Consequences of Uncertainty for Regulation: Law and Economics of the Financial Crisis

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Consequences of Uncertainty for Regulation: Law and Economics of the Financial Crisis

by

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This article analyzes the last financial crisis focussing on the recurrent dynamics of externalities in banking. It shows that two major determinants of the crisis were the uncertainty of a new form of financial intermediation and the failure of regulation to cope with its externalities. Differently from more standard explanations, which are based on opportunism and/or irrationality of financial institutions, this analysis suggests that regulation has not just been insufficient. Regulation has contributed to financial instability too, supporting fragile conventions to handle uncertainty and encouraging regulatory arbitrage through financial innovation.

Three implications are derived from this analysis and contrasted with the ongoing reforms of financial regulation in the US and in the EU. First, regulatory arbitrage is better dealt with by protecting banking from disintermediation than by extending prudential regulation to non-banks. Maturity transformation should be defined functionally and reserved to banks. Second, a major danger with ratings is that they support false conventions of safety. To avoid this outcome, the relevance of ratings for regulatory purposes should be reduced and rating agencies should be deterred from rating without verifiable background knowledge. Third, in order to reduce short-termism, regulation of banks' corporate governance should rather question than reinforce managerial accountability to shareholders.

Keywords: Financial Crisis, Maturity Transformation, Externalities, Shadow Banking, Rating Agencies, Corporate Governance of Banks, Dodd-Frank Act, EU Financial Reform.

JEL Classification: D80, G01, G21, G24, G28, K23.

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Table of Contents ECFR 2010, 479–511

1. Introduction 480
2. Why Are Banks Regulated? 485
3. What Went Wrong: A Simple Analysis of the Financial Crisis 490
4. The Urge to Re-Regulate 496
5. Making It Work: Financial Regulation in the Face of Uncertainty 505
6. Conclusion 511

1. Introduction

Policymakers have been working on the reform of financial regulation since the height of the last financial crisis.[1] One authoritative commentator warned against the dangers of rushing on regulatory reform before fully understanding the dynamics of turmoil.[2] This crisis caught regulators and most of the economists' profession by surprise. It can, and it will happen again if the regulatory overhaul claims to fix financial instability while failing to address its most subtle determinants. The recent Dodd-Frank Wall Act in the US and the comparable legislative initiatives on this side of the Atlantic seem to suffer exactly from this problem.[3]

Contrary to a widespread perception, this article contends that regulation, not just the lack thereof, can contribute to financial instability. This unintended effect stems from financial regulation's supporting conventions of safety upon which financial intermediaries act to the best of their interest and knowledge. Credit ratings, capital adequacy ratios, and best practices in corporate governance are good examples of such conventions. Their fallacy in dealing with financial innovations is evident, but only in times of crisis. In booms, these conventions have two important effects. On the one hand, they help overcome today uncertainty about tomorrow performance of new financial assets and patterns of intermediation. On the other hand, they allow financial institutions

1 See e.g. Report of the Advisory Committee on the Future of Banks in the Netherlands, "Restoring Trust", 7 April 2009; Jacques de Larosière, Chairman, "Report of the High-Level Group on Financial Supervision in the EU", 25 February 2009 (*Larosière Report*); US Department of Treasury, "Financial Regulatory Reform: A New foundation", 17 June 2009 (*Obama Plan*).

2 Richard H. Posner, *A Failure of Capitalism – The Crisis of '08 and the Descent into Depression* (Harvard University Press 2009), 117-47 and 252-58. But see also, critically, Robert M. Solow, "How to Understand the Disaster", 56(8) *The New York Reviews of Books* (14 May 2009).

3 See US Congress, *Dodd-Frank Wall Street Reform and Consumer Protection Act*, 21 July 2010. For EU overview see European Commission, "Regulating Financial Services for Sustainable Growth", COM(2010) 301 final, 2 June 2010.

to profit from innovation at the expenses of society, so long as innovation can be fitted to regulatory standards implying its 'safety'.

Regulatory reforms in Europe and in the US overlook these effects. Although neither the thick Dodd-Frank Act nor the broad set of legislation adopted or close to adoption in the EU include the full details of the forthcoming financial regime, both are inspired by a common purpose: fixing the failures of financial regulation in the recent past, implicitly assuming that prohibiting or restricting those practices that led to the financial crisis will suffice to avoid the next one. This approach is dictated by political expediency, as it would be nearly impossible to resist public pressure towards stricter and more vigorous financial regulation. However, it amounts to closing the barn after the horses have escaped. More importantly, such a stance towards stricter regulation is not bound to stay.[4] After the memories of this crisis have faded, there will be again political and intellectual pressure to accommodate regulations into the needs of financial innovation. This until the next crisis hits, and the whole process will start over again. Rethinking financial regulation already with a view to financial innovation seems to be therefore a more promising approach to cope with financial instability.

This perspective also adds one important element to our understanding of what happened. Financial innovation implies that decisions be taken under uncertainty, that is, without considering all possible consequences of the innovation on individuals *and* the society. This depends on our inability to assign objective probabilities to states of the world of which we do not have long-standing experience. Existing analyses of the financial crisis assume instead that people can – although not necessarily do – frame the future as a set of quantifiable events with attached probabilities. On this basis, the prevailing explanation of the financial crisis is excessive risk-taking due to various combinations of opportunism and externalities.[5] These factors were undoubtedly important, but leave two important questions unanswered.

First, it is clear that some key players (mortgage originators, bankers, rating agencies) had wrong incentives. Less clear is how these players, who all have lost substantially from the crisis, could manage to fool each other while being the most sophisticated professionals of the financial industry. In other words, how could the same financial institutions be simultaneously victims and vil-

4 See e.g. John C. Coffee, "Bail-Ins Versus Bail-Outs: Using Contingent Capital to Mitigate Systemic Risk", Columbia Law and Economics Working Paper No. 380, October 2010 (available at SSRN: http://ssrn.com/abstract=1675015), 17–21.

5 Charles W. Calomiris, "The Subprime Turmoil: What's Old, What's New, and What's Next" (2009) 15 *Journal of Structured Finance* 6. See also Nouriel Roubini and Stephen Mihm, *Crisis Economics – A Crash Course in the Future of Finance* (New York: Penguin Press 2010).

lains? Second, it is quite settled that securitization was a financial innovation imposing negative externalities on the financial system and the real economy.[6] But it is far from obvious how securitization, which uses markets to improve the allocation of risks, could lead to a major credit crisis through the paralysis of the very markets that nurtured its development. In other words, how could securities markets improve the efficiency of financial exchange and precipitate the financial system on the verge of collapse at two relatively close points in time?

The appealing answer to this question is that people as well as markets have been irrational.[7] Irrationality is appealing because it explains excesses of otherwise professional players and it excuses the economists' profession from failure to predict the consequences of those excesses. Furthermore, by claiming people's inability to protect from themselves, it brings a clear-cut case for regulation. However, irrationality explanations are at odds with the evidence that several market professionals knew what they were doing.[8]

Consider the standard subprime mortgages story, which is normally regarded as evidence of irrationality.[9] The narrative that the entire financial industry believed in ever-increasing housing prices is a fairy tale. Both rating agencies and financial analysts considered downturn scenarios, although the likelihood and especially the correlations between those turned out to be underestimated.[10] A few hedge funds started short-selling mortgage-related securities well before any sign of downturn, although that did not affect prices before the downturn effectively materialized.[11] Finally, the size of US subprime mortgages has never been such to determine a global financial crisis. The crisis originated only occasionally from the housing market downturn, and unex-

6 Martin Hellwig, "Systemic Risk in the Financial Sector: An Analysis of the Subprime-Mortgage Financial Crisis", MPI Collective Goods Preprint No. 2008/43, November 2008 (available at SSRN: http://ssrn.com/abstract=1309442), 35–60.

7 George A. Akerlof and Robert Shiller, *Animal Spirits – How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism* (Princeton University Press 2008).

8 See e.g. Charles W. Calomiris, "The Debasement of Ratings: What's Wrong and How We Can Fix It", www.economics21.org – Economics Policies for the 21st century, October 2009 (accessed 29 October 2010). See also Michael Lewis, "The Man Who Crashed the World", *Vanity Fair* (US edition, August 2009). I review additional evidence in Alessio M. Pacces, "Uncertainty and the Financial Crisis" (2010) 29 *Journal of Financial Transformation* 79, 82–83.

9 See e.g. Oren Bar-Gill, "The Law, Economics and Psychology of Subprime Mortgage Contracts" (2009) 94 *Cornell Law Review* 1073.

10 Kristopher S. Gerardi, Andreas Lehnert, Paul Willen, and Shane Sherland, "Making Sense of the Subprime Crisis" (2008) 2 *Brookings Papers on Economic Activity* 69.

