OECD Economics Department Working Papers No. 1108

The Prudential Regulation of Financial Institutions: Why Regulatory Responses to the Crisis Might Not Prove Sufficient

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https://dx.doi.org/10.1787/5jz6zgzzw8s4-en

OECD

Unclassified **ECO/WKP(2014)4**

Organisation de Coopération et de Développement Économiques
Organisation for Economic Co-operation and Development **24-Mar-2014**

English - Or. English

ECONOMICS DEPARTMENT

ECO/WKP(2014)4
Unclassified

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ABSTRACT/RÉSUMÉ

The Prudential Regulation of Financial Institutions:
Why Regulatory Responses to the Crisis Might Not Prove Sufficient

It is now six years since a devastating financial and economic crisis rocked the global economy. Supported strongly by the G20 process, international regulators led by the Financial Stability Board have been working hard ever since to develop new regulatory standards designed to prevent a recurrence of these events. These international standards are intended to provide guidance for the drawing up of national legislation and regulation, and have already had a pervasive influence around the world. This paper surveys recent international developments concerning the prudential regulation of financial institutions: banks, the shadow banking system and insurance companies. It concludes that, while substantial progress has been made, the global economy nevertheless remains vulnerable to possible future financial instability. This possibility reflects three sets of concerns. First, measures taken to manage the crisis to date have actually made the prevention of future crises more difficult. Second, the continuing active debate over virtually every aspect of the new regulatory guidelines indicates that the analytical foundations of what is being proposed remain highly contestable. Third, implementation of the new proposals could suffer from different practices across regions. Looking forward, the financial sector will undoubtedly continue to innovate in response to competitive pressures and in an attempt to circumvent whatever regulations do come into effect. If we view the financial sector as a complex adaptive system, continuous innovation would only be expected. This perspective also provides a number of insights as to how regulators should respond in turn. Not least, it suggests that attempts to reduce complexity would not be misguided and that complex behavior need not necessarily be accompanied by still more complex regulation. Removing impediments to more effective self-discipline and market discipline in the financial sector would also seem recommended.

JEL Classification: G280
Keywords: Bail Out, Bank Regulation, Financial Crisis, Globalisation

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Réglementation prudentielle des institutions financières :
Pourquoi les réponses réglementaires à la crise pourraient ne pas suffire

Cela fait maintenant six ans que l'économie mondiale a été mise à mal par une terrible crise économique et financière. Avec le soutien appuyé du G20, les instances de réglementation internationales, sous la houlette du Conseil de stabilité financière, s'efforcent depuis lors de mettre au point de nouvelles normes réglementaires destinées à empêcher que de tels événements se reproduisent. L'influence de ces normes internationales, conçues pour guider la conception de législations et de réglementations nationales, se fait déjà sentir partout dans le monde. La présente étude s'intéresse aux évolutions récemment intervenues dans la réglementation prudentielle des institutions financières : banques, système bancaire parallèle et compagnies d'assurances. Ses auteurs concluent que si des progrès considérables ont été accomplis, l'économie mondiale reste néanmoins vulnérable en cas d'éventuelle instabilité financière future. Cette éventualité repose sur trois sources de préoccupation : d'abord, les mesures prises à ce jour pour gérer la crise rendent plus difficile la prévention des crises futures. Ensuite, le débat très vif que continuent à susciter quasiment chacun des aspects des nouveaux principes réglementaires montre que les fondements analytiques sur lesquels reposent les propositions sont loin de faire l'unanimité. Enfin, la diversité des pratiques d'une région à l'autre pourrait nuire à la mise en œuvre des nouvelles normes proposées. À n'en pas douter, le secteur financier continuera d'innover à l'avenir, en réponse aux pressions concurrentielles et pour tenter de se soustraire à toutes les réglementations entrant en vigueur, quelle qu'en soit la nature. Si l'on considère que le secteur financier est un système évolutif complexe, il s'ensuit qu'il ne peut qu'innover en permanence, et ce point de vue apporte un certain nombre d'éclairages sur la manière dont les instances de réglementation devraient réagir. Surtout, il montre qu'aller dans le sens d'une moins grande complexité serait sans doute judicieux, et qu'un système complexe ne doit pas forcément aller de pair avec une réglementation plus complexe encore. Il serait sans doute également recommandé de lever les obstacles à une plus grande efficacité de l'autoréglementation et de la discipline de marché dans le secteur financier.

Classification JEL : G280
Mots-clés : Sauvetage, Réglementation bancaire, Crise financière, Mondialisation

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THE PRUDENTIAL REGULATION OF FINANCIAL INSTITUTIONS: WHY REGULATORY RESPONSES TO THE CRISIS MIGHT NOT PROVE SUFFICIENT

By
William R White[1]

Introduction

1. This paper provides an overview of recent international developments affecting the prudential regulation of financial institutions. It was commissioned[2] with a view to seeing whether there might be some lessons that might be drawn for Canadian regulators. A skeptic might suggest three reasons for doubting the usefulness of this exercise. First, financial regulation is by no means a science. This implies that best practice for different countries might well be different. Second, the international review of regulatory practice, sparked by the financial crisis which began in 2007, is still very much a work in progress. This might imply it is too early to draw lessons for domestic regulators. Third, since the Canadian financial sector had such a "good" crisis, this might imply that Canadian regulators have little to learn from others.

2. The counterargument to the first point is that countries might well differ in some respects, but the underlying analytical issues and problems to be faced have definite similarities. As for the second point, regulation is constantly evolving. To wait for the process to end would be to wait forever. As for the apparent relative strength of Canadian financial regulation, it might be that the Canadian financial sector has benefitted as much from luck as judgment. Indeed, some worry that the Canadian financial sector has not yet been tested by a credit fuelled "boom and bust" similar to those that have recently affected many other countries.[3] Recent developments in the housing sector in Canada imply that such a test might yet be forthcoming. In sum, this paper might still have some potential to be useful, not just for Canadian regulators but others as well.

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1. William White is the Chair of the Economic and Development Review Committee but the opinions expressed and arguments employed are those of the author. Without assigning any responsibility for remaining shortcomings, the author would like to thank Andrew Wong, Claudio Borio and Karl Cordewener for helpful comments and Veronica Humi for technical preparation.

2. This paper was originally commissioned by the School of Public Policy at the University of Calgary and was issued as a SPP Research Paper (Volume 6, Issue 32, October 2013).

3. The most recent OECD Economic Surveys for Canada, the Nordic countries, Australia and many other countries indicate worryingly high household debt ratios and often record high property prices. In each case, following the onset of the crisis, banks continued to grant mortgage loans in large volumes in response to strong demand spurred by low global interest rates. The share of residential mortgages in total Canadian dollar assets of Canadian banks rose from 35% in 2007 to 45% by the end of 2011. See OECD (2012).

The objective sought and the rationale for prudential regulation

3. It has always been recognized that the financial sector has vital functions; facilitating payments, providing liquidity, pooling savings and risk sharing, and credit intermediation between savers and investors. These functions ("financial stability") contribute materially to our economic well-being. Similarly, their absence ("financial instability") imposes great costs. The objective of prudential financial regulation is to ensure that these vital functions are maintained.

4. The traditional approach of prudential regulators has been to focus on the safety and soundness of individual financial institutions; a bottom up perspective to the working of the system as a whole. In practice, this approach remains dominant. However, in response to recurring financial crises over recent decades,[4] a top down approach to prudential regulation (focused on "systemic stability") has also begun to attract attention. While "systemic stability" has numerous definitions,[5] a new focus on systemic properties would recognize that the financial system is a complex adaptive system, with many interdependencies among agents who are constantly responding to the activities of other agents.[6] Such systems, while generally highly efficient, can sometimes break down catastrophically. Since all complex adaptive systems seem to share basic properties[7,] a first lesson might well be that financial regulators could learn significantly from those charged with regulating other complex systems[8] with a view to maintaining their stability.

5. If it is broadly agreed that the objective sought is to avoid "financial instability", there is less agreement on the role of prudential regulation in achieving such an objective. Perhaps the dominant view is that regulation is required to offset market failures[9] of various sorts: the failure of people operating in the system to appreciate the externalities associated with their behavior; excessive short termism and ignoring of risks; the influence of safety nets and moral hazard, etc. Without regulation, these market failures (or others) would eventually result in some degree of financial instability and associated output losses.

6. At the same time, regulation also has downsides. First, the costs implicit in the regulations chosen, lower static and dynamic efficiency of the financial system, have to be less than the expected costs of financial instability. Second, there is always the danger that regulation creates distortions and further market failures leading to the "need" for still more regulation. In effect, regulations increase the complexity of the financial system and the likelihood of instability. Third, regulations which force many financial agents to behave in the same way can easily exacerbate systemic problems. Finally, in complex adaptive systems, all policy actions have unintended and potentially undesirable consequences.

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4. Bordo *et al* (2001) document the increase in financial crises in recent decades and link them to the trend to deregulation of the financial system. Admati and Hellwig (2012) rather suggest that rising macroeconomic volatility from the 1970's onward was largely to blame. Perhaps both causes, and their interactions, were in play.

5. For an overview of a number of different definitions see Liedtke (2010).

6. For a useful description see Taylor (2012).

7. These include (1) the inevitability of crises, with magnitude and frequency being linked by a power law, (2) the impossibility of forecasting, (3) the absence of any relationship between the trigger for a systemic breakdown and its size, and (4) the inevitability of unforeseen consequences of all policy actions. See Ball (2012), Buchanan (2000) and Beinhocker (2006) for popular introductions to this literature.

8. Transportation, information and communication, forest management, food security and the spread of infectious diseases immediately come to mind.

9. See Llewellyn (1999) and Cecchetti (2012).

7. Partly in response to these perceived downsides of regulation, others have suggested that market failures are better addressed at source.[10] In particular, what laws, regulations or policies might lead to market failures and could they be removed? A common suggestion is that much more transparency about the functioning of financial institutions would go a long way to improving market discipline. Others suggest that incentive systems which encourage imprudent behavior could be changed, thus encouraging more self-discipline. Restoring a sense of "fiduciary responsibility" for client welfare, reducing pay incentives that encourage near sighted investment strategies, and stronger legal sanctions for imprudent risk taking would all help.[11] Perhaps most important, removing features of the financial safety net would imply that financial agents would no longer be able to gamble for huge gains, knowing that losses would largely be borne by taxpayers[12]. All these measures to increase market discipline and self-discipline would reduce the need for regulatory discipline. Perhaps, in the end, recourse to all these approaches will be needed to achieve the objective of financial stability. Whether they would collectively prove sufficient is another issue.

Changes in emphasis over the years

8. Going back to the beginnings of the last century, there have been long swings in financial regulatory practice, from less restrictive to more restrictive regimes and then back again to less restrictive. The current crisis has been the catalyst for another swing to tighter regulation. Underlying these swings has been fundamental changes in beliefs[13] about how efficiently a market based financial system would manage itself. Similarly, these changing beliefs about the efficiency of private markets also lay behind long swings in fashion about how best to conduct monetary policy.[14] The complementary nature of these regulatory and monetary regime changes had important implications for the real economy in that reliance on market processes encouraged credit booms that eventually turned to bust. This experience then provided the motivation for the next regime change in turn.[15]

9. There was little regulation prior to the 1930's. However, the belief that banking excesses had contributed to the Great Depression, especially in the United States, led to a significant tightening of financial regulation. This tightening of regulation was also thought justified by the introduction of deposit insurance in the US in 1933. Whatever the cause, there were subsequently far fewer bank failures and systemic crises in advanced market economies through the 1950's, 1960's and 1970's than had been experienced in the pre War period. However, there can also be little doubt that it came at the cost of some static inefficiency and a reduction in innovation in the financial sector as well.

10. With time, as the rising economic costs of the regulations themselves became better appreciated, there was a gradual swing back to a more deregulated financial environment. This swing was abetted by

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10. The origins of this way of thinking go back at least to the pre War Austrian School. See Littlechild (1978) for a short introduction. George Benston and George Kaufman have also been pursuing this line of thought for many decades. For a recent set of similar suggestions, see Institute for Economic Affairs (2012).

11. Considering the magnitude of this latest crisis, it is remarkable how few financial agents have been prosecuted in the advanced market economies. This stands in sharp contrast, for example, with the many prosecutions that followed the Savings and Loan crisis in the United States. See Ferguson (2012) p. 75.

12. Mervyn King, then Governor of the Bank of England, gave priority to the safety net issue to the point of calling banker's bonuses a "distraction". See Chu (2013). For a further analysis of this safety net issue see White (2004).

13. One is reminded of Keynes' famous quote "The ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood".

14. White (2013*b*).

15. See Bordo *et al* (2001).

the growing belief, noted above, that some combination of self-interest and market discipline would suffice to prevent imprudent behavior. The trend to financial market liberalization began in North America in the 1960's but proceeded only somewhat later in Europe and Japan, with the 1986 "Big Bang" legislation in the United Kingdom being of particular importance. The regulatory treatment of international capital flows also seems to have had a similar set of cycles.[16]

11. Regulatory liberalization, along with technological developments, contributed to three important structural developments which profoundly changed the financial landscape from the 1970s onwards. First, traditional "relationship" banking (on balance sheet) was increasingly complemented by "transactional" banking (largely off balance sheet) based on securitization of traditional bank assets financed through wholesale funding. A long chain of intermediaries thus developed (the "shadow banking" system) to link ultimate borrowers and ultimate lenders. Second, the financial system became increasingly globalized. Not only did gross international capital flows increase enormously[17] but banks from the advanced market economies increasingly established a local presence in other countries. Third, there was a significant degree of consolidation, with large financial firms not only gaining relative share, but also expanding the range of activities in which they were involved.

12. These structural developments were initially welcomed as improvements to the efficiency of the global financial system, though a few commentators did note important downsides.[18] Some worried that securitization and the spread of shadow banking was an inherently fragile business model in that it depended on very short term financing of much longer term assets.[19] Globalisation was also said to increase the likelihood of destabilizing international capital flows, threatening borrowers but perhaps even lenders[20]. Finally, consolidation raised the issues of "too big to fail" or even "too big to save", with all the associated concerns about ever increasing moral hazard. Attesting to the validity of such concerns, there were also a rising number of bank failures and other crises from the 1970s onwards. Among these were the EME debt crisis of the early 1980s, banking crises in the Nordic countries and Japan in the early 1990's, a severe financial crisis in South East Asia beginning in 1997, and the events surrounding the failure of LTCM (an American firm) in 1998.

