been developed, focused either on the assets side (asymmetric information and delegated monitoring functions; see respectively Leland and Pyle (1977) and Diamond (1984)), or on the liabilities side (liquidity problems and bank runs, Diamond and Dybvig (1983)), as well as on banks central role in the payments system and on the close linkages to the overall macroeconomic environment. Banks peculiarities are deemed to pose particular threats to financial stability through bank runs and contagion, due both to actual direct exposures and suspected exposures. With non-bank financial intermediaries contagion is less likely to occur due to the nature of contracts involved. There are not the same risks as far as the payments system is concerned: there is no lender of last resort, and therefore no moral hazard problems arise; the balance sheet structure and accounting practices are different. Insurance companies, for example, have the reverse cycle of maturity transformation, while securities companies assets are generally liquid and easily tradable, unlike the illiquid and long-term bank assets¹⁷.

Traditional bank regulation has focused on three pillars: prudential regulation of assets, capital requirements and deposit insurance. However, there is no unanimous consensus about banks specialness being caused by economic dynamics and by the nature of their balance sheet. According to the “new view” theories (Gurley and Shaw 1960, Tobin 1963), banks are special just because regulation makes them special, imposing limits and restrictions which cause disadvantages in the competition with other financial intermediaries. Safety net provisions have in turn reinforced the differences between banks and non-banks financial institutions, raising moral hazard issues for banks. The role of central banks has also been a further factor of distinction, especially when the central bank disposes of supervisory functions or is the monopolist supervisor of banks. The new

¹⁷ On differences between banks and non-bank financial intermediaries see, for example Llewellyn (1999, pp. 20-21).

theories on financial intermediation (Allen and Santomero 1996) have focused on risk management and reduction of costs of participation to the financial markets to explain why intermediation activities have grown even though transaction costs and asymmetric information have considerably diminished in recent decades. This view is applied to the entire spectrum of financial markets, regarded as a substantially unitary space. This approach is also coherent with the functional approach (Merton 1992, Oldfield and Santomero 1995), according to which functions are more stable of intermediaries which perform them and therefore regulation should focus on functions rather than on institutions.¹⁸

With regard to bank runs and banks failures there is no consensus on the direction of the cause-effect relationship. For example, Benston e Kaufman (1995, pp. 228-231) support the view that shocks in the real economy cause bank failures and not viceversa. Moreover, they suggest that bank runs are not the real root of banks failures, whose main causes would be, instead, other factors, such as asymmetric information, which would induce depositors incapable of evaluating bank assets and bank solvency to withdraw deposits, and functional and geographic regulatory restrictions, which would make the banking system insufficiently diversified and consequently particularly vulnerable to shocks. Gorton (1988) provided an explanation of bank runs opposite to the “sunspots” hypothesis: his analysis, focused on the US National Banking Era (1863-1914), suggests that banking panics are caused by a change in the perception of risk by depositors. The latter lack bank-specific information, but may use aggregate economic information to assess risk, so that they “panic” as some variables (such as the number of failed firms) reach certain thresholds (a sort of “mediated rationality”). Bank panics would therefore be a consequence of a deterioration of general economic conditions and not a “sunspot” cause of crises.

¹⁸ For an overview on the evolution of financial intermediaries theories, from the classic approach to the new theories, see Di Giorgio and Di Noia (1998, pp. 8-18). For a review of the rationales for banks specialness see Herring and Santomero (2000). For an overview of systemic risk in the payment and settlement system see De Bandt and Hartmann (2000, pp. 32-36).

Herring e Litan (1995, p. 67) suggested that the risk of systemic instability being caused by a bank run contagion appears low and provided the example of the bank run on Bcci¹⁹ to support such hypothesis, which might be interpreted with the trust by depositors in deposit insurance schemes and central banking lending of last resort functions. This view appears coherent with the events of the 2007-2008 financial crisis, where contagion in the banking system was neither initially triggered nor transmitted through the financial system by depositors bank runs, also because in many countries governments (temporary) raised the maximum amount covered by deposit insurance and placed a guarantee on certain classes of liabilities to prevent bank panic.

2.3 Legal and economic developments in financial markets and the rise of Large Complex Financial Institutions

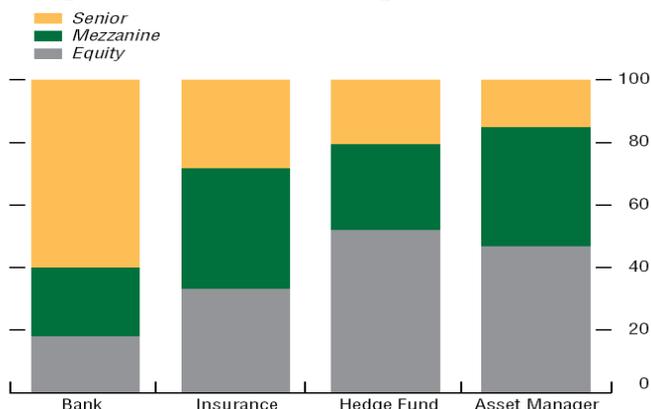
The 2007-2008 crisis has provided evidence that systemic risk is not intrinsically related to the banking sector any more, neither in the sense that it exclusively or mainly originates in depository banks nor in the sense that the specific features of depository functions play the main role in the propagation of a shock. In fact, the subprime crisis initially originated in financial firms which included but were not limited to depository institutions and the depository institutions involved were not involved because of a “classic” depositors bank run. Northern Rock troubles were due to its wholesale funding exposures, not to its depository functions: the bank run was a consequence of the fragility of its business model, not its cause. Hsbc was the first institution to report a loss on the subprime portfolio of its US mortgage finance subsidiary in March 2007; IKB and BNP, hit by the subprime crisis in the summer of 2007, are depository institutions as well, but Bear Stearns and its two failed hedge funds were not, Lehman Brothers and AIG were not, Goldman Sachs, Merrill

¹⁹ For a detailed study on the Bcci collapse see Herring (1993).

Lynch and Morgan Stanley were not, neither were Aegon in the Netherlands and Ethias in Belgium. The mechanisms which led to the explosion of the crisis in September 2008 are not the “traditional” dynamics of depositors bank run: instead, the triggering cause was the exposure to wholesale bank runs and the inability of financial institutions to roll-over their wholesale and short-term debt. On the other hand, banks were at the roots of the crisis because they issued and bought structured finance products, with an extensive use of off-balance sheet vehicles. However, the nature of the initial shock was not the massive and sudden withdrawal of deposits, which took place in the Northern Rock case but was an effect of the turmoil, not its origin. The nature of the crisis may be better understood through the model of systemic crisis propagation based on markets assumptions on financial institutions suspected to have similar exposures to those of a failed institution (see Kaufman 2000).

All financial sectors turned out to be deeply involved and suffered severe losses due to subprime exposures: banks, including investment banks, were the most hit institutions, but insurance companies and hedge funds were significantly involved as well. Similarly, banks, insurance companies and hedge funds were all involved in the credit derivatives market, being all large buyers and sellers of credit protection. Interestingly, financial institutions other than banks were reported to hold more low-rated structured credit products, which is probably due to lower capital charges for non-bank financial firms and might therefore represent a case of regulatory arbitrage (see IMF 2008a; Figure 2.3). In this perspective, coherently with the “new view” theories on financial intermediation, banks are “special” because of the specific (and more burdensome) regulatory requirements they have to deal with.

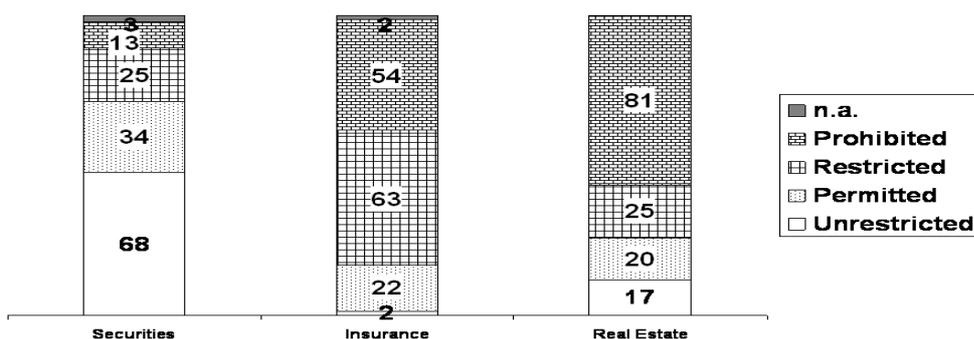
Figure 2.3. Exposures to structured credit products by financial industry.



Source: IMF (2008a) on Citigroup. Data as of the first half of 2007.

In the last three decades a series of economic and legal developments has significantly changed the financial markets’ morphology: the conglomeration process and the so-called blurring effect have eroded the barriers dividing banking, insurance and securities activities; geographic and functional legal restrictions on banks have been extensively removed and the model of universal bank has been substantially reaffirmed (see Figure 2.4).

Figure 2.4. Conditions under which banks can engage in securities, insurance and real estate activities (143 countries, 2006)



Source: Barth, Caprio, Levine, Database on bank regulation and supervision (2007).

Unrestricted: a full range of these activities can be conducted directly in banks. Permitted: a full range of these activities are offered but all or some of these activities must be conducted in subsidiaries or in another part of a common holding company. Restricted: less than the full range of activities can be conducted in banks or subsidiaries or in another part of a common holding company. Prohibited: none of these activities can be done in either banks or subsidiaries or in another part of a common holding company.

In the US regional barriers fell in 1978, with the lifting of the McFadden Act (1927). In 1999 the Gramm-Leach-Bliley Act (GLBA) removed the functional restrictions (business specialization and separation of commercial and investment banking) imposed by the Glass-Steagall Act and the Bank Holding Company Act of 1956. In the US the commercial banks market share of domestic financial flows between end-users of the financial system suffered a deep decline in the second half of the 20th century, from about 75% in the 1950s to below 25% in the early 2000s. Such trend was extremely intense in the US, but the declining trend regarded also Europe (for example a highly intermediated financial system like Germany), even though market share of commercial banks has remained well over 60% (see Walter 2004, pp. 11-13; the universal bank model adopted in Europe has probably played a major role in this perspective). “Classic” commercial banking centrality has thus been weakened and commercial banks have been increasingly involved in financial market trading activities, as opposed to the traditional lending business; securitization and risk-shifting strategies have weakened the illiquid assets versus liquid liabilities scheme²⁰; off-balance-sheet entities have been largely used to transfer risk, reduce funding costs and avoid capital constraints; deposit insurance has substantially eliminated *retail* bank runs problems (with the exception of Northern Rock, which, however, might be explained by the fact that the deposit insurance coverage was not adequate²¹).

The blurring of cross-sector barriers favoured the growth of financial conglomerates, defined as "any group of companies under common control whose exclusive or predominant activities consist of providing significant services in at least two different financial sectors (banking, securities, insurance)" (Bank for International Settlements 1995). While the model of universal banking has been dominant in Europe, over the last decade also in the US and in Japan, which

²⁰ Llewellyn (1999, p. 20) noted that banks depend for their funding on volatile and unsecured short-term deposits more than other financial institutions, which count more on long-term funding. However, this is still true only if we include in the category “banks” also investment banks.

²¹ Maximum deposit coverage in the UK was £ 35.000. Such limit was raised to £50.000 in October 2008.

formerly required strict separation of commercial banking and securities business, the combination of the two business has been permitted, even though with some limitations; increasingly, insurance activities have been included as well (for example Allianz, ING, Fortis, Credit Suisse and Citi have all made important cross-sector banking-insurance acquisitions in recent years). Indeed, substantially all large international financial institutions are to some extent financial conglomerates active in at least two of the three formerly distinct financial sectors of banking, securities and insurance. In 2000 over 80% of the assets of the largest 500 banking organizations were controlled by financial conglomerates, and among the largest 50 banking organizations the proportion reached 94% (Huertas 2006). The organizational structure of conglomerates differs across countries also according to legal constraints, which may still impose some forms of restriction on cross-sector business engagement (for example by requiring the creation of a separate subsidiary to perform certain activities; see Figure 2.4). Most large conglomerates are internationally active, thus they may be subject to multiple bankruptcy procedures and to multiple schemes of depositors, policyholders and investors protection and may also have access to multiple lenders of last resort. The rationale for consolidation and conglomeration is related to cost savings, attempt to achieve greater market power²² and economies of scope in production²³, even though diseconomies of scope may also be significant (see Herring and Santomero 1990)²⁴.

Data on mergers and acquisitions do not show a generalized trend towards cross-sector integration, but data for some countries seem to confirm that there has been an increase in cross-

²² See Berger, Demsetz and Strahan (1999) for a review of the literature on consolidation and market power. They note that market power is most likely to be of concern with regard to in-market rather than market extension mergers and that retail customers are more likely to be adversely affected than wholesale customers. Berger (1995) makes a careful distinction between the market power and efficient structure hypotheses taking account of both X-efficiency and scale efficiency. He concludes that neither the market power nor efficient scale hypotheses “are of great importance in explaining bank profits.”

²³ Economies of scope in consumption may also be important. But they could be exploited by using the distribution network of one institution to sell packages of financial services produced by other firms and thus cannot explain the formation of institutions such as LCFIs that produce and distribute several different kinds of financial services (Herring and Santomero, 1990).

²⁴ Laeven and Levine (2007) found evidence of a diversification discount applied to financial conglomerates.

sector deals in the last decade and that where cross-sector integration has been stronger the supervisory architecture has been changed accordingly. For example, comparing the 1990-1999 and the 2000-2006 periods, Germany and the UK experienced a significant increase in the share of cross-industry M&A, while in the US, Italy and Spain the percentage of within-industry deals remained stable and high. Interestingly, the removal of barriers between banking and securities activities in the US post-GLBA did not lead to an overall significant increase of cross-industry M&A, but it has to be noted that M&A between banking and securities sectors had an extremely relevant increase, counterbalanced by a drop of banks acquisition by insurance companies and by a doubling of within-sector deals in the securities sector.

Figure 2.5. M&A deals* in the financial sector in the United States, Europe and selected European countries - 1990-2006 (US \$ mln and percent on total value).

USA 1990-2006				USA 1990-1999				USA 2000-06			
acquiror	target			acquiror	target			acquiror	target		
	banks	insurance	securities		banks	insurance	securities		banks	insurance	securities
banks	56.1%	0.3%	4.6%	banks	60.4%	0.4%	2.1%	banks	51.8%	0.3%	7.0%
insurance	1032590	6076	84710	insurance	550652	3433	19559	insurance	481938	2644	65150
securities	6.1%	12.9%	0.8%	securities	10.0%	13.5%	1.3%	securities	2.4%	12.4%	0.3%
	112910	238267	14903		90950	122835	12071		21960	115432	2832
	3.7%	1.9%	13.5%		2.3%	0.6%	9.5%		5.2%	3.2%	17.5%
	68798	35104	248559		20520	5620	86226		48278	29483	162334
	within-sector		82.5%		within-sector		83.3%		within-sector		81.7%
	cross-sector		17.5%		cross-sector		16.7%		cross-sector		18.3%

EU-27 1990-2006				EU-27 1990-1999				EU-27 2000-2006			
acquiror	target			acquiror	target			acquiror	target		
	banks	insurance	securities		banks	insurance	securities		banks	insurance	securities
banks	53.4%	1.8%	4.0%	banks	52.7%	2.5%	3.0%	banks	53.9%	1.1%	5.1%
insurance	572744	19408	43367	insurance	275585	13086	15494	insurance	297159	6322	27873
securities	3.3%	15.4%	0.9%	securities	6.3%	16.3%	1.4%	securities	0.4%	13.1%	0.5%
	35140	167412	10041		32869	95302	7302		2271	72029	2739
	10.8%	3.9%	6.3%		36084	24215	22419		14.4%	3.2%	8.3%
	115600	41789	67928		within-sector		75.3%		within-sector		75.3%
	cross-sector		24.7%		cross-sector		24.7%		cross-sector		24.7%

Germany 1990-2006				Germany 1990-1999				Germany 2000-06			
acquir.	target			acquir.	target			acquir.	target		
	bank	insurance	securities		bank	insurance	securities		bank	insurance	securities
bank	41.92%	0.51%	2.59%	bank	28.38%	0.73%	1.44%	bank	48.39%	0.41%	3.14%
insurance	47.968	585	2.960	insurance	10.505	271	532	insurance	37.463	314	2.428
securities	2.07%	16.68%	0.07%	securities	6.32%	47.28%	0.00%	securities	0.04%	2.05%	0.11%
	2.365	19.083	81		2.338	17.498	0		28	1.585	81
	30.53%	2.14%	3.50%		4.52%	6.02%	5.32%		42.96%	0.29%	2.63%
	34.930	2.451	4.001		1.672	2.229	1.968		33.258	222	2.032
	within-sector		62.09%		within-sector		80.98%		within-sector		53.07%
	cross-sector		37.91%		cross-sector		19.02%		cross-sector		46.93%

Italy 1990-2006				Italy 1990-1999				Italy 2000-06			
acquir.	target			acquir.	target			acquir.	target		
	bank	insurance	securities		bank	insurance	securities		bank	insurance	securities
bank	75.56%	0.49%	2.05%	bank	75.89%	0.10%	1.48%	bank	75.24%	0.87%	2.60%
insurance	146.691	953	3.986	insurance	72.225	92	1.408	insurance	74.466	862	2.578
securities	0.06%	10.48%	0.15%	securities	0.12%	13.94%	0.28%	securities	0.00%	7.16%	0.03%
	114	20.353	295		111	13.269	269		3	7.084	26
	5.22%	1.62%	4.36%		4.55%	3.30%	0.34%		5.86%	0.00%	8.23%
	10.132	3.141	8.471		4.328	3.141	327		5.804	0	8.144
	within-sector		90.41%		within-sector		90.18%		within-sector		90.63%
	cross-sector		9.59%		cross-sector		9.82%		cross-sector		9.37%

Spain 1990-2006				Spain 1990-1999				Spain 2000-06			
acquir.	target			acquir.	target			acquir.	target		
	bank	insurance	securities		bank	insurance	securities		bank	insurance	securities
bank	90.04%	1.21%	1.18%	bank	90.39%	1.48%	1.03%	bank	89.11%	0.49%	1.58%
insurance	46.401	625	609	insurance	33.945	556	388	insurance	12.456	69	220
securities	0.00%	5.46%	0.00%	securities	0.00%	5.29%	0.00%	securities	0.00%	5.90%	0.00%
	1	2.811	0		1	1.987	0		0	824	0
	0.97%	0.05%	1.09%		0.49%	0.07%	1.25%		2.24%	0.00%	0.68%
	498	24	563		185	24	468		313	0	95
	within-sector		96.59%		within-sector		96.93%		within-sector		96.69%
	cross-sector		3.41%		cross-sector		3.07%		cross-sector		4.31%

UK 1990-2006				UK 1990-1999				UK 2000-06			
acquir.	target			acquir.	target			acquir.	target		
	bank	insurance	securities		bank	insurance	securities		bank	insurance	securities
bank	42.36%	0.67%	4.79%	bank	52.20%	0.05%	1.32%	bank	32.53%	1.29%	8.25%
insurance	120.281	1.911	13.593	insurance	74.113	74	1.880	insurance	46.168	1.837	11.714
securities	0.76%	25.07%	2.52%	securities	0.79%	25.17%	4.20%	securities	0.72%	24.96%	0.84%
	2.152	71.169	7.156		1.123	35.736	5.966		1.029	35.433	1.190
	8.31%	3.23%	12.30%		3.91%	3.67%	8.69%		12.71%	2.79%	15.90%
	23.506	9.171	34.913		5.551	5.209	12.330		18.036	3.963	22.574
	within-sector		79.72%		within-sector		86.05%		within-sector		73.39%
	cross-sector		20.28%		cross-sector		13.95%		cross-sector		26.61%

Source: computations based on Thomson Financial SDC data. Individual components may not sum precisely to the totals indicated in the tables because of rounding errors.

* Mergers and acquisitions of majority interest (the acquiror must have held less than 50% and be seeking to acquire 50% or more, but less than 100% of the target company's stock). Deals announced between 01/01/1990 and 31/12/2006; only completed deals have been included; classification by target nation. "Banks" include commercial banks, bank holding companies, credit institutions, real estate, mortgage bankers and brokers, savings and loans, mutual savings banks. "Securities" include investment and commodity firms, dealers, exchanges, other financial firms. For some deals SDC was not able to collect the value: these transactions are included with regard to the number of deals, even though their value is not available and, therefore, not included in the total value of deals.

However, the analysis of financial markets developments should not be limited to banking, securities and insurance. The LTCM crisis in 1998 had already shown that also hedge funds may have systemic relevance and such assumption found a confirmation in the failure of the two Bear Stearns hedge funds at the end of July 2008, which came just one week before the “official” beginning of the subprime crisis (the suspension by BNP Paribas of the calculation of the net asset value and in the subscription and redemption of three funds exposed to US ABS assets on August 9, 2007). Hedge funds have grown with exponential rates in the last two decades: by the end of 2006 the global hedge fund industry had about \$1.4 trillion in assets under management, while in 1990 the same value was below \$400 billion and in 2004 it was still lower than \$ 1 trillion (these figures are all estimates²⁵, since hedge funds are unregulated and unsupervised). Hedge funds are also prominent players in several markets: for example, according to Kambhu, Schuermann and Stiroh (2007), in 2005 hedge funds accounted for 89% of the U.S. trading volume in convertible bonds, 66% in distressed debt, 33% each for emerging markets bonds and leveraged loans, 20% of the speculative grade bond volume and 38% in credit derivatives. Hedge funds were at the second place in the credit derivatives market in 2006, both as protection buyers and as protection sellers, after banks but before insurance companies (IMF 2008a, p. 79).

²⁵ The source is Hedge Fund Research.

Figure 2. 6. Market participants in credit derivatives (% of total)

	Protection Buyers		Protection Sellers	
	2004	2006	2004	2006
Banks	67	59	54	43
Hedge funds	16	28	15	31
Pension funds	3	2	4	4
Insurance	7	6	20	17
Corporations	3	2	2	1
Mutual funds	3	2	4	3
Other	1	1	1	1

Source: British Bankers Association (2006), IMF (2008a).

Similarly, in 2005, 2006 and 2007 hedge funds suffered losses in the US subprime market inferior only to losses which hit banks (IMF 2008a, p. 78), despite having smaller exposures than insurance companies. Besides, hedge funds were the largest buyers of ABS CDOs and the category of financial institutions most exposed to equity tranches of structured credit products as a percentage of the total exposure to structured credit products (see Figure 2.3). Last but not least, in the US the FED included hedge funds as beneficiaries of the Term Auction Liquidity Facility launched at the end of November 2008 (see Table 1.1), which implicitly confirmed the systemic relevance of hedge funds.