11 Michael Lewis, *The Big Short – Inside the Doomsday Machine* (New York: Norton & Co 2010).

pectedly so. After the price of subprime-related securities was already falling for over six months, in August 2007 (and for nearly two years hence) the worldwide financial community was suddenly stuck in a liquidity crisis that nobody had predicted as a consequence of the subprime meltdown.[12]

The above picture is not exactly one of irrational swings between euphoria and panic, but rather one of mistaken judgments about the future.[13] As such mistakes are only revealed in hindsight, the problem is more precisely characterized as imperfect foresight, or uncertainty as I mentioned. I contend that uncertainty explains better than irrationality why financial institutions got certain risks wrong, both *before* and *during* the turmoil, thereby determining a liquidity crisis. The reason is that, in dealing with financial innovation, there is typically no objective way to quantify risks. In a number of relevant settings, we simply do not know.[14] Keynes carefully analyzed this problem long ago, building on Knight's well-known divide between quantifiable risk and immeasurable uncertainty.[15] The main point by Keynes is that although we do not know everything about the future, our *rational* selves induces us to take decisions *as if* we do. In so doing, we treat uncertainty as quantifiable risk based on a *convention* that the future will look like the present or, more precisely, like the majority of people perceives the present to be.[16] This provides us with the sense of safety we need in order to act.

Conventional rationality underpins Keynes' theory of expectations, but it is also at the core of an endogenous instability problem.[17] The natural uncertainty of a financial innovation is overcome by conventions allowing for exchange between borrowers and lenders. These conventions are fragile: they reflect a state of confidence about the future that does not eliminate uncertainty, but neglects it. Confidence is undermined by any event implying unreliability of existing conventions. For example, the default of a triple-A securitization or

12 See Gary B. Gorton, "Question and Answers about the Financial Crisis", NBER Working Paper w15787, February 2010.

13 See most efficaciously, Richard H. Posner, "Shorting Reason", Review of "Animal Spirits" by G.A. Akerlof and R. Shiller, in *The New Republic* (15 April 2009).

14 John M. Keynes, "The General Theory of Employment" (1937) 51 *Quarterly Journal of Economics* 209, 213–214.

15 See Frank H. Knight, *Risk, Uncertainty, and Profit* (Boston, MA: Houghton Mifflin 1921), 197–232. See also John M. Keynes, *A Treatise on Probability* (London: Macmillan & Co 1921).

16 See particularly Chapter 12 in John M. Keynes, *The General Theory of Employment, Interest and Money* (first published 1936, Milton Keynes: BN Publishing 2008), 96–106.

17 Hyman P. Minsky, *Stabilizing an Unstable Economy* (first published 1986, New York: McGraw-Hill 2008), 219–245, developed this insight at length. See also Hyman P. Minsky, *John Maynard Keynes* (first published 1975, New York: McGraw-Hill 2008), 62–66 and 115–127.

institution may suggest that the ratings of similar securitizations or institutions are unreliable too. When uncertainty about the future prevails, investors refrain from long-term commitments necessary to finance the real economy and hoard cash instead. Liquidity is suddenly withdrawn from financial instruments and intermediaries, and a crisis occurs. Investors' now flying to liquidity is no less rational than their previously accepting new financial assets as a substitute for cash. But this dynamics illustrates how uncertainty can adversely affect financial exchange and the entire economy when conventions of safety fail.

It might be tempting to disallow financial innovation altogether in order for financial exchange to be supported by more stable conventions.[18] The problem is that, in a market economy, resources tend to flow toward profit. Meeting uncertainty in order to uncover new profit opportunities drives innovation and growth. This process, famously characterized as "creative destruction" by Schumpeter,[19] cannot be detached from capitalism as we know it. One important difference is that malfunctioning of *financial* innovation imposes severe externalities on society. The externalities of a financial crisis are potentially so large that, in order to contain them, governments must undermine the destructive side of the Schumpeterian process. Indeed, this is the main reason why the financial industry is regulated.

The uncertainty perspective adds two important qualifications to the externality argument for regulation.[20] First, given that financial innovation is unpredictable, prohibiting it altogether is neither feasible nor desirable. Rather, regulation should be concerned of keeping funding and liquidity of new assets within the regulatory perimeter of protected intermediation, which is banking as functionally defined, in order to monitor innovation, discipline its growth under uncertainty, and credibly guarantee its safety in case of trouble. Second, increasing the regulatory burden on traditional intermediation may be conducive to the very externalities regulation intends to avoid. On the one hand, the higher the asymmetry between regulated and unregulated intermediation, the higher the incentives for financial institutions to embark on uncertainty. On the other hand, extensive regulation supports the fragile conventions by which uncertainty is handled as long as innovations can be fitted into existing standards. Therefore, I contend that financial reforms aimed at updating these standards and making them stricter exacerbates rather than solves the problem.

18 See e.g. Nicola Gennaioli, Andrei Shleifer, and Robert Vishny, "Financial Innovation and Financial Fragility", NBER Working Paper w16068, June 2010.

19 Joseph A. Schumpeter, *Capitalism, Socialism, and Democracy* (New York: Harper & Row 1942), 81–86.

20 For a similar perspective see Augusto de la Torre and Alain Ize, "Regulatory Reform: Integrating Paradigms", World Bank Policy Research WP 4842, February 2009 (available at SSRN: http://ssrn.com/abstract=1348983).

The remainder of the article is structured as follows. Section 2 reviews the economic rationales for regulating banking, the main instruments of regulation, and their limitations in the face of financial innovation. Section 3 discusses alternative explanations of the last financial crisis. I will illustrate the rationality of dealing with uncertainty and how regulation has ended up supporting instead of countering the externalities of this behaviour. Section 4 analyzes regulatory reforms in the US and in the EU with respect to three key issues in the financial crisis (credit rating agencies, shadow banking, corporate governance) and explains why these reforms miss the crux of the matter. Section 5 draws on the implications of uncertainty for the regulatory framework, hinting at how banking regulation should welcome innovation while being, at the same time, prepared to contain its externalities. Section 6 concludes.

2. *Why Are Banks Regulated?*

Regulation of banks is the core of financial regulation. The reason is that banks run an inherently fragile business. This fragility has potentially enormous repercussions on the society because banks channel two vital resources in a capitalist economy: money and savings.[21] The fragility of banks depends on the way they intermediate financial resources between their providers and recipients. Banks make financial exchange happen, in spite of a structural mismatch in time horizons between borrowers and lenders, by issuing two separate financial claims. Banks borrow short-term from lenders and lend long-term to borrowers. A bank's profit depends on its ability to borrow short and lend long, which is called *maturity transformation*.[22] This ability depends, in turn, on investors' trust that banks can cope better with asymmetric information of long-term lending, which allows banks to enjoy comparably lower costs of funding. Therefore, a bank typically issues liabilities that carry low risk premia and are redeemable on demand. These liabilities are 'liquid' and in many respects – including monetary policy – they are a substitute for cash.

This operation is stable so long as there is no uncertainty regarding banks' ability to deliver cash on their liquid liabilities.[23] When these are perceived as 'safe', banks can and do cope with temporary liquidity problems borrowing from each other. The problem is when some investors believe that the quality

21 On the economics of banking regulation, see Dirk Heremans and Alessio M. Pacces, "Regulation of Banking and Financial Markets" in Alessio M. Pacces and Roger Van den Bergh (Eds.), *Regulation and Economics*, forthcoming 2011 (on file with author).

22 For the implications on real-estate finance, see Hellwig, *supra* note 6, 7–10.

23 Gary B. Gorton, "Slapped in the Face by the Invisible Hand: Banking and the Panic of 2007", Working Paper, May 2009 (available at SSRN: http://ssrn.com/abstract=1401882).

of the assets of one or more banks is deteriorating. Whether this belief is correct or not does not matter, because investors are prompted to withdraw their cash anyway, knowing that only the first to do so will be satisfied. This is a so-called 'bank run'. Faced with widespread demand to redeem its liquid liabilities, a bank is forced to sell its illiquid assets – whatever their quality actually is – at fire-sale prices until equity is wiped out by losses.

The most dramatic part of the story is that it does not stop here.[24] A bank's failure may trigger a general panic about other banks, which are exposed to similar assets or are interconnected via interbank lending. Both individual bank runs and their contagion potential are specific to 'banking' (although, as we shall see, not to 'banks' as legally defined) and they are the very source of systemic externalities. A banking crisis typically leads to a credit crunch, reduction in the aggregate money supply, and cash hoarding, which in turn implies failure of savings to flow to investments, reduction of consumption and employment, and in the worst cases, deflation.[25] In the aftermath of a crisis, the banks' losses are negligible relative to the social costs of recession and they may even turn out to be nil in the aggregate.[26]

This explains the main reason why banks are regulated: avoiding externalities. There are different ways to pursue that goal, but historically, the major instruments have been public insurance of deposit and lending of last resort by the central banks.[27] Deposit insurance prevents investors from running on banks' demand liabilities, since departors will always be paid in full despite the banks' troubles with their assets. Lending of last resort is instead a remedy against interbank contagion, aimed to relieve banks and their counterparties from temporary liquidity shocks. Both instruments need be used with great care, for they are most effective ex-post when they undermine banks' incentives to avoid illiquidity and insolvency ex-ante. Unlimited access to deposit insurance and lender of last resort would be unsustainable because of banks' moral hazard banks find it profitable to pile as much risk as possible: when the losses are ultimately borne by taxpayers. Therefore the safety net aimed to counter systemic externalities is left intentionally incomplete and it is supplemented by regulation of banks' ability to enter risky courses of actions.