13. In eventual response to these developments, a number of central banks began to publish Financial Stability Reports, as did some supervisory authorities. The Financial Stability Forum was established in 1998 and, shortly thereafter, they proposed a set of twelve "standards" to improve the stability of the financial system. However, consistent with the then current belief system, these problems were not initially thought sufficient cause for a fundamental reassessment of the costs and benefits of a liberalized financial sector in the largest Advanced Market Economies. The crises observed were largely in Emerging Market Economies or AMEs in the process of financial deregulation, and thus deemed "special". It took the

16. Capital controls were accepted as an essential requirement for the proper functioning of the Bretton Woods system. The doctrine of the "Impossible Trinity" held that a country could not have a fixed exchange rate, and an autonomous monetary policy, given free (and highly elastic) international capital flows. Subsequently, controls were gradually lifted culminating in efforts made by the IMF in the late 1990's to change its Articles of Agreement to force countries to remove such controls. More recently, in light of the recent crisis, the Fund has swung back to the conclusion that capital controls can at times serve a useful purpose. See IMF (2012).

17. For some documentation see Obstfeld (2010).

18. Successive Annual Reports of the Bank for International Settlements and associated research papers raised a number of "unfashionable" concerns about all of these developments.

19. See Adrian and Shin (2008) among others.

20. See White (2000) for a review of the literature motivated by the Asian crisis. More recently, see Bruno and Shin (2013).

severity of the financial and economic crisis beginning in 2007 to lead to a more fundamental re-evaluation.

14. This is not to say that all of the developments between the 1960s and 2007 were moving in a liberalizing direction. While this was generally the case at the national level, at the international level there was increasing concern about the growing role of internationally active banks and the need for a "level playing field". The catalyst for these concerns was the international expansion of Japanese banks in the 1980's. This provided a significant threat to American and other Western banks who had been weakened by bad loans made to EME's in an attempt to "recycle petrol dollars" after the oil crises of the 1970's.[21]

15. The Basel Accord of 1988 (now known as Basel l) was the initial response to these concerns. Promulgated by the Basel Committee on Banking Supervision, and subsequently ratified by national legislators, the Basel Accord was an early example of international "soft law" now seen on a much wider scale.[22] Basel l also adopted the concept of risk–weighted capital requirements, which some jurisdictions had already introduced. Assets of banks were allocated into "buckets", with different capital requirements imposed depending on the relative riskiness of the assets concerned. As for the overall level of capital demanded, there was no attempt made either to assess why capital was needed or its optimal level.[23] Rather, to aid compliance, the level set was designed to be only slightly higher than what the banks were already holding.

16. As the number of bank failures and economic and financial crises continued to rise, the Basel Committee began work on a significant refinement of Basel l, now known as Basel ll. It was designed, not just to ensure a level playing field, but also to make the capital requirements much more sensitive to risk with a view to reducing regulatory arbitrage. The agreement fundamentally rested on three reinforcing "Pillars". Pillar 1 set out required capital holdings, and set out various ways in which these capital requirements could be calculated.[24] In effect, this was both an appeal to self-discipline to control risk taking ("skin in the game") and the application of a regulatory rule. Pillar 2 laid out understandings about supervisory oversight and the scope for judgment, a second source of discipline. Pillar 3 had to do with transparency and reporting, with a view to the market exercising more discipline. It should be noted that the development of Solvency ll standards for insurance companies in Europe also rests on three similar Pillars but, as will be discussed below, there are in fact significant differences in the regulatory regimes proposed for banks and insurance companies.

17. Even before the promulgation of Basel ll, a number of critics[25] had suggested that these measures might in fact increase rather than decrease financial instability. One important reason was that the "risk weights", while distinguishing properly between more and less risky assets at a moment in time, might also fall all at the same time in cyclical upswings and rise all together in cyclical downswings. This would

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21. Silber (2012) provides a fascinating description of these developments and the particular role played by Paul Volcker.

22. "Soft law" does not have the force of an international treaty. Rather it refers to international agreements, generally brokered by committees made up of national experts, that have subsequently to be given the power of law by national legislation.

23. See Goodhart (2012), p. 195.

24. The most important distinction is between the standard and advanced methodologies. The former relies more on external ratings to determine credit quality, whereas the latter allows for the greater use of internally developed models. There would be a presumption that more granular and sophisticated internal models would lower the assessed need for capital, but such models would also be expensive to set up and run.

25. Goodhart (2001) and a variety of publications authored by BIS staff. For example, see Borio (2003).

increase the inherent tendency to "procyclicality" in lending practices (explained in more detail below). Moreover, the emphasis in Basel ll continued to be on improving the safety and resilience of individual banks rather than the behavior of the system as a whole. Finally, and a still broader failing, stated concerns about financial stability were not always matched by commensurate and concrete action.

18. For better or worse, the ostensibly tougher Basel ll regulatory standards had not generally been implemented when the crisis broke in 2007. However, one important exception was that investment banks in the US were allowed by the SEC, from 2004 onwards, to use Basel ll risk weights to calculate their capital requirements. As a result, their required capital plummeted and they subsequently increased their leverage in order to absorb all the capital they actually had. Adrian and Shin (2008) as well as Admati and Hellwig (2013) among others, contend that increased leverage made a material contribution to much of the financial mayhem that followed.

19. The economic and financial crisis that began in 2007 had a significant effect on regulatory thinking. Two developments were particularly important. First, the idea that self-interest and market discipline would prevent imprudent behavior seemed clearly rejected by the facts. There was a need for tougher regulation. Second, there was further support for the belief that the system as a whole could be vulnerable even if the individual parts appeared strong. The suddenness of the drying up of the interbank market, and the unexpected collapse of Lehman Brothers, both pointed to systemic causes (both often described as "Minsky moments") and contributed to this intellectual change. These two new insights provide the jumping off point for the rest of this paper, which tries to evaluate which regulatory initiatives might best help achieve the objective of "financial stability" described above. In practice, these post crisis initiatives seem to have been driven much more by the need for tighter regulations than the need to address systemic issues.

20. It is finally worth noting the actions undertaken by regulators (in association with governments and central banks) to manage the crisis as it unfolded. Virtually everywhere the official sector turned to some combination of forbearance, public injection of funds to troubled institutions, massive extension of "safety net" provisions (deposit insurance and senior credits) and the use of takeovers and mergers and acquisitions to deal with seriously troubled institutions. These measures seemed necessary to prevent the crisis from spreading out with even more devastating effects. However, there also seems little doubt that these measures have made the challenge of preventing future crises much harder. All of these support measures ("bail out" rather than "bail in") have generated moral hazard and a further erosion of both internal and market discipline. Further, many institutions are now even bigger and more complex (and thus interdependent) than they were before, implying a clear worsening of the "too big to fail" problem during the crisis. Haldane (2013) suggests[26] that the implicit government subsidy to large banks has increased markedly since the crisis began. Something similar can also be said about many financial markets which are now more concentrated than before. In sum, future systemic risks in the financial sector have grown significantly as a result of recent policy actions.

21. Two other issues pertaining to regulatory actions in the post crisis period are both important and controversial. The first has to do with something that did not happen, and perhaps should have. The second has to do with something that did happen, and perhaps should not have.

22. What has **not** happened in any major regulatory jurisdiction has been a comprehensive approach to writing off troubled loans and to forcing lending institutions into bankruptcy. In effect, most affected countries (with the US being somewhat of an exception) have chosen a Japanese approach rather than a

26. He notes that, prior to the crisis, the large banks classified as SIFI's received a one notch upgrade from rating agencies on the assumption of state support. Since then, the upgrade has risen to three notches.

Nordic approach to resolving the problem of bad credits.[27] What **has** happened is that the regulators moved into crisis prevention mode well before the problems associated with this current crisis had been fully resolved. Not only have regulators everywhere called for a major increase in capital requirements, but national regulators have also been encouraging their financial institutions to retreat back behind national borders. Whether or not this might threaten the global recovery, and the very concept of "financial globalization" going forward[28], is discussed further below. The only point to be made here is that important decisions have already been taken, in spite of the fact that the analytical support needed was never anything more than "work in progress".

Other influences on regulatory changes

23. In looking at what other countries, or even international bodies, do in the regulatory area, it is important not to be naïve. Regulatory changes are mostly driven by valid economic objectives and the belief that regulatory changes can help achieve them. Nevertheless, other less noble motives often come into play as well.

24. First, in complex and unexpected circumstances, there seems to be a natural human tendency to revert back to earlier belief systems, whether appropriate or not.[29] In Europe, for example, disproportionate efforts have gone into regulating hedge funds and private equity firms, even though they played only a very limited role in the European financial crisis. Second, there seems to be an equally human tendency to wish to find someone to blame for any undesirable event. This can lead to angry and even punitive measures being taken, often legislated in haste. Many would now consider the Sarbanes-Oxley Act of 2002 to suffer from this, and many worry similarly about the recently passed Dodd-Frank bill in the United States. Third, the influence of lobbyists representing financial sector interests has increased sharply in recent years, and not just in the United States.[30] The financial industry has access to large amounts of money and is obviously prepared to use it in pursuit of its own interests.

25. The lessons from this are twofold. First, regulators in different countries should not assume that regulatory changes made elsewhere have been done for the best of reasons. Second, regulators must be aware that similar malevolent forces might also exist in their own countries and their influence must therefore be guarded against.

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27. For an excellent description of these two approaches, see Borio *et al* (2010). The Japanese approach was based on the assumption that the losses were small enough that the banking system and the country could grow out of them. This was also the tactic followed by the US in response to the banking losses associated with the EME debt crisis of the 1980's. It worked in the US case, but not in the Japanese case. The fundamental problem is that unrecognized bad loans may inhibit lending to such a point that they prevent the economic growth needed from actually happening. The Nordic approach recognized more clearly the down side risks of this approach, and opted for a more rapid and brutal restructuring. It led to a deeper recession, but one that was soon over.

28. In addition, the retreat into national jurisdictions in the euro zone threatens the very survival of the euro zone itself.

29. See Kahneman D (2011).

30. See Häring and Douglas (2012), Johnson (2009), and Wedel (2009). Taibbi (2012) provides a useful taxonomy of "How Wall Street Killed Financial Reform". Measures noted include watering down the original act, stalling for time, including many loopholes, bullying the regulators and appealing repeatedly to the courts.

Regulating Different Kinds of Financial Institutions

26. Prudential regulation has as its objectives the safety of individual institutions and the stability of the financial system as a whole. Traditionally such regulation has been primarily directed at banks, and initiatives with respect to banks will be the primary focus of section B1 below. However, in recent years, a view has emerged that other institutions might also have the potential to generate financial instability. This is considered in Section B2 which considers regulation pertaining to the many different types of financial institutions involved in the "shadow banking" system. Regulation pertaining to insurance companies and pension funds will be dealt with separately in Section B3. To put the size of these industries into some perspective, the FSB (2012*c*) has estimated the total assets of the global banking industry at $130 trillion, the shadow banking industry at $67 trillion, and the combined assets of the insurance industry and pension funds at $43 trillion.

27. In addition to prudential regulation, most countries have regulations directed to consumer protection. While these will not be treated in this paper, this is not mean to deny that unethical business practices can also contribute to financial and macroeconomic instability. The rapid growth and then collapse of the sub-prime mortgage market in the US is a case in point. Moreover, the reverse direction of causation is also extremely common, as pointed out[31] by Kindelberger and Aliber (2005). Finally, it is worth noting that unethical behavior can change the climate of public opinion in favor of tighter prudential regulation as well.[32] This may be one welcome side effect of the recent LIBOR rate setting scandal and the revelation of massive trading losses at JP Morgan[33] incurred by the "London Whale".

28. Financial instability has economic costs as described above. One way of looking at prudential regulatory measures is that they are designed to reduce the Expected Losses[34] arising from such instability. This involves measures to reduce the probability of a default/crisis arising, as well as regulatory measures to reduce the size of the losses incurred should a default/crisis actually happen. In this paper, an important distinction is made between the micro prudential approach and the macro prudential approach to the prudential regulation of financial institutions.[35] These different approaches imply that the same policy instruments can be used for different purposes. Thus, many of the instruments that could be used for macro prudential purposes (e.g., time varying capital requirements as described below) were originally introduced for micro prudential purposes. This historical legacy creates problems for institutional design going forward.

29. The **micro prudential** approach to prudential regulation is the more traditional of the two. It focuses on the health of individual institutions, essentially assuming that, if each institution is healthy, the system will be healthy. Issues of interdependence are given little attention and risks are taken as exogenous. This approach is essentially static in nature. It assumes that defaults could occur at any time and the regulatory response should be to reduce the probability of this happening. Indeed, most of the proposed measures in Basel lll are of this nature.

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31. See Chapter 9 on "Frauds, Swindles and the Credit Cycle". J K Galbraith famously referred to such late-cycle fraudulent behavior as "the bezzle".

32 . See Patterson S (2012).

33. Prior to this incident, JP Morgan was considered to be one of the world's best managed firms. If they could suffer such losses, what might happen elsewhere?

34. The Expected Loss is defined as the product of the Probability of default/crisis (PC) and the Loss incurred should there be such a default/crisis (LGC).

35. For an early discussion see Borio (2003).

30. The **macro prudential** approach to prudential regulation rather focuses on the stability of the financial system as a whole, and has both a static (cross sectional) and a dynamic (time varying) dimension. The former dimension recognizes the interdependencies in the financial system and the diverse ways in which the actions of individual institutions can feed back on the health of others. It recognizes the fact that "shared shocks" can be dangerous to the system, even if all its components initially seem healthy. Banks that are "Too Big To Fail" also need special attention as do particular forms of interdependency. This approach does not just focus on reducing the probability of a crisis but also reducing the size of the economic costs that might be associated with such a crisis.

31. The macro prudential approach also has a time dimension. This reflects the assumption that Expected Losses are not constant but change over time. This has largely to do with the inherent "procyclicality" of the financial system. To be more specific, the appetite to take on risk, both by lenders and borrowers, seems to be endogenous and tends to increase with the apparent strength of the cyclical upturn. This "boom" process (generally driven by leverage, speculation and rapid credit growth) frequently culminates in a costly "bust". This process is now well documented historically[36] and is increasingly well understood analytically[37]. Accordingly, it is suggested that macro prudential measures might be calibrated to lean against this process. The question of whether monetary policy should also "lean" against a credit bubble also deserves serious attention. This is discussed below. As a corollary it should also be noted that, in complex adaptive systems, identifying the specific time and character of turning points is essentially impossible.

Prudential regulation of banks

32. The approach taken below will be to allocate the prudential measures being currently discussed at the international level into the two categories of initiatives defined above. In the case of each, an attempt will be made to assess the reactions to these proposals.

Micro prudential initiatives

33. In theory, individual financial institutions protect themselves against possible credit losses in three ways. First, they take care to price the loan according to the riskiness of the loan. In a diversified portfolio, occasional loses are offset by the extra revenues from other risky loans that continue to be serviced. Second, when perceptions of risk shift, the lender makes loan loss provisions to cover this expected loss. Third, institutions hold capital to meet the challenges posed by unexpected losses.