There are different channels through which hedge funds can trigger or worsen a systemic crisis. The failure of an hedge fund might disrupt some financial market activities, as in the case of the LTCM collapse, which threatened the good functioning of the credit and interest rate markets. Besides, large commercial banks and securities firms provide liquidity to hedge funds and may be exposed to them through counterparties exposures (e.g. short-run financing for leveraged positions, prime brokerage activities, trading counterparty exposures in OTC, contingent credit lines, direct equity stakes). The unwinding of an hedge fund might cause a drop in asset prices, including the value of assets posted as collateral for the hedge fund's exposures;

prices decline can be reinforced by investors selling to meet margin calls. Overall, the loss of value of the collateral may lead lenders/dealers to revise stress testing and risk management procedures: as a result, the failure of an hedge funds might produce a knock-on effect, so that banks and brokers/dealers might end up imposing stricter borrowing conditions (the effect is likely to be stronger where there are no or fewer alternative funding sources other than banks). However, as noted by Kambhu, Schuermann and Stiroh (2007, pp-14-15), there is uncertainty about how these mechanisms might work in practice and indicate as an example the stabilization role played by commercial banks in 1998 after the collapse of LCTM: capital market credit was substituted by credit provided by banks, with the support of the Federal Reserve expansionary monetary policy.

Complexity, opacity and high leverage of hedge funds may exacerbate risks stemming from failures. In particular, leverage may have an amplifying effect (as in the case of LTCM) and has been indicated as a key issue concerning systemic risk and hedge funds²⁶. Leverage of hedge funds was dramatically reduced from mid-2007 to fall 2008: the ECB (2008c, p. 45) reported that in September and October 2008 there was a significant increase in the share of hedge funds with leverage lower than 1 (gross investments not exceeding capital). Huge and rapid deleveraging might significantly contribute to depress asset prices and possibly cause or reinforce a systemic crisis.

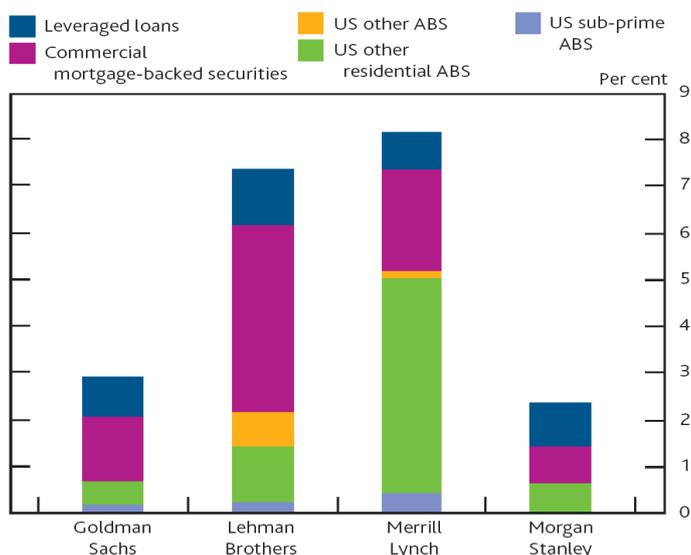
On the whole, barriers between financial sectors and different types of financial intermediaries had already fallen or become blurred, but the subprime crisis showed that cross-sector integration and cross-sector linkages have become so relevant that the nature of systemic risk has changed: it is not a typical commercial banking risk anymore and has assumed a wider financial markets nature, including securities and insurance firms and hedge funds.

²⁶ See, for example, PWG (1999) and Chan et al. (2006).

Functional and geographic deregulation and de-specialization favoured the creation and the growth of Large Complex Financial Institutions (LCFIs). These institutions provide an empirical example of how the nature of systemic risk has evolved. Some LCFIs are not depository banks and LCFIs which are depository banks are not exclusively commercial banks and are often engaged in a wide range of business lines (see column 6 in Figure 2.10 for an index of business lines diversification). LCFIs are financial conglomerates not simply large, but also with a high degree of business and corporate complexity. Their systemic relevance is not determined by specific legal structures and institutional forms and is not exclusively or mainly related to the “classic” bank fragility given by the liquidity and maturity mismatch between assets and liabilities. Instead, it derives also and especially from complexity in terms of business and geographical diversification and legal and organizational structure (the latter includes a very high number of subsidiaries; see Figure 3)²⁷. LCFIs have been at the heart of the subprime crisis: growth in the structured credit market had become the main source of income for many LCFIs (Bank of England 2007, p. 38). LCFIs issuance of residential mortgage-backed securities backed by subprime lending collapsed already in the first quarter of 2007 and substantially disappeared by the end of the third quarter of the same year (Bank of England 2007, p. 37). At the end of the third quarter of 2008, Lehman Brothers’ exposures to structured credit as a proportion of total assets were over 7%. The same figure was about 8% for Merrill Lynch, but below 3% for Goldman Sachs and Merrill Lynch (see Figure 2.7).

²⁷ For a detailed study on corporate complexity of LCFIs see Herring and Carmassi (2009).

Figure 2. 7. US securities' houses exposures to structured credit as a proportion of total assets at the end of 2008 Q3^(a)



a) Includes exposures to leveraged loans and asset-backed securities where details are disclosed by firms.
Sources: Bank of England (2008b, p. 20) on published accounts and Bank of England calculations.

LCFIs are at the core of the payments and settlement system²⁸ and are global institutions, with subsidiaries and branches in an extremely high number of countries and jurisdictions. They are also top players in the foreign exchange, interest rates derivatives, credit default swaps and OTC markets²⁹. Huge problems of coordination between the home country and the numerous host countries arise in case of bankruptcy of an LCFI³⁰. Authorities face the dilemma of letting an LCFI fail and very likely cause systemic problems or choose a bailout on the ground of the too-big-to-fail or too-complex-to-fail doctrine, with serious implications in terms of moral hazard. The failure of an LCFI forces authorities of a very high number of countries to face formidable challenges in the winding-down procedures, it may threaten the smooth functioning of financial markets and raise concerns about the overall financial stability. In conclusion, the

²⁸ See Hawkesby, Marsch, Stevens (2003) on involvement of LCFIs in the interest rate derivatives market.

²⁹ LCFIs, for example, are in the list of the top 25 counterparties for credit default swaps contracts (see Mengle 2007, p. 10). The list included the top five US investment banks and AIG.

³⁰ See Herring (2007) on conflicts between home and host country supervisors.

main point to be emphasized is that LCFIs are “special” not - or not exclusively - because of their depository bank functions, but in light of a wider range of financial functions performed, which make them complex and systemically relevant.

The Group of Ten (2001) proposed a definition of Large Complex Banking Organizations which focuses on banking but might well be extended to LCFIs: “LCBOs (i) have significant on- and off-balance sheet risk exposures, (ii) offer a broad range of products and services at the domestic and international levels, (iii) are subject to multiple supervisors in the United States and abroad, and (iv) participate extensively in large-value payment and settlement systems.” Hawkesby, Marsch, Stevens (2003) introduced a methodology for the identification of LCFIs which has also been adopted by the Bank of England. To be classified as an LCFI a financial institution must be present in at least two of the following league tables: ten largest equity bookrunners worldwide; ten largest bond bookrunners worldwide; ten largest syndicated loans bookrunners worldwide; ten largest interest rate derivatives outstanding worldwide; ten highest FX revenues; ten largest holders of custody assets worldwide (see Figure 2.8).

Figure 2. 8. Methodology for the selection of Large Complex Financial Institutions: ranking*

Name	Host country	Equities	Bonds	Syndicated loans	IR derivatives	FX revenues	Custody assets	*No. of categories
Citigroup	US	5	1	2	4	1	4	6
Deutsche Bank	DE	9	4	4	2	3	5	6
Credit Suisse	CH	6	6	8		4		4
JP Morgan Chase	US		5	1	1		3	4
Barclays	UK		10	5	8	6		4
Goldman Sachs	US	2	9		6			3
HSBC	UK			10		2	9	3
Société Générale	FR	8			9		10	3
Bank of America	US			3	3	8		3
Lehman Brothers	US	7	8					2
Merrill Lynch	US	1	3					2
Morgan Stanley	US	4	2					2
UBS	CH	3	7					2
ABN Amro	NE					7	6	2
BNP Paribas	FR				5		7	2

* Based on 2001 data.

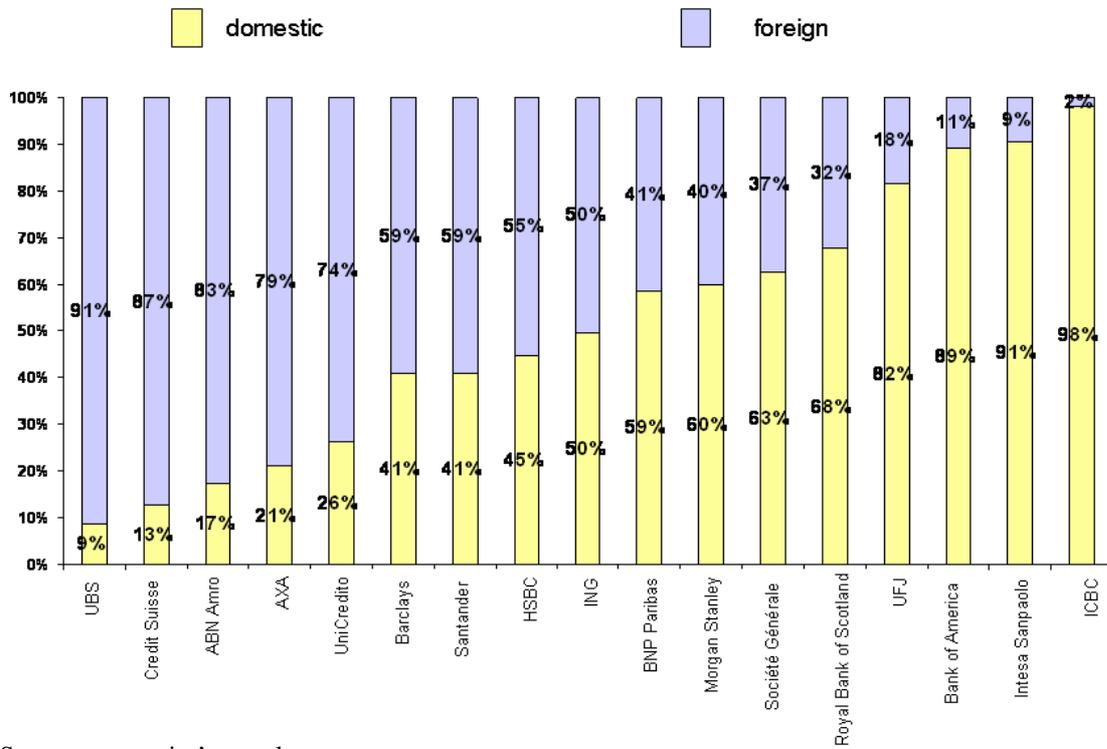
Source: Hawkesby, Marsch and Stevens (2003).

At the end of 2007 the group of LCFIs identified by the Bank of England on the basis of this methodology was the following: ABN Amro, Bank of America, Barclays, BNP Paribas, Citi, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, JPMorgan Chase & Co., Lehman Brothers, Merrill Lynch, Morgan Stanley, RBS, Société Générale and UBS (Bank of England 2007). In October 2008 Abn Amro, (acquired by a consortium formed by RBS, Fortis and Santander) and Lehman Brothers had fallen out of this list (Bank of England 2008b). Interestingly, AIG is not included in this list: the choice of markets/business sectors is clearly the key (for example, the CDS market is excluded).

The European Central Bank (2006b) adopted a similar approach for the identification of Large and Complex Banking Groups (LCBOs) in Europe. The focus is specifically on banks, but the methodology is very similar, since it is stressed that size alone risks not being an effective instrument to catch the interconnections of financial institutions with the financial system and the growing importance of off-balance sheet activities. Therefore, the selection of European LCBOs is based on size (total assets in excess of € 1 billion), ranking in the top 30 bookrunners in the European equity, bond and syndicated lending markets and in the top 48 worldwide custody market. If at least one of these criteria is satisfied, then a bank falls in the group of European LCBOs.

There is an impressive heterogeneity across LCFIs with regard to corporate complexity, organizational and legal structures, business diversification, foreign presence and strategies adopted for international expansion (see Figure 2.10 for an overview of size, corporate structure, geographic and business diversification of LCFIs; Figure 2.9 illustrates the heterogeneity in geographic assets diversification for some large global financial institutions, including but not limited to LCFIs).

Figure 2. 9. Geographic breakdown of assets of a sample of LCFIs and other large financial institutions*.



Source: companies' annual reports.

* For HSBC and Santander domestic assets are European assets (so foreign business is underestimated). For Intesa Sanpaolo the assets breakdown includes only loans.

Figure 2.10. Overview of Large Complex Financial Institutions*

1	2	3	4	5	6	7
LCFIs	Total assets (\$ bn) ¹	Total subsidiaries ¹	% of foreign subsidiaries	% of foreign net income before taxes(2006) ²	HHI - business lines revenues (2006) ³	Number of countries ⁴
The Royal Bank of Scotland Group Plc	3.808	1.161	11%	34%	1.966	16
Deutsche Bank AG	2.974	1.954	77%	80%	3.931	56
BNP Paribas	2.494	1.170	61%	51%	1.843	58
Barclays Plc	2.459	1.003	43%	44%	2.179	73
HSBC Holdings Plc	2.354	1.234	61%	78%	3.945	47
Citi	2.188	2.435	50%	44%	4.122	84
UBS AG	2.019	417	96%	62%	2.903	41
Bank of America Corporation	1.716	1.407	28%	12%	4.256	29
Société Générale	1.578	844	56%	46%	4.128	60
JP Morgan Chase & Co.	1.562	804	51%	26%	2.086	36
ABN AMRO Holding NV ^{**}	1.509	670	63%	77%	1.381	43
Credit Suisse Group	1.209	290	93%	71%	3.868	31
Goldman Sachs Group, Inc.	1.120	371	51%	48%	5.391	21
Morgan Stanley	1.045	1.052	47%	42%	4.476	46
Merrill Lynch & Co., Inc.	1.020	267	64%	35%	4.089	25
Lehman Brothers Holdings Inc.	691	433	45%	37%	7.807	20

Source: Herring and Carmassi (2009), updated.

* Yearend 2007 (unless otherwise specified). **The list of LCFIs is based on Bank of England (2007). Subsequently, a consortium of three banks (RBS, Fortis and Santander) acquired ABN AMRO.

¹ Source: Bankscope. Data on subsidiaries refer to majority-owned subsidiaries for which the LCFI is the ultimate owner with a minimum control path of 50.01%.

² Source: annual reports for each LCFI. Net income before taxes with five exceptions: net income after taxes for Citi and net revenues for Barclays plc, BNP Paribas, Lehman Brothers Holdings Inc., Merrill Lynch & Co., Inc.

³ Source: Oliver Wyman. The Herfindahl-Hirschman Index ranges from 0 to 10,000 and it is calculated on the percentage of revenues per business line. Higher values indicate a higher degree of specialization. Lower values imply a higher degree of diversification.

⁴ Number of countries in which the LCFI has at least one majority-owned subsidiary.

Consequently, it turns out to be extremely hard and discretionary to identify a threshold for a single variable (for example size), to draw the line and establish which financial institutions are systemically relevant and which are not. The risk is that systemically relevant institutions be cut out of the list, while non-systemically relevant institutions end up being included.

A combination of a significant number of variables is likely to provide more accurate results: the crucial point is that the variables to be used should be those which are regarded to

provide information about systemic relevance. The list of global LCFIs identified by the Bank of England, for example, might be “too short”, it probably does not take into account other systemically relevant markets and functions (like the CDS market) and does not include financial institutions which may have a national or regional systemic relevance. However, a functions-based approach is likely to be more effective than a methodology based merely on size indicators. The proposal of this work is to follow a functional approach to identify SRFIs of the same nature of that used to identify LCFIs, but expanding the list of variables to be included and identifying SRFIs also on a national basis³¹.

2.4 Identification of Systemically Relevant Financial Institutions

The identification of SRFIs is a complex task. Which criteria and variables should be chosen to determine if a financial institution is an SRFI? Size? Total balance sheet? Market capitalization? Income? Geographic diversification through subsidiaries and branches? Corporate complexity?

Since SRFIs perform a number of systemically relevant functions which are not reflected in specific legal structures, a functional approach appears the best methodology to deal with their specialness. The definition of systemic risk and the identification of SRFIs are both extremely complicate and controversial tasks, with no hard-and-fast answers. A functional approach might be the best strategy to prevent and deal with systemic risk: regulation and supervision should focus on financial institutions which perform systemically relevant functions and are crucial

³¹ It has to be noted that while the idea of a specific regulation of LCFIs is not new (see, for example, Čihák and Decressin 2007), this study proposes a new perspective, focusing on SRFIs with a systemic, functional (regardless of legal forms) and cross-sector approach.

players in systemically relevant markets. The key issue is not “who” they are (depository banks, investment banks, insurance companies, etc.), but what they do.

An important rationale for the adoption of a functional approach is that legal structures and business functions are not organized along the same lines, especially in large complex financial conglomerates.³² An interesting empirical evidence of this misalignment has been provided by the subprime crisis: financial institutions decided to “rescue” off-balance-sheet entities without a clear legal obligation towards these autonomous and unconsolidated stand-alone vehicles. The proliferation of the shadow banking and financial system, through off-balance-sheet entities such as Structured Investment Vehicles, has diluted the correspondence between corporate functions and legal structures. Consequently, authorities have to face significant obstacles both to exercise an effective supervision and also to manage bankruptcy procedures. A possible solution might consist in requiring financial institutions to maintain a coherence between legal structures and business functions, for example through “substantive consolidation”. This solution, however, might provide a disincentive for the use of off-balance-sheet entities. Moreover, a compulsory realignment might turn out to be hardly feasible and probably costly for financial firms and for the overall efficiency of the financial and economic system. A second option is that supervision focuses on corporate functions, not on legal structures. The functional approach suggested to identify systemically relevant institutions might contribute to solve the business-legal misalignment as well.

Merton (1993) and Oldfield and Santomero (1995) proposed a functional approach to financial regulation, based on the idea that functions performed are more stable through time than institutions which perform them. The functional model has received scarce empirical

³² See Hüpkes (2004) for a detailed analysis of this misalignment.

application compared to other models (by sectors, by objectives, single regulator). Merton (1993, pp. 22 and ff.) identified six core functions performed by the financial system, which provides: 1) a payments system for the exchange of goods and services; 2) a mechanism for the pooling of funds to undertake large-scale indivisible enterprise; 3) a way to transfer economic resources through time and across geographic regions and industries; 4) a way to manage uncertainty and control risk; 5) price information which helps coordinate decentralized decision-making in various sectors of the economy; 6) a way to deal with the asymmetric information problems when one party to a financial transaction has information that the other party does not.

The main hypothesis suggested here is that systemic relevance is not related to a specific category of financial firms any more and that functions, not institutions, have systemic relevance. Therefore, a change in the conceptual approach to regulation and supervision and the adoption of a functional perspective are proposed. The functional approach should be limited to the identification of SRFIs, which perform systemically relevant functions. These firms would require a specific regulatory and supervisory framework, but this does not imply the adoption of a functional regulatory architecture, which might work in theory but has to deal with many operational difficulties (for example, each firm would have to deal with a very high number of authorities; moreover, a pure functional approach would have to deal with the fact that institutions do fail, while functions do not).

The key step is the identification of systemically relevant functions and systemically relevant financial institutions. Hüpkes (2004, pp. 4-5) notes that there is no universally accepted definition of a systemically relevant function and that an institution's function might be considered systemically relevant if the institution's disruption would cause adverse consequences not only on its immediate counterparties but on the real economy as well, leading to disruptions to the payment system and to credit flows, and causing the collapse of asset values. Hüpkes

proposes the adoption of the functional approach to the resolution of global financial institutions, stressing also that one of the most important benefits of this approach is that systemically relevant functions would be preserved, not financial institutions. Provided that those functions are protected, the moral hazard issue due to the too-big-to-fail doctrine might be effectively tackled.

A first variable that might be used to assess systemic relevance is size³³. Two possible measures for size are total assets and market capitalization. However, size might be an important aspect but not the only key point. In fact, even small institutions can cause systemic problems, for example through reputational mechanisms, which can start from a small firm and then hit an entire market. As observed by Llewellyn (2008, p. 25), “it is always possible that the failure of a small bank could trigger generalised uncertainty about the state of the banking industry if depositors judged that all banks could be subject to the same problem as the failed bank.” Therefore, at a minimum, size measures have to be complemented with other indicators.

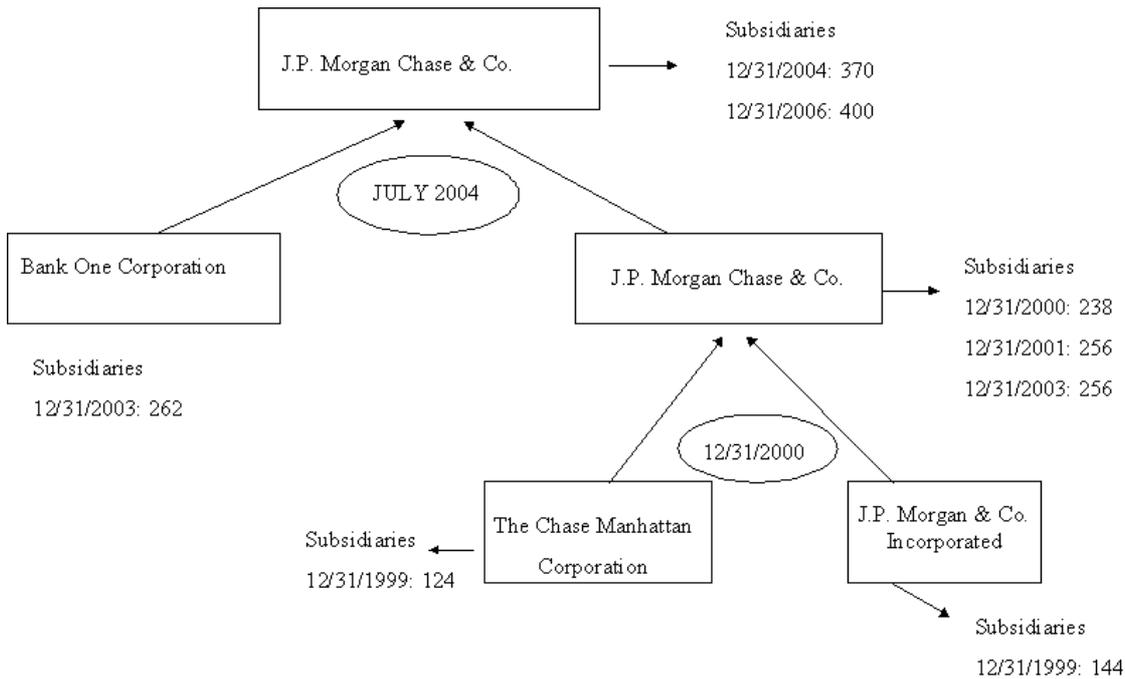
Market share is another possible option, which might provide information not just on the size per se, but also on the relative size within a country and a market. This measure is suggested by Hüpkes (2004, p. 6), along with a series of other indicators of systemic relevance with regard to large complex financial institutions: extent of (inter)dependences (direct and indirect), extensive participation in large-value payment and securities settlement systems, role in liquidity management in the interbank market, role in risk management and political consequences of a failure. Geographical diversification might provide useful indications on systemic relevance as well: subsidiaries and branches in a higher number of jurisdictions might increase conflicts

³³ In the UK, with regard to prudential regulation, the FSA focuses on the 50 largest financial firms operating in the country (including foreign institutions).

between home and host supervisors and hinder the efficiency of bankruptcy procedures in case of failure.