The typical regulatory framework tries to prevent banks' moral hazard by

24 For a detailed overview of the determinants of systemic externalities in banking, see Markus Brunnermeier, Andrew Crockett, Charles Goodhart, Avinash D. Persuad, and Hyun Shin, "The Fundamental Principles of Financial Regulation" (2009) 11 *Geneva Reports on the World Economy* 1, 1–12.

25 Irving Fischer, "The Debt-Deflation Theory of Great Depressions" (1933) 1 *Econometrica* 337.

26 See e.g. Gorton, *supra* note 23, 16.

27 See generally, Heremans and Pacces, *supra* note 21, 10–14.

limiting deposit insurance up to a certain amount and refraining from insuring the reminder of banks' liabilities, which incentivizes large investors to monitor banks' risk-taking. In a similar vein, lending of last resort is supplied parsimoniously and on unfavourable terms relative to market rates. Intuitively, with these restrictions, the safety net cannot entirely rule out banking crises. And it does not. However, the consequences of such crises are so dramatic that governments and central banks cannot be credibly committed not to intervene when the financial system is endangered. The safety net is in fact *broader* than what the law on the books says, which implies that systemically relevant financial intermediaries (those who are deemed to be 'too big' or 'too interconnected' to fail) face implicit insurance of their liabilities for they stand to be bailed out in case of trouble. Moral hazard is thus inherent to 'protected' banking, which makes its regulation crucial.[28]

Regulation of banking has evolved from structural measures to limit risk-taking, which may hinder competition and adversely affect efficiency, to a more market-oriented prudential regulation.[29] Prudential regulation aims to constrain banks' attitude to take excessive risks by requiring that a certain percentage of risk-weighted assets (traditionally 8%) be financed by the bank's own capital (including at least one-fourth of common equity).[30] Because of moral hazard, banks would otherwise tend to provide as little capital as possible. Capital adequacy requirements are supposed to improve bank stability by providing a cushion of safety against unexpected losses ('risk buffer') and incentives to monitor the quality of assets. The second goal is more important than the first one. Capital adequacy forces banks to have 'skin in the game', which should prompt them to assess carefully the creditworthiness of their borrowers. Both shareholders and uninsured creditors would reduce their funding and/or make it more expensive (i.e., demand higher returns on capital) when a bank's assets become riskier. Capital requirements make this constraint binding on the size of a bank's balance sheet, which would otherwise grow at the expenses of insured creditors and ultimately, of taxpayers. One of the basic rationales of regulating bank capital is thus 'market discipline.'

The mechanism is imperfect for a number of reasons. To start, the buffer function of capital adequacy is very limited and ultimately illusory. It is limited because capital requirements do not effectively constrain leverage. For one, these requirements include only a tiny part of *real* equity. In addition, the

28 See Charles W. Calomiris, "Financial Innovation, Regulation, and Reform" (2009) 29 *Cato Journal* 65.

29 Heremans and Pacces, *supra* note 21, 15–17.

30 Basel Committee on Banking Supervision, "Accord on International Convergence of Capital Measurement and Capital Standards", July 1988 (*Basel I*), available at www.bis.org.

capital charges of each category of assets are weighted for their risk in order to preserve banks' incentives to optimize risk-taking. But banks have high-powered incentives to increase leverage (which implies higher returns on equity) as opposed to low-powered incentives of regulators and bank themselves to get the risk weights right. As a result, banks' capital buffers tend to shrink with the investment in uncertain assets carrying a favourable risk assessment, for instance because they enjoy a high credit rating.[31] Finally, the idea that capital requirements (or direct constraints on leverage) can sustain a buffer is illusory because they are mechanical and they bite exactly when the equity cushion would be needed to absorb the bank's losses.[32] Regulation of capital provides loose constrains when asset prices move upwards, whereas they prompt banks to recapitalize or to sell their assets at fire-sale prices in case of distress.

The ideal of market discipline fares no better.[33] Particularly in times of low interest rates, one easy way to make shareholders happy while complying with prudential regulation is to invest in risky assets carrying a low capital charge. Top-rated securities are a case in point. In principle, this strategy would be constrained by uninsured creditors, who should demand a higher risk premium for supporting increased leverage with long-term liabilities. The genius of securitization is the potentially unlimited amount of marketable securities that it can generate out of risky loans. These securities can be posted as collateral for short-term funding. The bank then finances the securities and the underlying loans with instruments that are functionally equivalent to demand deposits, save that they are not insured. Investors, on the other hand, park their cash at the bank knowing they can withdraw it anytime by redeeming or rehypothecating the collateral.[34]

The perceived safety of collateral makes funding risky assets with short-term liabilities attractive for investors and relatively inexpensive for banks. The advantage over insured deposits is that the guarantee is provided by marketable collateral, not by governments, and it is not capped at a certain amount. Investors who doubt about the safety of collateral can curtail their funding by increasing the margins or 'haircuts' on the securities' market value.[35] In the absence of government guarantee, this mechanism does not allow for moral hazard. However, it allows banks to overcome market discipline so long as

31 See Basel Committee on Banking Supervision, "Amendment to the Capital Accord to Incorporate Market Risks", January 1996 (*1996 Amendment to Basel I*) and "International Convergence of Capital Measurement and Capital Standards: A Revised Framework", November 2005 (*Basel II*), available at www.bis.org.

32 Hellwig, *supra* note 6, 64–66.

33 Id., at 29–33.

34 Gorton, *supra* note 23, 14.

35 Gary B. Gorton and Andrew Metrick, "Haircuts", NBER Working Paper w15273, August 2009.

their liabilities are accepted as a substitute for cash. Put differently, the amount of maturity transformation performed by banks in this fashion is unconstrained by prudential regulation, with the only exception of the need to maintain capital adequacy. Of course, problems arise when banks' liabilities are no longer considered liquid and short-term funding is withdrawn from long-term assets. This is essentially a bank run by wholesale investors instead of retail depositors.

One final limitation of capital adequacy is that it applies to banks, not to banking.[36] While collecting funds in the form of demand deposit is reserved to banks, other functionally equivalent forms of short-term funding are not. Other financial intermediaries, like hedge funds, can invest in securitization borrowing short-term wholesale funds. As they are loosely regulated, they could theoretically perform as much maturity transformation as they wish. Only because they have no access to demand deposits, the amount of funds that they can intermediate is comparatively smaller than the banks'. However, unregulated intermediation can grow at the expenses of regulated banking when the former provides investors with higher returns than the latter. Moreover, so long as unregulated intermediaries face lower capital requirements from the market than banks do from regulation, they can be more leveraged and earn higher returns on equity than banks when they engage in collateralized borrowing. This operation, known as 'shadow banking', has been the most important threat to traditional banking in the past 20 years.[37]

Facing the threat of disintermediation, it is natural for banks to defend their turf through regulatory arbitrage. Instead of allowing equity capital to flow towards the more profitable, unregulated financial sector, banks would rather increase their leverage. The creation of off-balance-sheet investment vehicles enjoying the implicit or explicit guarantee of the parent bank is a perfect instrument to get around capital requirements and to compete with unregulated intermediaries on comparable levels of leverage.[38] This is how shadow banking could grow so big and so fast in the competition for higher earnings.[39] Shadow banking was not just a major determinant of the financial crisis, but also a natural reaction of banks to financial innovation.

36 On the so-called 'boundary problem' in financial regulation, see Brunnermeier *et al.*, *supra* note 24, 67–74.

37 See extensively, Gary Gorton, *Slapped by the Invisible Hand – The Panic of 2007* (Oxford University Press 2010).

38 Martin Hellwig, "The Causes of the Financial Crisis" 4/2008 *CESifo Forum* 12, 16.

39 Gorton, *supra* note 23, 23–31.

3. What Went Wrong: A Simple Analysis of the Financial Crisis

The last financial crisis is often called *The Subprime Crisis*, as it is understood mainly as a consequence of the meltdown of the US non-prime mortgage markets.[40] This depiction is misleading, for it tends to confuse the symptoms with the disease. The problems underlying securitization of subprime mortgages did actually trigger the crisis, but they are evidence of a much larger set of contradictions developed inside the financial system. In a sense, subprime mortgages were the tip of the iceberg, but it was its submerged part to sink the boat. Fixing the mortgage market would contribute little to preventing the next financial crisis. Therefore, in the following analysis, I will not discuss consumer protection in banking and its reform.[41] On the one hand, the issue is not new.[42] On the other hand, consumers may be those who benefit or suffer from financial innovation, but they are certainly not those behind it.