34. In practice, the regulatory regimes associated with the Basel process have commonly failed to make these distinctions, implying that the analytical underpinnings of the Basel framework could have serious shortcomings. At the least, regulators have failed to ensure that financial institutions have recourse to all three safeguards.

35. The pricing of risky loans has received surprisingly little attention.[38] Indeed, the narrowing of risk spreads between 2004 and 2007 (just before the crisis started) was generally interpreted by regulators

36. Reinhart and Rogoff (2009) and Jorda, Schularik and Taylor (2012) are two well known references.

37. For a recent overview of this literature, see Borio (2012). Also Borio and White (2003). Note as well, that government policies also contribute to the tendency to "procyclicality". The fact that the shareholders of financial institutions have legally limited liability is equivalent to saying that they have a "put" on the value of the firm with the strike price at zero. In effect, they have a limited downside but an unlimited upside which encourages risk taking. Moreover, official safety net measures worsen this asymmetry.

38. In the late 1980's, the Committee on the Global Financial System at the BIS set up a sub-committee under the Chairmanship of a Senior Vice President at the Federal Reserve Bank of New York to compare ex ante

and central bankers as a positive sign for the future stability of the system[39]. Moreover, diversification, per se, has not been seen as a high priority[40], even if this argument has been used from time to time to support the existence of "universal" banks. Absent such concerns about diversification, there has been a gradual drift upwards in the proportion of loans against property in the banking systems of many countries. This is particularly worrisome given how commonly property finds itself at the centre of "boom-bust" credit cycles.[41] Further, excessive reliance might have been put on the low (and assumed constant) correlations observed historically between returns on asset classes in assessing diversification. If those correlations might be expected to rise significantly in crisis situations, then actual diversification might prove much less.

36. As for making provisions against expected losses, this has been resisted firmly for decades by both Treasury officials and by the accounting profession. The former feared tax losses as bank profits were reduced, while the latter feared that the introduction of "subjective" expectations would allow the accounts to be manipulated. Better, they felt, to allow provisions only when loans actually had gone bad or were about to (the "incurred loss" approach). However, this approach might be about to change. Both the FASB and the IASB announced in 2012 their desire to move to an "expected loss" model, though both remain reluctant to embrace full "through the cycle" loss experience. Further, technical differences in the FASB and IASB proposals still need to be dealt with. The former prefers to recognize more losses up front, while the latter continues to argue that this could discourage needed lending.

37. The principal set of international regulations directed to establishing capital levels at individual banks is now known as Basel lll. It has received strong support from the G20 process, having been emphasized in successive G20 Communiqués. Moreover, both the Basel Committee on Banking Supervision and the Financial Stability Board (upgraded from the Financial Stability Forum) have had their memberships expanded to more closely resemble the G20. The intention is to build greater global "credibility" for the recommendations made by these two bodies.

38. Basel lll lays out new and higher capital requirements than Basel ll,[42] and also specifies what is to be done when certain requirements are not met. As well, it also significantly tightens the definition of capital, by excluding a number of liabilities that would not actually be loss absorbing in a crisis. The framework also specifies a series of dates for introduction of various measures. Basel lll is intended to apply only to internationally active banks, as was the original intention under Basel l. However, some jurisdictions (e.g. the European Union) are applying it to all banks. This has raised numerous objections, not least to the complexity of calculating the capital requirements and the associated costs of compliance for smaller firms.

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and ex post assessments of risk at large financial firms. The identification of big differences would then have called into question the risk assessment procedures at the institutions involved. For various reasons, not least the unwillingness of financial institutions to cooperate, this work was not pursued.

39. As discussed further below, there seems to be a growing consensus that market based indicators of increasing risks in the system (like the Vix index) systematically move in the wrong direction.

40. In fact the assumption underlying the calculation of the capital requirements is that each portfolio is perfectly diversified.

41. Commercial property prices are generally even more volatile than residential property prices. Looking forward, the value of retail shops (bricks and mortar) might be under particular threat from on line shopping. See The Economist (2013). As on-line banking expands, something similar could affect the property value of branch banks as well.

42. See Basel Committee on Banking Supervision (2010).For an excellent overview of all aspects of Basel lll, See Moody's Analytics (2012).

39. The BCBS has also instituted a comprehensive program for assessing whether member countries are complying with the new capital regulations.[43] In so far as the timing of intended conformance is concerned, the latest report[44] indicates that the twenty seven member countries of the BCBS are well advanced in the adoption of the Basel lll capital regulations. Final rules are already being enforced in eleven countries and have been published in three others. In all the remaining countries, draft rules have been published and discussions with the banking industry are ongoing. While delays have been observed in two crucial areas, the United States and the European Union, firm commitments to rapid implementation of Basel lll have been made by the relevant authorities.[45] That said worrisome differences in the specifics of the suggested rules in different regions have been identified.[46] This raises the danger of important countries or regions backsliding on the grounds that some other country or region is not playing "according to the rules".

40. The Basel committee has also surveyed the world's largest 101 banks, and calculated the amount of supplementary capital they would need if they were to meet the final capital targets (7% of Tier 1 equity by 2019) today. As of June 2012 this shortfall was 176 billion euros versus a shortfall of 386 billion euros only six months earlier. This "progress" has led the committee to conclude that the big banks were likely to meet their requirements some years before they were formally required to do so, and that they could likely do so through retained profits. This said, a number of large banks (particularly in Europe) still seem to face some significant challenges

41. In spite of this apparent "progress", two important analytical issues continue to be debated. The first has to do with the timing of the introduction of the capital measures in particular. The Basel Committee gave long lead times, specifically to avoid raising capital in the middle of an ongoing recession. Their fear was that higher capital requirements might lead to slower credit growth which would make the economic weakness more intractable. Needless to say, the banking community echoed these concerns, going even further to suggest that the Basel Committee deadlines were still far too tight[47] In contrast, the

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43. This work takes place at three levels and, for the moment, focuses on compliance with respect to capital requirements. Level 1 ensures the timely adoption of Basel lll. The last report in April 2013 covers all members of the committee. Level 2 ensures regulatory consistency with Basel lll. To date, only four countries have been covered. Level 3 ensures consistency of outcomes. To date, the committee has focused on the calculation of risk weights at the level of individual banks. The results of two initial reports are discussed below.

44. Basel Committee on Banking Supervision (2013*b*).

45. Given the complexity of the regulatory structure in the US, and the need to get all member countries on side in the EU, some delay might have been anticipated. In Europe, one cause for delay was a vigorous debate as to whether all countries would have to have the same capital requirements, or whether individual countries could opt for still higher capital levels. The European Commission argued for the former, while the UK and Sweden (and some others) took the latter position. In the end, a compromise was reached.

46. The Level 2 compliance studies completed to date have covered the US, the EU and Japan along with Singapore. The US is non-compliant in only one respect. Their regulations eschew all references to rating agencies, while Basel lll still relies on them to some extent. The EU is materially non-compliant in two respects, the more important of which is that their definition of capital is broader than Basel lll. As actual capital levels rise in European banks, the hope is that the definition of capital will come in line. For an overview see Veron (2013). Lanoo (2013) notes worrisome aspects of CDRIV, which is the directive to implement Base llll in Europe. He contends that it has been drafted so as to allow significant differences in the application of Basel lll across European countries.

47. The effects on the global economy of implementing the capital standards as anticipated were investigated by the official community and by the Institute for International Finance, representing the banks. The former concluded that the shorter term costs of higher capital (and the avoidance of very costly downturns) were minimal, whereas the latter concluded the shorter term costs would be very heavy indeed. Since none of

Swiss National Bank and the European Banking Authority independently mandated much higher and much earlier capital requirements than did the Basel Committee. Since the Basel standards lay out minimum requirements, the Committee could not object to tighter standards, yet many others continued to question the effect of an earlier imposition of higher capital requirements on the supply of credit. In Europe in particular, credit growth has been very restrained, particularly for small and medium size enterprises. It is of course very difficult to distinguish the effects on credit growth of these regulatory developments from the macro economic effects of the euro zone crisis more generally.[48]

42. The second analytical issue has to do with the level of the capital requirements imposed by Basel lll. What is incontrovertible is that the basic level of capital required under Basel lll will rise from 2% under Basel ll to 7% of risk weighted assets,[49] and that the definition of capital will be much stricter. What needs to be remembered, however, is that the required levels of capital under Basel ll were designed to be close to those under Basel l, and the original requirements were close to the levels of capital that banks already held. In short, there was never at any point a rigorous analysis of how much capital banks should hold. Put otherwise, we know capital requirements have risen under Basel lll, but we do not know if they have risen enough.

43. This uncertainty sparked a vigorous debate which continued into 2013. On the one hand, some have contended that the Basel lll requirements are already exercising a significant impact on how banks behave.[50] Reflecting higher risk weights, banks are withdrawing from riskier activities. As with the timing issue discussed above, representatives of the banking industry also contend that the current higher capital requirements are already raising credit spreads and threatening loan growth. Still higher requirements would threaten economic recovery even more. Finally, it has been suggested that higher regulatory requirements for capital quickly become treated as absolute minimum requirements by the market. In effect, available capital can no longer be used for the purpose for which it was originally intended; i.e. absorbing unexpected losses.[51] This argument needs serious attention, since it suggests the possibility of a ratcheting up of target levels for capital that could have serious economic effects.

44. On the other hand, a wide variety of commentators have suggested that banks' capital ratios should be much higher.[52] They argue that this would not impede growth and would minimize the likelihood of costly crises. A common empirical thread is the observation that banks held much more capital in earlier decades and that there is no evidence that lending and economic growth were materially lower. At the level of theory, Admati and Hellwig (2013) essentially rely on the Modigliani Miller theorem to suggest that higher capital ratios would not lower the risk-adjusted rate of return on equity in banking. In

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the models used to support these different conclusions actually included a developed financial sector, there must be a suspicion (at the least) that ad hoc assumptions produced the results desired.

48. While loans to small and medium size firms have fallen everywhere in the euro zone, the declines have been much greater in the so called "peripheral" countries whose continued membership in the euro zone remains most in doubt.

49. The 7% comprises a minimum equity requirement plus a "conservation buffer". In addition Basel lll allows for other supplementary capital requirements (especially "countercyclical" surcharges and surcharges for SIFI's) that could raise the required ratio to as high as 13%.

50. See for example, Barker and Braithwaite (2013) and Risk Magazine (2013). In particular, higher capital requirements have made short term repo financing more expensive, and this market has recently been contracting. It remains to be seen whether this is a welcome or a worrisome development.

51. In principle, supervisors might envisage that a higher capital ratio could be ratcheted down, thus evoking ever stronger supervisory oversight and eventual resolution. This process would also be impeded if the markets panicked whenever regulatory capital began to fall, even from high levels.

52. See for example Admati and Hellwig (2012), Turner (2011), Hoenig (2012) and Miles et al (2012)

effect, with a higher equity ratio, banking would be less risky which would allow banks to raise financing much more cheaply.[53] In contrast, Jackson and Birchler (2012) suggest that there are many reasons why the Modigliani- Miller theorem does not apply in the real world.[54] Further, there is the question of where the increased equity investment would come from and whether it might not raise capital costs elsewhere, to the broader detriment of fixed capital investment[55]. Since there does not seem to be much support from regulators for the basic suggestion of Admati and Hellwig, that an unweighted capital ratio of 15 to 20% should be imposed on all banks, the official sector seems yet to be convinced.[56]

45. A complicating feature of this debate has to do with the definition of capital. While Basel lll narrows the definition when compared to previous practices, it still allows enough flexibility of interpretation to allow quite divergent practices between the United States and Europe. In particular, under the Dodd-Frank bill, contingent capital bonds (CoCo's) are not allowed whereas in Europe they are. To date, two kinds of these bonds have been issued in Europe. Some are bonds which convert into equity when a bank's capital ratio falls below a certain threshold set by regulators, and some are bonds that are written off entirely. Moreover, it is clear that significant efforts are likely to be made in devising still other variants.[57] The debate continues on the pros and cons of these types of instruments, with Admati and Hellwig (2013) perhaps the most categorical. While contingent liabilities might be preferred by the banking industry, they offer no broader advantage than do higher levels of more narrowly defined capital.

46. Another feature of Basel lll is that, together with its continued reliance on risk weighted capital requirements, it also imposes an overall (unweighted) leverage ratio as a "backstop". One reason for this seems to have been concerns that banks have been "gaming" the risk weights ever since they were introduced in 1988. Blundell-Wignall *et al.* (2009) and Slovik (2011) show how the ratio of weighted to unweighted risk assets in fact has been declining steadily ever since Basel 1 was introduced. Haldane (2012*a*) also notes that risk weights have many other disadvantages, not least an inherent unreliability.[58] In effect, he suggests that the problems bankers face is not the evaluation of risks but Knightian uncertainty. The Euro crisis, with its attendant pressures on the ratings and credit spreads of a number of sovereigns, has also called into question whether sovereigns should continue to be assigned zero risk weights[59] as at present. Worries about the "procyclicality" of the risk weights chosen by banks have already been referred to above.

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53. Some would contend that this is already happening. Barclays issued a bond in 2012 with a coupon of only 7½ per cent in spite of a provision that the bond would be written down to nothing if pre-specified minimum capital ratios were breached. In addition, spreads on bank bonds continue to tighten. See Rodrigues and Foley (2013).

54. In particular, banks are subsidized by the state in two ways. First, interest payments are deductible from profits for tax purposes. Second, deposit insurance and other safety net provisions imply they can attract deposits at lower interest rates than otherwise. It seems odd that the state should subsidize activities whose dangers the state would subsequently decry. The evident way to square the circle would be to remove the subsidies and accept that lending costs would rise somewhat.

55. See Lex (2013).

56. Chapters 12 and 13 of Admanti and Helwig (2013) ask why this might be the case, and suggest the influence of vigorous bank lobbying and the more general (and traditional) problem of regulatory capture. That said, prominent members (or ex members) of the official community, like Mervyn King and Paul Volcker, have stated publically that the Basel lll requirements are too low.

57. See Hartford (2013) and his reference to Equity Recourse Notes.

58. The related issues of data, modeling and risk measurement are considered further below.

59. More broadly, a number of commentators have seen these zero weights as part of a broader trend towards "financial repression" which aims to lower the real borrowing costs of highly indebted sovereigns. See Reinhart and Sbrancia (2011).