Also corporate structures might provide some useful indications on the systemic importance of financial institutions. A high degree of complexity in legal and organizational structures, possibly amplified by a significant geographical diversification, is likely to create significant challenges to financial stability in case of distress and to pose relevant obstacles to orderly failure and liquidation procedures. Corporate complexity probably plays a major role in making an institution unlikely to fail (to be let fail) and is inclusive of all the listed variables; it is determined by a wide range of factors and is related to a combination of size, business diversification, geographic diversification and legal structures. A relevant determinant of corporate complexity is mergers and acquisitions activity. For example, LCFIs have engaged not only in a large number of mergers, but also in some very large mergers. In the period 1990-2006, Bank of America, Deutsche Bank, JP Morgan Chase and UBS have implemented mergers in which the target institution was larger than 10 percent of the acquiring firm's total assets (source: SDC Thomson Financial). The corporate structure of JPMorgan Chase at the end of 2004 shows how the degree of organizational complexity, measured by number of wholly owned subsidiaries, increased due to a long series of significant M&A deals since 1999 through 2004 (see Figure 2.11).

Figure 2.11. M&A and corporate complexity: the case of J.P. Morgan Chase & Co.



Source: author's elaborations on Secinfo data.

Another factor of complexity is given by the misalignment between corporate functions and legal structures due to the large use of off-balance-sheet vehicles. Further rationales for corporate complexity may be identified in the attempt to ease asymmetric information problems among shareholders, creditors and managers, to mitigate conflicts of interest or to minimize tax burden (e.g. through subsidiaries in Offshore Financial Centers)³⁴.

The empirical evidence of the relevance of corporate complexity was offered by the failure of Lehman Brothers. As for M&A, unlike most LCFI, Lehman's activity had not been

³⁴ On these issues see Herring and Carmassi (2009).

significant: in the period 1990-2006 the largest deal (acquisition of Neuberger Berman Inc) accounted for just 1.5% of Lehman assets. Probably also as a result of this limited M&A involvement, at the end of 2007 Lehman Brothers had a lower number of majority-owned subsidiaries than other LCFIs, but the figure was still very high (433). Geographic diversification furtherly increased complexity: these subsidiaries were largely based in the US and the UK (238 and 120 respectively), but also in other 18 countries, including Offshore Financial Centers, such as the Cayman Islands (18) and Bermuda (4).

Figure 2. 12. Geographic breakdown of Lehman Brothers Holding Inc. majority-owned subsidiaries.

Lehman Brothers Holdings Inc	
Country	Majority-owned subsidiaries (yearend 2007)
USA	238
UNITED KINGDOM	120
CAYMAN ISLANDS	18
AUSTRALIA	9
LUXEMBOURG	6
IRELAND	5
NETHERLANDS	5
BERMUDA	4
FRANCE	4
HONG KONG	4
JAPAN	4
KOREA REP. OF	4
GERMANY	3
SINGAPORE	2
THAILAND	2
ARGENTINA	1
CANADA	1
SWITZERLAND	1
INDIA	1
MAURITIUS	1
TOTAL	433
number of countries	20

Source: elaborations on Bankscope data.

One of the main criticalities emerged with Lehman's bankruptcy was the settlement of credit default swaps: the notional value of CDS with Lehman as a reference entity was \$72 billion, but the net settlement payments were about \$6 billion. However, the uncertainty preceding the settlement played a major role in causing the systemic crisis, and such uncertainty was largely due to the lack of transparency (who had what) and complexity. What happened after

September 15 confirms the hypothesis that LCFIs have systemic relevance, as indicated by the impressive increase in CDS spread post September 15. The subprime crisis turned into a systemic crisis right after Lehman bankruptcy. The type of systemic risk propagation was not mainly the one related to bank run and direct contagion effects, but the one caused by markets perception that other financial institutions have similar exposures than those of the failed institution. Lehman provided prime brokerage services to a large number of hedge funds, which posted collateral that in turn were used by Lehman for re-hypotecation. In the wake of Lehman's insolvency hedge funds suddenly lost access to collateral assets for the duration of the administration process, being thus locked into positions of uncertain value whose future disposal would depend on different legal proceedings and contractual arrangements in various jurisdictions. Consequently, hedge funds had to reallocate funds across jurisdictions, which took place simultaneously with a huge deleveraging process, and both strategies caused relevant further stress for funding and securities lending markets (see Bank for International Settlements 2008). Another important structural aspect to be stressed is that by lending the securities accepted as collateral in these transactions Lehman was substantially performing the traditional (commercial) bank function of credit creation,; moreover, since 2003 the company's short-term funding (including deposit liabilities at banks) constantly increased as a proportion of both equity and liquid assets, exposing the firm to an wholesale bank run. The failure of Lehman Brothers was the failure of a business model whose structure was very similar to that of commercial banks (liquid, short term liabilities versus illiquid, long term assets), with the significant difference that there was no appropriate bank regulation (on this point see, for example, De Grauwe 2008).

Overall, it is hard to determine which specific single variable or which group of variables might best capture systemic relevance. A first best strategy seems hardly feasible and any solution will inevitably contain a certain degree of discretion. Following a pragmatic approach,

the second best solution might be a combination of a series of variables which might – simultaneously – create a systemic relevance: total assets, market capitalization, market share (both for total assets and for specific variables: loans, deposits, mortgages etc.), balance sheet structure (e.g. degree of maturity mismatch), leverage, interbank exposures, role in the payment and settlement system (e.g. through interest rate derivatives or foreign exchange derivatives), role as bonds or equity bookrunner and in the syndicated loans market, number of subsidiaries and branches (domestic and foreign), activity in OTC markets, especially in the CDS market (as counterparties). The choice of thresholds for each variables is discretionary as well and, given cross-country differences, such thresholds might be country-specific, so that authorities in each country might be able to identify national SRFIs. Moreover, to limit moral hazard it would be crucial that the identification be not on request of financial institutions, but exclusively based on authorities' decisions.

All in all, the identification of SRFIs might turn out to be a more complex issue than it could initially appear. The challenging objective is the translation of the functional approach into operative regulatory schemes. However, it has to be noted that a number of national and international authorities and institutions, for example the IMF, the ECB and the Bank of England, have already adopted methodologies for the identification of large and complex financial institutions and develop specific analyses on this category of financial institutions. The objective of this research is not to design all the technical implementation details, which undoubtedly have conceptual implications; instead, the main aim is to stress the importance of reforming financial supervision and regulation on the basis of systemic relevance of financial institutions, to be determined with a functional and cross-sector approach.

Chapter 3

Supervision of Systemically Relevant Financial Institutions

Introduction

The subprime crisis provided empirical evidence that there is neither an optimal nor a superior financial supervisory structure. An extremely intense wave of reform of supervisory models took place in a high number of countries in the last twenty years, especially after the institution of the Financial Services Authority in the UK. The intense wave of reforms of regulatory architectures in the last decade have been largely justified both with the economies of scale rationale and with the so-called “blurring effect”³⁵: financial markets are not as segmented as they used to be (banking, securities, insurance). Cross-sector integration, made possible by the removal of legal barriers, substantially transformed what was traditionally regarded as a tripartite market into a substantially unique market, despite all the persisting relevant differences across sectors (for example, balance sheet structures of banks and insurance companies are still different and “opposite”; capital regulation and even the definition of capital are different across sectors; on these issues see Half and Jackson (2002)). A large number of studies have focused on supervisory structures, stressing the importance of adapting the architecture of controls to new market structures and dynamics. However, no supervisory structure was able to prevent the subprime systemic crisis, neither in the US (a complex mix of functional, sectoral and by objectives approach), nor in the UK, Germany, Belgium, (single regulator different from the central bank), nor in Ireland (single regulator within the central bank), nor in France, Italy (sectoral/by objectives approach), nor in the Netherlands (twin peaks model). All these models have in common a functional mismatch regarding the role of central banks and the preservation of systemic financial stability. In fact, substantially all countries have assigned to the central bank the task of ensuring macro-financial stability, even in countries where they don’t have, or

³⁵ See De Luna Martinez and Rose (2003).

have recently lost, direct supervisory functions on the banking and/or financial markets. However, if central banks do not dispose of micro-prudential supervision of SRFIs, regardless of their type of business, then the risk of pursuing an objective without adequate instruments might arise. In the following sections, after a cross-country overview on supervisory structures and a discussion of the role of central banks in financial supervision, a new supervisory framework for SRFIs is proposed, in which the central bank has micro-prudential supervisory powers on SRFIs on a cross-sector basis: all SRFIs would fall under the central bank umbrella, regardless of their legal nature and type of business. Such supervisory structure has both advantages and drawbacks: the main problem is related to the combination of monetary policy and micro-supervisory functions, which might lead to accommodative monetary policy to preserve the micro-stability of supervised entities. However, the traditional drawback due to the implicit extension of the safety net to non-bank financial institutions has been de facto removed by authorities' behaviour during the subprime crisis. On balance, the costs of potential distortions, also due to costs of supervision, might be lower than the costs of systemic crises, which are often accompanied and exacerbated by a destructive ambiguity in the policy choices on bailouts: a "constructive certainty" appears preferable. Consequent moral hazard risks stemming from the central bank's *ad hoc* supervision of SRFIs might be tackled through stricter regulation of SRFIs, for example on capital and leverage ratios and on off-balance-sheet activities.

A new framework for the financial supervisory architecture in Europe (euro area) is proposed, with the objective of arranging supervision of SRFIs at the European level. A new SRFIs supervisory EU agency might be created: this authority should be in charge of ensuring macro-financial stability and of prudential supervision of European SRFIs. Moreover, supervision of SRFIs on a global scale seems necessary to tackle the geographic misalignment given by the global nature of business and the national approach to supervision. A international

committee in charge of SRFIs supervision might be established and participated by national central banks, which would be responsible for the national supervision of SRFIs. Finally, the current allocation of supervisory responsibilities between home country and host countries creates a misalignment of incentives in managing financial institutions' distress, which may exacerbate the intensity of financial crises: a mechanism to realign incentives is proposed.

3.1 Models of financial supervision and cross-country overview of supervisory architectures

Economic and legal developments and innovations have made depository banks less “special” than they used to be and supervisory architectures have evolved accordingly. In fact, many countries have abandoned the traditional sectoral model of supervision and adopted integrated, cross-sectoral models³⁶. The three main broad areas on which financial regulation and supervision focus are macro-financial stability, micro-prudential stability and conduct of business regulation/investors protection. More detailed functions can be identified within each broad area. For example Llewellyn (2005, p. 112) offers a more specific taxonomy: 1) prudential regulation for the safety and soundness of financial institutions; 2) stability and integrity of the payments system; 3) prudential supervision of financial institutions; 4) conduct of business regulation; 5) conduct of business supervision; 6) safety net arrangements (deposit insurance and lender of last resort); 7) liquidity assistance for systemic stability (for solvent institutions); 8) the handling of insolvent institutions; 9) crisis resolution; 10) market integrity. The objective of the macroprudential supervision³⁷ is to limit financial system distress that might damage the real

³⁶ This section is largely based on Herring and Carmassi (2008).

³⁷ This distinction between macroprudential and microprudential supervision broadly follows the definitions introduced by Borio (2003).

economy. This function is based on an understanding of macroeconomic and financial relationships, economists tend to dominate in this area.

Crisis management is closely related to the macroprudential function. If macroprudential surveillance fails to prevent financial distress at a large institution, authorities may decide that intervention is necessary to limit the systemic spillovers, through provision of liquidity support either to the distressed institution or to other institutions through discount-window lending. By permitting institutions to borrow against their assets rather than selling them into a disorderly market, the authorities may be able to prevent a liquidity crisis from turning into a solvency crisis that could jeopardize a broader range of financial institutions and the real economy. Or it may involve the provision of liquidity to the broad market through open market operations. Because the central bank is the ultimate custodian of liquidity in an economy, it has traditionally played both of these roles.³⁸

Central banks generally provide liquidity assistance only on a fully collateralized basis. Thus if a systemically important institution becomes insolvent the participation of the deposit insurer (if any) or some entity representing tax payers, such as the Ministry of Finance or Treasury, must be included to determine the optimal resolution whether it be through liquidation or a subsidized merger.

The microprudential function is closely related to the macroprudential function, but its focus is on the solvency of individual institutions rather than the financial system as a whole. Its objective is to protect consumers from loss by monitoring the compliance of individual institutions with prudential regulations, bringing enforcement actions when compliance falls

³⁸ Based on the assumption that a central bank has control over monetary policy and the overall level of liquidity in the economy whether through open market operations or discount-window lending. The central banks of members of the European monetary system have only indirect influence over the money supply and the overall level of liquidity in the economy. They have become, in effect, financial stability agencies. The economies of scope and moral hazard arguments emphasized below are, therefore, less relevant for these institutions.

short. The approach tends to be bottom up rather than top down and may rely on peer group analysis to highlight areas where an individual institution may appear to be more risky than other similar institutions.

These functions are clearly interdependent. The optimal resolution decision will depend on data and institution-specific knowledge acquired through microprudential surveillance and the insights from macroprudential analysis. The need for crisis management may depend on the efficiency of resolution tools and the resolution process for dealing with insolvent institutions. If the exit of systemically important institutions can be facilitated without significant spillover costs, last resort lending may be completely unnecessary.

Conduct of business regulation is also concerned with consumer protection. But rather than focusing on the protection of clients from the insolvency of individual financial institutions, it emphasizes safeguarding clients from unfair practices. Conduct of business surveillance involves monitoring potential conflicts of interest between a financial institution and its clients. Conduct of business regulation may also include disclosure requirements, competition issues and anti-money laundering regulations. Since enforcement of conduct of business standards relies heavily on the interpretation of rules, standards and codes of conduct, lawyers tend to dominate this function.

These three basic functions can be organized in a variety of different institutional structures. Until the 1990s, however, sectoral and/or functional supervision prevailed in most major markets. Different financial sectors - banking, insurance and the securities industry - offered distinctive products, with the barriers between sectors often reinforced by regulation. Moreover, sectoral differences corresponded not only to regulatory differences but also to

differences in distribution channels, accounting practices, business practices and risk profiles.³⁹ With regard to prudential regulation these include differences in regulatory objectives, differences in the definition of regulatory capital and differences in capital charges.

The United States provides a particularly good example of these differences across banks, investment banks and insurance companies. Regulators in all three sectors emphasize conduct of business rules, particularly customer protection measures. The most striking differences are with regard to systemic risk. Systemic risk has long been the preoccupation of bank regulators reflecting the central role that bank runs have played in financial panics, recessions and depressions. Because of concerns about the contagious transmission of shocks across members of the same banking group, bank supervisors have insisted on consolidated supervision of banking groups and the application of prudential standards not only to each separate entity in the group, but also to the group as a whole.

In contrast, systemic risk has not been a concern of insurance regulators. This may well reflect the fact that an insurance company has never been implicated as the primary cause of a financial panic or significant downturn in economic activity. Since a contagious loss of confidence is not a central concern, insurance supervisors typically focus on the solvency of individual legal entities and do not insist on consolidated supervision. The collapse of HIH, one of the largest insurance companies in Australia, is sometimes mentioned as a counterexample. The collapse of HIH did, in fact, have an adverse effect on the real economy, but this was because of its status as the near-monopoly supplier of insurance to the construction and medical sectors. The collapse of HIH had virtually no impact on other financial institutions or financial markets.

³⁹ For additional discussion of cross-sectoral differences see Half and Jackson (2002).

Similarly, systemic risk has not been a concern of the primary supervisor of investment banks in the United States, the Securities Exchange Commission (SEC).⁴⁰ Instead the SEC has typically focused on the broker/dealer function, rather than the consolidated entity. It is only in response to intense pressure from the European Union that the SEC has agreed to undertake consolidated supervision of investment banking groups that form an investment bank holding company (Consolidated Supervised Entities program, launched in 2004 but ended in September 2008). These differences in objectives correspond to differences in procedures for dealing with faltering firms and differences in what counts as capital as well.

The primary objective of insurance regulators is the protection of policy holders and so, rather than trying to rehabilitate a faltering firm, they will tend to ring fence it to protect its assets for the benefit of policyholders. Since the main role of capital is to guarantee the claims of policyholders, insurance supervisors place very heavy emphasis on technical reserves (an allocation of assets to meet policy commitments).

Securities regulators are primarily concerned with protecting the customers of broker-dealers (and not the broker-dealers themselves). They want to insure that clients have unimpeded access to their assets and can continue to trade whatever the condition of their broker-dealer. The emphasis is on early intervention, before insolvency occurs, in order to transfer client accounts to a stronger institution before the faltering broker-dealer becomes ensnared in bankruptcy proceedings. Because it does not view the rehabilitation of faltering broker-dealers as part of its mission, the SEC places less emphasis than bank regulators on equity capital and has traditionally permitted substantial amounts of subordinated debt as regulatory capital.

⁴⁰ For a detailed analysis of structural differences between banking and securities market in terms of systemic risk see Allen and Herring (2001, pp. 27-28).

Although regulators in all three sectors count net worth as part of regulatory capital, the measures of net worth are not comparable because accounting conventions differ markedly across the three sectors. Securities firms practice mark-to-market or fair value accounting. Since assets and liabilities are always valued at current prices, the concept of valuation reserves is entirely irrelevant. Securities regulators tend to favor a high degree of transparency to enhance customer protection and to improve the efficiency of markets.

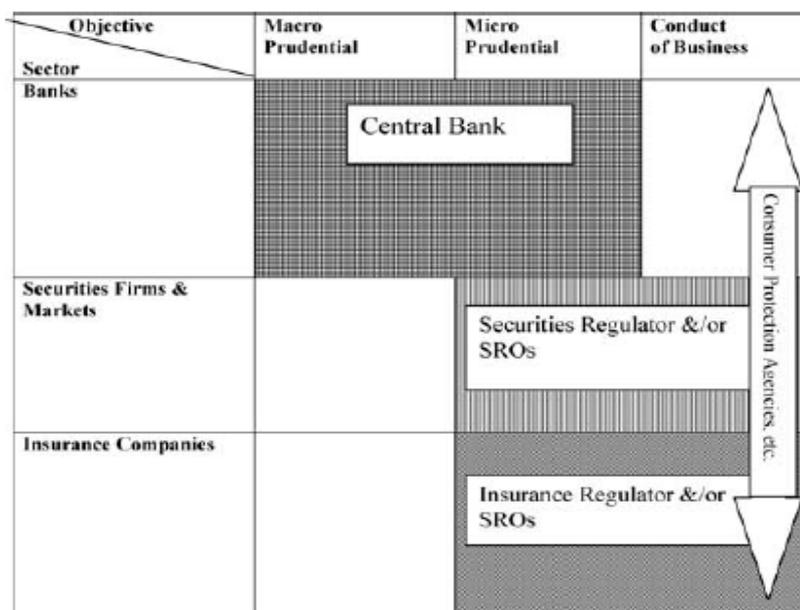
The traditional organization of supervision can be summarized in Figure 3.1.⁴¹ Oversight of banks was often (but not always) conducted by the central bank.⁴² Central banks generally conducted both micro and macro prudential surveillance, in part because they might be called upon to act as lender of last resort in the event of a banking crisis. They often shared conduct of business regulation with consumer fraud agencies, industry associations or law enforcement agencies.

Oversight of insurance and securities firms was conducted by specialist regulators and/or self-regulatory organizations. Securities firms and insurance companies were generally not subject to macroprudential supervision and, indeed, financial history had provided little justification for extending macroprudential regulation to these institutions, at least until the 2007-2008 financial crisis.

⁴¹These figures depicting alternative regulatory structures are based on diagrams introduced by Kremers, Schoemaker and Wiertz (2003).

⁴² For an historical overview of central banks' role in supervision see Hawkesby (2000).

Figure 3. 1. Traditional structure of financial supervision



Functional supervision aimed at various aspects of the conduct of business sometimes overlapped this sectoral (or institutional) supervision. Examples include disclosure regulation, anti-money laundering surveillance and protection against fraud. In large, decentralized economies this structure was even more complex with regional regulation layered over (or sometimes in lieu of) national regulation. In the U.S., for example, insurance supervision is conducted at the state level, with no national oversight.

Over the last two decades 30 countries have formed a unified financial supervisor. Recently, the pace has accelerated: in fact, twenty-three countries have established a single regulator in the last decade alone. After Singapore created a unified regulator in 1984, Norway (1986), Denmark (1988) and Sweden (1991) soon followed.⁴³ The most influential reorganization took place in the United Kingdom in 1997. Its role as a leading international

⁴³ For details regarding the organization of supervision in north-European countries see Taylor and Fleming (1999), Bjerre-Nielsen (2005), and Bonde (2005).

financial center means that supervisory initiatives taken in the UK inevitably engage the interests of financial institutions and supervisors everywhere. Figure 3.5 describes the structure and the evolution of the organization of supervision in 35 countries.

The details of the reorganization varied from country to country, but usually included oversight of banks, investment banks, and asset managers. Sometimes they included insurance companies and occasionally finance companies and pension funds as well. In general the integrated financial supervisor was given responsibility for microprudential and conduct of business supervision. Often the responsibility for macroprudential supervision was shared with other official agencies, especially the central bank. Sometimes the integrated financial supervisor was housed in the central bank, but more often it was not.

Four basic supervisory models can be identified. Supervision can be organized (1) by sector, (2) by objective, or (3) by function.⁴⁴ Alternatively, all supervision can be combined in a single (or unified) financial regulator⁴⁵ that has responsibility for both microprudential and conduct of business supervision for all financial institutions and activities (see Figure 3.3). Within a single regulator, the nature and intensity of supervision may vary based on the systemic importance of a financial institution and the sophistication of its customers. Large, systemically important institutions with retail customers would receive the greatest scrutiny. Small institutions with predominantly wholesale customers, in contrast, would be supervised with a very light touch.

⁴⁴ The model “by function” has found limited application, with the notable exceptions of the UK before the introduction of the single regulator and certain aspects of regulation by the SEC in the US. Merton (1993) has argued that functions performed by financial intermediaries are more stable than the institutions that perform them, so supervision should focus on functions and activities, rather than types of intermediaries.