The US subprime market is still interesting because it shows that the process of securitization of increasingly less creditworthy loans was entirely driven by investors' demand. Despite the documented decline in the quality of borrowers, the risk premia on subprime mortgages remained low until the housing market downturn.[43] Without securitization, that would simply show that financial intermediaries had an appetite for risk. Securitization seemed to have squared the risk-return circle. In principle, the idea was a good one. Housing prices very seldom move together across the US territory (and even more so worldwide), thus securitization of a pool of geographically distant mortgages reduces default risk through diversification. In addition, securitization creates different classes of risks by allocating the pool's cash flow by seniority of different securities tranches. These tranches were rated from triple-A until below investment grade, with the lowest equity tranche being supposed to absorb all the losses under normal conditions. The credit rating agencies commonly estimated the size of equity to be about 5–6% of the pool. The remaining securities (including the triple-A tranches, accounting for 80–85% of the pool) were considered 'safe.'[44]

40 See Steven L. Schwarcz, "Protecting Financial Markets: Lessons from the Subprime Mortgage Meltdown" (2008) 93 *Minnesota Law Review* 373.

41 See e.g. Dodd-Frank Act, Title X (Bureau of Consumer Financial Protection) and Title XIV (Mortgage Reform and Anti-Predatory Lending Act).

42 See Jonathan R. Macey, Geoffrey Miller, Maureen O'Hara, and Gabriel D. Rosenberg "Helping Law Catch Up to Markets: Applying Broker-Dealer Law to Subprime Mortgages" (2009) 34 *Journal of Corporation Law* 789.

43 Hellwig, *supra* note 38, 15.

44 For an accessible illustration of the securitization mechanism, see Gary B. Gorton, "The Subprime Panic" (2009) 15 *European Financial Management* 10, 17–30.

It is easy to question the validity of this mechanism in hindsight.[45] Housing prices *can* move together and they tend to do so especially when their upward trend is sustained by the same systematic factors that make securitization attractive (and thus, boost housing finance and prices): that is, low interest rates and a steady demand for marketable securities.[46] The failure to account for these correlations explains the losses in the subprime mortgage business, but it cannot explain the financial crisis.[47] Albeit large, the figures of non-prime US mortgages securitization are too little for that. Moreover, at least at the peak of the crisis, the estimated write-downs on asset-backed securities exceeded the most pessimistic forecasts on depreciation of the underlying assets.[48] Short of subprime mortgages, there was no reason why the price of those assets should drop. While markets at some point refused to trade and refinance position in *all* kinds of asset-backed securities, so far very few of the triple-A bonds have actually defaulted.[49]

So what went wrong? Securitization completes financial markets, allowing funding of assets (mortgages, credit cards, auto and student loans) that would not be suitable for traditional intermediation if not at higher rates.[50] According to some commentators, however, securitization tends naturally to support low-quality loans, not just poor mortgages, because of the so-called 'originate-to-distribute' model. Originators, the argument runs, did not risk enough to care about creditworthiness.[51] Their deals were closed as the loans were pooled in a securitization vehicle and the output placed with outside investors. Rating agencies, paid by the originators, apparently faced similar incentives to structure as many deals (and to rate their tranches as attractively) as possible.[52] This perspective neglects that however bad the sellers' incentives are to produce "a modern form of snake oil,"[53] they need to find buyers. There were plenty of investors hungry for asset-backed securities despite alleged incentive problems with their origination.

45 See e.g. Calomiris, *supra* note 5, 13–15.

46 Joshua Coval, Jakub Jurek, and Erik Stafford, "The Economics of Structured Finance" (2009) 23 *Journal of Economic Perspectives* 3.

47 Hellwig, *supra* note 38, 12 and 16–17.

48 Compare International Monetary Fund, "Financial Stress and Deleveraging: Macro-Financial Implications and Policy", *Global Financial Stability Report October 2008*, with International Monetary Fund, "Navigating the Financial Challenges Ahead", *Global Financial Stability Report October 2009*.

49 Gorton, *supra* note 12, 6.

50 Hellwig, *supra* note 38, 13–14.

51 Id., at 14–20.

52 Marco Pagano and Paolo Volpin, "Credit Rating Failures and Policy Options" (2010) 25 *Economic Policy* 401.

53 Akerlof and Shiller, *supra* note 7, 37.

The high demand for securitization has two unconvincing explanations. The first is moral hazard.[54] Investors had little incentives to be careful with the risky output of securitization because they had access to the safety net or they could rely on the implicit government guarantee when they did not. As we have seen, moral hazard is intrinsic to regulated banking, but this cannot be the full story. There are two important circumstances suggesting that the prospect of government bailouts was too uncertain to support widespread moral hazard. First, those who financed banks' and non-banks' operation in asset-backed securities were ready to run (i.e. withdraw from short-term funding) and they did run at the first sign of trouble – recall that one major reason for moral hazard is that financiers do not run when they believe they are insured.[55] Second, government bailouts could not be relied upon. Despite any statement to the contrary, they were implemented quite randomly at least until the gravity of the problem was understood by the authorities.[56] Only after the failure to save Lehman Brothers was recognized as a mistake bailout could be safely assumed. Moral hazard is likely to be a problem in the future but it was not sufficient reason to flirt with bankruptcy in the past.[57]

Equally unconvincing is the claim that professional investors have been irrational.[58] To support irrationality, the behaviour of investors should have systematically disregarded pieces of available knowledge. That did not happen. For investors, the available knowledge was that asset-backed securities faced the same portfolio restrictions (for institutional investors) and the same capital charges (for banks) as corporate and government bonds with the same rating, but offered considerably higher returns. In addition, those securities were widely accepted as collateral for short-term funding, which high-grade financial institutions were able to regularly roll over with almost no haircuts and at ridiculously low interest rates. It would have been irrational to forego these profit opportunities.[59]

Investors did not neglect anything they knew, but overlooked a lot that they did not know. This statement is not as trivial as it looks. It conveys the essence of decision-making under uncertainty. Investors could not consider all possi-

54 See e.g. Calomiris, *supra* note 5, 12–20; Hellwig, *supra* note 6, 29–35.

55 See de la Torre and Ize, *supra* note 20, 10–11.

56 See the "events logbook" of the crisis in Markus Brunnermeier, "Deciphering the Liquidity and Credit Crunch 2007–2008" (2009) 23 *Journal of Economic Perspectives* 77, 88–91. See also Gorton, *supra* note 37, 148–152.

57 In a similar vein, see Charles A.E. Goodhart, *The Regulatory Response to the Financial Crisis* (Cheltenham: Elgar 2009).

58 See Emilios Avgouleas, "The Global Financial Crisis, Behavioural Finance and Financial Regulation: In Search of a New Orthodoxy" (2009) 9 *Journal of Corporate Law Studies* 23.

59 For a brilliant defence of this account, see Posner, *supra* note 2, 75–116.

ble downturn scenarios when deciding whether to purchase or to finance positions in asset-backed securities. Nobody ever does that. This decision was taken based on Keynesian conventions to overcome uncertainty.[60] Credit ratings were the most important among these conventions, although another evil of the crisis according to the standard narrative, credit default swaps, performed a similar reassuring function. Rating agencies and counterparties to swap relied on the same models of risk assessment whose flaws were revealed only in hindsight. Asset-backed securities were considered safe until then, either because they enjoyed sufficiently high rating themselves or because their default risk could be swapped to top-notch counterparties.

One might still wonder why theoretical models of risk assessment were accepted at face value.[61] In part, that was due to the regulatory distortions attached to ratings.[62] Banks can economize on their capital requirements when they invest in high-grade securities. Likewise, the majority of institutional investors are prevented by regulation or by contract from investing in below-investment-grade securities. Still, for a bunch of unregulated investors, like hedge funds, short-selling overrated asset-backed securities could have been a profitable course of action. There is anecdotal evidence that some hedge funds did exactly this.[63] Whatever short-selling took place, however, it was not sufficient to stop the volume of securitization from growing. Originally there was no market venue where to cash in profits from arbitrage, which affected its long-term sustainability.[64] Until 2006, when that venue started developing, the models of risk assessment underlying ratings and credit default swaps were the only way to price asset-backed securities. It is on this basis that shadow banking could flourish. Because asset-backed securities were traded with virtually no volatility they could be as good collateral as treasury bonds, but offering much more attractive earning spreads.