47. These identified shortcomings of the risk weighted approach have led to a spectrum of proposals. As noted, the Basel Committee treats the leverage ratio as a backstop to the risk weighted requirements and there is some evidence that the banking industry would go along.[60] Haldane (2012*a*) states explicitly that the two ratios should be treated as of equal importance, but the thrust of his argument seems to sympathize more with Hoenig (2013). Hoenig feels the leverage ratio should have precedence and the risk weighted ratio should be the backstop. Blundell-Wignall and Atkinson (2010) go one step further and ask whether one needs the risk weighted requirements at all. They contend that the banks' proven capacity to shift risk outside of the formal banking system implies that the unweighted ratio will always be the binding constraint, and that the weighted ratio can be dispensed with. Further, Blundell-Wignal and Roulet (2013) and Haldane (2012a) also conclude that the unweighted leverage ratio is a much better predictor of default risk than the weighted ratio. Given the very high costs of complying with Basel lll, for both banks and supervisors,[61] this issue is of great practical importance.

48. Along with Admanti and Hellwig (2013), Hoenig and others also recommend a leverage ratio that is many multiples of the ratio (3%) suggested in Basel lll. However, recent statements by US banks that they need only "shuffle assets" to meet higher leverage requirements[62] must raise doubts about the effectiveness of these unweighted ratios as well. In response to such concerns about "gaming" the ratios, Goodhart (2013) and Admati and Hellwig (2013) have suggested regulators should demand increases in the absolute level of capital held by banks. This would have the further advantage of reducing the incentive for banks to cut loans as a way of meeting capital requirements couched in terms of ratios.

49. Finally with respect to capital requirements, Basel lll continues to rely on rating agencies to set risk weights under the "standardized approach". One problem with this is that the Dodd Frank Act in the United States explicitly rules out the use of such ratings. Another issue has to do with the poor quality of some ratings. Consider the problems associated with the AAA ratings of structured products, revealed as erroneous by the onset of the global crisis, and the sudden revision of sovereign ratings in the context of the euro crisis. However, whether these specific shortcomings[63] should call into question the validity of all ratings provided by rating agencies remains very much an open question. Moreover, to the extent banks (and others) rely less on the "opinions" of rating agencies, they must find some alternative. One possibility is that the BIS (or some other institution equally capable of respecting confidentiality) might collect "internal ratings" for all borrowing entities from a wide range of lenders known to carry out such assessments. If the full distribution of such results were to be published, the uncertainties associated with ratings would then become much clearer.

50. Not surprisingly given market developments during the crisis, Basel lll also lays out new standards concerning liquidity management. These regulations prescribe the need for short term liquidity requirements (the capacity to sell enough assets to meet a cumulative liquidity shortfall over a thirty day period) and also the need for a stable funding ratio over time. The implication of the latter is that is that banks should rely much more on stable retail deposits rather than wholesale sources of funding that could

60. See Sands (2013).

61. See the references in Haldane (2012*a*) p. 12.

62. Brathwaite and Alloway (2013).

63. For example, it is now clear that it was effectively impossible to provide a rating for many structured products that would demonstrate any stability over time. See Fender *et al* (2008) and Coval *et al* (2008). The latter shows that even modest imprecision in the parameters used in rating methodologies could lead to wide variation in the default risk of structured products like CDO's. Further, these products (p2) "substitute risks that are highly diversifiable for risks that are highly systematic". As for sovereign ratings, it could be that the rating methodology could be significantly improved. For a new initiative in this area, see Bertelsmann Foundation (2013).

dry up at any moment. Both suggestions proved very controversial. The timing of the introduction of the stable funding requirement has been put off repeatedly, no doubt reflecting the difficulties it would pose for banks (especially European banks) that had become increasingly reliant on wholesale funding in recent years.[64] In March of 2013, the BCBS also agreed to weaken the short term liquidity requirement (by both lowering the threshold for expected outflows and widening the spectrum of assets judged to be eligible to meet liquidity requirements). While some critics saw this as a capitulation to bank lobbying, Wagner (2013) and others suggested there were valid concerns that implementation of the original proposals would actually prove counterproductive.

51. Recent discussions about "Banking Union" in the euro zone, serve to remind us that the regulation and supervision of banks is only one of three features required for a properly functioning banking system. The other two features are a well-designed deposit insurance scheme and an efficient legal mechanism for resolving banks deemed to be insolvent. The latter is a mechanism for offsetting the "moral hazard" generated by the former. Similarly, absent the ultimate threat of insolvency, the regulation of financial institutions is bound to be highly inefficient and market discipline will also not work properly. While a discussion of deposit insurance issues is beyond the scope of this paper, it would seem worth reviewing recent developments with respect to bank resolution procedures.

52. Bank resolution procedures demand different legislation from normal corporate bankruptcies. The externalities from bank failures are very different, and resolution must often be carried out quickly to avoid uncertainty and contagion effects. The crisis has made it clear that bank resolution procedures were, and often remain, inadequate in many jurisdictions. Absent the legal capacity to resolve a banking crisis in an orderly way, the only alternative seen was to keep the institution functioning so at to avoid a disorderly outcome. In many jurisdictions, there was also a significant degree of concern that forcing losses on to the creditors of threatened banks could also have contagion effects, not least that it would significantly raise the borrowing costs of other banks. In this fashion, even small banks might prove "systemic".

53. Consistent with such fears and as noted above, "bail out" has generally been preferred to "bail in". Particularly remarkable has been the extraordinarily lenient treatment given to senior creditors in the current crisis in Europe. Only in late 2012 and 2013 did the failure and nationalization of SNS REALL bank in the Netherlands, and the treatment of the banking crisis in Cyprus, give hints of an approach that would be tougher on private creditors.[65] This new approach was confirmed in the Bank Recovery and Resolution Directive issued on 27 June of 2013. Dubel (2013) traces the evolution of this process, beginning with the banking crisis in Greece and culminating with the crisis in Cyprus. In particular, he documents how potentially "bail-inable" capital was allowed to leave at the European taxpayer's expense.[66] This crucial issue of bank resolution procedures is returned to below, in the context of SIFIs.

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64. The development of the "shadow banking" system, characterized by increased reliance on securitization and wholesale funding, will be discussed further below.

65. Yet there remained considerable uncertainty about what these "hints" might lead to. Resolution of SNS REALL was originally said to be a template for future bank resolutions in Europe, but this was almost immediately denied. To add to the uncertainty, the initial proposal to deal with a troubled bank in Cyprus reversed the "normal" order in which creditors were to take losses. Senior bondholders were left untouched (albeit, a very small share of total liabilities) while insured depositors were initially supposed to take a significant haircut.

66. Beyond these explicit fiscal costs, it is somewhat ironic that the "bail out" approach did not succeed in avoiding contagion from Greece to other peripheral Euro zone countries. In contrast, as a tougher approach to bank creditors did emerge, it did not trigger still more contagion. For example, after the suggestion that

54. Measures taken to support banks in the UK, the US and many European countries have all involved the commitment of significant amounts of government money. In a number of jurisdictions, particularly in Europe, fears remain of still greater expenditures. In virtually every country, government debt levels are already so high that significant bank related expenditures might call into question the capacity of governments to service such debts. This has already happened in a number of peripheral countries in Europe; the so called, bank-sovereign instability nexus. Similar problems cannot be ruled out elsewhere.

Macro prudential initiatives

55. Three sets of issues will be discussed below; the treatment of systemically important financial institutions, the issue of interlinkages via the interbank and derivatives market, and finally the use of countercyclical policies to reduce the amplitude of "boom bust" cycles driven by imprudent lending and "procyclicality" in the financial system. The first two reflect the cross sectional aspect of the macro prudential approach, whereas the third reflects a response to the changing time dimension. All three focus on issues affecting the system as a whole, not just its constituent parts.

Systemically Important Financial Institutions (SIFIs)

56. The so called SIFIs have received attention from the Basel Committee and also from the FSB. At the moment 29 banks have been classified as SIFIs, reflecting the belief (based on objective evidence) that they are so large, so interconnected, or are so dominant in important spheres of finance that they cannot be allowed to fail in a disorderly way.[67] The systemic implications would be too great. The fact that there is also great uncertainty about what these effects might be, especially given the high degree of interdependence among large firms, has been a further argument for official support should fears arise of such a failure.[68]

57. There is a developing literature on how to estimate the contribution made to systemic risk by individual financial institutions.[69] In principle, this might be used to calibrate the relative need for the use of supplementary instruments to influence the behavior of all financial institutions. Then, there would be no need to designate institutions as SIFI's, with all the associated moral hazard. As noted above, the implicit subsidy given to SIFI's has widened significantly since the crisis began. Moreover, there is an unwelcome dynamic here, in that healthy SIFIs have the capacity to devour their competitors, becoming even more SIFI like in the process. In practice, however, it has been decided to make a hard distinction between institutions designated as SIFI's and all others. This decision deserves to be revisited.

58. A number of steps have been taken or have been suggested to reduce the expected losses associated with the disorderly failure of a SIFI. Cecchetti (2012), Haldane (2013) and many others are of

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insured depositors in Cyprus should take a haircut, there was no increase in deposit flight from peripheral countries. Of course, this could still happen in the future.

67. Blundell-Wignall and Roulet (2013) provide econometric evidence, drawn from a panel of 34 large banks, that default risk is strongly influenced by a bank's chosen business model. In particular (p. 14) there is "strong evidence that the gross market value of derivatives is a key driver of the distance to default". They further postulate that this exposure also seems correlated with leverage, size and reliance on wholesale funding, all of which seem to contribute to the probability of default.

68. Paul Volcker feels this has been the single most important reason for forbearance in the post crisis period. See Volcker (2012). Astonishingly, because of concerns about systemic concerns arising from reputational loss, a number of bankers who committed criminal acts have not been prosecuted by the US Department of Justice. See Taibbi (2013).

69. See Drehmann and Tarashev (2011).

the view that these measures are grossly inadequate. Indeed, as Cecchetti suggests (2012, p. 5), the measures taken can only be judged adequate when "the FSB's list of G-SIFI's….is blank. Or, as the Governor of the Bank of England said earlier, "Any institution that is too big to fail is too big to exist". Against this standard, the actions of the BCBS seem very limited. In December the Basel Committee (2011) circulated a document which suggested[70] SIFI's should have higher risk weighted capital ratios than those imposed on ordinary banks under Basel lll. This makes sense in that it reduces the probability of a disorderly default. Nevertheless, the size of the surcharge seems far too small to offset the expected costs should a SIFI fail in a disorderly way.[71] This raises again the issue of whether risk weighted capital ratios are generally too low. As for leverage ratios, the 3% capital requirement under Basel lll was thought too low by the Vicker's Committee in the UK. Instead the Committee suggested a 4% ratio. Regulators in the US announced in mid-2013 that they would impose a 5% leverage standard.[72]

59. This measure also seems somewhat anomalous in that it does not attack directly the factors that lead to such institutions having the potential (size, interconnectedness and concentration) to wreak such systemic damage in the first place[73]. In fact, a number of proposals for structural change have been made to reduce the systemic fallout from the failure of a SIFI. Among the better known proposals, one would have to include the Volcker rule in the United States, the Liinkanen proposals in Europe, and the Vickers proposals in the United Kingdom. These proposals are all similar, in that each suggests that problems seem most likely to arise in the investment banking arm of a SIFI and that some aspects of these activities should be "ring-fenced". This may reflect the recent evidence that investment banks were, in fact, virtually unique in running up their leverage ratios prior to the crisis.[74] However, in other important ways, the proposals made in different jurisdictions do differ, as described in Gambacorta and van Rixtel (2013). This diversity bears witness to the fact that there is no agreed answer on the best structural solution to the problem.

60. Perhaps reflecting such uncertainties, the political will to rigorously pursue these initiatives seems lacking. The French and German governments have recently passed legislation which is significantly less ambitious than the Liikanen proposals. On the one hand, this could well be a capitulation to bank lobbying.[75] On the other hand, concern has also arisen that the partial ring fencing suggested by extant proposals might have costs as well as benefits. Gambacorta and van Rixtel (2013) suggest that current ring fencing proposals might provide disincentives for globalization, are likely to make resolution procedures even more difficult, and could encourage migration out of the regulated sector all together. Critics of separation proposals also note that many of the banks that got into trouble did so through making bad loans (mostly retail) rather than through unprofitable trading.[76]

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70. Base Committee on Banking Supervision (2011).

71. See Haldane (2012*b*).

72. It might also be suggested that the leverage ratio might be raised by a "conservation" buffer or moved counter cyclically as is already proposed for the risk weighted capital requirements.

73. Admati and Hellwig (2013) focus on capital requirements (reducing the probability of failure) because they are highly skeptical that measures to reduce the costs associated with a SIFI failure will have any meaningful effects.

74. See Kalemli-Ozcan *et al* (2011) and Blundell-Wignall *et al* (2009).

75. Guerrera (2011) suggests "They (the big banks) think that if they can survive a few tough years, they will benefit from a system, blessed by regulators, that concentrates power in a few large institutions". In light of the discussion in Section A1 above, this seems all too plausible.

76. While this is true, the retail business of many banks may have been conducted in a more imprudent way because investment bankers were in charge of the unified entity.

61. Yet there are signs of motion in the opposite direction as well. In July of 2013, a bill was introduced into the US Senate that proposed bringing back many provisions of the Glass Steagall Act – a much stricter form of ring fencing. The OECD also continues to recommend, based on the work of Blundell-Wignall and his colleagues, a strict separation of traditional banking functions from investment banking functions through the use of a non-operating holding company structure. Haldane (2012*a*, p. 23) also seems sympathetic to a cleaner separation. Indeed, Barr and Vickers (2013) contend that there is actually a growing agreement across countries that a US style bank holding company structure ("structured universal banking") has a great deal to recommend it. Whether such initiatives will garner broader political support remains to be seen, but there is certainly broad popular support for punishing both banks and bankers.

62. Having the capacity, legally, to resolve a SIFI in an orderly way is obviously even more important than having the capacity to do so for a normal bank. Unfortunately, resolving a SIFI is much more complicated than in the case of a normal bank. Firstly, most SIFI's have an enormously complicated internal structure. Some have literally thousands of legal subsidiaries. Second, virtually all SIFIs operate internationally and are subject to diverse, national legislation. As well, they are subject to oversight by both home and host supervisors, which raise the issue of international cooperation with respect to both crisis management and crisis resolution. In the aftermath of the crisis, the FSB sought to deal with all these issues by developing the "Key Attributes for Effective Resolution Regimes for Financial Institutions".[77] Subsequently, they also conducted a series of peer reviews to establish where there were gaps between current practice and the key attributes. As well, cross border crisis management groups were set up to develop high level resolution procedures for each G SIFI.

63. What has emerged is that fundamental shortcomings still exist, and progress in dealing with them is likely to be very slow.[78] The heart of the issue (as with non-systemic institutions) continues to be wholly inadequate domestic legislation. Resolution authorities lack the powers to wind down a SIFI, and often even the powers (e.g. temporary stays on the termination of financial contracts) to manage crises better. Indeed, in a number of jurisdictions, the authorities do not even have the power to force a SIFI to reorganize itself to facilitate subsequent resolution.[79] As for the international dimension, the FSB documents suggest that the state of play is even worse. In many, perhaps even most, jurisdictions, there are no domestic procedures in place to allow cooperation with foreign authorities trying to resolve a SIFI. In fact, in many cases there are laws which still forbid the sharing of confidential information crucial to the resolution process.