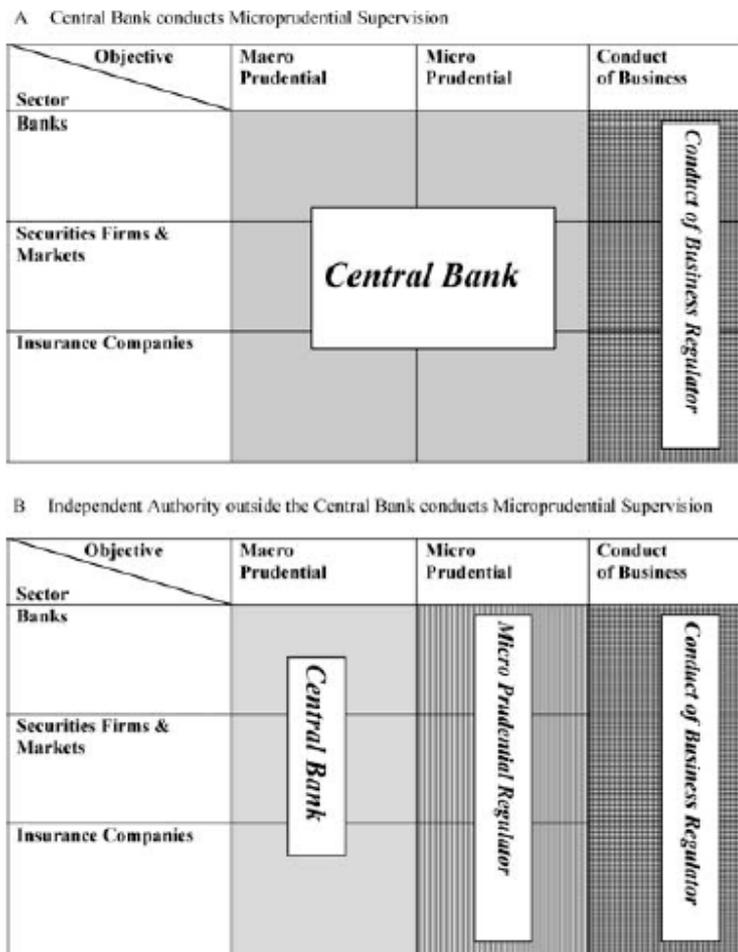
⁴⁵ For a detailed analysis of alternative supervisory models, see for example Di Giorgio and Di Noia (2001). For additional discussion of unified financial regulators see Mwenda (2006). Di Giorgio and Di Noia (2008) suggest the adoption of a 4-peaks model by objectives both in Europe and in the US (the 4-peaks model includes an antitrust authority).

Sometimes the term “integrated regulator” is distinguished from single or unified regulator. An integrated regulator has responsibility for only microprudential supervision or conduct of business supervision, but not both. The “twin peaks” model provides an example of integrated regulator model.⁴⁶ Figure 3.2 illustrates a version of the twin peaks model in which micro and macroprudential supervision are combined and housed inside the central bank.

As shown by Figure 3.5, European countries have adopted a variety of supervisory structures. Fourteen of the 27 EU countries have adopted a single financial regulator, even though they have implemented it in different ways. In 10 countries (Austria, Belgium, Denmark, Germany, Hungary, Latvia, Malta, Poland, Sweden, United Kingdom) the unified supervisor is separated from the central bank, while in 4 countries either the central bank is the single regulator (Czech Republic, Slovakia) or the single regulator is an agency of the central bank (Ireland) or an independent agency affiliated with the central bank (Estonia). Of the remaining 13 countries, 6 follow the sectoral approach (Cyprus, Greece, Lithuania, Romania, Slovenia, Spain), 3 introduced an integrated, sectoral model (Bulgaria, Finland and Luxembourg), and 3 have combined regulation by sector with regulation by objectives (France, Italy and Portugal). Finally, the Netherlands chose the twin peaks model, with the central bank responsible for macro and micro prudential supervision (see Figure 3.2.A).

⁴⁶ See Taylor (1995). The twin peaks model is integration by objectives. Another option for integration is by sector, in which one authority is responsible for two of the three sectors, while the third sector is supervised by a different authority.

Figure 3.2 The Twin Peaks Model (A) Central Bank conducts Microprudential Supervision (B) Independent Authority outside the Central Bank conducts Microprudential Supervision.



Australia adopted a different kind of twin peaks model in which the prudential supervisor, the Australian Prudential Regulation Authority (APRA), is located outside the central bank and an independent authority, the Australian Securities and Investments Commission (ASIC), oversees conduct of business regulation (see Figure 3.2.B).

Japan has also had a single regulator outside the central bank since 2000. Hong Kong and New Zealand follow the sectoral approach and in Singapore the central bank is the unified

regulator. Since 1987 Canada has integrated the supervision of banks and insurance companies in the Office of the Superintendent of Financial Institutions. In Canada, as in the US, where supervision by objective is mixed with sectoral and functional supervision,⁴⁷ the supervisory structure is complicated by the presence of both federal and state (or provincial) authorities.

The UK adopted the single regulator model, housed outside the central bank. Beginning in 1997, the UK consolidated 9 different regulatory entities into the Financial Services Authority (FSA).⁴⁸ The FSA is the sole supervisory authority for microprudential and most conduct of business issues, but it shares macroprudential oversight with the Bank of England (and with Her Majesty's Treasury (HMST)). The FSA has tended to focus on the fifty largest financial firms in the three combined sectors for prudential supervision. Other firms are supervised mainly to protect consumers and enforce compliance with conduct of business regulations and codes.

The Bank of England, FSA & HMT have monthly meetings to address mutual concerns, assess threats to financial stability, recommend measures to reduce risks and prepare to manage financial crises. The Bank of England retains primary responsibility for macrostability and controls the lender-of-last resort function, but must consult with HMT if taxpayer funds are to be put at risk.

⁴⁷ For example, the SEC acts not only as a sectoral supervisor, but also as a functional supervisor that cuts across institutions. Similarly the CFTC is a functional supervisor, while the FED has significant consumer protection responsibilities.

⁴⁸ The FSA, however, received its full range of supervisory powers on December 1, 2001, when the Financial Services and Markets Act (2000) came into force.

Figure 3. 3. The Single Regulator model.

Objective \ Sector	Macro Prudential*	Micro Prudential	Conduct of Business
Banks	<i>Central Bank</i>	<i>Single Financial Regulator</i>	
Securities Firms & Markets			
Insurance Companies			

* The horizontal stripes in the macroprudential column indicate a sharing of responsibility for this objective between the single financial regulator and the central bank.

The German Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin) has implemented a different approach to integration. The three sectoral agencies remain more or less intact within the BaFin with separate directorates in charge of banks, insurance activities and securities/asset management activities. In addition, three cross-sectoral departments were created (International/Financial Markets, Consumer and Investors Protection/Certification of Pension Contracts, Integrity of the Financial System). Only the International/Financial Markets division, however, has been explicitly assigned supervisory tasks with regard to financial conglomerates.⁴⁹ The BaFin shares responsibility for oversight of banks with the Bundesbank, which remains independent from the BaFin.

Regulators in the Netherlands have implemented the “twin peaks” version of the integrated supervisory model, which separates conduct of business supervision from macroprudential and

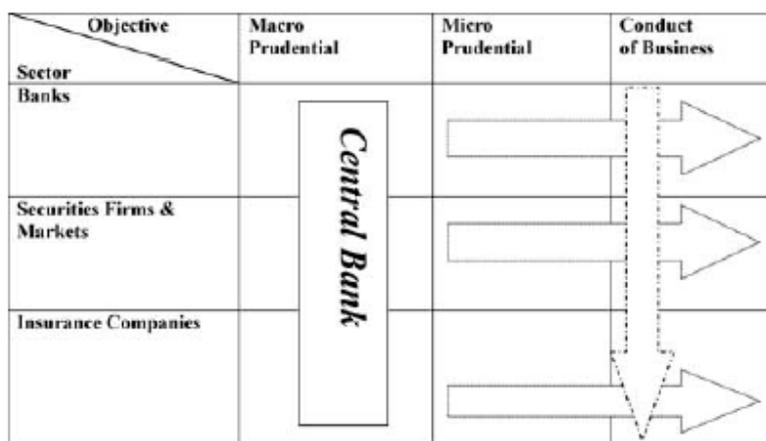
⁴⁹ On the internal organization of the BaFin see Schüler (2005), who identifies cross-sector integration in the financial industry and the growing importance of “Allfinanz” (one-stop financial services) as the main drivers for the introduction of the single regulator in Germany; the author also uses data on cross-industry M&A in the period 1990-1999 and market share of financial conglomerates to show that the degree of cross-industry integration has been significant in Germany.

microprudential supervision.⁵⁰ The Dutch Central Bank is responsible for both macroprudential and microprudential oversight of firms in all three sectors and the newly established Authority for Financial Markets has responsibility for supervision of conduct of business issues in all three sectors. Kremers, Shoenmaker and Wierts (2003, p. 238) argue that this model has the merit of avoiding potential conflicts of interest between the objectives of prudential supervision and conduct of business supervision.

In the United States, the recent financial modernization legislation, the Gramm-Leach-Bliley Act of 1999 (GLBA), established a new organizational architecture for oversight of financial conglomerates (see Figure 3.4). GLBA established a new category of financial service holding companies for firms that wished to combine banking activities with securities or insurance activities. The financial services holding company would be subject to prudential oversight by the Federal Reserve, while specialist sectoral supervisors would retain responsibilities for microprudential supervision of the individual entities in their sector. Moreover, existing functional supervisors – for example, the Treasury with regard to money laundering regulations and the SEC with regard to disclosure regulations for publicly trade securities – would continue to oversee particular functions. For most nonbanks the anticipated gains from operating a financial conglomerate do not appear to have been sufficient to overcome the prospective costs of prudential oversight by the Federal Reserve Board because only two – the securities firm, Charles Schwab, and the insurer, MetLife – have chosen to establish financial services holding companies. All other financial service holding companies have been established by banks, whose holding companies were already subject to prudential oversight by the Federal Reserve Board.

⁵⁰ This sketch of the Dutch system is based on Kremers, Schoenmaker and Wierts (2003).

Figure 3.4. The Gramm-Leach-Bliley Act model.



The US structure of financial regulation and supervision is extremely complex, also due to the presence of a state and a federal level⁵¹. The Federal Reserve, the Office of the Comptroller of the Currency (OCC), the Office of Thrifts Supervision (OTS) and the Federal Deposit Insurance Corporation (FDIC) are the federal authorities with banking supervision responsibilities. To these four agencies fifty state banking departments have to be added. The Securities and Exchange Commission (SEC) and Commodity Futures and Trading Commission (CFTC) are the two authorities responsible for regulation and oversight of the securities sector. There is no federal authority for the insurance sector, which is left to regulation and supervision of state insurance departments. The President's Working Group on Financial Markets ensures some form of coordination and its members are the Secretary of the Treasury, the Chairman of the Federal Reserve, the Chairman of the SEC and the Chairman of the CFTC. In March 2008 the US Treasury outlined a proposal for a reform of the financial supervisory architecture, aiming at the adoption of a model by objectives, and more precisely a twin peaks model without the central bank (central bank not involved in micro-prudential supervision): the Federal Reserve

⁵¹ For an in-depth study on the US regulatory and supervisory structure see Brown (2005), who proposed the establishment in the US of a single financial regulator.

would be responsible for the overall financial stability and two newly created agencies should be in charge of prudential supervision and and conduct of business regulation (United States Department of the Treasury 2008).

Figure 3.5. Supervisory Architectures in 35 countries (2006)

	Banks	Securities	Insurance	Year of establishment of integrated or unified supervisors	Organizational model	Does the central bank have primary responsibility for microprudential supervision?
Australia		P/C		1998	by objectives	no
Austria	U	U	U	2002	unified	yes**
Belgium	U	U	U	2004	unified	no
Bulgaria	CB	SI	SI	2003	integrated	yes
Canada	BI	S	BI	1987	integrated	no
Cyprus	CB	S	I		sectoral	yes
Czech Republic	CB	CB	CB	2006	unified	yes
Denmark	U	U	U	1988	unified	no
Estonia	U	U	U	2002	unified	no***
Finland	BS	BS	I	1993	integrated	no***
France	B	B/S	I		sectoral/by objectives	no
Germany	U	U	U	2002	unified	yes**
Greece	CB	S	I		sectoral	yes
Hong Kong	CB	S	I		sectoral	yes
Hungary	U	U	U	2000	unified	no
Ireland	U(CB)	U(CB)	U(CB)	2003	unified	yes
Italy	CB/S	CB/S	I		sectoral/by objectives	yes
Japan	U	U	U	2000	unified	no
Latvia	U	U	U	2001	unified	no
Lithuania	CB	S	I		sectoral	yes
Luxembourg	BS	BS	I	1999	integrated	no
Malta	U	U	U	2002	unified	no
Netherlands		P(CB)/C		2004	by objectives	yes
New Zealand	CB	S	I		sectoral	yes
Norway	U	U	U	1986	unified	no
Poland	U	U	U	2008	unified	no
Portugal	CB	CB/S	I		sectoral/by objectives	yes
Romania	CB	S	I		sectoral	yes
Singapore	CB	CB	CB	1984*	unified	yes
Slovakia	CB	CB	CB	2006	unified	yes
Slovenia	CB	S	I		sectoral	yes
Spain	CB	S	I		sectoral	yes
Sweden	U	U	U	1991	unified	no
United Kingdom	U	U	U	1997	unified	no
United States	CB/B	S	I		sectoral/by objectives/functional	yes

Sources: Herring and Carmassi (2008) on ECB (2006a) and “How Countries Supervise their Banks, Insurers and Securities Market 2007”

B = one or more authorities specialized in banking oversight

BI = authority specialized in oversight of the banking and insurance sector

BS = authority specialized in oversight of the banking sector and securities markets

C = authority in charge of conduct of business supervision for all sectors

CB = central bank

I = one or more authorities specialized in oversight of the insurance sector

P = authority in charge of prudential supervision for all sectors

P (CB) = central bank in charge of macroprudential and microprudential supervision

S = one or more authorities specialized in oversight of securities markets

SI = authority specialised in oversight of securities markets and insurance sector

U = single authority for all sectors

U (CB) = the unified regulator is an agency of the central bank

*The central bank of Singapore, the Monetary Authority of Singapore (MAS), was established in 1971 and had initially supervisory powers only for the banking sector; it was assigned supervisory functions on the insurance sector in 1977 and finally on the securities markets in 1984.

** The central bank is entrusted by law to conduct only specific supervisory tasks.

*** The integrated or single regulator is an independent agency of the central bank.

Why have several countries abandoned the traditional, sectoral model in favor of integrated financial supervision? What is the advantage to forming an integrated financial supervisor?⁵² Three main rationales are frequently offered. First is the need to respond to the convergence of lines of business across sectors to prevent inconsistencies or gaps oversight. Innovations in products and institutions have tended to blur the traditional boundaries between sectors. Advances in information technology and financial knowledge have enabled producers of financial services to create close substitutes for profitable products that were once the exclusive domain of financial institutions in another sector. Boundaries separating institutions could have been maintained by strengthening regulation, but heightened international competition in goods and services placed pressure on governments to liberalize regulations to reduce the cost of financial services.

Some firms responded to these forces by forming financial conglomerates that combined banking with investment banking or insurance activities or both. The prospect of achieving economies of scope appears to have influenced corporate strategy in some major markets, although the realized gains have been difficult to quantify. For example, in the Netherlands, financial conglomerates control 90 percent of banking, 70 percent of securities activities and 60 percent of the insurance market (Kremers, Schoemaker and Wierdsma, 2003, p. 230). Nonetheless, cross-sector mergers and acquisitions (M&A) have not trended upwards in the period 2000-2006. Moreover, cross-sector M&A in Europe and the United States continues to be small relative to within-industry M&A, whether measured by value or number of deals.⁵³

⁵² See also Abrams and Taylor (2000).

⁵³ Note that the increase in the percentage of cross-sector M&A in terms of number of deals in the period 2000-2006 relative to 1990-1999 is due mainly to a significant reduction of number of within-sector deals in the banking and insurance sector, not to an increase in the number of cross-sector deals. For a detailed analysis of M&A in the financial sector in Europe and the United States from 1985 to 2002, see Walter (2004).

Although many firms have expanded into other lines of business across sectors, most are still firmly anchored in their original core business in a single sector. Nonetheless, even if sectoral differences remain significant, the rise of financial conglomerates intensifies questions about the efficiency and equity of the traditional, sectoral approach to supervision. When applied to conglomerates, this approach may lead to substantial overlaps in supervisory efforts with correspondingly heavy compliance costs for conglomerates as they supply similar (but seldom identical) information to multiple supervisors.

The sectoral approach may also give rise to gaps in oversight if some of the activities of the conglomerate fall outside the scope of the sectoral supervisors. Given the size of most conglomerates, macroprudential concerns inevitably arise. Can specialist, functional supervisors provide adequate oversight for a conglomerate managed in an integrated fashion? In addition, differences in supervision across sectors inevitably raise questions about competitive equity.

The German draft legislation⁵⁴ to establish the BaFin explicitly cited the rationale of convergence of lines of business across sectors, noting that “Banks, insurance companies, and securities firms are now competing in the same markets for the same customers, with similar and often identical products and with the same distribution channels....” Moreover, in a survey of supervisors in 15 countries⁵⁵ that adopted integrated or unified regulators, De Luna Martinez and Rose (2003) report that 14 out of the 15 indicated the need to better supervise a financial system in which convergence of lines of business across sectors was growing. They also showed that the

⁵⁴ As quoted by Clive Briault (2002, pp. 7-8).

⁵⁵ Australia, Canada, Denmark, Estonia, Hungary, Iceland, Korea, Latvia, Luxembourg, Malta, Mexico, Norway, Singapore, Sweden, and the United Kingdom.

market share of financial conglomerates in these countries increased from 1990 to 2001, especially in the banking and in the insurance industry.⁵⁶

A second commonly cited rationale for integrating supervision is to level the regulatory playing field. Consistency in rule-making and oversight will eliminate opportunities for regulatory arbitrage across sectors and eliminate the possibility that firms in one sector can gain market share at the expense of firms in another sector because of regulatory advantages. Although whether competitive equity should be an objective of regulatory reform is open to question,⁵⁷ it has often appeared to be the primary motive for reform.

The third rationale for the integration of supervision is efficiency in oversight and compliance. With less duplication of supervisory effort and the potential for achieving economies of scale and scope in the production, transmission and interpretation of information, it should be less costly to produce supervisory services under one roof. Similarly, if supervised firms can provide information once in one integrated format, compliance costs should diminish. Like economies of scope in the production of financial services, economies of scope in supervision are difficult to verify empirically. Čihák and Podpiera (2006) found no evidence that supervisory integration brings costs reduction in terms of the number of employees in supervisory organizations.⁵⁸ Of course, the appropriate measure of cost should include much more than the regulatory head count. It should encompass all of the direct costs of regulation

⁵⁶ De Luna Martinez and Rose (2003) show that the market share of conglomerates in the banking sector increased from 53% in 1990 to 71% in 2000. For insurance, the comparable increase was from 41% to 70%. And, for the securities industry, the comparable increase was from 54% to 63%.

⁵⁷ See, for example, Herring and Litan (1995, pp.151-152).

⁵⁸ The authors conjecture that too little time may have passed since the establishment of many of the integrated authorities to observe a decrease or that cost savings may not be realized because new tasks have been assigned to the new integrated supervisors.

borne by the supervisory authorities as well as the direct and indirect costs borne by the supervised entities and the consumers of financial services.⁵⁹

Some proponents of the integrated supervisor model also advance a fourth rationale: that separating macroprudential oversight from microprudential and conduct of business oversight can improve outcomes for all three kinds of supervisory objectives. The hypothesis is that financial stability would be enhanced if central banks focus solely on macroprudential supervision without the distractions of microprudential concerns or conduct of business issues. Similarly, customer protection would improve if the integrated supervisor focuses on the conduct of business rather than the solvency of individual firms or macroprudential issues.

While there is certainly a presumptive case for clarity and focus in supervisory organizations, conflicts among objectives will inevitably arise. The question then becomes whether trade-offs can be made more effectively within or between supervisory agencies. Decisions can be made more readily when they take place within an organization that can deploy a full range of institutional incentives to reach agreement. But decisions taken within an agency are often opaque. Transparency and therefore accountability for such decisions may be enhanced if conflicts occur between agencies.

The move toward widespread adoption of the integrated supervisor model has raised some concerns, however. First is the threshold question of whether integrated supervision is feasible. Is it possible, for example, to treat the fifty largest firms in exactly the same way regardless of the sector in which each firm conducts its primary line of business? While there has been a definite blurring of the lines between financial institutions, sectoral differences still do matter. Differences in accounting conventions, for example, defy meaningful consolidation of insurance

⁵⁹ See Alfon and Andrews (1999), Briault (2003), and Franks, Schaefer and Staunton (1998). For empirical work on the direct costs of regulation see Coffee (2007), Jackson (2005) and Carmassi (2004).

business with banking and investment banking activities. Very few financial conglomerates actually run an insurance business in a totally integrated fashion with a banking business, which raises the question of whether oversight should be integrated even when the businesses are not.

A second concern is whether an integrated supervisor can strike an appropriate balance between conduct of business supervision and microprudential or macroprudential supervision. Typically conduct of business issues are more politically charged and publicly visible than the necessarily confidential microprudential problems in financial services firms. Will conduct of business objectives tend to dominate over time?

A third, related concern is potential cultural conflicts within an integrated supervisor. As noted above, lawyers tend to dominate in the supervision of conduct of business rules, while economists tend to dominate in the supervision of macroprudential issues. The US experience with the SEC suggests that when conduct of business issues are the primary objective, lawyers will shape the supervisory culture and control the supervisory agenda and even the information the agency collects. Whether this is welfare enhancing is open to question.

A fourth concern is that an integrated supervisor, with monopoly supervisory powers, may be more inclined to over-regulate. The possibility for users of financial services to shift from one firm to a differently regulated firm and the possibility for firms to shift regulators protects against the arbitrary or excessively burdensome regulation. The argument for regulatory competition is made most often by scholars in the United States,⁶⁰ which gives rise to the suspicion that it is mainly an ex post rationale for the complex and overlapping US regulatory system. Yet the numerous financial innovations that have started in the United States over the last 50 years are consistent with the concept of regulatory competition.

⁶⁰ See, for example, Coffee (1995) and Scott (1977).

A fifth and closely- related concern is whether an integrated supervisor with monopoly powers may be less flexible over time. If we were certain about what the rules should be and how they should be enforced, then an integrated supervisor would have obvious efficiency advantages.⁶¹ But if we are uncertain about optimum regulations and how they may change over time, an integrated supervisor may achieve static efficiency gains at the cost of dynamic efficiency. A degree of regulatory competition may enhance the efficiency of the financial system over the long run by increasing the likelihood that regulations will be responsive to changing circumstances.

Both of these concerns regarding the implicit monopoly powers of an integrated supervisor have less force in an open economy without capital controls or restrictions on entry by foreign financial institutions. International competition among regulators can achieve many of the gains associated historically with domestic regulatory competition in the United States.

3.2 The role of the central bank in financial supervision

A relevant feature common to the supervisory architecture of many countries is that central banks have responsibilities for the preservation of macro-stability without being entrusted with supervisory functions on the whole financial market, and in some countries not even on the banking sector. A possible solution might be the concentration of supervisory powers on financial markets (all sectors) within the central bank; however, as it is widely debated in the literature⁶², the concentration of supervisory powers within central banks may offer benefits but also poses a number of relevant problems, such as, for example, the combination of monetary

⁶¹ Similarly, if we were certain about what level market prices should be, there might be efficiency gains from a centrally planned economy.