60 See *supra*, text accompanying notes 13–19.

61 Calomiris, *supra* note 5, 15–17.

62 See e.g. Hellwig, *supra* note 6, 25–34; Mark J. Flannery, Joel F. Houston, and Frank Partnoy, "Credit Default Swap Spreads as Viable Substitutes for Credit Ratings", (2010) 158 *University of Pennsylvania Law Review* 2085, 2089-95 (summarizing professor Partnoy's theory of ratings as regulatory license). John C. Coffee, "Ratings Reform: The Good, The Bad, and The Ugly", ECGI-Law Working Paper No. 162/2010, September 2010 (available at SSRN: http://ssrn.com/abstract=1650802), 41, argues that no regulatory license effect can be hypothesized outside the US. For regulatory biases in Europe see, however, Luigi Abete, *Audizione del Presidente dell'Assonime sulla Proposta di modifica del Regolamento (EC) 1060/2009*, 6 October 2010 (on file with author).

63 Lewis, *supra* note 11, *passim*.

64 Gorton, *supra* note 44, 28–34. See also Andrei Shleifer and Robert Vishny, "The Limits of Arbitrage" (1997) 52 *Journal of Finance* 35.

Uncertainty was hidden behind the conventional safety of shadow banking. Nobody knew, for instance, individual investors' exposures to certain categories of asset-backed securities directly or through their counterparties. That turned out to be one major problem during the financial crisis, but it was no reason to worry so long as the convention held that high-grade asset-backed securities were almost as liquid as cash. Note that this does not imply a belief that individual securities could never default, only the conviction that investors could always unwind their positions in the event of a downturn.[65] One theoretical model demonstrates that a strategy of maximum short-term borrowing against securitization rationally maximizes profits under the expectation of *moderate* losses due to forced sales.[66] What was not expected is that liquidity of asset-backed securities could disappear altogether, which suddenly disallows refinancing, forces *massive* fire sales, and may result in widespread bankruptcy. Only at that stage uncertainty of asset values and of counterparty solvency became relevant for decision-making.

While conventional rationality explains the growth of shadow banking despite effective uncertainty of liquidity, externalities tell us why this harms society. Liquidity is a positive externality based on the perceived safety of long-term assets backing short-term liabilities.[67] We have seen that the peculiar structure of banks' balance sheet generates this externality on a large scale. However, as in the case of demand deposits, when uncertainty kicks in liquidity is withdrawn because investors only trust cash and a few equivalents as stores of value. Shadow banking was thus as fragile as traditional banking prior to the introduction of deposit insurance, perhaps even more so given the innovative character of the underlying assets. Consensus on inevitably uncertain models of risk assessment should not have gone as far as to generate a new form of systemically unstable liquidity, or at least not so quickly. But there is little reason to expect financial intermediaries, which individually free ride on the liquidity they collectively establish, to worry about that.[68] That is the task of regulation. Neglecting how securitization was changing the pattern of financial intermediation, regulation did the opposite: it focussed so much on traditional banking that it nurtured, instead of constraining, the growth of shadow banking.

65 As late as on 10 July 2007, Chuck Prince – former CEO of Citigroup – famously stated: "When the music stops, in terms of liquidity, things will be complicated. But as long as the music is playing, you've got to get up and dance. We're still dancing."

66 Andrei Shleifer and Robert Vishny, "Unstable Banking" (2010) 97 *Journal of Financial Economics* 306.

67 Gorton, *supra* note 23, 6–14.

68 "[I]t would make no more sense for a individual businessman to worry that because of the instability of the banking industry his decision and those of his competitors might trigger a depression than for a lion to spare a zebra out of concern that lions are eating zebra faster than zebra can reproduce." Posner, *supra* note 2, 284–285.

We have already seen how regulation encouraged reliance on ratings. Paired with formal compliance of banks with capital regulation, this contributed to creating the illusion of safety supporting the liquidity of asset-backed securities. Still, credit rating agencies, counterparties to swap, and banks themselves realized the problems with the theoretical models of risk assessment as soon as the housing prices started to fall in late 2006.[69] By that time, however, the size of shadow banking had become simply too large, and a sudden revision of risk assessments would have anticipated individual losses without countervailing benefits.

Free riding on existing liquidity thus continued to be the individually rational course of action, both for investors and for those who sustained their leveraged investments with favourable risk assessments.[70] Being credit ratings the only source of information, there was no need to rush on unwinding positions at a loss. Meanwhile, the market had developed forward-looking instruments for alternative pricing of default risk. In early 2007, the newly created ABX-CDS index on subprime risk plummeted. This circumstance was systemically insignificant, given the relatively small size of the subprime business. The problem is that this index forced rating agencies to downgrade top-notch subprime-related securities later on. This generated uncertainty about the ratings of *all* asset-backed securities. As a result, these became unreliable as collateral and triggered panic on any sort of short-term funding.[71] Had the impact of ratings on liquidity generation been lower, the market downturn would have simply allocated losses according to the individual exposures to the housing market downturn.

A second responsibility of regulation was the failure to recognize that whatever form of funding illiquid assets with liquid liabilities is effectively banking – which implies systemic fragility.[72] Both the definition of banking and its prudential regulation encouraged banks to engage in maturity transformation outside the boundaries of traditional banking – which implies failure to control externalities. The reason is twofold. First, banks need constantly to fight against disintermediation, which typically occurs when non-banks can profit as much as banks (if not more) from short-term funding. In this perspective, the boundaries of regulated banking are "a line in the sand,"[73] which banks have natural incentives to cross in order to defend their turf against financial innovation. Second, banks can intermediate comparatively higher volumes through traditional maturity transformation so long as they maintain suffi-

69 For references, see *supra* notes 8 and 10–11.

70 Bengt Hölmstrom, "Discussion of the Panic of 2007 by Gary Gorton", Working Paper, October 2008 (available at http://econ-www.mit.edu/files/3784, accessed 29 October 2010).

71 Brunnermeier, *supra* note 56, 77–100.

72 Gorton, *supra* note 23, 38–42.

73 de la Torre and Ize, *supra* note 20, 6.

cient equity capital to keep up with prudential regulation. When banks compete with unregulated intermediaries, however, capital adequacy is a handicap because it induces shareholders to move to non-banks in search of higher returns.[74] There is no static setting of regulations that can prevent banks from seeking higher leverage at the expenses of society when they face competition from unregulated intermediation. Unless regulation protects them, banks need to outperform non-banks in order to survive.[75]

One last problem with banking regulation highlighted by the financial crisis is short-termism. The exponential growth of securitization was mainly due to the investors' inclination to cash in profits as quickly as possible. Securitization was a way to *realize* the return spread between long-term and short-term funds. It did not need to be. A more long-term strategy, for instance based on more stable sources of funding, would have simply postponed the real profits (if any) without overly feeding securitization with uncertain liquidity.

Regulation encouraged short-termism and its implications on the size of systemic externalities supporting the conventional wisdom that managerial accountability to shareholders enhances market discipline and thus the safety and soundness of banks.[76] This provided bankers with a major reason to engage in highly levered maturity transformation: making shareholders happy with the bank's quarterly results. Not differently from driving the bank into bankruptcy, failure to provide these results would have cost managers their office. Of course, bankers had another good reason to maximize short-term profits: their own performance pay. The open question is whether fixing managerial compensation would suffice to cope with short-termism when the corporate governance of banks continues to support shareholder empowerment in decision-making.

4. The Urge to Re-Regulate

The ongoing reform of financial regulation in Europe and in the US is far broader than what can be reviewed in a single paper. Even confining the analysis to the few key issues discussed in the previous section, I will not illustrate how they are being addressed in detail. The modest purpose of this section is to show that the overhaul of financial regulation focuses excessively on filling in regulatory gaps highlighted by the financial crisis. The reforms

74 Brunnermeier *et al.*, *supra* note 24, 67–74.

75 See, in a historical perspective, Gorton, *supra* note 23, particularly 38–39.

76 See Hellwig, *supra* note 6, 29–32; William W. Bratton and Michael L. Wachter, "The Case against Shareholder Empowerment" (2010) 158 *University of Pennsylvania Law Review* 653, 716–726. See also Basel II, *supra* note 31, 175–190 (Pillar 3 – Market Discipline).

tend to overlook the regulatory distortions that positively contribute to financial instability, supporting fragile conventions of safety and regulatory arbitrage. I will articulate this claim with respect to three important aspects of regulatory reform: i) securitization and rating agencies; ii) prudential regulation of banks; and iii) corporate governance of banks.

a) Securitization and rating agencies

The standard narrative on the originate-to-distribute model of securitization is that it fails to provide credit originators with the incentives to screen and monitor the quality of borrowers: originators do not have sufficient 'skin in the game' to care.[77] The plain reaction of regulation in Europe and in the US was then to compel originators to retain at least 5% of credit risk in the form of equity tranches of securitization.[78] The disadvantage of this solution, as of any substantive discipline of financial instruments, is that it interferes with one major function of securitization: efficient allocation of credit risk. Moreover, this regulation does not produce countervailing benefits because it focuses on the wrong side of the market. Originators were not responsible of the excessive growth of securitization. They were only providing investors what they wanted.[79]

Why would investors trust securitization if the origination process was flawed? To start, the originate-to-distribute model was more incentive-compatible than it looks.[80] Originators have never been insensitive to the credit risk they generated, for they retained servicing and other financial interests in the securitization. This was sufficient for most of them to go bankrupt when mortgages started to default. Investors, on the other hand, were not as foolish as to buy whatever originators tried to sell them. At least in the private sector, originators were sponsored by major banks committed to warehousing the junior tranches of securitization. Banks therefore, whether directly or through their off-balance-sheet vehicles, were already providing the market with the guarantee that now policymakers seek to impose. The difference is that regulation will set a limit to the amount of risk that can be allocated by the market and implicitly suggest that anything below that limit is 'safe' for the market to handle. Short of preventing future troubles – the banks' guarantee ultimately

77 Hellwig, *supra* note 6, 14–16.

78 See Dodd-Frank Act, s 941; Directive 2009/111/EC amending Directives 2006/48/EC, 2006/49/EC and 2007/64/EC as regards banks affiliated to central institutions, certain own funds items, large exposures, supervisory arrangements, and crisis management (*CRD II*) [2009] OJ L302/97, art 122a.