64. In addition to these legal shortcomings, progress on cross border resolution issues might be held back by other complications. First, as always, individual countries are hesitant to cede the degree of sovereignty that a more ideal solution demands. This is a broader problem leading to regulatory fragmentation across countries. Second, and closely related, individual countries might lose faith in a cooperative solution and turn to unilateral action. For example, in February of 2012, Governor Tarullo of the Federal Reserve Board of Governors announced plans to apply the same capital and liquidity rules on foreign bank holding companies operating in the US as apply to US holding companies.[80] The UK and

77. See Financial Stability Board (2011).

78. See Financial Stability Board (2013*a*) and Financial Stability Board (2013*b*).

79. This is related to what is popularly known as the "living will" issue. In principle, each SIFI should itself describe ex ante how it might be wound down (which units might be sold at a profit, which units might be preserved to carry out essential functions, etc.). If the regulator were not satisfied with the feasibility of this plan, they could order a restructuring of the organization. However, they would have to have the legal powers to do so, and in many jurisdictions this is lacking.

80. Deutsche Bank and Barclay's discarded their position as US bank holding companies in anticipation of this plan. The European reaction to this proposal has been distinctly hostile. See Barker and Braithwaite (2013)

Swiss authorities are also trying to get more control over international banks operating in their jurisdictions. The fundamental objective of these measures is to ensure that domestic depositors have access to assets to meet their claims in the case of bankruptcy. Third, differences in international practice can also impede cooperative solutions. For example, Dodd Frank in the US emphasizes the speedy shut down of failing SIFIs. In contrast, continental Europeans seem to prefer keeping such institutions alive through the prior issue of CoCos and the like, as described above.

65. Faced with all these complications, it seems inevitable that the issue of branches vs. subsidiaries will come to the fore once again. While banks prefer branches, because it allows a more efficient pooling of both capital and liquidity, domestic regulators fear that domestic creditors of cross border banks will suffer in a crisis. Separately capitalized subsidiaries provide a solution to this problem.

Risks Arising from Inter linkages between Institutions

66. The Basel Committee in March 2013 issued a consultative document that proposed a sharp reduction in the allowed degree of interbank exposure for SIFIs.[81] This comes on top of a number of the measures noted above, which also have implications for this issue. For example, the Volcker plan to reduce proprietary trading **by** investment banks, not only reduces the potential losses from such exposures, but also aims to reduce such trading **among** banks and thus the inter linkages among them. As noted above, Volcker is of the view that uncertainty about the character of these linkages was the primary reason for the support provided by the US government to the derivatives unit of AIG in 2008.

67. Of course, to the extent that the problem is one of uncertainty about interlinkages, this could be rectified by more transparent and real time reporting. There is a growing literature on this,[82] prompted in part by the possibilities opened up by new technology. More ominously, many hold the view that banks have underinvested in new technology for many years, and that this could have systemic implications – not least through failures in the payments and settlements system.[83] Addressing the interlinkages issue is then seen as a wedge to address these broader exposures. Efforts underway in the G20 to collect and interpret financial data, with a view to preventing systemic problems, are discussed below.

68. Two areas that have received particular attention in light of the crisis have been links through the interbank markets and the derivatives markets. Worries about the former were first flagged in the Holland Report to the Euro Currency Standing Committee (ECSC) at the BIS in the early 1980's. Moreover, the issue was then returned to repeatedly by the same Committee.[84] The basic concern was a sudden drying up of liquidity in the interbank market leading to a series of cascading bankruptcies. In the end, however, nothing much was done. Against this background of persistent concern, it is puzzling that the drying up of the interbank market, after the failure of Lehman Brothers in 2008, was seen by most central banks as

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who quote Michel Barnier (EU commissioner for financial services) as saying this was a "protectionist reaction" which could lead to "retaliation" against US banks. The mood was not lightened by comments from the Federal Reserve that US banks should not count on regulators cooperating internationally in the event of a crisis.

81. SIFI's would be allowed to conduct business with other big banks only up to an individual exposure limit of 10 to 15% of core capital. This is well below the 25 % limit previously recommended.

82. See Johnson (2010). He recommends trading limits between SIFI's and substantial investment in information systems by big banks.

83. Freeman (2013) also notes that IT issues are a substantial constraint on needed bank restructuring.

84. The ECSC was renamed as the Committee on the Global Financial System (CGFS) in the late 1990s. At various times, the Committee received reports on this topic from the Frankel Working Group, the Yoshikuni Working Group and the Brockmeijer Working Group.

totally surprising and unexpected. This myopia likely had deeper roots in the belief, supported by the facts of "The Great Moderation", that improvements in the conduct of monetary policy had effectively eliminated economic and financial cycles.[85]

69. The fundamental problem with reining in the interbank market is that interbank lending is a key component of an efficient financial system. It transfers money from those with excess deposits to those who have an excess demand for loans. This raises the difficult issue of identifying the point at which this efficiency has become "too much of a good thing". This issue is pursued further in the context of the discussion of the "shadow banking" system. There, wholesale flows of funds between banks, and also between banks and non-banks, play an important role in the intermediation of funds between ultimate savers and investors.

70. Cross border interbank exposures, particularly in foreign currencies, have also been receiving increasing attention of late. On the one hand, the focus has been the traditional one of financial instability. In the euro zone in particular, cross border lending (in part through interbank lending) rose sharply prior to the crisis[86]. Lending banks in Northern Europe thus became heavily exposed to bank and other borrowers in the peripheral European countries. On the other hand, there has also been growing attention paid to the impact of cross border capital flows on the functioning of the economies (real as well as financial) in the recipient countries. In effect, banks are part of the international transmission mechanism through which credit bubbles spread across countries[87]. Both sets of concerns can have regulatory implications.

71. As for measures to safeguard the health of the financial system, national regulators of creditor countries in euro zone countries have recently been encouraging their banks to reduce their cross border positions[88]. While "prudent" from a micro prudential perspective, it could actually prove "imprudent" if the health of the euro zone was to deteriorate in consequence and financial losses mount in turn.[89] As for the effects of cross border capital flows on recipient countries, the IMF has recently suggested[90] that countries that are the source of capital outflows must take responsibility for the implications of those outflows for other countries. This could in principle have implications for regulatory regimes in source countries, and also for the conduct of monetary policy in AME's and especially the United States. Whether, in response, source countries will eschew "self interest" in favour of "the broader good" seems rather unlikely. What seems more likely is that this suggestion will provide "cover" for recipient countries to rely more on macro prudential measures (as discussed below) and even overt capital controls.

72. Exposures arising from bilateral trading of derivatives have also been a priority for those concerned about risks arising from interrelationships between financial institutions. Uncertainty about

85. See White (2013*b*).

86. This constituted the capital flow financing of rising current account imbalances within the euro zone.

87. There is growing evidence that heavy cross border capital flows provided by banks are a good indicator of subsequent domestic crises. See Fender and McGuire (2010), Borio, McCauley and McGuire (2011), Takats (2010), and Bruno and Shin (2012).

88. The BIS reported that cross border interbank lending, as a share of total cross border lending, fell to a record low of 38% in the fourth quarter of 2012. The share had been 46% at the end of 2007. The retreat was most evident in Europe and the United States.

89. Private sector capital outflows (absent compensating official flows) must induce a contraction of current account deficits. This could lead to deep recession and rising debt unsustainability. Greece, Ireland and Portugal are cases in point. Further, were a debtor country to leave the euro zone, and then depreciate its new currency, the burden of debts still denominated in euros would likely prove unsustainable. Wide spread defaults would then threaten the health of the creditors, including banks in Northern Europe.

90. IMF (2012).

counter party exposures, particularly to derivatives, was an important contributing factor to the collapse of the interbank market in 2008. The principal suggestion to deal with it, strongly supported by the G20 process, has been to change OTC derivatives into exchange traded derivatives. This means the exposure is no longer to another bank but to a clearing house. This proposal was intended, not only to reduce the dominance of banks and associated systemic risks, but also to decrease counterparty risk through a greater reliance on collateralization by the clearing houses. Finally, implementation was also expected to provide more transparency about exposures, given enhanced reporting requirements.

73. Unfortunately, a whole host of practical issues has arisen as participants have begun the process of implementation. First, and perhaps most important, is the potential of this scheme to aggravate fears of a growing shortage of collateral in the financial system. Not only will the demand for collateral rise markedly[91], but the supply of effective collateral will fall as collateral is increasingly "locked up" and unavailable for rehypothecation.[92] Another emerging problem has been the proliferation of such clearing houses in recent years, often operating under different national rules and legislation. In addition to concerns about declining standards, dealing costs could rise substantially as the benefits provided by "netting" within individual clearing houses will be much reduced.[93] As well, there is growing concern that clearing houses themselves might become sources of systemic instability. They will soon be massive counterparties to all the G-SIFIs, yet currently have relatively low levels of capitalization. Further, given their international clientele, any instability will likely prove exceedingly hard to manage. As for the limitations to increased transparency, and some cross border accountancy issues concerning derivates, they are discussed further below.

74. A final issue that needs discussion is whether an increased reliance on exchanges really does lower the expected losses from systemic failures within the financial system. A report issued in 2013 by the BIS (2013), based on evidence presented by the Macroeconomic Assessment Group on Derivatives, concludes that the benefits clearly outweigh the costs because the probability of crises will be significantly reduced. Critics argue, however, that the new procedures do not reduce the risk of losses overall, should a bank counterparty fail, but simply redistribute them. Those without collateral will pay a larger proportion of the losses and, absent knowledge of how precisely this might play out, the risks of a systemic crisis could either rise or fall. This important issue also needs further consideration.

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91. See The Banker (2013), Allen and Moesner (2013) and Future and Options World (2013). Fears about collateral shortages had already been raised as a result of an increase in the issue of covered bonds and the Basel lll requirement that banks routinely hold a much higher level of high quality liquid assets. Further, it is not just that collateral requirements will generally be higher at clearing houses than has been traditional for OTC transactions. The new regulations also require much higher collateral requirements for remaining OTC derivatives transactions. This might be thought of as an incentive to use the exchanges instead, but the requirement applies even to derivatives whose structure is such that they could not possibly be centrally cleared. Finally, as central banks expand their balance sheets (in the context of "unconventional monetary policy") they again take collateral out of the system. This is just one of the many unintended consequences of such policies. See White (2012). A recent study by the CGFS (2013) downplays all these concerns. It notes that the problem is not an absolute shortage of collateral but whether it will be available to those who need it on a timely basis. It is not clear that this provides much solace.

92. On the repeated use of the same collateral ("rehypothecation") see Singh and Aitken (2010). Just as a decrease in the velocity of circulation of money can constrain expansion of the money supply, a decline in the velocity of circulation of collateral can constrain the functioning of the financial system. This could potentially produce serious strains.

93. Another unintended consequence might be for swaps to be replaced by cheaper and less regulated futures contracts, even though the hedge they provide might be less perfect. Apparently such a transformation has already begun. See The Banker (2013).

Counter cyclical policies

75. By way of background, it should be noted that macro prudential measures to lean against either the economic cycle or the (longer) financial cycle[94] have only rarely been used in recent years in the AME's. Regulatory instruments such as minimum down payments for consumer credit, loan to value ratios for mortgages, and variable reserve requirements were widely in use AME's in the 1950s and 1960s. However, they were gradually phased out as the process of market liberalization proceeded. Note the important implication that regulatory actions in AMEs have been positively procyclical. That is, there has generally been no leaning against the upswing, but as losses materialized in the downswing, regulatory requirements were generally tightened.

76. The first issue to be dealt with is whether leaning against the upswing of the financial cycle with macro prudential instruments would be effective? Some evidence on this can be drawn from much earlier experiences in AMEs, but more recent evidence is drawn from EMEs. Most of these countries have maintained the use of such instruments and have used them actively for macro prudential purposes in recent years. The evidence on their effectiveness in resisting credit upswings is, however, rather mixed. [95] Consider for example, that the use of "dynamic provisioning" in Spain still allowed the development of a massive credit bubble. That said, because of the build-up of loan loss provisions, the Spanish banking system was better prepared to ride out the downturn. As for the use of macro prudential instruments in credit downturns (the "bust" after the "boom"), Borio *et al* (2012) notes that upswings tend to be "long and slow" while downturns are "abrupt and violent". They conclude that the use of macro prudential instruments should reflect this asymmetry. In contrast, Goodhart has raised concern that such a policy might reduce confidence in the banking system and actually lead to less lending in the downturn and not more as intended.[96]

77. The second issue is determining when the process of leaning might begin. This is very similar to the "indicator" problem in conducting monetary policy. A decision is needed as to what indicators to monitor, and what thresholds should trigger action. The Basel Committee has already suggested that national supervisors should consider raising required capital ratios when the ratio of credit/GDP rises significantly above its long term trend. Again there is a developing literature on these issues[97] largely based on empirical evidence (probit analysis) linking the probability of a banking (or some other kind of) crisis to sharp movements in credit growth rates and/or increases in asset prices. These models, in contrast to those used in the "risk map" analysis discussed below, are surprisingly parsimonious.

78. A third issue is the choice of macro prudential measures and their order/combination of use. Evidently, conclusions here might be very country specific, depending on institutional structure, perceived trade-offs and preferences. Nevertheless, some guidelines in this regard have already been prepared by the CGFS (2012). A point amply made in this CGFS paper, and a central theme of a recent IMF conference on the topic,[98] is that there are many uncertainties about the effectiveness, timing and efficiency of macro prudential measures. Given their experimental nature, policies should be introduced carefully.

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94. See Borio (2012).

95. See Galati and Moesner (2011), Moreno (2011), CGFS (2010) and the IMF (2011*b*) for overviews of the evidence.

96. See White (2013a). The only way to ensure Goodhart's prediction would not materialize would be to ensure that banks had built up sufficiently high capital ratios prior to the downturn. Evidently this was not done prior to the current downturn.