⁶² See, for example, Herring and Carmassi (2008), Di Giorgio and Di Noia (1999), Goodhart and Shoenmaker (1995), Shoenmaker (1992).

policy and supervisory functions and the risk of an implicit extension of the safety net to non-bank financial institutions. In fact, this model has found limited application to date (Czech Republic, Ireland, Singapore and Slovakia represent some exceptions; see Figure 3.5). In the analysis of supervisory architectures the role of central banks plays undoubtedly a crucial role. As stressed by Masciandaro (2005) a negative correlation can be found between the establishment of a single regulator and the involvement of the central bank in financial supervision (“central bank fragmentation effect”)⁶³. Undoubtedly, the role of central banks have significant consequences on the overall supervisory architecture, the number of authorities, the type of model adopted and the approach to supervision. The debate about the opportunity of assigning to the central bank supervisory powers has focused to a large extent on criticalities potentially emerging from the combination of monetary policy and banking supervision.

Figure 3. 6. The supervisory role of central banks in 160 countries.

	Central Bank	Other	Total
Banks alone	81	10	91
Banks & Securities	3	5	8
Banks & Insurance	14	8	22
Banks, Securities & Insurance	9	32	39
TOTAL	104	56	160

Source: Llewellyn (2006).

⁶³ He also finds that the probability that a country adopts a unified regulator is higher the smaller the financial system, the more equity dominated the private governance model and the higher the standards of public governance. Moreover, the probability seems to be higher in Civil Law countries, especially if the legal framework has German or Scandinavian roots.

Such combination has both advantages and drawbacks, as it is ultimately the case for any supervisory structure. As a result, what matters is the balance between costs and benefits, and national peculiarities should be carefully taken into account. In fact, the origin and history of central banks is highly path-dependent and depends on historic, economic and political specific features of every single country. Hawkesby (2000, 37-8) identified three central banking models:

- the Bank of England model: established in 1694 as a private bank competing with other banks, it progressively developed supervisory skills due to repeated intervention to rescue the banking system, even though prudential supervision was formally assigned to the BoE only in 1979 (Banking Act), following the 1973-1974 secondary banks (the Bank of England, however, lost supervisory powers in 1997, even though it retained responsibility for systemic stability);- the U.S. Federal Reserve System model: the Fed was established in 1913 with the primary objective of prevent banking crises, which had repeatedly hit the country in the 19th century and at the beginning of the 20th century; monetary policy functions were assigned to the Fed only subsequently, in the 1920s (previously monetary policy had basically been determined by the Gold Standard mechanisms);

- the Bundesbank model: the German central bank was established in 1957 and it was granted independence in the management of monetary policy, with the objective of safeguarding the value of the currency and ensuring price stability. To prevent conflicts of interest, it didn't receive *explicit* supervisory functions, not to undermine the credibility of monetary policy (for example, through distortion of inflation expectations).

However, the lack of formal assignment to the Bundesbank of direct supervisory responsibilities does not imply that it is not indirectly involved in supervision. In fact, the German central bank was given the right to be consulted by the Federal Agency in charge of banking supervision, used to operationally participate to banking supervision and its consensus was compulsory for decisions who

would produce consequences on monetary policy; moreover, the Bundesbank is involved in specific supervisory tasks also with the new single regulator structure.

The Bundesbank model, with the central bank substantially and primarily responsible only for monetary policy, has represented the model for the European Central Bank. However, even though the ECB does not perform supervisory functions, many national central banks - which are member of the European System of Central Banks - dispose of banking supervision powers and, rarely, of supervisory functions also on non-bank financial sectors.

One of the most controversial issues is the potential conflict of interests stemming from the assignment of supervisory responsibilities to the central bank, due to the risk that monetary policy might be influenced by considerations about banking stability issues, which might lead to a lax attitude in the management of monetary policy. An empirical evidence of such risk was provided by Di Giorgio and Di Noia (1999). They found that inflation rate is considerably higher and more volatile in countries where the central bank acts as a monopolist in banking supervision and that a central bank with sole responsibility for bank supervision might produce consequences on banks profitability and on the balance sheet structure (higher costs and more deposits on the liabilities side, compared to more “sophisticated instruments” in countries where the central bank is not the solo bank supervisor). They also note that “a general problem of inconsistent policy assignment can emerge, given that with just one policy instrument there are two objectives to control: a trade-off among monetary stability and microstability of financial intermediaries (in particular, banking intermediaries) may exist and be difficult to tackle” (Di Giorgio and Di Noia 1999, pp. 16-17).

Monetary policy restrictions might exacerbate banks’ financial conditions and, ultimately, might hinder banks stability: as a result, if the central bank gives priority to the stability of the banking system, it is likely that no monetary restrictions be adopted or even that an expansionary policy is preferred when a restriction is needed. Such behaviour might be determined by the asymmetric effects

of supervisory performance: on the one hand, success of supervision are generally unnoticed, while, on the other hand, authorities' reputation and credibility may be dramatically hit by one or more, or systemic, bank failures. In turn, a lack or a loss of reputation and credibility may also seriously threaten the effectiveness of monetary policy.

Not only seem the updated data to confirm that mechanism, but they offer an even stronger evidence if the analysis is focused on those countries which used to have a monopolist central bank but then assigned supervisory powers to authorities different from the central bank. The trend is particularly evident for the UK, where the average inflation rate in the post-FSA reform, from 1999 to 2007, was at 1.56%, compared to an average of 5.35% in the 1980-1998 period (see Figure 3.7). Of course there is a wide range of factors that might explain this extremely significant divergence, the direction of the cause-effect chain might be debatable and the two time periods have a significantly different length. Still, this information, compared to the overall data of inflation rates in monopolist versus non-monopolist central bank countries, seems to suggest that the inflationary effect of concentration of banking supervision within the central bank has to be seriously taken in account as one of the most dangerous drawback of a central bank with supervisory functions.

Besides, profit and loss account data show that banks in countries with a monopolist central bank are more profitable, especially in the net income after tax (62% higher than for banks of countries with non-monopolist central bank). Also costs, and specifically staff costs, are higher where the central bank is the sole supervisor (29%; see Figure 3.8). These data also suggest that some regulatory capture dynamics might take place where the central bank is the monopolist supervisor and that the supervisor tends to overprotect supervised entities⁶⁴.

⁶⁴ On regulatory capture see the pioneering work of Stigler (1971).

Figure 3. 7. Inflation rate in monopolist and not-monopolist countries (average consumer prices, %)

Not-monopolist central bank	avg 1980-2007
Austria	2,66
Belgium	2,40
Canada	3,77
Denmark	3,81
Finland	3,81
France	3,86
Germany	2,38
Hungary	12,95
Japan	1,24
Norway	4,38
Poland	52,66
Sweden	4,73
United States	3,85
AVERAGE	7,88
AVG EXCL. HU, PO	3,35

Monopolist central bank	avg 1980-2007*
Bulgaria	72,38
Cyprus	4,19
Czech Republic	6,53
Greece	11,84
Hong Kong SAR	4,88
Ireland	5,16
Italy	6,23
Lithuania	38,61
New Zealand	5,73
Portugal	8,88
Romania	50,12
Singapore	1,96
Slovak Republic	7,14
Slovenia	9,41
Spain	6,13
AVERAGE	15,95
AVG EXCL. BU, LIT, RO	6,51

Not-monopolist but former monopolist central bank		
	avg. 1980-1998	avg 1999-2007
Australia	5,67	3,00
	avg 1980-2001	avg 2002-2007
Netherlands	2,69	2,03
	avg. 1980-1998	avg 1999-2007
Luxembourg	3,67	2,30
	avg 1980-1998	avg 1999-2007
United Kingdom	5,35	1,56

* 1981-2007 for Bulgaria; 1993-2007 for Lithuania and Slovenia; 1994-2007 for the Slovak Republic.
Source: elaborations on IMF World Economic Outlook database (IMF 2008c).

Figure 3. 8. Banks' profitability in selected countries (monopolist versus not-monopolist countries)

All banks (commercial banks for Greece and Portugal); average 1984-2005	CB MONOPOLIST (Greece, Ireland, Italy, New Zealand, Portugal, Spain)	CB NOT MONOPOLIST (Austria, Belgium, Canada, Denmark, Finland, France, Germany, Norway, Sweden, USA)	difference (monop-not monop), %
% of balance sheet total - average total			
Interest income	8,11	7,14	14%
Net interest income	2,48	2,08	19%
Net non-interest income	1,20	1,13	6%
Net interest and non-interest income	3,69	3,21	15%
Staff costs	1,33	1,03	29%
Income before tax	1,04	0,67	56%
Net income after tax	0,76	0,47	62%

Source: elaborations on OECD Bank Profitability database (2008b).

Briault (1999, p. 28) notes, however, that there might be a different cause-effect relationship, with the degree of independence of central banks having an impact on both the inflation rate and the combination of monetary policy and supervision: according to this view, the lower the degree of independence, the higher the probability that the two functions are combined and that the inflation rate is higher. The two latter variables would therefore be both dependent variables: independence would simultaneously determines both of them and there would not be a direct causation effect of combination of functions on the inflation rate. Coherently with this perspective, Goodhart e Shoenmaker (1995) noticed that the least independent central banks are the ones which perform both monetary policy and supervisory functions.

Bernanke (2007) denies the relevance of the concern about the combination of functions in the United States, noticing that “U.S. monetary policy has been quite successful for some time, and I am not aware of any evidence that monetary-policy decisions have been distorted because of the Fed’s supervisory role”. He also observed that “[T]he information, expertise, and powers that the Fed derives from its supervisory authority enhance its ability to contribute to efforts to prevent financial crises; and,

when financial stresses emerge and public action is warranted, the Fed is able to respond more quickly, more effectively, and in a more informed way than would otherwise be possible.” However, experience in several leading economies during the 1970s has demonstrated the heavy cost to real economy of a loss in confidence in the monetary authority. The US, for example, endured a double-dip recession and very high real interest rates for a number of years in the 1980s before confidence was restored in the Federal Reserve’s commitment to a low inflation rate. If the central bank is responsible for both monetary policy and microprudential supervision, it is possible that a highly visible failure in the latter may undermine confidence in the former. As stressed by Goodhart (2000), success in microprudential supervision is usually confidential while “failures” receive considerable adverse publicity, even when they should be regarded as evidence that the microprudential supervisor is performing its job effectively. He also observes that a central bank may have the resources and discretion to sustain an insolvent institution even when it should be resolved and may be motivated to do so out of concern for its reputation.

However, the historical experience of the United States between 1930 and 1938 and Japan after 1991 might prove the absence of a causality effect of expansionary monetary policy on banking crises: “the historical evidence instead suggests that periods of financial instability, and of major, continuing failures among banks are those where monetary policy has been too tight, e.g. Japan since 1991, USA between 1930 and 1939. Per contra, rapid credit expansion is simultaneously a danger signal for macromonetary policy and for supervisory concern at the micro-level of the individual bank. It would seem to be natural for the micro concerns of supervisors and the macro concerns of the monetary authorities to reflect and complement each other, rather than conflict” (Goodhart 2000, pp. 22-23). The story of the 2007-2008 financial crisis, however, might lead to completely different conclusions, since lax monetary policy (combined with huge foreign capital inflows) is regarded as one of the main structural causes. It is true that financial crises often explode as monetary policy begins to be restrictive,

but to what extent the real root is the monetary tightening or the previous expansive policy is an extremely controversial issue.

The main rationale to concentrate supervisory functions within central banks is the need to provide the supervisor with a complete oversight of financial markets. Informational synergies between microprudential supervision and monetary policy might provide a rationale for the combination: availability of information at the micro level might allow the central bank to achieve a better understanding of the macroeconomic context. A central bank not involved in microprudential oversight of banks might be less able to prevent and manage bank failures and systemic crises and also to perform effectively monetary policy functions. Viceversa, knowledge and expertise deriving from monetary policy, oversight of money markets and the payments system might be beneficial for supervisory activities.

A concern about establishing an integrated financial supervisor outside the central bank is whether it will be able to cooperate effectively with the central bank during a crisis. Crisis management requires rapid transmission and interpretation of information. In principle, interagency cooperation could ensure that information flows between agencies as readily as within agencies. Since crisis management often requires overcoming coordination and collective action problems, this seems a very serious concern. An interagency crisis management committee may not function as effectively as an institution that can deploy the full range of bureaucratic incentives to make decisions and initiate actions. The 2007-2008 subprime crisis showed, however, that both integrated regulators inside and outside the central bank incurred in huge failures: thus the root of the problem does not seem to be exclusively in the dichotomy of the integrated regulator inside or outside the central bank.

Besides, a protection of regulated entities by the central bank might take place not just through low interest rates, but also through lending of last resort functions: in this case, the injection of liquidity to support distressed financial intermediaries might be counterbalanced by open market operations, so that in the end the overall amount of money in the system would be unaltered and the only change

would be a re-distribution of liquidity in favour of intermediaries facing liquidity problems (Goodhart and Shoenmaker 1992, p. 361). Moreover, a widespread banking fragility is generally associated with deflationary dynamics, so that the conflict between the two objectives might turn out to be more apparent than real (ECB 2001, p. 6). According to Goodhart e Shoenmaker (1992, pp. 363-364), incentives to adopt an expansionary monetary policy and not restrictive actions (or to postpone them) largely depend on the structure of the banking and financial markets: the higher the share of intermediaries funding relying on maturity mismatch through wholesale and competitive markets, the higher the risk that a conflict may arise between the two objectives.

The key issue about liquidity support is certainly the distinction between illiquid but solvent institutions and insolvent institutions. The perspective adopted on the Bagehot doctrine may have a crucial impact on the decision to assign supervisory tasks to the central bank. According to the “open market operations view”, markets should be able to make the distinction and canalize resources to illiquid but solvent institutions, but not insolvent institutions. The ability to make such distinction would be made possible by the fact that illiquid but solvent intermediaries, unlike insolvent institutions, would be able to provide good collateral. In this case, there would not be any rationale for the central bank to step in as lender of last resort and it should not perform supervisory functions. On the other hand, the “banking policy view” admits the existence of a conflict between objectives, but still suggests that supervision should be assigned to the central bank, because markets would not be capable of distinguishing illiquidity from insolvency: for example, a bank might have good collateral available, but such collateral might be illiquid and consequently not useful to obtain refinancing. In this perspective, supervision might provide the central bank with precious extra information unavailable to the market (see Schinasi 2003, pp. 9-10).

The direction of causality might also be opposite: a lack of prevention and a poor management of systemic crises might undermine monetary policy credibility. This risk is probably

higher when regulatory capture and rent-seeking phenomena are more intense. There is also a relevant asymmetric reputational effect regarding the two functions: while the results of monetary policy may be somehow quantified and verified, the performance of supervision is not easy to be judged, let alone quantified. As a result, “the best the supervisors can expect is that nothing untoward happens” (Goodhart 2000, p. 21). It is important to observe that the potential conflict of interests between monetary policy and supervision is softened – at least formally - in the euro area countries, whose central banks have lost *direct* control on monetary policy decisions after the institution of the European System of Central Banks. Moreover, the European Central Bank does not have responsibility for microprudential or macro prudential supervision.

Beyond the criticalities related to the perverse effects on the inflation rate, other potential weaknesses related to the assignment of supervisory functions to the central bank derive from 1) the procyclicality of regulation versus the anticyclicality of monetary policy; 2) the excessive concentration of power (“monopolist bureau effect”, as defined by Masciandaro, 2005); 3) the risk of regulatory capture and 4) the moral hazard issue related to the safety net.

Concerns about excessive concentration of power in an independent, unelected body may lead to the establishment of an integrated supervisor outside the central bank. Interestingly, the shift of supervisory functions to integrated regulators external to the central bank has often coincided with a greater central banks’ independence in the monetary policy tasks. Padoa Schioppa (2003, p. 168) questions the practical relevance of the concentration of power issue, even though he believes that it is probably the strongest rationale against the involvement of central banks in supervision.

3.3 A new supervisory model for Systemically Relevant Financial Institutions

Although the concentration of cross-sector supervisory functions within the central bank may offer relevant benefits, the model of the single regulator within the central bank has not been particularly successful to date (see Figure 3.5 and Figure 3.6). As stressed by Masciandaro (2005), “it has been argued that the reason of the trade off between the supervision consolidation and the central bank involvement is because of a fear that the safety net – central bank function of lender of last resort – might be spread to a wider set of institutions than just banks if the central bank is also involved in supervising insurance and securities trading firms (blurring hazard effect)”. While the subprime crisis didn’t bring any significant innovation with regard to the procyclicality/anticyclicality, conflict of interests, concentration of power and regulatory capture issues, the extension of safety net to non-depository financial institutions might eliminate one of the main concerns traditionally associated to the combination of supervisory functions within the central bank: the moral hazard stemming from the implicit assumption of non-bank financial institutions that in case of distress they will receive support just as depository banks. In fact, during the subprime crisis it was made clear by authorities’ and governments’ behaviour that protection is very likely to be extended to non-bank financial institutions in case of distress and risk of systemic spillovers.

Different tasks have been assigned to central banks across countries and, consequently, any reform should take into consideration national peculiarities: there is no one-fits-all supervisory architecture. However, since central banks have been generally assigned supervisory powers on the overall macro-financial stability, a realignment of instruments and objectives appears desirable. Figure 3.5 shows that in many countries central banks do not have (primary) microprudential supervisory functions; besides, even when the central bank has microprudential responsibilities,

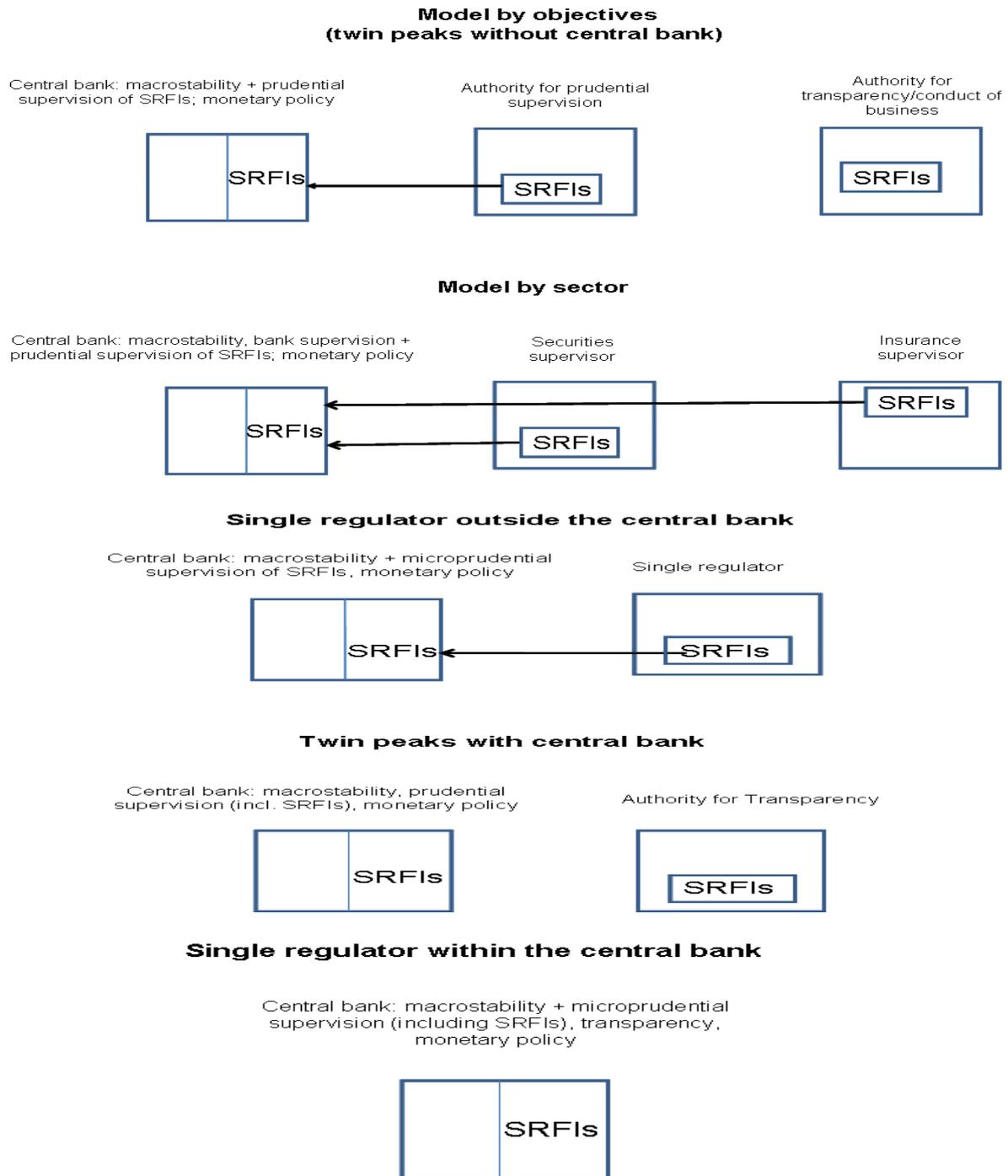
they are often limited to the banking sector and do not have a cross-sector nature, so that non-bank SRFIs fall out of the central bank supervision. The supervisory model by objectives provides a clear indication of the objectives to be pursued and suggests a coherent assignment of them across different authorities, each responsible for one single objective: an authority is responsible for micro-prudential supervision, another authority is in charge of transparency/conduct of business regulation and the central bank is entrusted with responsibility on macro-financial stability.⁶⁵ This model is particularly helpful to underline the separation of macro and micro-prudential stability functions, which might pose challenges to the effective safeguard of financial stability, given that single institutions with systemic relevance are not directly supervised by the authority responsible for the overall financial stability. The creation of a specific department within the central bank, separated by monetary policy functions and entrusted with microprudential supervision of SRFIs, might allow to solve such mismatch. Separateness of this department from monetary policy functions might be desirable to limit the potential distortions to monetary policy: in fact, as widely discussed, the combination of monetary policy and micro-supervisory functions might lead to accommodative monetary policy to preserve the micro-stability of supervised entities (especially banks). The optimal degree of separateness is hard to be determined on a general basis; there are advantages and drawbacks of combination, with a trade-off between protecting the independence of monetary policy and exploiting the informational benefits of the combination. The risk of a regulatory capture and its implications for monetary policy, profitability and balance sheet structure of supervised SRFIs suggest that some form of separation should be maintained.

The SRFIs department should assume micro-prudential supervisory functions on SRFIs on a cross-sector basis: this implies that any type of financial institution (commercial bank, investment bank, insurance company) deemed to be systemically relevant should fall under the central bank's

⁶⁵ On the supervisory model by objectives see Di Giorgio and Di Noia (2001, 2008), Taylor (1995).

umbrella. The SRFIs department within the central bank might also be structured as an interagency committee to benefit of specific skills and knowledge of financial supervisors specialized in the different sectors (this applies especially to countries which still adopt a sectoral approach to supervision). In countries where the model by sector is followed the only, but relevant, innovation to be introduced would be subjecting non-bank SRFIs to central bank's prudential supervision. In countries where the central bank does not dispose of supervisory functions at all, not even for the banking sector (single regulator outside the central bank, twin peaks without central bank), a more significant shift of powers should take place: prudential supervision of both bank and non-bank SRFIs should be transferred to the central bank. The twin peaks model with the central bank and the model with the single regulator within the central bank would need the least significant changes, given that the central bank already disposes of macro and microprudential supervision on a cross-sector basis. However, a specific department should be created to deal with SRFIs, which already fall under the central bank's supervision. As in the other models, this department should be separate to minimize the possible distortions which might arise from the central bank *ad hoc* supervisory activity on SRFIs. Figure 3.9 illustrates the required changes to current supervisory architectures in order to implement the new model of financial supervision based on SRFIs.