79 See *supra*, text accompanying notes 54–62. See also Calomiris, *supra* note 5, 13–20.

80 Gorton, *supra* note 44, 38–41 (illustrating the evidence discussed below in the text).

did not help – this approach replicates one major distortion that concurred to determining the last financial crisis: regulatory support of ratings.

The originate-to-distribute model only generates tradable securities. It is credit rating that certifies their degree of safety, thereby making them attractive as collateral. from the investor's perspective, the crucial issue is how to finance asset-backed securities with as much short-term debt and as little equity as possible. Investing in high-grade securities is the strategy to minimize capital charges while having access to collateralized borrowing. Ratings are essential to this game, which explains why, correctly, they are a major item in the regulatory reform agenda. Unfortunately, policymakers continue to focus on the wrong side of the market. According to the standard argument, rating agencies tend to collude with originators in over-rating securitizations, both because they act simultaneously as advisors and appraisers of the securitization and because their models of risk assessment are too complex and too obscure for other market players to understand. As a result, the regulatory countermeasures focus on conflicts of interest and transparency as the main problems.[81]

This is certainly the approach of EU legislation, which was the first to deal with this issue in the aftermath of the financial crisis.[82] In Europe, rating agencies will be subject to registration and to a number of rules, including mandatory disclosure of their methods of credit risk assessment and the prohibition to offer advisory services susceptible of creating conflicts of interest. But the matter is still in a state of flux. In the context of the general reform of the EU financial regulatory architecture,[83] the European Commission has already proposed to amend Regulation 1060/2009 in order to establish, most prominently, centralized supervision by the new European Securities and Market Authority and the issuers' obligation to share information with multiple rating agencies.[84]

These solutions fail to address the core problem, namely the incentives of rating agencies to provide unbiased risk assessment despite the regulatory advantages of high ratings for investors.[85] Some commentators contend that

81 See, critically, Fabian Amtenbrink and Jakob de Haan, "Regulating Credit Ratings in the European Union: A Critical First Assessment of Regulation 1060/2009 on Credit Rating Agencies" (2009) 46 *Common Market Law Review* 1915.

82 Regulation (EC) 1060/2009 on credit rating agencies [2009] OJ L302/1.

83 See the Positions adopted by the European Parliament at first reading on 22 September 2010 with a view to the institution of the following European Supervisory Authorities (ESA): a) European Systemic Risk Board; b) European Banking Authority; c) European Insurance and Occupational Pensions Authority; d) European Securities and Markets Authority (available at www.europarl.europa.eu).

84 European Commission, "Proposal for a Regulation of the European Parliament and of the Council on amending Regulation (EC) No. 1060/2009 on credit rating agencies", COM(2010) 289 final, 2 June 2010.

85 Goodhart, *supra* note 57, 113–140.

rating agencies have wrong incentives because they are paid by the issuers of the securities they rate.[86] But the fact is that issuers seek for high ratings because *investors* demand these instead of a neutral risk assessment. Regulation has conferred upon rating agencies a licensing role of securities' creditworthiness,[87] thereby feeding investors' reliance on (and demand of) highly rated securities. Thus, who pays for ratings is irrelevant.[88] As long as regulation provides benefits to investing in rated assets, in terms of lower capital charges or of lifting portfolio restrictions, the market will tend to produce more ratings than optimal and high ratings may be inflated.[89] This situation compromises the reputational incentives underlying the historical emergence of credit ratings, which would otherwise prompt rating agencies to be cautious with their judgments. Even worse, regulatory support of ratings induces the conventional view that high-grade financial assets are safe, with important repercussions on generation and contraction of liquidity by the private sector.

The approach to reforming regulation of rating agencies is significantly different in the US.[90] Rating agencies were already subject to registration and SEC oversight. The problem is that they could not be sued. The Dodd-Frank Act has removed the regulatory impediments to civil liability.[91] But it could not delete at once provisions requiring, for instance, that certain securities be issued with a rating. The first reaction of rating agencies was then refusing to participate in new issues under the new liability regime.[92] However, prospectively, the Dodd-Frank Act requires the Federal Reserve and the SEC to review references to credit rating with a view to removing them from their rules.[93] Although it is not know whether and to what extent these measures will be actually implemented, this is an important recognition that regulations may undermine the informational role of credit ratings. Differently from the

86 See e.g. Posner, *supra* note 2, 78; Pagano and Volpin, *supra* note 52.

87 Frank Partnoy, "Rethinking Regulation of Credit Rating Agencies: An Institutional Investor Perspective" *Council of Institutional Investors*, April 2009 (available at SSRN: http://ssrn.com/abstract=1430608).

88 Calomiris, *supra* note 5, 17.

89 For a formal model discussing this argument see, recently, Christian Opp, Marcus M. Opp, and Milton Harris, "Rating Agencies in the Face of Regulation – Rating Inflation and Regulatory Arbitrage", Working Paper, August 2010 (available at SSRN: http://ssrn.com/abstract=1540099).

90 See Coffee, *supra* note 62, 18–25.

91 Dodd-Frank Act, ss 933 and 939G.

92 In order to avoid the paralysis of securitization, the SEC had to suspend the application of Regulation AB – requiring securities to be issued with a rating – for 6 months after the coming into force of s 939G of the Dodd-Frank Act. See SEC No-Action Letter of July 22, 2010, available at www.sec.gov/divisions/corpfin/cf-noaction/2010/ford072210-1120.htm (accessed 29 October 2010).

93 Dodd-Frank Act, s 939A.

EU, the American reform is not only trying to discipline rating agencies but also to decrease their impact on establishing fragile conventions of safety.

b) Prudential regulation of banks

Ratings had another implication on financial stability. High ratings effectively allowed banks to economize on equity capital. The political discomfort with this circumstance, especially after the various bank bailouts, is well known.[94] Banks and their investment vehicles were excessively leveraged in dealing with asset-backed securities, which made them insolvent when the securities became illiquid and their value uncertain. Policymakers also realize that this mechanism creates an enormous potential for contagion, which existing regulation fails to address both because it is too much focussed on individual stability and because it is pro-cyclical (i.e., it bites little in good times, whereas it exacerbates distress in bad times).

Ongoing reforms of prudential regulation try to cope with all these problems. Issues of pro-cyclicality and macro-prudential regulation are under serious study by both academics and policymakers. For reason of space, I deal with these issues elsewhere.[95] The initiatives being taken at the micro level follow instead one single mantra: the capital of financial institutions must be increased both quantitatively and qualitatively. Both in Europe and in the US prudential regulation of banks is being overhauled in this fashion, paying particular attention to securitization and off-balance-sheet vehicles.[96] Moreover, in the context of the international Basel Accords, central bankers have recently settled on heightened standards of regulatory capital, which will eventually require banks to maintain at least 7% (as opposed to the current 2%) of their risk-weighted assets as common equity, to add a countercyclical capital buffer, and to comply with a straightforward leverage ratio.[97]

94 See Larosière Report, *supra* note 1, 15–26, and Obama Plan, *supra* note 1, 19–42.

95 Alessio M. Pacces, "Causes and Consequences of the Financial Crisis in the Perspective of Uncertainty", Working Paper, prepared for the conference "Corporate Governance and the Global Financial Crisis", Philadelphia, 24–25 September 2010 (on file with author).

96 In the US, see Dodd-Frank Act, Title I, particularly ss 115, 165, and 171. In Europe, see the Position adopted by the European Parliament at first reading on 7 July 2010 with a view to the adoption of a Directive amending Directives 2006/48/EC and 2006/49/EC as regards capital requirements for the trading book and for re-securitisations, and the supervisory review of remuneration policies (*CRD III*), available at www.europarl.europa.eu.