97. See Borio and Dhreman (2009) and Barrell *et al* (2010).

98. For a summary of the proceedings, see White (2013*a*).

79. Finally, there is the issue of whether the use of macro prudential instruments to lean against the credit cycle should be complemented by the use of monetary policy. I have argued in a recent paper[99] that monetary policy should play an active role in the tightening phase, not least because the empirical evidence on the efficacy of macro prudential instruments to moderate the financial cycle is very mixed. This debate is very much on going, with different central banks actually having very different views on this issue. The Bank of Japan (along with some other Asian and the Nordic central banks) seem the most supportive, the Federal Reserve Board of Governors the least supportive, and the ECB somewhere in between. It should be noted that small open economies often have a bias towards the use of macro prudential policies in the credit upswing because it helps avoid the exchange rate appreciation[100] likely to be triggered by higher interest rates. As for monetary policy in the aftermath of a credit boom, there is one thing that the crisis has made clear. The Greenspan view that monetary policy can always "clean up" easily after a crisis is just plain wrong.[101]

Prudential regulation, the "shadow banking system" and innovation

80. In the wake of the crisis, the "shadow banking system" has received a great deal of attention. One reason for this increased attention goes back to the perception that non-banks played a big role in precipitating the crisis. One aspect of this was the role played by bank supported (but off balance sheet) special investment vehicles during the early part of the crisis. More broadly, the withdrawal of funding from such entities by money market mutual funds led directly to the failure of Lehman Brothers. This, in turn, led to a subsequent drying up of the inter bank loan market. It is highly problematical, however, whether these dramatic events were the cause, rather than just the trigger, for the economic and financial crisis which still continued six years later.

81. Both the meaning and the measurement of "shadow banking" remain "shadowy". The Financial Stability Board defines the "shadow banking system" as being all those financial activities which involve the granting of credits that are essentially unregulated. As noted above, this paper focuses more narrowly on those entities involved in the process of securitization of assets and their funding through collateralized wholesale markets.[102] This covers a wide spectrum of financial institutions, including those specializing in collateral management, but allows a separate consideration (below) of the regulations involving the insurance industry and pension funds. In fact a closer look at how the FSB has organized its work program indicates they would not have trouble with the approach taken in this paper.

82. The function of the shadow banking system is essentially to take loans that have significant credit risk, are long term and illiquid, and package them in such a way that they appear riskless, short term and liquid. This is done through a long chain of relationships which strip away the risks, one by one, until the

99. White (2010).

100. The so called "fear of floating" has been an important phenomenon in recent decades. One legitimate reason (and there are numerous illegitimate reasons) is that the theory of Uncovered Interest Parity (UIP) only applies only over very long periods. Thus, exchange rates can overshoot fundamental value by significant amounts and for an extended period.

101. See Bech *et al* (2012).

102. Evidently, the Financial Stability Board definition is wider and this has certain advantages. First, it would also encompass institutions and processes set up specifically for regulatory arbitrage. Consider, for example, what has come to be called "shadow banking" in China. There has been a massive increase in the granting of credit through investment trusts and other lending vehicles, which offer higher interest rates to depositors than the regulated rates available at banks. While not suffering from crisis thus far, this source of credit expansion has been of increasing concern to the Chinese authorities. Second, a broader definition would recognize that the particular character of shadow banking might vary from cycle to cycle. The advantage of a narrower definition is that it allows more specific solutions to more specific problems.

final product is ready.[103] While this whole process need not involve the traditional banking system, in fact banks and shadow banks are closely linked. Shadow banks and traditional banks interact continuously, not least through shadow banking entities providing wholesale funds to banks via the repo market. Moreover, many shadow banking entities are actually owned by traditional banks.

83. With the definition of shadow banking somewhat unclear, measuring its size is also difficult. A recent publication by Deloitte (2012) provides a range of estimates from $11 trillion to $65 trillion (the latter being the FSB estimate). In part, the width of this range reflects the use of net versus gross flows and different treatments of collateral (gross up for rehypothecation or not?). What is clearer is that the system grew very rapidly until 2007 and grew more slowly through to 2013. Geographically, European shadow banking still seems to be growing although the shadow system has declined significantly in the United States. From 2012 onwards, there were been signs of renewed growth, particularly in Europe.

84. Before turning to the regulatory response, it is important to note that the shadow banking system has an upside as well as a downside. Thus, the purpose of regulation has to be to preserve the former while reducing the latter. The first point is that shadow banking emerged to meet a real need. Over the last few decades, there has been an explosion in asset management institutions and in the financial assets of corporations. All of these portfolios must include a tranche of money or money-like assets (i.e. assets that are safe, short term and liquid). As well, banks (especially in Europe) had need of AAA rated assets that they could use to raise wholesale funds from institutional investors and money market funds. The development of structured products effectively met these needs while also providing riskier products for those with a greater risk appetite. Further, the system provides static gains in efficiency in that borrowers (especially ultimate borrowers) can borrow more cheaply. Finally, there are dynamic benefits resulting from a vast array of analysts trying to design better products customized to the needs of clients.

85. While the upside of the shadow banking system was more apparent in the upswing of the credit cycle, the downside revealed itself only later. Perhaps most important, it is now clear that much of the impetus for shadow banking came from regulatory arbitrage. Very low policy rates led to a sharp increase in the demand for credit which, if granted, would have led to shortages of regulatory capital and funding. The shadow banking nexus helped avoid both problems, at least for a time. However, when the crisis spread, a number of banks had (for reputational reasons) to take many off balance sheet items back on their balance sheet, with serious implications both for capital adequacy and funding. Further, given possible systemic implications for the banking system, the official sector had to extend its support to parts of the shadow system as well.[104]

86. Further downsides emerged as it became clear the risk transformations promised by the shadow system were only temporary, not permanent. The final assets produced by the system looked safe, short term and liquid, but they were not. With respect to credit risk, the complexity and opaqueness of the shadow banking system eroded all forms of market discipline. In effect, everyone in the long chain of relationships assumed that someone else was doing "due diligence" and in the end no one was. In

103. For an excellent overview of this whole system, see Claessens *et al* (2012). An example of the chain of institutions involved would link the following: house buyer to loan originator to loan warehouser to ABS pooler (broker dealer) to warehouser to CDO creator to SIV/conduit (issuer of asset backed commercial paper) to money market mutual funds (MMF). Cash moves from the MMF to the house buyer, while obligations to repay flow the other way. Poszar *et al* (2010) contend that the links can be as few as three or as many as nine. Generally, the lower the quality of the underlying loan, the longer the "risk stripping" chain has to be.

104. For example, broker dealers got access to discount facilities at the Federal Reserve, AIG's derivates business was supported, and government guarantees were given to depositors at MMF's.

particular, the threat of tail events, inherent in the use of many structured products,[105] was completely ignored. The risks associated with maturity transformation also reappeared. Indeed, Singh (2012) argues convincingly that a system in which longer term assets are funded by short term collateralized lending is significantly more "procyclical" than traditional lending[106]. As for the newly created products being liquid, the system showed itself all too susceptible to funding "runs". When depositors at Money Market Funds started to fear losing part of their deposits ("breaking the buck") the whole system promptly collapsed. More recently, commentators have also raised the possibility of a similar kind of run involving scarce collateral.

87. Finally, the crisis drew attention to two other problems. First, much of the shadow banking business is international. In particular, European banks became heavily dependent on dollar funding from US MMF's to finance heavy investments in US dollar assets. When the run on MMF's began, the access to these dollar funds suddenly disappeared.[107] In the end the Fed (and other central banks) had to reopen swap lines to make funding available in various currencies. Second, with the growth of the shadow banking system, collateral management has become much more important. However, there are only a limited number of firms providing such services and, partially as a result, all of them have been designated by the FSB as G-SIFIs. Moreover, for triparty repos, which have also been growing in importance, only two Wall Street firms provide such services. In short, the expansion of shadow banking may actually have worsened the "too big to fail" problem.

88. What has been the official response? In Europe, the EU recently approved a new Directive on Alternative Fund Managers which introduces official capital and reporting requirements. The European Commission in September 2013 proposed tough new regulations for MMF's which will require funds promising "no loss" investments (CNAV's) [108] to hold 3% capital. New regulations will also seriously constrain the capacity of all MMF's to undertake liquidity transformation. Initial reaction from the industry was that these regulations would "kill off" the MMF business in Europe. A serious accounting impediment to corporate Treasuries simply switching funds to Variable Net Asset Value Funds (VNAV's) is that CNAV's are not treated as "cash". Thus, they cannot be subtracted from gross debt to lower net debt figures. In the United States, similar proposals are also being considered with the industry lobbying vigorously against them.

89. The FSB also issued three documents for consultation in November of 2012; an integrated overview of policy recommendations, a policy framework for oversight and regulation of shadow banking entities (other than MMF's), and a policy framework addressing risks in securities lending and repos. They subsequently issued a series of policy proposals in FSB (2013*a* document The FSB proposes enhanced monitoring of the system, viewed very broadly, with a special focus on innovative and potentially risky developments. However, when it comes to policy prescriptions, the FSB makes recommendations with respect to five specific areas where systemic risk mitigation is thought possible.[109]

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105. See Footnote 63 above for an analysis. For warnings on this front, see Rajan (2005). Even self-discipline disappeared as many big banks bought structured products, with AAA ratings, that in the end proved toxic. See Tett (2009). It is finally worth noting that many of these products were deemed riskless because they were insured by monoline insures and sometimes others (like AIG). Little, if any, attention was paid to whether the insuring firm actually had the capacity to make good on the coverage promised.

106. As asset prices rise, there is more collateral, haircuts get smaller, the velocity of turnover rises, and new kinds of collateral become acceptable. In the downswing, this all goes into reverse.

107. See McGuire and von Peter (2009).

108. Europe's fixed value MMF's (also known as CNAV's, for constant net asset value MMF's) have about 500 billion euros in assets. Variable NAV funds (VNAV's) are even larger.

109. The recommendations reflect the work of five separate Working Groups.

In particular, they want (1) to reduce spillover effects between banks and shadow banks (2) to reduce the susceptibility of MMF's to runs (3) to assess and align the incentives associated with securitization (4) to dampen risks and pro-cyclical incentives associated with securities financing transactions, such as repos and securities lending, and (5) assess and mitigate systemic risks posed by other shadow banking entities and activities.

90. The principal FSB recommendations all seem quite sensible: central clearing of repos, curbs on rehypothecation, more stringent collateral valuations, and better liquidity management at MMF's. Nevertheless, some issues remain. What will be the net influence on the size of the shadow banking system of tighter regulation of both banks and of non-banks? Could the interconnections between the banks and shadow banks actually increase as the opportunities for regulatory arbitrage increase? Is the regulatory approach to dealer banks, which play a big role in the shadow banking system, adequate given the "inherently fragile" nature of their business model?[110] Finally, could enhanced regulation in AME's lead to a migration of the shadow banking business elsewhere (especially Asia, now deemed "the future") with still further unintended consequences?[111]

91. This last comment raises a whole set of still broader concerns about innovative/adaptive responses by the financial system to enhanced regulation of all sorts. Consider, for example, the Vicker's proposal to "ring-fence" the investment banking arm of big conglomerates in the UK. The authorities have explicitly said that they are concerned these proposals might be "gamed" and they have threatened complete legal separation should this happen.[112] Another example of innovation to respond to new regulation has been the creation of new instruments, like "callable" paper to be issued by US municipalities, to reduce the impact on banks of new liquidity requirements. Other examples will surely follow.

92. It is not clear that any regulatory authority has yet come to grips with the reality of continuous innovative adaptation to regulatory change, which is a typical characteristic of complex adaptive systems. The suggestions made by Andrew Haldane,[113] in this vein, clearly need to be treated seriously. First, it is not at all clear that complexity in the system itself is best met with still more complex regulation. It will be evaded or have unintended consequences. Second, relying more on regulatory principles, focusing on the "spirit of the law", rather than on still more detailed regulation, would seem to have much to recommend it in such circumstances. Third, there would seem to be a need for regular updating of legislation and regulation to keep pace with endogenous innovation.

Prudential regulation of insurance companies and pension funds

93. The business models for insurance companies and pension funds are very different from banks. Banks borrow short and lend long. The principal risks they face are losses in the value of their assets (threatening insolvency) and difficulties in attracting funding. In contrast, insurance companies and pension funds receive stable revenues up front (premia and pension contributions respectively), and then have to pay out on contingent contracts extending over very long time periods. For such entities, the principal risks are on the liability side of the balance sheet, though for life insurance companies and

110. See Claessens *et al* (2012).

111. Oliver Wyman (2011).

112. Whether they would so act, given the continuing presence of universal banks elsewhere, remains to be seen. In continental Europe and Japan, universal banks have existed "forever", and this seems unlikely to change in the near future. In the US, as noted above, a bill has recently been introduced in the Senate to bring back aspects of the Glass Steagall Act.

113. Haldane A. (2012*a*). The point is also made by Claessens *et al* (2012).

pension funds the risks concerning assets also remain substantial. Given these different risks, it is not surprising that the preoccupations of the prudential regulators in these different financial sectors have also been quite different. Further, absent any crisis in the insurance and pension industries in recent years, to match that in the banking sector, regulatory change has been much more stable and, indeed, slower moving.

94. The principal preoccupation of the insurance industry in recent years has been the implementation of the Insurance Core Principles (ICP) promulgated by the International Association of Insurance Supervisors (IAIS) in 2011.[114] Twenty-six high level principles are laid out to ensure the insurance sector is financially sound and that there is an adequate level of policyholder protection. Arguably, however, the three key elements are the following. First, ICP suggests focusing on a group wide evaluation of risks, using economic based evaluations of the value of assets and liabilities. Second, it requires minimum capital and solvency requirements and "ladders" of supervisory intervention, ending with resolution and closure. Third, it points out the need to develop a full-fledged "Enterprise Risk Management Framework".

95. While insurance companies and pension funds in advanced market economies have been significantly affected by the ICP, many of them had already been aspiring to "best practice" in the industry. The greatest effect may then be felt in emerging market economies, whose regulatory officials recognize that their compliance with ICP will be evaluated under the IMF's FSAP program. Further, many companies in EME's are part of broader international groups that will be actively interested in importing best practices from elsewhere. Finally, the earnings of insurance companies and pension funds everywhere are under pressure given the environment of very low interest rates. The need to re-evaluate business lines, to establish whether the risk being run is worth it, is another reason for wishing to implement ICP.

96. Measures to implement Solvency ll in Europe provide some insight into the pros and costs of an ICP consistent regulatory regime, as well as Solvency ll itself. As noted above, the regime has a three "Pillar" foundation which is broadly based on Basel lll. [115] As with Basel lll, the calculation of the amount of required capital has been the most controversial. The amount of capital required should ensure solvency over a period one year ahead, with a probability of 99.5%. Unlike Basel lll, where risks (e.g. market, credit, liquidity, operational) are considered additively, Solvency ll attempts to calculate the totality of these risks, thus considering their interactions as well. This characteristic of the calculation, together with the use of economic based evaluations of the values of assets and liabilities, has led to enormous complexity.[116] Haldane's concerns about "over fitting" would seem to apply in spades here. Moreover, given the very long maturity structure of the assets and liabilities, the calculations of required capital can be very sensitive to relatively small changes in assumptions about discount rates in particular.[117] In fact, such issues have

114. International Association of Insurance Supervisors (2011). For some detailed country analysis of recent regulatory changes and the influence of ICP, see Financial Services, KPMG (2013).