Figure 3. 9. New supervisory model based on SRFIs and required changes to current structures.



SRFIs should pay a supervisory fee to the central bank, which might create a separate fund to be specifically used for SRFIs supervision. Alternatively, since oversight of SRFIs should contribute to preserve a public goal - financial stability - the funding system might be mixed, with a

state funding to be added to the fees paid by SRFIs. It is probably desirable to impose *ad hoc* fees on SRFIs and not to adopt a totally public funded system, also to limit moral hazard (fees might be one of the possible instruments to make SRFIs pay a price for their systemic status). Placing SRFIs exclusively under the central bank's umbrella or imposing them a double supervision when they are not already supervised by the central bank is a debatable issue. On the one hand, the *direct* costs of regulation would increase with double supervision, and such additional burden would especially affect countries with an already high number of supervisory authorities; moreover, beyond direct costs, compliance and distortion costs should be taken into account⁶⁶. On the other hand, taking SRFIs completely away from their current supervisor would probably encounter strong resistances and pressures of both regulators and regulated entities.

Selection of a group of SRFIs and its disclosure to the market imply that their systemic nature is recognized and, consequently, that these financial institutions are likely to receive support from the authorities (central bank and government): this might weaken market discipline mechanisms for SRFIs. However, an explicit commitment towards SRFIs appears a better solution than a “constructive (destructive?) ambiguity”⁶⁷. Market discipline, in fact, is likely to be eroded even in absence of explicit commitments, for example on the basis of the too-big-to-fail doctrine: in that case, in fact, not only would market discipline result weaker, but it would also be biased from the assumption that what matters is merely size (the Lehman Brother’s failure proves that such assumption may be dramatically wrong). Moreover, as noted by Guttentag and Herring (1987),

⁶⁶ For analyses of costs of regulation see Alfon and Andrews (1999), Briault (2003), Franks, Schaefer and Staunton (1998). For empirical work on the direct costs of regulation see Coffee (2007).

⁶⁷ Bagehot supported explicitness rather than ambiguity with specific reference to lender of last resort functions: “The public is never sure what policy will be adopted at the most important moment: it is not sure what amount of advance will be made, or on what security it will be made. The best palliative to a panic is a confidence in the adequate amount of the Bank reserve, and in the efficient use of that reserve. And until we have on this point a clear understanding with the Bank of England, both our liability to crises and our terror at crises will always be greater than would otherwise be.” (Bagehot 1873, pp. 208-209). A similar conceptual framework may be applied to any type of support – not only lending of last resort – offered to SRFIs. Besides, it has to be noted that ambiguity is not confined to the bailout versus non-bailout choice, but concerns a wide range of factors related to the forms, conditions and duration of support.

market discipline may fail to perform its functions (e.g. penalty premium for excessive risk-taking behaviour) because markets, and depositors even more, lack accurate and timely information, so that risk premiums probably end up being determined largely by the size of a financial institution. Guttentag and Herring also identifies both ex-ante and ex-post costs of ambiguity: largest banks might be provided ex-ante with an unwarranted competitive advantage and ex-post it is not sure that they will be protected from devastating bank runs. They refer to the failure of Continental Illinois to provide an example of the consequences that might arise from the absence of an explicit guarantee: nine days after the run on the bank the US authorities took the unprecedented step of explicitly guaranteeing all depositors and other general creditors of the bank. Beyond such guarantee, the program also included a \$1.5 billion capital injection from the FDIC and \$0.5 billion from a group of commercial banks, an increase in secured credit lines from other banks to \$5.5 billion and an unlimited liquidity commitment by the Federal Reserve. However, all these measures were not sufficient to stop the run on the bank. The similarity with the approach adopted by central banks and governments during the 2007-2008 crisis is striking (recapitalization, debt guarantee and central bank liquidity facilities). Once a financial institution faces financial distress - either liquidity or solvency problems - ex-post rescue measures may arrive too late and may not be credible, so that market confidence in that institution is not restored.

In the proposed supervisory model the focus is on SRFIs, rather than on size, and this might contribute to eliminate or at least correct the bias in favour of large financial institutions. The substantially explicit commitment might represent a credible guarantee that a SRFI would be rescued in case of distress. Coherently, non-SRFIs should not receive any type of public support, given that, by definition, their failure would not cause costs and disruption to the financial sector and the real economy serious enough to justify and deserve a public intervention.

The main criticality of the proposed model might be moral hazard, even though with different dynamics than those stemming from the concentration of supervisory functions on the entire financial market within the central bank: in fact, if the central bank is the sole financial supervisor, moral hazard might arise because of non-bank financial institutions' expectations to benefit of the safety net in case of distress. In the proposed supervisory regime this effect would be limited to SRFIs (both bank and non-bank SRFIs). To contain such mechanism it is fundamental to design a differentiate regulatory regime for SRFIs. The rationale is that different degrees of (explicit or implicit) protection should always be accompanied by different rules: a price has to be paid for protection and the price should be higher if the (expectation and probability of) protection is higher.

3.4 Regulation of Systemically Relevant Financial Institutions

A special regulatory regime for SRFIs might create incentives (or disincentives) to qualify as SRFIs and regulatory arbitrage issues might arise. A very dangerous drawback would be that institutions classified as SRFIs would consider themselves more protected and likely to receive public support than non-SRFIs and would probably take on more risk than they would if they were not SRFIs. It has to be underlined, however, that probably large financial institutions already assume that they are too-big-to-fail and that government is very likely to bail them out in case of distress. The identification and disclosure to the market of SRFIs would only formalise and clarify what is often a *de facto* situation, but with a relevant innovation: it would also eliminate the misperception that size is what triggers public intervention: systemic relevance, not mere size, is - or should be - the rationale for bailouts. A costs-benefits analysis of constructive (or destructive?) ambiguity versus "moral hazard certainty" suggests that the second choice might be preferable, but

only as long as a number of conditions are met. The conceptual key is that moral hazard should be contained by creating a specific regulatory framework for SRFIs, just as it happened with commercial banks.

In principle, a regulatory framework should be designed in such a way that financial institutions are not tempted to exploit a regulatory arbitrage and that no significant regulatory discrepancies across sectors arise, especially in presence of significant cross-sector integration. The treatment of the same financial asset should be the same in terms of capital absorption, independently from the type of financial institution. For example, interestingly, financial institutions other than banks hold more low-rated structured credit products as a share of total structure credit products in their portfolios, which is probably related to lower capital charges for non-bank financial firms and therefore might represent a case of regulatory arbitrage (IMF 2008a). The conceptual framework behind the proposal of “competitive neutral” cross-sector capital requirements is a key issue: as noted by Benink and Llewellyn (1995, pp. 203-204), if the probability and related costs of potential failures are similar across-sectors, then different capital requirements are likely to produce asymmetric consequences and pave the way for an unjustified anti-competitive regulatory treatment for some categories of financial institutions; however, a different burden of capital requirements across sectors is justified if institutions of a particular sector/typology are more likely fail and/or more likely to cause higher social cost in case of failure, which is – by definition – the case of SRFIs. The same reasoning about competitive neutrality may be applied also to other areas of regulation different from capital requirements. Overall, an *ad hoc* regulatory treatment is therefore desirable to contain moral hazard and acceptable with regard to competition issues, given the asymmetric potential effects of failures of SRFIs versus failures of non-SRFIs.

Creating an ad hoc regulatory regime for SRFIs is certainly an extremely complex task. There are many aspects that such specific regulation should address. For example, a diversified and systemic-risk-based approach to deposit insurance might be an important tool to preserve a level-playing field. Maximum coverage of deposit insurance should not be diversified between SRFIs and non-SRFIs: a different degree of protection for SRFIs depositors might induce a massive flight of deposits to SRFI and would probably cause a (paradoxically) systemic shock to non-SRFIs. However, a possible adjustment might be applied to the price paid by SRFIs for deposits protection. There could be at least two possible solutions: 1) a higher level of deposit insurance premiums for depository SRFIs; 2) a co-insurance system, with SRFIs required to top up the amount covered by the deposit insurance scheme.

Activity in OTC markets should be discouraged (for example through extra fees to be paid to a central counterparty) or it should be regulated and supervised and not left to bilateral agreements which escape supervision and are likely to cause a high degree of uncertainty in bankruptcy procedures. Another possible instrument might be the introduction of *ad hoc* limits for large exposures, stricter than those applied to other financial institutions. Here the focus is on two aspects which seem to be particularly relevant: capital/leverage ratios and off-balance sheet entities.

Capital appears to be one of the main - if not the main - issue at the roots of the subprime crisis. The revision of the Basel I framework, deemed not to be sufficiently risk-sensitive, was based on the idea that capital requirements should be better aligned with the actual risk incorporated in assets. At the beginning of the crisis capital ratios in major countries were in compliance with capital requirements, the ratio of total capital on risk-weighted assets being at least equal to 8%. In the first phase of the turmoil, such compliance was presented as evidence that companies were basically facing liquidity troubles and were not affected by capital shortage. That was officially declared by the Chairman of the SEC, Christopher Cox, who declared right in the aftermath of Bear

Stearns collapse that “the fate of Bear Stearns was the result of a lack of confidence, not a lack of capital” (Cox 2008). In fact, the holding company capital ratio was at 13,7%, 14,4% and 13,5% respectively at the end of December 2007, January 2008 and February 2008⁶⁸. An overall outlook on capital ratios at the end of 2007 suggests that information on risk-based capital may hardly be effective in predicting an incoming crisis. In fact, while data on profitability did show a deterioration of economic performance, the indications stemming from capital ratios appear much less reactive and efficient in signalling financial distress (see Figure 3.10). Moreover, the passage to Basel II is likely to have weakened capital buffers, especially for large banks which adopted internal advanced models. In Europe, the Basel II framework, applied since January 1, 2008, led to a “paradoxical” improvement in total capital ratios, since regulatory capital decreased but less than risk-weighted assets from yearend 2007 to mid-year 2008 (-3,2% versus -9,6%). As a consequence, the average capital ratio went up from 11,4% at the end of 2007 to 12,2% at the end of June 2008, while the Tier 1 ratio increased from 8,8% to 9,3% in the same period (source: Mediobanca 2008). The new Basel framework might not be effective in ensuring that banks keep a sufficient capital buffer and in providing the authorities with timely early warnings.

⁶⁸ The Consolidated Supervised Entities program had relaxed limits on leverage for investment banks but had imposed high risk-weighted capital requirements (10%, corresponding to the “well capitalized” category in the Prompt Corrective Action scheme).

Figure 3. 10. Profitability, capital and liquidity ratios of major banks

Profitability of major banks ¹												
As a percentage of total average assets												
	Pre-tax profits			Loan loss provisions			Net interest margin			Operating costs		
	2005	2006	2007	2005	2006	2007	2005	2006	2007	2005	2006	2007
Austria (3)	0.85	1.64	1.29	0.30	0.38	0.28	1.64	1.90	2.24	2.10	2.40	2.40
Australia (4)	1.52	1.62	1.67	0.14	0.13	0.15	1.92	1.96	2.01	1.70	1.64	1.63
Canada (5)	1.01	1.32	1.27	0.10	0.10	0.14	1.79	1.64	1.68	3.00	2.56	2.57
Switzerland (6)	0.66	0.87	0.31	0.00	0.00	0.01	0.63	0.53	0.45	1.67	1.73	1.70
Germany (7) ²	0.38	0.55	0.28	0.06	0.07	0.04	0.65	0.68	0.52	0.96	1.32	0.98
Spain (5)	1.15	1.51	1.65	0.23	0.33	0.41	1.55	1.78	1.94	1.70	1.91	1.96
France (5)	0.76	0.87	0.41	0.06	0.06	0.09	0.93	0.76	0.47	1.47	1.43	1.28
United Kingdom (8)	0.87	0.97	0.67	0.23	0.27	0.23	1.23	1.26	0.94	1.59	1.70	1.36
Italy (4)	1.23	1.12	0.88	0.23	0.26	0.25	1.95	1.93	1.71	2.34	2.34	2.01
Japan (13) ²	0.66	0.67	0.50	0.12	0.15	0.13	0.89	0.97	0.75	1.05	1.15	0.80
Netherlands (4)	0.58	0.57	0.38	0.05	0.10	0.10	1.09	1.17	0.99	1.29	1.48	1.37
Sweden (4)	0.90	1.06	0.98	0.01	-0.03	0.01	1.03	1.08	1.07	1.07	1.11	1.07
United States (11)	1.93	1.82	1.02	0.20	0.20	0.56	2.72	2.50	2.47	3.44	3.12	3.51

¹ All values are IFRS; the number of banks included is shown in parentheses. ² Values are a mix of local and US GAAP.
Sources: Bankscope; FitchRatings. Table VII.1

Capital and liquidity ratios of major banks ¹									
	Tier 1 capital/risk-weighted assets			Non-performing loans/total assets			Net loans/total deposits		
	2005	2006	2007	2005	2006	2007	2005	2006	2007
Austria (3)	7.7	8.9	8.1	2.3	2.1	1.8	56.4	58.1	63.2
Australia (4)	7.5	7.2	6.8	0.1	0.2	0.2	88.3	89.8	85.1
Canada (5)	9.9	10.4	9.6	0.3	0.2	0.2	58.3	56.2	57.2
Switzerland (4)	11.7	11.7	9.8	0.2	0.2	0.1	25.2	26.1	27.3
Germany (7)	8.4	8.4	8.0	1.0	0.6	0.8	36.2	30.4	25.4
Spain (5)	7.9	7.6	7.9	0.5	0.5	0.6	69.9	76.7	76.1
France (4)	8.1	7.9	7.4	1.2	1.2	1.3	32.3	36.5	25.8
United Kingdom (7)	7.5	7.9	7.6	0.8	0.7	0.8	54.8	54.5	51.1
Italy (4)	4.7	5.0	6.6	4.0	3.2	3.1	42.7	49.6	70.9
Japan (10)	7.3	7.9	7.4	1.1	1.0	0.9	53.1	55.1	62.5
Netherlands (4)	10.4	9.4	10.0	0.6	0.6	0.4	54.1	55.8	55.1
Sweden (4)	7.1	7.2	7.1	0.4	0.4	0.3	71.7	74.2	74.9
United States (11)	8.4	8.6	8.0	0.3	0.3	0.6	63.4	63.6	61.5

¹ Weighted averages by banks' total assets; in per cent; the number of banks included is shown in parentheses.
Source: Bankscope. Table VII.2

Source: Bank for International Settlements (2008)

Also Tier 1 capital on risk-weighted assets remained at good levels in 2007, despite a wide and significant decline in profitability (see Figure 3.10). However, risk-weighted capital ratios are only one side of the coin and appear unable to provide satisfactory explanations. The other factor to

be taken into account is leverage, or capital ratio in absolute values, without the filter of risk-weighting. Data on leverage reveal that the main weakness was not a lack of formal compliance with capital requirements, but an exploiting of regulatory arbitrage which allowed banks to comply with the 8% ratio even when having an impressively high leverage ratio. In the United States the overall bank capital to assets ratio for all FDIC-insured institutions was around 10% between 2003 and 2007; the same figure was much lower (implying higher leverage) in European countries (in 2007 it was 7.7% for Italy, 5.5% for France, 7% for Spain; in 2006 it was 4.3% for Germany and 8.9% for the UK). It has to be noted that in the US bank holding companies and state member banks have to meet a minimum level of primary capital to total assets of 5.5 percent and a minimum level of total capital to total assets of 6 percent⁶⁹. Moreover, a minimum ratio of Tier 1 capital to total assets of 3 percent is required for “strong” bank holding companies, while for all other bank holding companies the minimum ratio is 4 percent⁷⁰.

The bank regulatory capital to risk-weighted assets ratio was around 13% in the US in the period 2003-2007 for FDIC-insured institutions. Major European countries had a comparable ratio in the same period, around 13% and generally higher than 10%. These numbers⁷¹ confirm in aggregate a general compliance with the Basel capital requirements. However, an excessive leverage emerges for some European countries, even in the aggregate data (over 20 for Germany), for the US investment banks (see Figure 3.11) and also for many large European banks, which had a leverage ratio, measured as (non-risk-weighted) total assets on capital, higher than 50 at the end of June 2008: this was the case of Barclays, Crédit Agricole, Deutsche Bank, Dexia, Ing and Société Générale. Other institutions had comparatively lower but still extremely high leverage ratios: BNP

⁶⁹ Regulation Y, Appendix B to Part 225 - Capital Adequacy Guidelines for Bank Holding Companies and State Member Banks: Leverage Measure.

⁷⁰ Regulation Y, Appendix D to Part 225—Capital Adequacy Guidelines for Bank Holding Companies: Tier 1 Leverage Measure.

⁷¹ The source for these data is IMF (2008b, pp. 215-218).

Paribas, Commerzbank, Fortis, HBOS, Lloyds TSB and UBS had a leverage ratio above 30 (see Mediobanca 2008)⁷².

Figure 3. 11. Leverage of US investment banks

Leverage ratio of the top 5 US investment banks (total assets/equity capital)	2008**	Nov. 2007	Nov. 2006
Bear Stearns	32,8	32,8	26,5
Goldman Sachs	23,7	26,2	23,4
Lehman Brothers	24,3	30,7	26,2
Merrill Lynch*	20,3	27,8	19,9
Morgan Stanley	23,4	32,6	30,5

* Data on 2006 and 2007 as of December.

**GS: August 2008. BS: February 29, 2008. ML: September 26, 2008. LB: May 31, 2008. MS: August 31, 2008.

Source: companies' 10-K and 10-Q.

It is crucial to stress that these institutions were compliant with the Basel capital requirements (regulatory capital on risk-weighted assets equal at least to 8%). It is also fundamental to note that with a leverage ratio of 50 an assets devaluation of a mere 2% can precipitate the firm into insolvency. The Basel framework leaves to national authorities discretion in the adoption of a minimum threshold for capitalization in absolute values (not on risk-weighted assets). What these data clearly suggest is that on the one hand risk-weighting of assets is crucial to avoid excessive risk taking and moral hazard, and this was the rationale behind the introduction of the Basel I capital regulation. On the other hand, however, risk-weighting may lead to perverse incentives to “hide” the risk of assets without limiting assets growth in absolute values: this mechanism may cause an extremely high leverage, even though risk-weighted capital requirements are met. Different instruments have been employed by banks to take advantage of this regulatory gap: among them,

⁷² Since January 2008 most of these banks decided to raise capital and were recapitalized (or selected as eligible for recapitalization) by their respective governments.

risk-shifting strategies through off-balance sheet vehicles and credit default swaps have played a major role (CDS may allow to charge zero capital on the insured asset; see Zingales 2008). The crucial issue is whether a financial institution actually transfers risks or maintains some degree of exposure, even though this is not explicitly declared (as in the case of implicit liquidity commitments to SIVs).

A combination of caps on leverage and risk-weight capital requirements might be able to prevent such regulatory arbitrage, and even though it should be applied to all financial firms, it appears particularly desirable for SRFIs. It has to be noted that a leverage ratio would be itself sufficient and “inclusive” of risk-weighted capital requirements; however, the latter might allow to impose a lower threshold for maximum leverage and contain restrictive effects on assets and credit expansion. If such requirements were to be applied indistinctly to all banks/financial institutions, then stricter thresholds should be applied to SRFIs: the rationale is always that eligibility for safety net and public support has to be somehow paid by potential beneficiaries, to preserve level-playing field and competitive dynamics. Besides, stricter requirements for the composition of regulatory capital should be met by SRFIs. For example, a higher minimum level for Tier 1 and Core Tier 1 ratios might be imposed on SRFIs, and lower limits might be placed on the use of hybrid capital instruments⁷³.

Most importantly, all these requirements should not leave gaps: for example, the banking system in the US has an overall leverage ratio lower than the EU banking system, but the investment banking was clearly overleveraged, due also to the 2004 legislation which introduced the Consolidate Supervised Entities (CSE) Program for investment banks and relaxed leverage

⁷³ On the treatment of hybrid instruments as regulatory capital see the EU Commission proposal to amend the Capital Requirements Directive (EU Commission 2008c).

limits⁷⁴. Besides, the new regulation should be designed on an international basis, to prevent geographic arbitrage: for example, financial institutions could locate unconsolidated vehicles in countries with more favourable regulation to take on excessive leverage. Requirements on a consolidated basis might contribute to contain such risk, but a cross-border homogeneity would be fundamental to ensure that significant entities in foreign countries do not avoid regulation (especially if those entities are systemically relevant in the host country).

The issue of off-balance-sheet vehicles is connected with the capital and leverage issues. Special Purpose Vehicles are created by a sponsor firm and are financially insulated by it. A main rationale for their creation is bankruptcy remoteness⁷⁵, which allows them to benefit of higher ratings on their liabilities and therefore reduce the funding costs. The objective is to reassure investors in the SPV that their rights to the promised cash flows will not be compromised by financial distress or insolvency in the sponsor or its affiliates. The SPV itself is structured so that it cannot be taken through bankruptcy. Typically any shortfall of cash that would otherwise cause an event of default will trigger, instead, an early amortization of the pool of assets. The benefit of this structure is that it should avoid the deadweight costs of financial distress and so the debt issued by the SPV should not be subject to a bankruptcy premium. By separating the control rights over assets from the financing of these assets, the SPV reduces the costs of financial distress and thus the cost of debt financing (Gorton and Souleles 2006).

SPVs are created for a limited and specific purpose which is defined by a set of contractual obligations determined as they are established. SPVs buy pools of assets, generally originated by

⁷⁴ The CSE program made investment bank holding companies subject to the SEC supervision on a voluntary basis and did not require a leverage ratio limit for the CSE firms. Previously, the broker-dealers affiliated with the CSE firms were required to either maintain a debt to-net capital ratio of less than 15 to 1 (after their first year of operation) or have net capital not less than the greater of \$250,000 or two percent of aggregate debit items computed in accordance with the Formula for Determination of Reserve Requirements for broker-dealers (SEC 2008, p. ix). The equity on assets ratio of Lehman Brothers constantly decreased since 2003 from 4.64% to 3.25% in 2007.

⁷⁵ Other rationales may be related to a more favourable accounting treatment for the sponsor, tax efficiency and reduction of deadweight costs (see Tufano 2006).

the sponsor, and issues debt whose repayment is granted by the cash flows deriving from the pool of assets. SPVs tend to be thinly capitalized, lack independent management or employees and have all administrative functions performed by a trustee who receives and distributes cash according to detailed contracts. Most SPVs involved in securitization are organized as trusts, although they may also be organized as limited-liability companies, limited partnerships or corporations. For some kinds of transactions substantial tax benefits can be achieved if an SPV is domiciled offshore – usually in Bermuda, the Cayman Islands or the British Virgin Islands (Gorton and Souleles, 2006)⁷⁶.