97 See Basel Committee on Banking Supervision, "Group of Governors and Heads of Supervision announces higher global minimum capital standards", 12 September 2010 (*Basel III*), available at www.bis.org.

While these policies aim to restore confidence in banks' safety, they fail to address the main factor that undermines effectiveness of capital adequacy regulation in maintaining that safety: regulatory arbitrage. This problem cannot be dealt with simply by tightening regulation of banks, because eventually banks will find other ways to get around the capital requirements that penalize them in the competition with unregulated intermediaries.[98] As I showed, for banks this is a matter of survival. Moreover, the uncertainty perspective developed in this essay implies the impossibility for regulators to determine ex-ante how banks will react to new threats of disintermediation. Financial innovation is unpredictable, which makes uncertainty of future patterns of financial intermediation a most dangerous source of systemic externalities. In order to prevent the latter, the regulatory perimeter cannot be confined to banks, but it must include whatever is functionally banking.

In theory, there is an easy way to avoid regulatory arbitrage: regulate either nothing or everything.[99] The first option – free banking – has failed historically, and anyway it would not be politically feasible today. The second option is very popular in times of financial crisis, but it is illusory and, even if it could be ever implemented, it would deprive society of the benefits of financial innovation. The Dodd-Frank Act tries to cope with this problem with some pragmatism. The idea is that all systemically relevant institutions, whether banks or non-banks, would be subject to stringent prudential regulation and supervision when they cross certain quantitative or qualitative thresholds. On the one hand, the Federal Reserve will be responsible of establishing heightened prudential standards on supervised bank and non-bank holding companies with total consolidated assets exceeding $50 billions.[100] On the other hand, the new Financial Stability Oversight Council will have the power to require Federal Reserve supervision for non-banks posing risks to US financial stability.[101]

This approach seeks to address the 'too-big-to-fail' problem. Since governments cannot credibly commit not to rescueing systemically relevant intermediaries, the latter need to fall under the regulatory umbrella from the very beginning in order to prevent moral hazard. Moral hazard was most probably not a main determinant of the crisis given the original uncertainty of governments' response, but it could well be in the future after bailouts having proven unavoidable to prevent systemic collapse. Unfortunately, if the broadening of the regulatory umbrella is ineffective against regulatory arbitrage, it is unlikely to prevent moral hazard too. Defining systemically relevant intermediaries

98 de la Torre and Ize, *supra* note 20, 24–25.
99 Brunnermeier *et al.*, *supra* note 24, 69–70.
100 Dodd-Frank Act, ss 115 and 165.
101 Dodd-Frank Act, ss 112–113.

puts regulators in a bind.[102] If the criteria are defined ex-ante, financial intermediaries will try to circumvent the relevant thresholds, save claiming protection when things go wrong. If the identification is discretionary, regulators could be in theory sufficiently smart to detect circumvention in real time. However, lacking credible commitment, the exercise of this discretion will be predictably as time-inconsistent as it has been so far. Regulators already had the power to limit the growth of shadow banking.[103] They knowingly ignored shadow banking when it was profitable, but eventually they were prompted to rescue banks from it. Incentives matter for regulators too.[104]

The EU approach to this problem does not fare any better. The forthcoming overhaul of financial supervisory architecture will include (among many new supervisory authorities) a European Systemic Risk Board with a mission comparable to that of the US Financial Stability Oversight Council.[105] However, the European Board will have no power to require action by national supervisors outside the limited set of EU provisions explicitly allowing that. In other words, the European Board will only be able to formulate recommendations on upcoming systemic threats. Perhaps for this reason, the EU approach to regulation of non-banks is much stricter than in the US, where for instance hedge funds that are not systemically relevant will only be subject to registration and disclosure obligations.[106] The proposed European Directive on Alternative Investment Fund Managers seeks instead to extend to hedge funds and comparable institutions the same restrictions applicable to banks.[107] Short of the unsettled controversy on the asymmetry with the US approach, this solution – if implemented – will eventually encourage instead of limiting the development of new and potentially dangerous forms of financial intermediation.

There is no easy way to define the boundaries of banking for regulatory purposes. But this problem is more urgent than any revision of prudential

102 Brunnermeier *et al.*, *supra* note 24, 71–74.

103 Ross Levine, "An Autopsy of the U.S. Financial System", NBER Working Paper w15956, April 2010 (available at SSRN: http://ssrn.com/abstract=159807).

104 See most efficaciously in this perspective, Simon Johnson and James Kwak, *13 Bankers – The Wall Street Takeover and the Next Financial Meltdown* (New York: Pantheon Books 2010).

105 See the Position adopted by the European Parliament at first reading on 22 September 2010 with a view to the adoption of a Regulation establishing a European Systemic Risk Board, available at www.europarl.europa.eu. See also *supra* note 83.

106 Dodd-Frank Act, ss 403–408 (requiring hedge funds and private equity funds having over $150 million under management to register with the SEC).

107 See most recently the 'AIFM compromise' reached in the EU trialogue on 26 October 2010. Council of the EU, "Proposal for a Directive of the European Parliament and of the Council on Alternative Investment Fund Managers and amending Directives 2003/41/EC and 2009/65/EC", 2009/0064 (COD), available at http://register.consilium.europa.eu/pdf/en/10/st15/st15053-re01.en10.pdf (accessed 29 October 2010).

regulation. The uncertainty perspective suggests that banks engage in financial innovation to protect their turf and, in so doing, they generate intractable externalities for the financial system. One possible way forward is to define banking based on what banks can do that non-banks cannot do, namely maturity transformation on a large scale. Allowing only banks to issue short-term liabilities under strict capital adequacy requirements would ensure that the leverage (and the degree of moral hazard) in the system is constantly under control, whereas unregulated intermediaries would be free to pursue financial innovation without endangering systemic stability (and therefore without need or expectation to be bailed out if they fail). I will elaborate on this point in the last section.

c) Corporate governance of banks

A most popular item in the reform agenda is regulation of bankers' pay. This is a sensible issue for policymakers because banks' losses are or will be borne by taxpayers, in the eyes of whom the generous compensation of the managers who determined those losses is just outrageous.[108] From an economic perspective, however, the problem – if any – is one of structure not of level of compensation.[109] The circumstance that bankers' pay-per-performance is highly sensitive to profit realization but insensitive to making losses is apparently problematic, for it is suspected of inducing both short-termism and excessive risk-taking. As we have seen, both were two major determinants of the financial crisis.

On this basis, authoritative commentators have advocated mandatory backloading of performance pay.[110] The structure of bonuses and stock option plans before the crisis aligned managerial reward with the production of quarterly results, regardless of the losses that could follow. Undoubtedly, this supports short-termism. By including the subsequent losses in the calculation of incentive pay, backloading – via restrictions on cash bonuses, holding periods on stock-based compensation, or straightforward clawbacks – should induce managers to take a more long-term perspective. In a sense, this solution makes the incentive structure of managers similar to that of blockholders.

108 See Lucian A. Bebchuk, Alma Cohen, and Holger Spamann, "The Wages of Failure: Executive Compensation at Bear Stearns and Lehman 2000–2008" (2010) 27 *Yale Journal on Regulation* 257.

109 Lucian A. Bebchuk and Holger Spamann, "Regulating Bankers' Pay" (2010) 98 *Georgetown Law Journal* 247.

110 See Posner, *supra* note 2, 299–300; Sanjai Bhagat and Roberta Romano, "Reforming Executive Compensation" (2009) 26 *Yale Journal on Regulation* 359. For the view that this would not be sufficient to counter excessive risk-taking by bank managers, see Bebchuk and Spamann, *supra* note 109, 274–277.

What is unclear is why this solution should be mandated by regulation, instead of being left to shareholder choice.

The short answer to this question is that shareholder choice is (deemed) flawed. This can mean two things. One is that shareholders are not in the position to monitor managers, because the latter can always resist shareholders' attempts to hold them accountable. The second problem with shareholder choice is that the corporate governance of banks is special because of the externalities imposed by their instability. Those who support this contention consistently argue that bankers should be accountable not only to shareholders, but also to creditors and taxpayers.[111]

Choosing the first approach, the Dodd-Frank Act has set the basis for a major reform of corporate governance in the US, which is not limited to financial institution but will apply to *all* listed companies.[112] Without going into details, also because the effectiveness of many of the new provisions is postponed or requires implementing measures, the reform aims to empower shareholders over management. Executive remuneration and severance payments will be subject to a non-binding vote by shareholders (so-called say-on-pay); independence of compensation committees will be strengthened; and the SEC can allow shareholders to place nominees in the company's proxy materials, which the SEC immediately did.[113] That said, shareholders are free to design executive compensation as they wish. They only cannot waive clawbacks of three-year incentive pay in case of an accounting restatement, because the Dodd-Frank Act mandates inclusion of such policies in the listing rules.[114]

Apart from these clawbacks, the idea behind the US reform is that shareholders with more powers would cope with managerial short-termism. However, if we look at shareholder choice more carefully, there is hardly any reason why diversified shareholders should care of the long term.[115] Managers at least have one, which is protection of their human capital. Actually, in the traditional corporate governance debate, this used to be an argument for warning against managerial risk-aversion as opposed to the risk-neutrality of diversified shareholders.[116] Incentive pay seemed to be most welcome to align managerial

111 Id, at 284–287.

112 Dodd-Frank Act, Title IX, Subtitles E (ss 951–957) and G (ss 971–972).

113 Rule 14a–11, SEC Release No. 33-9136 of 25 August 2010. The implementation of the rule has been delayed in response to a judicial petition by the US Chamber of Commerce and the Business Roundtable challenging the legality of SEC rulemaking.