115. There remain many material differences between the two regimes. See Gatzert and Wesker (2012) and Al-Darwish *et al* (2011).

116. The guide book for calculating capital requirements under Basel lll is 100 pages, while for Solvency ll it is apparently over 400 pages.

117. In addition, the impact on capital requirements of an increase in the probability threshold (say from 99.5% to 99.6 % versus from 99.75% to 99.85 %) also rises exponentially. See Pfister (2012). He makes the point that the only way to totally avoid crises is to shut the industry down. This raises starkly the trade-off between safety and efficiency.

required five quantitative impact studies to date (the last in March of 2013) and the postponement of Solvency ll to a date still to be determined.[118]

97. A related feature is that calculations of profit and loss under this proposed system would likely be much more variable than in the past. Various proposals, some on the asset side and some on the liability side, have been proposed to mitigate this and related problems.[119] The fear raised by many is that this increased volatility of profits, together with the significant costs associated with the practical application of Solvency ll,[120] could raise the cost of capital for many insurance companies. The implication would be that some insurance products would become more expensive, while others might be withdrawn altogether.

98. A further source of concern related to this volatility would be an increased tendency to "procyclicality on the part of the insurance industry. One problem might be a widening of risk spreads on assets, implying losses in the downswing of the cycle. This might lead in turn to attempts to constrain losses and thus "procyclicality". This tendency would be exacerbated if "risk free" rates were falling as well, since the average duration of insurance liabilities tends to exceed that of assets. Finally, if the regulatory regime encouraged many insurers to react similarly, rather than idiosyncratically as in the past, "procyclicality" would be further enhanced. Since the insurance industry has typically absorbed volatility, rather than creating it, this would be a step backwards for the financial system as a whole[121]. A recurrent theme in the regulatory literature is that proposed reforms in one sector give too little emphasis to the effects on other financial sectors.

99. Because Solvency l1 is based on risk weights, like Basel lll, the new system could also affect the allocation of funds as well.[122] In particular, there is concern that the risk weights will discourage equity investments and longer term assets holdings. The former might be a threat to profits and solvency going forward. The latter might impede insurance companies from making the longer term investments (especially in infrastructure) that seem increasingly demanded for well-functioning societies.[123] Finally, some have raised the possibility that insurance companies, traditionally a major source of longer term funds to the banking system, will be dissuaded from doing so.[124] Since longer term funding for banks has emerged as a serious problem in its own right, the consequences of this could be material. In contrast, it must be noted that careful empirical work by Höring (2013) indicates that these concerns are groundless. He concludes that the current Standard and Poors ratings model requires 68% more capital than the standard (Solvency ll) model for the same market risks. Thus, Solvency ll would not be expected to

118. For a discussion of the currently "live" issues, see Morgan Stanley and Oliver Wyman (2013).

119. Some of these proposed solutions require the agreement of accounting bodies like the IAB and FASB which is an added complication. For an overview of some of these mitigation approaches, see Daniellson *et al* (2012).

120. The Financial Stability Authority has estimated the upfront costs for UK insurers would be around 2 billion pounds and a further 250 million a year for compliance. See The Economist (2012). A Deputy Governor of the Bank of England recently declared that both the Bank of England and the FSA were "dismayed" at these costs. See Masters (2012).

121. Oliver Wyman (2012).

122. For an overview, see Committee on the Global Financial System (2011). Also the literature review in Höring (2013).

123. For recent recommendations in this area, see Group of Thirty (2013) and McKinsey Global Institute (2013).

124. Jenkins and Braithwaite (2013). The CEO of the Prudential (UK) has been quoted as saying "The insurance industry is (traditionally) the biggest investor in the banking industry but Solvency ll says we can't invest in banks."

influence significantly the insurance companies' investment strategies. However, whether this will prove a definitive finding must remain open to question.

100. Basel llll (as Basel l) is intended to provide regulatory guidance for internationally active banks. In contrast, there has until recently been no similar guidance for internationally active insurance companies. For a while, it was hoped that Solvency ll might be adopted outside Europe as well, thus leading to a de facto harmonization. However, given the difficulties just described, this no longer seems likely. Further, while there are both difference and similarities (both have risk based capital requirements) between the proposed European and actual US regulatory regimes, there seems to be no appetite for convergence.[125] In part this seems due to American commentators feeling their state-based regulation (while divergent) is "mature and robust" while they see European initiatives as very much "work in progress".

101. In response to these challenges, and the need for greater cross border cooperation among supervisors, the IAIS recently initiated ComFram, the Common Framework for the Supervision of internationally Active insurance Groups (IAIG). ComFram is built upon the high level principles found in the ICP, but expands upon them to reflect, not only the international dimension, but also the added complexity of the business being done by large firms.[126] It is not in any way compulsory, but invites firms to take a group wide view of risks and opportunities. ComFram is currently undergoing development with a view to field testing late in 2013 and formal adoption in 2018. It is hoped that implementation will follow.

102. The IAIS has been at pains to stress that, while all systemically important insurance groups will likely be global firms, not all global insurance firms are systemically important.[127] Indeed, the single most important effort made by the insurance industry in recent years has been to provide evidence that their industry should not be thought of as a source of systemic concerns, either globally or in individual markets.[128] Their motivation is obvious; namely they wish to avoid capital surcharges for SIFIs. In a nutshell, they argue that the Expected Loss from a crisis originating in the insurance sector would be very low because both the probability of a sudden crisis and the losses given a crisis would be very low. A recent study[129] has compared the "systemic" properties of 28 systemically important banks and 28 of the largest global insurers, using 17 criteria suggested by the FSB and the IAIS. The insurance companies score far less than the banks. Indeed, they all score significantly lower than three banks that were originally classified as SIFIs, but then removed from the list as not being systemic enough.

103. With respect to the probability of crisis, industry representatives note that there has not been such a systemic crisis in the insurance sector in the last one hundred years. Far from being engaged in a maturity transformation business (like banks) which could leave insurance companies subject to liquidity runs, their premiums are prepaid and their liabilities are generally of longer term than their assets. Further,

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125. See KPMG (2013). In October 2012 there was a first meeting of the EU-US Dialogue on Insurance Regulation which identified "key communalities" and "key differences". The KPMG paper notes (p. 7) "Disappointingly, the paper provides (these) two main observations, without offering a firm commitment to change". See also Woodall (2013). The potential importance of this issue is underlined by the recognition that Basel l was triggered by the agreement of the US and UK regulators to move ahead jointly, thus effectively forcing smaller players to go along as well. See Silber (2012).

126. For documentation see International Association of Insurance Supervisors (2013).

127. For a good overview see KPMG (2013).

128. For a seminal piece from the industry see The Geneva Association (2012). The FSB made the original distinction between global G-SIFI's and domestic D-SIFI's.

129. Patrick (2013).

the industry spontaneously builds reserves during good times[130] to have them available when circumstances worsen. With respect to losses given a crisis, there is little prospect of the crisis spreading because (absent the link via reinsurers) most insurance conglomerates have few bilateral links with other such companies. As well, resolution procedures for insurance companies tend to be well defined and there is also plenty of time to detect problems and to deal with them. Finally, when companies fail, there is invariably sufficient capacity in the system for their products to be easily replaced.

104. The IAIS has agreed with these arguments that "traditional" insurance activities are unlikely to cause or amplify systemic risks in the financial sector.[131] However, in light of the earlier problems at AIG, both they and the industry accept that Non Traditional Non Insurance (NTNI) lines of business could pose problems. In spite of the judgment by the IAIS about "traditional" insurance, the FSB announced in mid-July 2013 that nine large insurance groups would be classified as SIFI's and would be subject to both tighter supervision and the need to provide "living wills". [132] However, as with banks, exactly how this supervision would be done on a cross border basis remains to be determined.

105. As for supplementary capital requirements for insurance SIFI's, the IAIS has suggested that NTNI's should be segregated into separate businesses and any capital surcharge should be similarly restricted. However, they admit that defining NTNI's might not be easy.[133] The FSB has recently agreed with this proposal, and has further encouraged such segregation by noting that firms that fail to segregate will have to face higher capital requirements over the entire balance sheet. The determination of precise capital surcharges is still very much work in progress.[134]

106. Pension funds played an even more limited role than did insurance companies in initiating and propagating the continuing economic and financial crisis. Nevertheless, they might still be affected by some of the regulatory changes proposed in light of the crisis. An important European initiative has been to consider imposing a Solvency ll type regime on defined benefit pension funds across Europe. An initial Quantitative Impact Study has already been carried out[135] and shows that the average defined benefit pension fund in a large number of European countries is significantly underwater. Not surprisingly national pension regulators (in the UK, the Netherlands, Germany, Ireland and Belgium) have all expressed their unwillingness to import these European standards, and the European Commission has recently said it will pursue them no further. It bears noting, however, that the use of national methodologies also shows that many defined benefit pension funds in Europe, as well as in Canada and the United States, are deeply underfunded.[136]

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130. In the industry jargon, "hard times" are periods when demand is high for insurance products (a seller's market) and the industry can charge more for the services it provides. These cycles are generally not highly correlated with the economic cycle. See Baranoff (2012).

131. See IAIS (2011) and IAIS (2012).

132. In the US, AIG and GE Capital have already been designated as Systemically Important Financial Institutions by the US Financial Stability Oversight Council. What exactly this will entail remains to be determined.

133. Insurance Regulation (2013).

134. IAIS (2013*a*).

135. The study was undertaken by the European Insurance and Occupational Pensions Authority at the request of the European Commission. Strict assumptions about the discount rate and the need for capital buffers contribute to pushing up the shortfall.

136. A study by Towers Watson (2013) shows that, at end 2012, 55% of global pension assets were in defined benefit schemes. The ratios are much higher for Canada (96%), Japan (98%), the Netherlands (94%) and the UK (74%).

107. The European initiative seems likely to focus more attention on to this long neglected topic of underfunding, as will the prospects of bond rates staying low for a long time.[137] At one extreme are suggestions that pension schemes should rely on more flexible accounting that dispenses with the need for discounting altogether.[138] Critics, of course, will see this as another form of forbearance. At another extreme, company sponsors could be forced into making good the pension shortfall. At the least, this would be another major constraint on fixed capital investment at a time when such investment is greatly needed to support the advanced market economies. At the worst, it would lead to widespread corporate bankruptcies implying workers would lose both their jobs and their pensions. Evidently, some middle road will be required to deal with this current problem before regulatory steps can be taken to reduce the risk of this happening again.

Possible implications for the institutional structure for governance

108. There are many issues to be addressed to ensure the prudent regulation of financial institutions. Not least is the issue of how regulation and supervision should be organized institutionally. The IMF (2012) recently looked at national practices around the world. They identified seven major models for overseeing financial regulation, as well as a whole host of variants. Each seemed to them to be very much an accident of history, rather than an attempt to apply agreed principles. That said, as the interconnections between markets and financial institutions became more evident as financial liberalization proceeded, the IMF did identify a tendency towards the unification of the regulatory agencies involved. In this process, central banks in a number of countries saw their responsibility for prudential oversight somewhat diminished.

109. What needs to be asked is whether some principles might be identified to guide the adoption of an institutional structure for prudential regulation, including macro prudential regulation. Against the background of financial globalization, some have suggested[139] the need for a global super-regulator. Given the great need for cross border cooperation to harmonize reporting, and to aid in recovery and resolution issues, this suggestion has clear merit at the level of principle. However, there is currently virtually no support for such an approach among national politicians and officials. That said, the crisis has led to a serious discussion within the euro zone area of the need for a banking union. This would include common deposit insurance, common resolution procedures and unified banking supervision. Indeed, the process of setting up supervisory capacity at the European Central Bank is already well advanced. Nevertheless, the ongoing debate about the relative mandates of the ECB and national regulatory authorities shows clearly the unwillingness of many European countries to give up what they have always thought of as sovereign powers. It will take significantly more progress before Europe can be held up as a model for the rest of the world in the regulatory area.

110. The search for organizational principles must therefore be conducted at the national level. I have elsewhere suggested[140] that there are criteria for assigning mandates and powers to existing national institutions to ensure effective policy decisions in the pursuit of macro prudential objectives. I defined these as the "should, could and would" criteria. The "should" criterion asks which institution has the expertise to identify what needs to be done in the regulatory sphere, including the use of macro prudential measures. The "could" criterion asks which institution currently has, or should be assigned, the needed

137. Some other policy changes might also affect pension funds adversely. A proposed financial transactions tax in Europe could be costly, as could regulations to force derivatives trading on to exchanges. The exchanges are very likely to ask for collateral that pension funds do not have.

138. Kelleher (2013).

139. See Eatwell and Taylor (2000) and Clancy (2013) who reports on the views of David Wright of IOSCO.

140. See White (2012*a*).

legislative powers to act? Finally, there is the "would" criterion. Which institution would seem most likely to have the will to act when such action will be resolutely opposed by many self-interested groups. Recognizing the pervasive influence of inertia, lobbying, justified uncertainty about the implications (both expected and unexpected) of policy action, the importance of this last criterion cannot be over emphasized.

111. Application of these three criteria, especially the first and third, would seem to give an important role to central banks in the pursuit of systemic stability in the financial sector. Broadly stated, the more the objective of regulatory policy moves in the direction of systemic stability, the greater should be the role played by central banks in regulating institutions whose activities seem likely to have systemic implications. This conclusion is further strengthened if it is agreed that monetary policy also has a role to play in the pursuit of financial stability.[141] Indeed, some would even argue that, in the limit, there is no valid distinction between pursuing price stability and pursuing financial stability.[142] They are two sides of the same macroeconomic coin.

112. It is important to stress that there is currently no consensus on the underlying macroeconomic analytics. In particular, there is no consensus on whether monetary policy should support macro prudential policies in leading against the credit cycle and systemic instability. Therefore, there is no consensus on the implications for institutional structure. To illustrate the resulting diversity, the US has set up the Financial Stability Oversight Council made up of the heads of various regulatory agencies and chaired by the Treasury. In Europe the European Systemic Risk Board is made up supervisors and central bankers and is chaired by the President of the ECB. In the UK, all these prudential functions have been given to the Bank of England which now has two internal committees (the Monetary Policy Committee and the Financial Policy Committee) both headed by the Governor. In the euro zone, banking supervisory oversight has recently been given to the ECB, but there is to be a strict separation (and "firewalls") from the ECB's monetary policy function. Evidently, what has been done in practice reflects a wide range of divergent "beliefs", not all of which can be well founded.

113. There might, however, be other areas where a broader consensus could be arrived at. First, to avoid central banks becoming overly "powerful" and unnecessarily embroiled in political decisions, "micro prudential supervision" and "conduct of business" functions should likely be in another institution. This said, when it comes to the use of instrument of all sorts for macro prudential purposes, some institution (likely the central bank) must have the power to make binding decisions. Levels of central bank accountability must of course be raised commensurately. Second, in the event of a "bust" after a "boom", those responsible should be held accountable. This would of course be a marked change from current practice. And third, in a post boom crisis, institutional dominance should likely pass to Treasuries given the likely need for committing significant amounts of taxpayer's money in such circumstances.