To guarantee the bankruptcy remote status of SPVs the sponsor should not make any legal commitment, which might cast doubt on the bankruptcy remote structure of the SPV. If a sponsor should enter bankruptcy proceeding, the judge might recharacterize the sale of assets to the SPV as a secured financing, which would bring the assets back onto the sponsor's balance sheet. Attempts to minimize this possibility account for a considerable amount of the complexity of securitization vehicles. For example, sponsors often employ a two-tiered SPV structure to provide an extra layer of insulation between the claims of the investors and the sponsor (Gorton and Souleles, 2006, p. 558).

If the SPV funding occurs through short-term liabilities, its balance sheet structure may be substantially similar to that of banks, with illiquid long-term assets and liquid short-term liabilities (this applies, for example, to SIVs). The extremely relevant difference is that, unlike banks, SPVs do not have to comply with banking regulation and are thinly capitalized, which implies that their use may have a significant impact on the *substantial* leverage ratio of the sponsor firm. If the SPV faces a financial distress, the sponsor is likely to bring it back on its balance-sheet, even when no formal commitment to do so has been explicitly established: the incentive behind this action is to a

⁷⁶ See Herring and Carmassi (2009) for data on presence of LCFIs in Offshore Financial Centers.

large extent reputational risk. Gorton and Souleles (2006) present evidence that sponsors have supported their SPVs and, based on the pricing of debt issued by SPVs and the credit rating of the sponsoring institution, conclude that investors rely on this implicit support. Gorton and Souleles (2006) argue that this implicit commitment is essential to deal with moral hazard and adverse selection problems implicit in the asymmetric information between the originator of the assets and investors in the SPV. Nonetheless, the efforts by several LCFIs to support their Structured Investment Vehicles and Asset Backed Commercial Paper Conduits during the turmoil in financial markets in the latter half of 2007 appear to have surprised shareholders and some regulators. In any event, this disconnect between explicit and implicit contracts complicates any analysis of how the existence of SPVs might affect the resolution of an SRFI experiencing extreme financial distress. Although these bankruptcy-remote structures may well turn out to be “bullet proof,” they are likely to complicate the resolution of a faltering SRFI.

The key issue is whether an SPV is consolidated or not by its sponsor. According to the Financial Accounting Standard No. 140, a number of requirements have to be met to allow the sponsor firm not to consolidate an SPV. Specifically, a “true sale” has to occur, which means that the sponsor must surrender control of the assets sold to the SPV and the SPV must be a qualifying SPV (QSPV). A QSPV must be clearly distinct from its sponsors: the sponsor cannot unilaterally dissolve the SPV and at least 10% of the fair value of its beneficial interests must be held by unrelated 3rd parties (Gorton and Souleles, 2006, p. 556). QSPVs do not have to be consolidated in their sponsor’s financial statements. Some Variable Interest Entities (SPVs that do not meet the requirements for QSPVs) must be consolidated. But if the sponsor is unlikely to absorb a majority of the expected losses of a VIE or to receive the majority of the expected residual returns of VIE, then there is no obligation to consolidated a VIE (Soroosh and Ciesielski, 2004). For example, JPMorgan Chase & Co. reports that in 2006 its revenue from QSPEs was almost 15 times greater

than the combined revenues of its consolidated and significant unconsolidated VIEs (JPMorgan Chase & Co., 2007, p. 59).

Therefore, unconsolidated SPVs probably account for a large majority of banks balance-sheet activities and may produce two relevant side-effects on capital and leverage ratios: first, on the asset side, risky assets are shifted off-balance sheet, and this lowers the total amount of risk-weighted assets which has to be covered by capital; secondly, on the liabilities side, thinly capitalization of SPVs make the actual leverage of the sponsor higher than the value resulting from balance-sheet accounts (a sort of “hidden leverage”). Thinly capitalization does not increase the actual leverage of the sponsor only if there is no possibility for the sponsor to bring it back on its balance-sheet. SRFIs might well be compliant with capital requirements but have a substantially and hidden leverage through SPVs. For example, the European Central Bank (ECB 2008, p. 94) estimated that the Euro area large and complex banking groups provided almost € 90 billion as liquidity support to ABCP conduits and SIVs, and only re-intermediated on their balance sheet € 11.8 billion of assets (data as of December 2008). Regulation should be introduced to require either that the sponsor keep more capital for off-balance sheet entities even when there is no obligation to consolidate and no formal support commitment or that the sponsor be allowed to bring back on its balance-sheet only those SPVs to which a support commitment was explicitly declared *ex-ante*. Last but not least, SPVs are likely to increase corporate complexity and complicate bankruptcy procedures, also because of the lack of transparency on the overall number of SPVs sponsored by a firm.

Therefore, stricter regulation for SRFIs with regard to the shadow banking and financial system should aim at 1) a full disclosure of commitments to SPVs, 2) a clear representations of corporate structure of SRFIs inclusive of sponsored SPVs, 3) prevention of a “hidden” increase of

actual leverage through off-balance sheet vehicles⁷⁷. As in the case of capital and leverage ratios, also for SPVs the requirements on SRFIs should be stricter if they are generally applied to all financial institutions. The EU Commission proposal to amend the Capital Requirements Directive, for example, introduces a quantitative minimum retention requirement 5% of the total risk transferred by the originator through securitization. If generally applied, this percentage should be higher for SRFIs (e.g. 10%).

3.5 Proposals for European and international supervision of Systemically Relevant Financial Institutions

The establishment of a single global regulator and supervisor appears not feasible yet: while it is too late for relying exclusively on national controls, on the other hand it is probably too early for an integrated regulatory and supervisory regime on a global scale, due to national legal and economic peculiarities (corporate governance, commercial codes, company laws, bankruptcy procedures). Above all, the major challenge to be faced in establishing supranational authorities is probably the fact that governments (and fiscal policies) are still national: for example, how should a bailout decision be taken by a global regulator? Who should bear the costs? How should costs be allocated among different countries? Overall, the creation of a global supervisor would undoubtedly have to deal with formidable obstacles. However, there is a geographic mismatch between financial business, which has increasingly become global, and financial supervision, which is still national. The activities and the organizational structure of large financial institutions have become global, but

⁷⁷ For an exhaustive analysis of SPVs and securitization see Gorton and Souleles (2006) and Herring and Carmassi (2009)

these firms are not globally regulated and supervised. For example, LCFIs have such a high degree of geographic diversification that only a global approach to supervision might ensure that no part of a financial firm, wherever located, escapes oversight. In this perspective, it is important to observe that LCFIs make a very significant use of subsidiaries in offshore financial centers⁷⁸, which furtherly challenges the capability of supervisors to get the whole picture of financial firms' business and organizational structure. An intermediate solution to such mismatch appears desirable; here the focus is on possible new supervisory arrangements for the regulation and oversight of SRFIs in Europe and on a broader global scale.

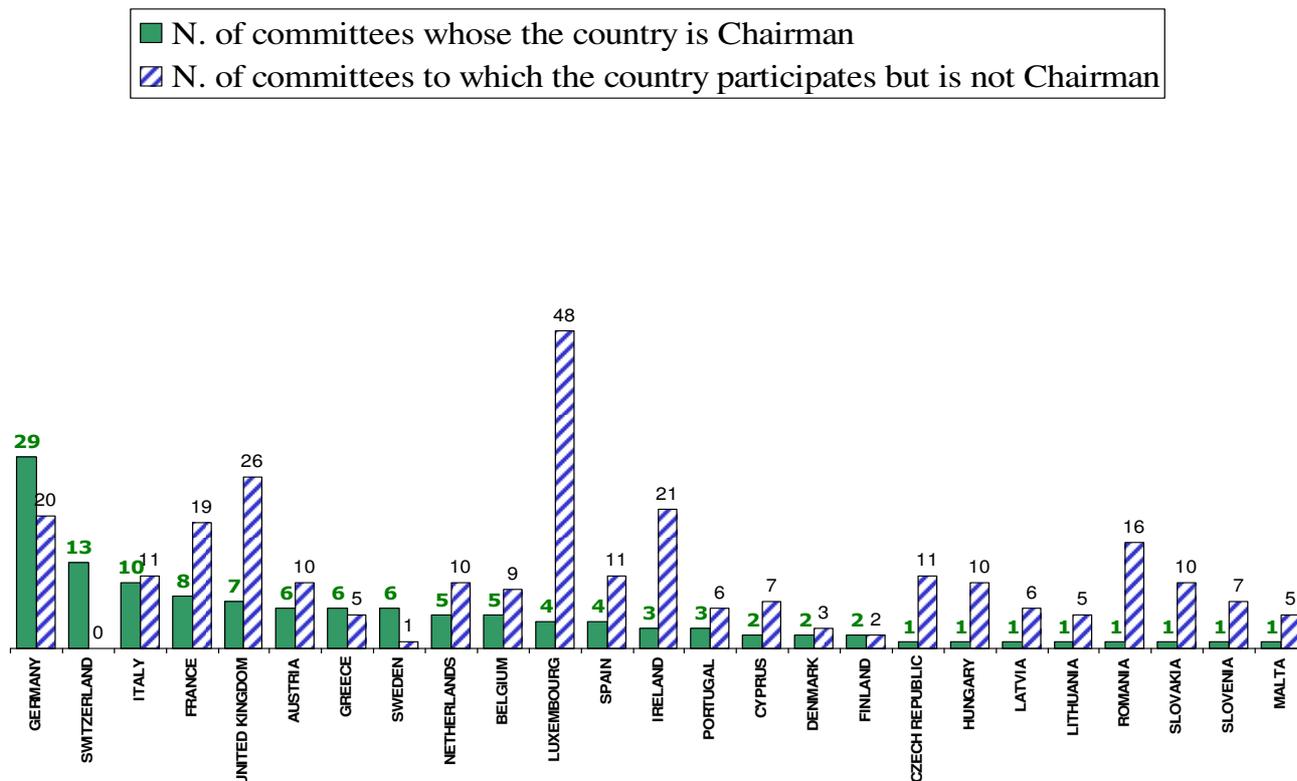
The European supervisory arrangements present relevant peculiarities compared to national oversight structures. As emphasized by Schoenmaker and Oosterloo (2008), with a single financial market a trilemma has to be faced, the three incompatible objectives being financial stability, national financial supervision and integrated financial markets. Schoenmaker and Oosterloo argue that, to maintain and strengthen an integrated EU financial system, national supervision and crisis management functions should be centralized at the EU level.

In the current supervisory arrangements not only doesn't the European Central Bank dispose of supervisory functions, but it has received neither the responsibility of preserving macrostability nor the functions of lender of last resort. This latter function, however, is unlikely to be centralized as long as the cost of financial support is ultimately born by national governments and not at a European level. The comitology strategy, which led to the creation of committees (such as CESR, CEBS and CEIOPS, level 3 committees) within the Lamfalussy procedures framework, is based on a sectoral approach and committees have not been assigned supervisory functions. The instrument chosen for supervision of cross-border financial institutions has been so far that of supervisory colleges, which should be established for financial institutions operating in more Member States

⁷⁸ See Herring and Carmassi (2009)

through branches or subsidiaries. Each college is chaired by the home supervisor of the parent company of the group and is participated by supervisors of all countries where the financial institutions operates. Mandatory written agreements assign to the home country authority the consolidated supervision of the group (see art. 131 of the Capital Requirement Directive 2006/48/EC). The EU Commission proposal (European Commission 2008c) on amendments to the CRD includes the strengthening of supervisory colleges and an increase of host countries authorities supervisory powers for systemically relevant branches. Such colleges, however, appear to present an extremely high degree of complexity in their functioning, and their high number clearly complicates the EU supervisory structure instead of simplifying it (see Figure 3.12). Formidable information and coordination problems might arise.

Figure 3. 12 Supervisory Colleges



Source: European Banking Report (ABI, Italian Banking Association)

In the euro area two options would be possible to introduce a pan-European supervision of SRFIs. A first option would be to give to the ECB supervision of SRFIs. The role of the ECB in financial supervision has been long and widely discussed. The EU Treaty created two fallacies in the European supervisory framework: first, it did not assign to the ECB a mandate for the preservation of macro-financial stability, nor did it give the ESCB micro-prudential supervisory functions, restricting its role to ensuring “the smooth conduct of policies pursued by competent authorities relating to the prudential supervision of credit institutions and the stability of the financial system” (art. 105, 5). Moreover, art. 105 (4) of the Treaty limits the ECB involvement in regulation to an advisory function. Art. 105 (6) gives the Council the faculty, “acting unanimously on a proposal from the Commission and after consulting the ECB and after receiving the assent of the European Parliament” to “confer upon the ECB specific tasks concerning policies relating to the prudential supervision of credit institutions and other financial institutions with the exception of insurance undertakings”. The exclusion of the insurance sector would require a review of the Treaty and such process would probably be long and hardly feasible, at least in the short term. As a result, the assignment to the ECB of supervisory functions on SRFIs would leave out the insurance sector, thus making the cross-sector functional approach to SRFIs supervision incomplete and probably inefficient. In 2001 the ECB advocated the assignment to itself of prudential supervision, supporting the view that “arguments in favour of a separation of prudential supervision and central banking lose more of their force, while those in favour of combining become more prominent” (ECB 2001, p. 7). Moreover, as stressed by Lannoo (2008, p. 36), the ECB might suffer from the lack of supervisory powers when providing liquidity to the banking system against collateral, since it might prove difficult to distinguish between illiquid and insolvent institutions without disposing of appropriate supervisory information. An effective transmission of information is the key: however, given the high degree of complexity and geographic diversification of pan-European

financial institutions, information sharing mechanisms might contribute to complexity instead of diminishing it.

An alternative strategy might consist in the establishment of an EU agency, different from the ECB, responsible for macro-stability and in charge of micro-prudential supervision of European SRFIs. This solution would have a number of advantages. First, it would not pose the problem of the combination of monetary policy and micro-prudential supervision within the same agency. Secondly, legal issues related to the Treaty provisions, specifically to the insurance sector, would not arise. Third, the new agency might be structured on a federal basis and might be participated by national central banks, which would be in charge of supervision of their respective national SRFIs. Criteria on European cross-border systemic relevance might be introduced to bring under the new agency's umbrella only SRFIs with a significant European dimension (a national SRFI might not result an SRFI with EU relevance). Fourth, the new agency might assume the role of EU lender of last resort for SRFIs. Its funding might partially come from the fees paid by SRFIs to their respective national central banks and partially from national governments (this latter option, however, could raise independence issues; fees alone, on the other hand, might not be sufficient, given the high amounts often required for bailouts). The fees paid by SRFIs should be structured in such a way that a portion would provide funding to national central banks and the remaining portion would finance the EU agency; pragmatically, quotas should be decided case-by-case on the basis of the domestic and foreign (European) activities of SRFIs (for example total assets; it would probably be hardly feasible to split systemic relevance into a national and a foreign part, therefore a "basic" variable could be the best solution).

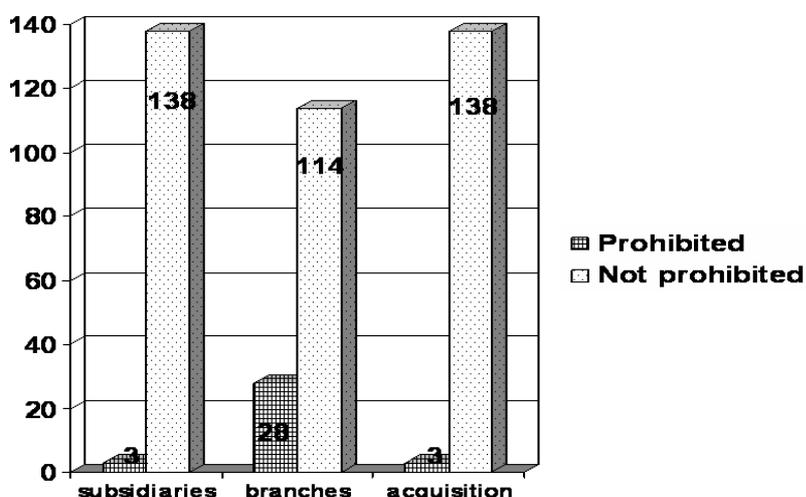
A new European supervisory structure might increase the effectiveness of oversight of financial institutions with European cross-border systemic relevance. However, a better European supervisory system alone would not be able to solve the "business-supervision" mismatch, unless

some international agreement is found to establish a new and global system of financial supervision. As underlined, the creation of a single global authority with regulatory and supervisory tasks might encounter very high obstacles. However, supranational arrangements limited and focused on the oversight of SRFIs might be more feasible and might effectively address the key issue, that is preventing and managing systemic risk on a global scale. Since SRFIs would be supervised by national central banks, the global supervision of SRFIs might be assigned to an international committee formed by national central banks. Financial institutions should get the SRFIs status on a national level; on a global scale authorities might more efficiently do their job in the supervision of SRFIs working on a specific list validated on a national basis by each single country. Obviously, such list should be necessarily amended on a continuous basis, whenever financial institutions fall out of the SRFI status or new firms are identified as SRFIs.

Another criticality of the current international supervisory regime emerges from the incentives structure of home country and host countries authorities and the allocation of oversight responsibility. Governments and authorities are likely to take into account negative externalities for their own country stemming from a financial institution's failure: the misalignment between incentives of home country and host countries in dealing with a faltering financial institution may imply that the same institution results too-big-to-fail in a host country but not systemically relevant in the home country. As a result, the host country is exposed to the negative externalities of a failure of a foreign bank owning subsidiaries or branches which are systemically relevant in the host country. This is the typical situation of “small” countries with a very high foreign share in their banking and financial system. In the case of branches, the host country is exposed to systemic consequences without disposing of appropriate supervisory functions. Two possible solutions might be that either the home country creates ex-ante a fund for financial support of foreign branches in case of distress or that the host country is assigned supervisory tasks also on branches. The latter

solution, however, would probably impose significant costs on foreign expansion (in the EU it would compromise the single market project). The EU Commission proposal on amendments to the CRD opts for an intermediate solution, supporting an improvement of information rights of host country supervisors of systemically relevant branches (European Commission 2008c).⁷⁹

Figure 3. 13. Entry prohibition for foreign entities (2007)*



* Sample of 143 countries, but information for a few countries is not available, hence totals don't sum up to 143.
Source: Barth, Caprio, Levine, Database on bank regulation and supervision (2007)

As a result of the distribution of supervisory functions, restrictions on foreign entry are generally more focused on branches than subsidiaries, given that supervision on foreign subsidiaries is left to host countries authorities, while supervision on branches is retained, on a consolidated basis, by the home country supervisor. Barth, Caprio and Levine (2007) found that in a sample of 143 countries only 3 countries prohibit entry by foreign subsidiaries, but 28 countries prohibit entry by foreign branches. Moreover, even if foreign branch entry is not prohibited, host countries often

⁷⁹ In a November 2008 letter on cross-border banking in the EU and EEA to Charlie McCreevy, EU Commissioner for the Internal market, Alistair Darling, Chancellor of the Exchequer, stressed the importance of ensuring that host supervisors of significant cross-border branches of banks receive all the necessary supervisory information commensurate to the risks the branch poses” (Darling 2008). On these issues see also House of Lords (2008).

impose strict regulatory requirements on foreign branches that make the formation of a separate subsidiary relatively attractive. For example, of the 19 Latin American and Central European countries surveyed by Cerutti et al (2005), 7 restrict foreign branches more heavily than foreign subsidiaries.

Given that home-host country supervisors conflicts derive to a great extent from incomplete and asymmetric information, it might be challenging to try to model the interactions between home and host supervisors with a game theory approach, for example with a prisoner's dilemma scheme, in which home and host authorities can choose either forbearance or closure/bailout. On the one hand this could fit well with the suboptimal result which takes place due to asymmetric information: the lack of cooperation brings to a worse outcome than cooperation, thus the focus should be on how to enhance cooperation (in Europe the strategy to tackle asymmetric information has been to date the creation of supervisory colleges, but it is still early to evaluate whether colleges are able to improve information sharing; their high number might exacerbate rather than simplify the complexities of cross-border financial supervision). On the other hand, the difficult point is the quantification of payoffs, which depend also on specific legislation across countries (for example, in the case of branch closure, the "separate entity doctrine" gives preference to home country creditors and could decrease the host country payoff and increase the home country payoff).

One of the most critical issue is forbearance, given also the authorities' self-reinforcing tendency to forbear instead of letting a bank fail. The nightmare scenario is one where neither the home nor the host country takes the first step either to close or to bail out an insolvent bank (this is more likely to happen in absence of a mechanism similar to that of Prompt Corrective Action), so that in the end the gambling for resurrection imposes the highest cost on both home and host country. Given the uncertainty of each side on the information available to the other side and on the

decision that will be taken by the other authority, the equilibrium is forbearance-forbearance, which is the worst possible solution and is due to the lack of cooperation. The payoffs in the two cases where one of the two, either the home or the host country authority, decides to close or rescue the bank rely on the hypothesis that there is a coincidence between the jurisdiction competent to declare failure (or the country which decides bailout) and the authority/country who is going to bear the costs (for example, home country with resolution powers/bailing out plan on the one hand and lender of last resort, deposit insurance or, for instance, banking group bailing out and acquiring the insolvent bank on the other hand; the coincidence is evident for bailout). Obviously this coincidence of functions is not necessarily true (for example in the case of deposit insurance). Besides, the involvement of many home and host country authorities might furtherly increase the complexity of the conflicts dynamics.

A disadvantage of this scheme is the difficulty of assigning coherent and “realistic” payoffs, which should be calculated taking into account a wide range of factors. Besides, payoffs and related analyses would significantly differ if the focus is on branches or subsidiaries. An advantage is that it could help to model the problem of interaction between home and host country authorities as a non-cooperative game where a suboptimal result is achieved because of lack of cooperation, and first of all lack of information sharing due to reputation defence and prevention of bad news leakage.

Figure 3. 14. A game theory analysis of conflicts between home country and host country supervisors.

		HOME COUNTRY	
		FORBEARANCE	CLOSURE/BAILOUT
HOST COUNTRY	FORBEARANCE	(-5, -5)	(-1, -6)
	CLOSURE/BAILOUT	(-6, -1)	(-3, -3)

A possible solution to contain these perverse mechanisms and lack of incentives to properly prevent and manage financial crises might be found in the internalization of negative externalities: home country authorities (central banks in the proposed SRFIs model) might be required to pay a fee to the international agency in charge of supervising SRFIs for branches of national SRFIs located in foreign countries, while host country authorities should pay it for subsidiaries of SRFIs established in their territory. The fee should be part of the overall fee to be paid by national SRFIs supervisors (central banks) to the international body responsible for supervision of SRFIs (central banks could draw upon the *ad hoc* SRFIs fund). The amount should be calculated on the basis of systemic relevance but, once again, a pragmatical solution might be to calculate it on the basis of total assets. It could be paid partially ex-post and partially ex-ante and a mechanism similar to that applied in the Prompt Corrective Action might be introduced; a penalty fee might be imposed in case certain solvency thresholds are not respected and it might increase more than proportionally with subsequent deterioration of solvency.

Conclusive remarks

The 2007-2008 financial crisis poses formidable challenges to policy makers, supervisory authorities and scholars. The depth and complexity of the crisis require an overall rethinking of some basic concepts and a new conceptual approach to the analysis of financial markets dynamics and of related supervision and regulation issues. This work attempts to go at the roots of some structural aspects and specifically focuses on systemic risk, which is considered the key to redesign financial supervision and regulation. The main proposal of this research is to adapt current supervisory structure and regulatory regimes to the new nature of systemic risk. The identification of systemically relevant financial institutions is a fundamental step and is certainly not a straight-forward task. The choice of technical methodologies to select SRFIs requires a careful evaluation of which markets and which functions are more likely to have systemic implications: the inclusion or exclusion of certain variables undoubtedly has a great conceptual impact and this appears an extremely interesting area for further research. However, the shift from a (substantially still) institutions-based approach to a functions-based perspective might be an important innovation itself. The assignment to the central bank of prudential supervision of SRFIs is not a flawless option, but it might be an effective strategy to realign instruments and objectives: systemic stability might be better preserved if the authority in charge of ensuring it disposes of supervisory powers on financial institutions which have a systemic relevance. It is crucial to stress that this issue is different from the long debated issue about concentrating supervisory powers on banks and/or financial markets within the central bank: here the key aspect is supervision of SRFIs, and also the model of the single regulator within the central bank should be adapted, with a specific supervisory focus on SRFIs. Specialness of SRFIs and consequent supervisory arrangements suggest that also an *ad hoc* regulation should be designed.

This new regulatory regime should be carefully elaborated: the need to limit moral hazard should not produce an over-regulation and cause undue competitive disadvantages for SRFIs. As for the identification of SRFIs, also the creation of a specific regulatory framework is a complex task: which issues should regulation address? How might regulatory arbitrage risks be prevented and managed? How should the “price” for systemic status – and for the consequent implicit commitment of governments and authorities - be calculated? At any rate, SRFIs appear to be the new special financial institutions and consequently a specific and stricter regulation seems desirable, just as it happened with commercial banks. This research suggests that regulation of SRFIs could focus on some aspects which turned out to have played a crucial role in the subprime crisis, such as capital and leverage ratios and off-balance sheet vehicles. Moreover, the shift to a systemic approach to financial supervision and regulation should not be limited to the national level and should assume a global scale: a European and a global supervisor of SRFIs might contribute to solve – at least for SRFIs - the current misalignment between the national dimension of supervisors and the international nature of financial business. These authorities might be participated by national central banks, since in the proposed model the latter would be in charge of supervising national SRFIs. The current allocation of supervisory tasks between home and host country authorities might exacerbate asymmetric information and the risks of negative externalities: host supervisors may be significantly exposed to the risks of distress of systemically relevant branches of foreign banks without disposing of adequate oversight functions. An alternative to a mere improvement of information sharing could be an ex-ante mechanism of internalization by the home country of costs stemming from faltering systemically relevant branches in host countries.

Finally, for how ambitious it may be, a new supervisory model would not itself solve all the complex problems highlighted by the subprime crisis: there is no first-best supervisory

structure, also because path-dependency and countries' peculiarities inevitably play a major role. However, since systemic risk has always been the main rationale for banking and financial regulation, the adoption of a new perspective based on the new nature of systemic risk and a coherent reform of financial supervision and regulation could provide second-best solutions.

References

- Abrams, R. and M. Taylor (2000). "Issues in the Unification of Financial Sector Supervision", IMF Working Paper 00/213.
- Alfon, I. and P. Andrews (1999). "Cost-Benefit Analysis in Financial Regulation – How to do it and how it adds value", Financial Services Authority, Occasional Paper Series.
- Allen, F. and R.J. Herring (2001). "Banking Regulation versus Securities Market Regulation", Working Paper 01-29, Wharton Financial Institutions Center, University of Pennsylvania.
- Allen F. and A.M. Santomero (1996). "The Theory of Financial Intermediation", Wharton Financial Institutions Center, working paper n. 96-32.
- American International Group (2008). 10-K, Annual Report 2007.
- Bagehot W. (1873). "Lombard Street", Kegan, Paul & Co., London.
- Baily, M.N., Elmendorf. D.W. and R.E. Litan (2008). "The Great Credit Squeeze: How It Happened, How to Prevent Another", discussion paper, Economic Studies, Brookings Institution, May.
- Bank for International Settlements (1995). "The supervision of financial conglomerates".
- Bank for International Settlements (2008). "International banking and financial market developments", BIS Quarterly Review, December.
- Bank of England (2007). "Structure of the financial system", Financial Stability Report, Issue No. 22, October.
- Bank of England (2008a). "Financial Stability Report", n. 23, April.
- Bank of England (2008b). "Financial Stability Report", n. 24, October.
- Barth, J. R., Caprio, G. and R.E. Levine (2006). "Rethinking Bank Regulation - Till Angels Govern", Cambridge University Press.

Barth, J. R., Caprio, G. and R.E. Levine (2007). Database on bank regulation and supervision, updated.

Bartram, S.M., Brown, G. W. and Hund, J. (2005). “Estimating Systemic Risk in the International Financial System”, FDIC Center for Financial Research Working Paper No. 2005-12.

Benink, H. and D. Llewellyn (1995). ‘Systemic Stability and Competitive Neutrality Issues in the International Regulation of Banking and Securities’, in «Journal of Financial Services Research», 9(3/4), pp. 393-407.

Benston, G. and G. Kaufman (1995). “Is the Banking and Payments System Fragile?”, in «Journal of Financial Services Research», 9, pp. 209-240.

Berger, A. (1995). “The Profit-Structure Relationship in Banking - Tests of Market-Power and Efficient Structure Hypotheses”, in «Journal of Money, Credit and Banking», Vol. 27, No. 2, pp. 404-431.

Berger, A., Demsetz, R. and P. Strahan (1999). “The consolidation of the financial services industry: causes, consequences, and implications for the future”, in «Journal of Banking & Finance», 23, pp. 135-194.

Bernanke, B. (2007). “Central Banking and Bank Supervision in the United States” , remarks before the Allied Social Sciences Association Annual Meeting, Chicago, January 5.

Bjerre-Nielsen, H. (2005). “Denmark,” in Handbook of Central banking and Financial Authorities in Europe: New Architectures in the Supervision of Financial Markets, edited by Donato Masciandaro, Cheltenham: E. Elgar Pub., pp. 175–181.

Bonde, I. (2005). “Sweden,” in Handbook of Central banking and Financial Authorities in Europe: New Architectures in the Supervision of Financial Markets, edited by Donato Masciandaro, Cheltenham: E. Elgar Pub., pp. 182–202.

Bordo, M.D., Mizrach, B and A.J. Schwartz (1995). “Real versus pseudo-international systemic risk: some lessons from history”, NBER working paper 5371.

Borio, C. (2003). “Towards a macroprudential framework for financial supervision and regulation?”, BIS working papers no. 128, February.

Briault, C. (1999). “The costs of financial regulation”, conference on regulation and supervision of financial markets and institutions in the EU, Mannheim, 10 July.

Briault, C. (2002). “Revisiting the Rationale for a Single National Financial Services Regulator”, Special Paper 135, LSE.

Briault C. (2003). “The costs of financial regulation”, conference on regulation and supervision of financial markets and institutions in the EU, Mannheim, 10 July.

Brown, E.F. (2005). “E Pluribus Unum – Out of Many, One: Why the United States Needs a Single Financial Services Agency”, « University of Miami Business Law Review», 14, pp. 1-101.

Calomiris, C.W., Klingebiel, D. and L. Laeven (2005), “Financial Crisis Policies and Resolution Mechanisms: A Taxonomy from Cross-Country Experience”, in Honohan P. and Laeven L. (eds), “Systemic financial crises – containment and resolution”, Cambridge University Press.

Caprio, G. and D. Klingebiel (1996). “Bank Insolvency: Bad Luck, Bad Policy or Bad Banking?”, Annual World Bank Conference on Development Economics.

Carmassi J. (2004). “La regolamentazione e i costi della vigilanza sui mercati mobiliari”, in Di Giorgio G. and C. Di Noia (eds), “Intermediari e mercati finanziari”, Bologna, Il Mulino, Collana di Studi e Ricerche Dario Mazzi.

Cerutti, E., Dell’Ariccia, G. and M.S. Martinez Peria (2005). “How Banks Go Abroad: Branches or Subsidiaries?”, World Bank Policy Research Working Paper 3753, October.

Chan, N., Getmansky M., Haas S.M. and A.W. Lo. (2006). “Systemic Risk and Hedge Funds,” in Mark Carey and René Stulz (eds.), *Risks of Financial Institutions*, Chicago, IL: University of Chicago Press, pp. 235-330.

Čihák, M. and J. Decressin (2007). “The case for a European Banking charter”, IMF Working Paper, WP/07/173.

Čihák, M. and R. Podpiera (2006). “Is One Watchdog Better than Three? International Experience with Integrated Financial Sector Supervision,” IMF Working Paper 06/57.

Coffee, J. (1995). “Competition versus consolidation: the significance of organizational structure in financial and securities regulation,” in *The Business Lawyer* 50, February.

Coffee, J. (2007). “Law and the Market: the Impact of Enforcement,” *Columbia Law and Economics Working Paper*, n. 304, March.

Cox, C. (2008). “Sound Practices for Managing Liquidity in Banking Organizations”, March 20, available at http://www.sec.gov/news/press/2008/2008-48_letter.pdf.

Crockett, A. (1997). “Why is financial stability a goal of public policy?”, *Economic Review*, Federal Reserve Bank of Kansas City, issue Q IV, pp. 5-22.

Darling, A. (2008). “Cross-border banking in the EU and EEA”, letter to the EU Commissioner for the Internal Market, Charlie McCreevy, November 24.

De Bandt, O. and P. Hartmann (2000). “Systemic Risk: a Survey”, *ECB Working Paper* n. 35, November.

De Grauwe, P. (2008). “The Banking Crisis: Causes, Consequences and Remedies”, *CEPS Policy Brief* No. 178, November.

De Luna Martínez, J. and T. Rose (2003). “International Survey of Integrated Financial Sector Supervision”, *World Bank Policy Research Working Paper* 3096, July.

Demirgüç-Kunt, A. and E. Detragiache (2002). “Does Deposit Insurance Increase Banking System Stability? An Empirical Investigation”, in «Journal of Monetary Economics», 49, pp. 1373-1406.

Di Giorgio, G. and C. Di Noia (1998). “La regolamentazione degli intermediari finanziari”, introductory essay to the Italian edition of “The prudential regulation of banks” by M. Dewatripont and J. Tirole, Editoriale Grasso, Bologna, 1998.

Di Giorgio G. and C. Di Noia (1999). “Should banking supervision and monetary policy tasks be given to different agencies?”, in «International Finance», Blackwell, 2, n.3, pp. 361-378.

Di Giorgio, G. and C. Di Noia (2001). “Financial Regulation and Supervision in the Euro Area: A Four-Peak Proposal”, The Wharton Financial Institutions Center, working paper n. 01-02.

Di Giorgio, G. and C. Di Noia (2008). “Designing a Regulatory and Supervisory Framework for Integrated Financial Markets”.

Diamond, D.W. (1984). “Financial Intermediation and Delegated Monitoring”, in «Review of Economic Studies», vol. 51, pp. 393-414.

Diamond, D.W. and P.H. Dybvig (1983). “Bank Runs, Deposit Insurance and Liquidity”, in «Journal of Political Economy», vol. 91, n. 3, pp. 401-19.

European Central Bank (2001). “The role of central banks in prudential supervision”.

European Central Bank, (2006a). “Recent developments in supervisory structures in EU and acceding countries”, October.

European Central Bank (2006b). “Identifying large and complex banking groups for financial system stability assessment”, Financial Stability Review, December, pp. 131-139.

European Central Bank (2008a). “Recommendations of the Governing Council of the European Central Bank on government guarantees for bank debt”, October 20, published on December 19.

European Central Bank (2008b). “Recommendations of the Governing Council of the European Central Bank on the pricing of recapitalizations”, November 20, published on December 19.

European Central Bank (2008c). “Financial Stability Review”, December.

European Commission (2008a). “The application of State aid rules to measures taken in relation to financial institutions in the context of the current global financial crisis”, Communication, (2008/C 270/02), October 13.

European Commission (2008b). “The recapitalization of financial institutions in the current financial crisis: limitation of aid to the minimum necessary and safeguards against undue distortions of competition”, Communication (C(2008) 8259 final), December 5.

European Commission (2008c). “Proposal for a Directive of the European Parliament and the Council amending Directives 2006/48/EC and 2006/49/EC as regards banks affiliated to central institutions, certain own funds items, large exposures, supervisory arrangements, and crisis management”, COM(2008) 602/3.

Franks, J., Schaefer, S. and M. Staunton (1998). “The direct and compliance costs of financial regulation”, in «Journal of Banking & Finance» 21, pp. 1547–1572.

Freshfields Bruckhaus Deringer (2007). “How Countries Supervise their Banks, Insurers and Securities Markets 2007”, Central Banking Publications.

Goodhart, C. (2000). “The Organisational Structure of Banking Supervision”, FSI Occasional Paper, No. 1, 25 October.

Goodhart C. and Shoenmaker D. (1992). "Institutional Separation between Supervisory and Monetary Agencies", in «Giornale degli Economisti e Annali di Economia», vol. 51, 9-12, pp. 353-439.

Goodhart C. and D. Shoenmaker (1995). "Should the Functions of Monetary Policy and Banking Supervision Be Separated?", *Oxford Economic Papers*, 47, pp. 539-560.

Gorton, G. (1988). "Banking Panics and Business Cycles", *Oxford Economic Papers*, 40, pp. 751-81.

Gorton, G. and N. Souleles (2006). "Special Purpose Vehicles and Securitization," in Carey, M. and Stulz, R. (eds), "The Risks of Financial Institutions", Chicago: NBER, 549-597.

Group of Ten (2001). "Report on Consolidation in the Financial Sector".

Gurley, J.G. and E.S. Shaw (1960). "Money in a Theory of Finance", Brookings Institution, Washington, D.C.

Guttentag, J. and R. Herring (1987). "Emergency liquidity assistance for international banks", in "Threats to International Financial Stability", R Portes and A Swoboda, (eds.), Cambridge University Press.

Half, C. and H. Jackson (2002) "Background Paper on Evolving Trends in the Supervision of Financial Conglomerates", working paper, Harvard Law School, June.

Hawkesby, C. (2000). "The Institutional Structure of Financial Supervision: A Cost-Benefit Analysis", « *The Journal of International Banking Regulation* », July.

Hawkesby, C., Marsh, I. and I. Stevens (2003). "Large complex financial institutions: common influences on asset price behaviour?", *Financial Stability Review*, Bank of England, December, pp. 91-101.

Herring, R. (1993). "BCCI: Lessons for International Bank Supervision", *Contemporary Economic Policy*, Oxford University Press, vol. 11(2), pp. 76-84, April.

Herring, R.J. (2007). “Conflicts between Home & Host Country Prudential Supervisors”, Wharton Financial Institutions Center, working paper n. 07-33.

Herring, R. J. and J. Carmassi (2008). “The Structure of Cross-Sector Financial Supervision”, «Financial Markets, Institutions & Instruments», Vol. 17, n. 1, pp. 51-76, February.

Herring, R. J. and J. Carmassi (2009). “The Corporate Structure of International Financial Conglomerates: Complexity and Its Implications for Safety & Soundness”, in the “Oxford Handbook of Banking”, forthcoming.

Herring, R.J. and R. Litan (1995). “Financial Regulation in the Global Economy”, Brookings Institution Press, Washington.

Herring, R.J. and A.M. Santomero (1990). “The Corporate Structure of Financial Conglomerates”, «Journal of Financial Services Research», December, pp. 471-497.

Herring, R.J. and A.M. Santomero (2000). “What Is Optimal Financial Regulation?”, The Wharton Financial Institutions Center, working paper n. 00-34.

House of Lords (2008). “EU Legislative Initiatives in Response to the Financial Turmoil – Report with evidence”, December.

Huertas T. (2006). “Dealing with distress in financial conglomerates”, paper presented to the conference "Prompt Corrective Action and Cross-Border Supervisory Issues in Europe" hosted by the Financial Markets Group of London School of Economics on November 20.

Hüpkens, E. (2004). “'Too big to save' – towards a functional approach to resolving crises in global financial institutions”, paper for the Chicago Federal Reserve Bank Conference on systemic financial crises: Resolving Large Bank Insolvencies, September 30 – October 1.

International Monetary Fund (2008a). “Global Financial Stability Report”, April

International Monetary Fund (2008b). “Global Financial Stability Report”, October.

International Monetary Fund (2008c). “World Economic Outlook”, October.

Jackson, H. (2005). “Variation in the intensity of financial regulation: preliminary evidence and potential implications”, Harvard Law and Economics Discussion Paper n. 521, August.

JPMorgan Chase & Co. (2007). “Annual Report 2006”.

Kambhu, J., Schuermann, T. and K.J. Stiroh (2007). “Hedge Funds, Financial Intermediation, and Systemic Risk”, Economic Policy Review, Federal Reserve Bank of New York, Vol. 13, No. 3, December.

Kaufman, G. (2000). “Does bank regulation retard or contribute to systemic risk?”, Stanford Law School, John M. Olin Program in Law and Economics, Working Paper no. 211, December.

King, M. (2008). Speech to the CBI, Institute of Directors, Leeds Chamber of Commerce and Yorkshire Forward at the Royal Armouries, Leeds, Tuesday 21 October.

Kremers, J., Shoenmaker, D. and P. Wierts (2003). “Cross-Sector Supervision: Which Model?”, in Brookings-Wharton Papers on Financial Services - 2003, edited by Richard Herring and Robert Litan, pp. 225–243.

Laeven, L. and R. Levine (2007). “Is there a diversification discount in financial conglomerates?”, in «Journal of Financial Economics», 85, pp. 331-367.

Laeven, L. and F. Valencia (2008). “Systemic Banking Crises: a New Database”, IMF working paper 08/224.

Lannoo, K. (2008). “Concrete Steps towards More Integrated Financial Oversight: the EU’s Policy Response to the Crisis”, CEPS Task Force Report, December.

Lehar, A. (2005). “Measuring systemic risk: a risk management approach”, «Journal of Banking & Finance», n.29, pp. 2577–2603

Leland, H.E. and D.H., Pyle (1977). “Informational Asymmetries, Financial Structure and Financial Intermediation”, in «The Journal of Finance», vol. 32, n. 2, pp. 371-387.

Llewellyn D. (1999). “The Economic Rationale for Financial Regulation”, Financial Services Authority, Occasional Paper Series, n. 1.

Llewellyn, D. (2005). “Integrated Agencies and the Role of Central Banks,” in “Handbook of Central banking and Financial Authorities in Europe: New Architectures in the Supervision of Financial Markets”, edited by Donato Masciandaro, Cheltenham: E. Elgar Pub., pp. 109–140.

Llewellyn, D. (2006). “Institutional Structure of Financial Regulation: the Basic Issues”, paper presented at the World Bank and IMF conference Aligning Supervisory Structures with Country Needs, Washington DC, June 5–6.

Llewellyn, D. (2008). “The Northern Rock crisis: a multi-dimensional problem waiting to happen”, European Banking Report, II newsletter, April.

Lockhart, J.B. (2008). “Statement on the creation of FHFA”, Federal Housing Finance Agency, July 30.

Masala, F. (2007). “La relazione tra innovazione finanziaria, rischio e gestione del rischio”, in “29° Rapporto Osservatorio EBR – European Banking Report”, December.

Masciandaro, D. (2005). “Central Banks and Single Financial Authorities: Economics, Politics and Law,” in Handbook of Central banking and Financial Authorities in Europe: New Architectures in the Supervision of Financial Markets, edited by Donato Masciandaro, Cheltenham: E. Elgar Pub., pp. 67-105.

Mediobanca (2008). “Le maggiori banche europee nel 2008”, R&S, October.

Mengle, D. (2007). “Credit Derivatives: An Overview”, Economic Review, Federal Reserve Bank of Atlanta, vol. 92, n. 4.

Merton, R. (1993). "Operation and Regulation in Financial Intermediation: a Functional Perspective", presented at the Conference on Operation and Regulation of Financial Intermediaries and Financial Markets, Stockholm School of Economics, Stockholm. Sweden, August 20 1992.

Mwenda, K. (2006). "Legal aspects of financial services regulation and the concept of a unified regulator," Law, Justice, and Development Series, The World Bank.

OECD (2008a). "Economic Outlook", 84, November.

OECD (2008b). Bank Profitability Database.

Oldfield, G. and A. Santomero (1995). "The place of risk management in financial institutions", Wharton Financial Institutions Center, working paper n. 95-05-B.

Padoa Schioppa, T. (2003). "Financial supervision: inside or outside central banks?" in Financial Supervision in Europe, edited by J. Kremers, D. Schoemaker and P. Wierds, Cheltenham, E. Elgar Pub., pp. 160–175.

President's Working Group on Financial Markets (1999). "Hedge Funds, Leverage, and the Lessons of Long-Term Capital Management", April 28.

Schinasi, G.J. (2003). "Responsibility of Central Banks for Stability in Financial Markets", IMF Working Paper 03/121, June.

Schoemaker, D. (1992). "Institutional Separation between Supervisory and Monetary Agencies", FMG Special Papers sp52, Financial Markets Group.

Schüler, M. (2005). "Germany," in Handbook of Central banking and Financial Authorities in Europe: New Architectures in the Supervision of Financial Markets, edited by Donato Masciandaro, Cheltenham: E. Elgar Pub., pp. 288–310.

Schwarcz, S.L. (2008). "Systemic risk", Duke Law School Legal Studies - Research Paper Series, Research Paper No. 163, March.

Schwartz, A.J. (1986). "Real and Pseudo-Financial Crises", in F. Capie and G.E. Woods (eds), "Financial Crises and the World Banking System", London, MacMillan Press, pp. 11-13.

Scott, K. (1977). "The Dual Banking System: a Model of Competition in Regulation" Stanford Law Review 30, n.1: November.

Stigler, G.J. (1971). "The Theory of Economic Regulation", Bell Journal of Economics, The RAND Corporation, vol. 2(1), pp. 3-21, Spring.

Taylor M. (1995). "Twin Peaks: A Regulatory Structure for the New Century", Centre for the Study of Financial Innovation, London, December.

Taylor, M. and A. Fleming (1999). "Integrated Financial Supervision: Lessons from Northern European Experience", Policy Research Working Paper n.2223, World Bank, Washington.

Tobin, J. (1963). "Commercial Banks as Creators of 'Money' ", Cowles Foundation Discussion Papers 159, Cowles Foundation, Yale University.

Tufano, P. (2006). "Comment," in Carey, M. and Stulz R., (eds), "The Risks of Financial Institutions", Chicago, NBER, pp. 597-602.

United States Department of the Treasury (2008). "Blueprint for a Modernized Financial Regulatory Structure", March.

Walter, I. (2004). "Mergers and Acquisitions in Banking and Finance: What Works, What Fails and Why?", Oxford University Press.

Zingales, L. (2008). "Causes and Effects of the Lehman Brothers Bankruptcy", Testimony Before the Committee on Oversight and Government Reform United States House of Representatives, October 6.