Estimating the Build Up of Financial Risks

114. A large part of "modern" regulation has to do with estimating the build-up of risks within individual firms and across the financial system as a whole. Recent experience has taught us that both regulators and bankers are less good at this than might be desired. A number of shortcomings have been identified, but there continue to be differing views in different jurisdictions (and often within jurisdictions) as to what precisely needs to be done to remedy those deficiencies. These issues (what "should" be done to mitigate risks) are logically separate from issues having to do with effective supervision (the "can" and

141. See IMF (2013).

142. Laidler (2007) says, p. 8, "These (inflation control) regimes, in short, have a long intellectual prehistory during which the stabilization of inflation was by and large not treated as a policy goal separate and distinct from mitigating the cycle and maintaining financial system stability, but as a key means of promoting precisely these ends".

"would" issues identified above). Unfortunately, the issue of effective supervision is beyond the scope of this paper.[143]

115. A first problem with estimating the build-up of risks has to do with accounting standards. In spite of immense efforts, significant accounting differences still exist between the international accounting standards laid out by the IFRS and the GAAP standards that apply in the United States. Different approaches, especially with respect to the netting of derivative contracts, also make it difficult to make international comparisons between banks. However, the fact of differences is less significant than the absence of agreement about the best way to do things. The biggest conceptual issue holding back standardization of accounting standards affecting banks seems to be differences of view about the benefits (or costs?) of mark to market and "fair value" accounting. As well, there is a sense that current accounting standards are not granular enough. Thus, they permit banks to present their accounts in such an opaque way that they remain virtual "black boxes".[144] As for insurance companies, the process of standardization has only begun. KPMG (2013) summed up the issue well. They state that "currently financial statements can be unrepresentative and confusing" though they then map out existing plans to improve the situation over the next five years.

116. A second problem has to do with auditing standards, which seem universally too low. All of the financial firms which have gotten into trouble over the last few years had recently been audited and received good marks. In sum, audits appear to be very costly but provide little useful information. A particular source of concern has been the performance of auditing firms in emerging market countries who are, in principle, linked to larger firms in advanced market countries. Nevertheless, they seem in practice to receive little oversight with respect to quality standards. Again, there is a proposed agenda for change which includes measures to encourage audits by firms other than the "big four" and more frequent rotation among auditing firms.

117. A third problem, closely related to the first two, has to do with the broader issue of transparency. If financial institutions were to be more explicit about their business models and the associated risks, as well as the assumptions underlying the calculations feeding into their risk calculations, this would go a long way to opening the "black box". The Report of the Enhanced Disclosure Task Force (2012), a private sector initiative supported by the FSB, at least indicates some good intentions. These good intentions could be supported by a realization that it is also in the banks' own interests to follow through with action. Recall that uncertainty about exposures seems to have been an important element in the seizing up of the interbank market after the failure of Lehman Brothers in 2008. Note, further, that many large banks have market values for their equity well below book values. In part, this reflects the influence of such uncertainty.

118. Improvements to data have also moved much higher up the agenda of the official sector, not least data on real time counterparty exposures.[145] Against the backdrop of the crisis, the G20 has strongly

143. Caruana (2010) notes that the effectiveness of supervision across countries varies widely, In part, this may reflect different philosophical approaches; "light touch", based on general principles, versus strict rules-based approaches. Each has its shortcomings. A "light touch" approach will be inadequate if assumptions about ethical behavior are routinely violated. At the same time, a rules-based approach invites evasion and will always lag behind ongoing innovation.

144. See Partnoy and Eisinger (2013).

145. The CGFS of the BIS tried in the late 1990's to substantially enhance such data collection (the Bédeneau Group), but this was strongly resisted by the biggest countries. The arguments used were that such data collection would reveal proprietary trading strategies and would be too costly. As well, national central banks might well have been trying to protect their own national "champions". Note that real time exposure data would not only be of use for crisis prevention but also for crisis management.

supported efforts to improve the availability and quality of data for monitoring growing risk exposures within the financial system and a great deal of progress has been made.[146] That said, there remain significant shortcomings, particularly with respect to consolidated (global) data for individual banks.[147] Moreover, the complexity of risk management processes, and the variety of inter firm relationships through which risk exposures are transferred, could imply a need for data that is almost infinite. An evident danger, absent all the data required, is that costly efforts are made to collect data which in the end proves impossible to interpret.[148]

119. A fourth problem has to do with the quality of the modeling of risk exposures in the financial sector. As Borio (2013) puts it "The main reason why crises occur is not lack of statistics but the failure to interpret them properly and take remedial action". Nevertheless, certain positive developments can be noted. A welcome development has been the increasing attention paid to "risk maps" which attempt to identify points of stress within the financial system.[149] Network analysis seems to provide an especially promising source of insight in this regard.[150] As a stylized fact, increases in cross border lending, especially by banks, appears to have strong predictive capacities for subsequent crises. Bruno and Shin (2012) also emphasize the dangers associated with a rising dependence by banks on wholesale funding.

120. On the other hand, less positive developments concerning modeling can also be noted. First, Haldane (2012*a*) makes a convincing case that the risk weights produced by complex "internal models" are inherently extremely unreliable. The more complex the portfolio and the shorter the available data set, the greater the danger of over fitting and spurious results. In contrast, Sands (2013) recognizes shortcomings but suggests important improvements are still possible. Second, a number of commentators have suggested that many of the technical assumptions underlying the Basel methodology are seriously flawed.[151] Third, those trying to predict financial crises using market generated price data have been gravely disappointed. At best, market indicators (e.g. credit spreads and the Vix) are coincident indicators of crises. At worst,

146. See Financial Stability Board (2012*a*) for an update. Monitoring risk exposures within the financial system is a different exercise from determining when to begin "leaning" against credit bubbles likely to have significant macroeconomic costs. As recorded in Borio and Drehman (2009), joint deviations of credit and property prices from longer term trends appear to have significant predictive power. Unfortunately, data series on property prices are very poor in most countries.

147. See Borio (2013). Consolidated data for individual banks (both on balance sheet and off balance sheet, both domestic and international) would shed light on exposures to various risks, including funding risks. A very useful complement would be comparable income information, especially about the sources of profits. Once completed, such data would allow drilling down to get other useful information about inter office exposures and bilateral exposures. In addition, methodologies and processes developed for banks might then be extended to "shadow banks" and perhaps other financial institutions.

148. This applies less to more highly aggregated data. In contrast, one of the purposes of forcing OTC derivatives to be exchange traded is that the information about each such trade can be consolidated at trade depositories. However, according to the FSB, only a limited number of depositories worldwide actually have the capacity to collect information on counterparty exposure (gross and net) along with information about collateralization and the character of the legal agreements governing the trade. Unfortunately, having such information is essential for evaluating risk exposure, as indicated in International Financing Review (2013), which records the views of market professionals attending ISDA's 2013 AGM.

149. See for example Issing *et al* (2009), Khranen(2010) and Cecchetti *et al* (2010).

150. The BIS was an early entrant into this area. See McGuire and von Peter (2009) and Upper (2007).

151. See, for example, Zanganeh and Jones (2012). The Basel Committee assumes that asset return correlations and default probabilities are negatively correlated on sovereign, corporate and banking exposures. The authors rather contend they are positively correlated. See also Aubrey and Le Pera (2013) who fundamentally questions the relevance of historical data in evaluating systemic risk going forward. Thus, VaR calculations give much more solace than they should do.

such indicators are positively misleading, in that the market indicators of risk go down just as the underlying risks are really going up.[152] Third, models used by individual banks to assess capital requirements under the Advanced Assessment Regime under Basel 2 have been found by the Basel Committee to give wildly different results for both the Trading book and the Banking Book.[153] This could lead to some banks being asked to revert to use of the Standardized Methodology, or to the imposition of capital floors.[154] Interestingly, a substantial proportion of the differences in the Trading Book can be explained by differing requirements for calculating "risk weights" laid down by national regulators themselves. This has raised further concerns about the whole "risk weight" methodology as well as the real commitment of supervisors to a "level playing field" internationally.

121. Finally, as Hellwig (2010) notes, stress tests still hold constant too many variables that would change simultaneously in a crisis. Thus stress tests fail to measure the full effects of systemic events. As a result, they have repeatedly provided solace when no solace was due. Worse, there have been growing concerns that the failure of stress tests to reveal underlying banking fragilities might actually have been the purpose of the exercise. In Europe in particular, the disconnect between benign stress tests and subsequent outcomes has been remarkable.[155] Such perceptions have also contributed to the wide spread belief that European banks still have many losses that have not yet been revealed, and this perception has clearly aggravated the euro zone crisis. Against this background, the European Central Bank will face grave risks when it conducts similar tests in the exercise of its new responsibilities. The tests will only be credible if they can reveal some banks as being undercapitalized. However, absent a "Plan B" to resolve such a problem,[156] this will not be possible and the ECB's reputation could suffer accordingly.

Conclusions and Suggestions for Further Work

122. In recent years, both at the level of the nation-state and internationally, an extraordinary amount of effort and resources have gone in to drafting laws and regulations to prevent a recurrence of the current crisis. The last progress report submitted by the FSB to the G20[157] records welcome developments in a whole host of areas. Serious attempts are being made, sometimes opposed by vigorous lobbying efforts, to address virtually all the questions raised above. Nevertheless, a dispassionate observer would still harbour two sets of concerns.

123. The first would be that the concern for crisis prevention led to too little attention being paid to resolving the current crisis. Short term measures avoided disaster but, as described above, compounded medium term problems. In some regions, the "too big to fail" problem worsened. In others, banks and the shadow banking system remained for years too weak to provide the loans needed for the early resumption

152. One important exception might be the ratio of book values and market values for the equity of banks.

153. See BCBS (2013*a*) and BCBS (2013*c*).

154. The Swedish authorities have done this for residential mortgages. By raising the minimum risk weight to 15%, they essentially tripled the capital requirement. The Norwegian Ministry of Finance has asked the banking supervisors to consider a minimum risk weight of 35% for residential mortgages. In both countries household debt and house prices are at record levels, and these policy prescriptions have been motivated by macroprudential considerations.

155. For example, stress tests conducted on the Irish banks, just prior to the collapse of the banking system, gave all the Irish banks a clean bill of health.

156. A Plan B would likely require public sector recapitalization, for which there are currently no adequate funds available, or closure. As described above, the latter approach seems almost impossible in the European case.

157. FSB (2013*c*).

of "strong, stable and balanced growth" desired by the G20. This latter problem continues to plague Europe in particular.

124. The second concern would be that most of the measures proposed to ensure future financial stability have a strong flavor of "more of the same"; more capital, more liquidity, more supervisors and, above all, more detailed regulatory prescriptions. Many of the difficulties associated with these individual initiatives have been described above. Perhaps even more important, what continues to be missing is a willingness to approach the problem of financial stability in an even more radical way. The rest of this paper identifies the most fundamental issues pertaining to the prudential regulation of financial institutions. While posed as questions, in order to motivate more research going forward, the author's inclination is to answer most of these questions in the affirmative.

125. Should we be clearer about the ultimate purpose of a financial system, and how it might be structured to achieve that purpose? Avoiding financial instability, laudable as this might be, is only a partial answer to this broader question of efficiency. We need a thoughtful combination of both.

126. Should there be more explicit recognition of the financial sector (indeed the whole economy) as a complex adaptive system? This implies greater "top down" attention to systemic issues as opposed to "bottom up" attention to individual institutions and individual market failures. It also implies recognition that the problem is largely uncertainty, not risk, and that simple regulatory responses might generally be preferable to complex ones.[158] Thirdly, it implies the need for a constant regulatory response to what is likely to be constant innovation in response to regulation itself as well as other forces. Finally, it implies financial regulators might have a lot to learn from other regulators of complex, adaptive systems

127. Closely related, should we pay more attention to the problem that Hayek referred to as the "pretence of knowledge" when setting policies? We never know as much as we would like, and therefore policies can have unintended consequences. Collateral, for example, shifts risk in the system rather than reducing it overall and could make the system less stable not more. At the philosophical level, how do we approach policy making in the area of prudential regulation in the face of pervasive uncertainty?

128. Should prudential regulation in pursuit of financial stability be pursued jointly with monetary policy or independently? Since macro prudential policies and monetary policies both affect the real economy, as well as the financial sector, who should make what decisions?

129. Should capital requirements for banks be even higher than mandated by Basel lll given how elusive a concept it is, how hard it is to measure, how easily it can be gamed (weighted vs. unweighted?) and how quickly it can disappear in a crisis? How might these problems associated with a reliance on capital standards be minimized? Is there a possibility that regulatory standards might become "floors" in the eyes of the market? If so, how might this tendency be minimized since it implies that capital (below the floor) could never be used as a buffer (for unexpected losses) because such use would cause market panic. Should relatively less emphasis be put on regulatory and supervisory discipline and relatively more on self-discipline and market discipline?

130. How might self-discipline (more prudent behavior) be best improved? Should we roll back the public safety net, re-establish banker's sense of "fiduciary responsibility" to their clients, change compensation incentives to discourage "short termism" and encourage value investing, make legal redress (including prison) more threatening, restore unlimited liability etc.? How might these changes be practically carried out?

158. As argued by Haldane (2012*a*).

131. How might market discipline be improved? How can accounting and auditing be made more useful to those who rely on these functions to exert market discipline. Does it really make sense to use market determined numbers ("fair value") to value firms when the purpose of the accounts is to inform the market? Are we collecting the right data from financial institutions ("risk map" issues) and are we making them known to the market in the right way?

132. Should we show more willingness to change the structure of the financial system to make it more stable? Should we be prepared to roll back globalization by insisting that foreign banks act as branches not subsidiaries? Should we be prepared to roll back securitization and shadow banking by reducing the (dangerous?) role of collateral in the system? Should we be prepared to roll back consolidation by breaking up SIFI's and by forbidding links between commercial banks and investment banks)? What about "narrow banking" and the Chicago proposals (Henry Simons and Irving Fisher) from the 1930s?

133. Should there be greater recognition that different financial institutions have different business models (banks are not insurance companies) and pose different threat to financial stability? If so, different regulatory responses would seem required.

134. Finally, with respect to identified shortcomings in the prudential regulatory prescriptions identified above, could more research show us how they might be "tweaked" to improve their effectiveness? In principle, the answer is yes. Nevertheless, there is the clear danger of just replacing "more of the same" with "still more of the same". In the end, the greatest benefit of more research might be to call into question some of the fundamental assumptions motivating the current policy agenda. This would close some doors but, hopefully, would open others.

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