114 Dodd-Frank Act, s 954.

115 For this perspective on the problem of short-termism in corporate governance, see Bratton and Wachter, *supra* note 76, 696–716.

116 Coffee, *supra* note 4, 2–3 and 10–13.

incentives with the shareholder interest.[117] Likewise in banking, maximization of shareholder value has been long considered in line with the interest of society.[118] After all, the more profitable banks are the healthier and the more stable they are supposed to be.

This logic of market/shareholder discipline is being reconsidered in Europe at least as far as financial institutions are concerned. In overhauling the capital requirements of banks, the EU institutions have recently agreed to impose strict limits to the remuneration of bank managers.[119] Performance pay will have to include shares for at least 50%, and 40 to 60 percent of the variable component will have to be deferred for at least three years. Similar restrictions are being considered in the debated legislation on Alternative Investment Fund Managers.[120] The EU legislation will be thus more binding on shareholder choice than the Dodd-Frank Act. The question whether more shareholder empowerment would contribute to fixing short-termism in the management of banks is still open in Europe. Without denying the merits of the shareholder franchise, the European Commission's Green Paper on the corporate governance of financial institutions also recognizes that shareholder pressure may be the ultimate reason why managers are overly focused on short-term results.[121]

Compared to the US approach, re-regulation in Europe considers the speciality of banks an issue for corporate governance. At least so far, however, regulation in the EU is not questioning shareholder sovereignty outside the rigour of the discipline of remuneration in banking. On both sides of the Atlantic, it is not obvious that managers with backloaded compensation will care more of the long-term implications of their decisions, when diversified shareholders still have the power to force them out of office upon failure to deliver short-term results.

5. Making It Work: Financial Regulation in the Face of Uncertainty

As the foregoing analysis shows, production of systemic externalities is a fundamental reason for regulating the financial system, and banking in particular. However, in dealing with this problem, regulation may do both too much

117 See Edward B. Rock and Marcel Kahan, "How I Learned to Stop Worrying and Love the Pill: Adaptive Responses to Takeover Law" (2002) 69 *University of Chicago Law Review* 871.

118 Hellwig, *supra* note 6, 29–33.

119 See Proposal of CRD III Directive, *supra* note 96, Annex I as amending Annex V to Directive 2006/48/EC.

120 See Proposal of AIFM Directive, *supra* note 107, art 13 and Annex II.

121 European Commission, "Green Paper – Corporate governance in financial institutions and remuneration policies", COM(2010) 284 final, 2 June 2010, 8.

and too little. It may do too much because it distorts market incentives. Moral hazard in banking, but also overreliance on ratings and market discipline of banks, illustrate how protection against externalities can ultimately result in higher costs to taxpayers. Regulation may also do too little by failing to address a major determinant of externalities: financial innovation. Banks' venturing in unknown territories that turn out to be disastrous for society tends to be retrospectively regarded as evidence of moral hazard or irrationality, which prompts policymakers to extend regulation (and its distortions) to areas not previously considered as banking. Whatever it adds to our understanding of past crises, which is arguably little, this attitude certainly does not help prospectively. Conversely, studying the regularities in banks' dealing with uncertainty may enable regulation to cope with the externalities of financial innovation.

Under uncertainty, regulation faces limits in preventing externalities for the simple reason that a major aim of financial innovation is getting around existing regulations. Accepting this as the natural outcome of a dynamic process, instead of helplessly trying to counter it as the result of excesses (whether rational or not) in the quest for profit, allows focussing on the crux of the matter. That is, what features of banking – however banking is legally defined – systematically determine externalities and what regulation can do about this other than stifle innovation or be ineffective in the face of it. Looking at the cause and consequences of shadow banking from this angle help devise the boundaries of banking regulation and its dynamic features in a way that is most likely to contain, instead of exacerbate, the adverse effects of the next financial crisis.

Shadow banking is effectively banking, namely borrowing through short-term liabilities while lending long-term.[122] The innovation is the securitization of assets with a long maturity, which makes collateral available for short-term funding. As this operation could be carried out with higher leverage by non-banks, banks had to circumvent their capital requirements in order to keep up with competition. However, exactly because banks successfully avoided disintermediation by entering shadow banking, securitization could not have grown so quickly without banks guaranteeing to redeem the collateral on demand. That is equivalent to the more traditional form of liquid liabilities banks issue, namely demand deposit, and it is likewise exposed to run. No matter how effectively regulation manages to constrain the ability of financial intermediaries to borrow short on securitization, we do not know how banks will respond to the next threat of disintermediation. But we can expect that it will be by issuing short-term liabilities through some unregulated form of financial intermediation.

122 Gorton, *supra* note 23, 14.

Albeit radical, one solution to this problem is reserving to banks the ability to borrow short on the market, in whatever form.[123] That would make banks the only providers of funding liquidity to the reminder of the financial sector,[124] keeping the systemic externalities problem within the pre-defined boundaries of banking and under its regulation and supervision. The idea is that "if it swims, flies and quacks it should be a duck and be dealt with as such."[125] The quacking of banks is maturity transformation, which is also the source of systemic externalities. The advantage of a functional definition over size thresholds or discretionary naming of systemically relevant institutions is that the former is less prone to circumvention and it is not time-inconsistent. Regulators would be committed to bringing under the regulatory umbrella every intermediary that issues short-term liabilities, which implies that both the ex-post safety net and the ex-ante regulation aimed at countering moral hazard could be more focused.

Conversely, all intermediaries that want to remain unregulated (or more lightly regulated) would be forced to borrow short-term from banks, which would limit the extent to which they can engage in financial innovation (and attempt to disintermediate banks) up to the controlled amount of liquidity banks can generate.[126] While this functional approach allows unregulated intermediaries to compete with banks under conditions of free entry and exit, it should prevents banks from engaging in excessive maturity transformation and non-banks from growing too big to fail. The same approach could be extended to the problem of interconnectedness between non-banks, for instance by allowing only banks subject to strict capital requirements to establish and have direct access to clearing facilities (of credit derivatives, interbank lending, and whatever may involve sudden pulling of collateral through margins or 'haircuts').[127]

A second advantage of the uncertainty perspective is that it does not rule out rational choice. This implies that individuals and firms that bet on the unknown still respond to incentives, and thus regulation can cope with market failures by setting appropriate penalties or rewards on certain behaviours. The complication introduced by uncertainty is that regulation may also end up

123 For a more radical recommendation (reserving to regulated intermediaries the faculty to issue market liabilities with *any* maturity), see de la Torre and Ize, *supra* note 20, 28–29.

124 On the notion of 'funding liquidity' and its connection with short-term liabilities, see Brunnermeier, *supra* note 56, 91–94.

125 Ravi Jagannathan and John Boyd, "Avoiding the Next Crisis" 6(7) *The Economists' Voice*, July 2009, 3.

126 I discuss how to control bank liquidity in a companion paper (Pacces, *supra* note 95).

127 Jean-Charles Rochet, "Regulating Systemic Institutions" (2009) 22 *Finnish Economic* Papers 35, 41–44.

supporting new activities that mimic desirable behaviour, but in fact generate externalities. The universal reliance on credit rating agencies in structuring and pricing securitization, in spite of many reasons for questioning their assessment, is a prominent illustration of this circumstance. Other than being irrational or reckless, this reliance reflected the regulatory incentives of banks and institutional investors to invest in high-grade securities as opposed to the weak incentives of credit rating agencies to get the grading right. Regulation was primarily responsible of the illusion of safety that surrounded securitization and made it grow beyond what the system could stand. A more careful study of the incentives to create illusory liquidity (and thus, externalities) through financial innovation would have not avoided the losses on securitization, but it could have prevented the crisis.

Probably the best solution to counter inflation of ratings in the face of uncertainty would be making ratings irrelevant for regulatory purposes. This is what the Dodd-Frank Act is trying to do in the US. But regulatory reference to ratings cannot be eliminated by the stroke of a pen, also because regulators need to adjust the capital charges they impose on banks (and the restrictions on other forms of financial intermediation) to *some* form of risk assessment.[128] An immediately workable solution is instead to prevent rating agencies from grading, and thus dismissing, intractable uncertainty, which differently from risk is not measurable. Granted that rating agencies have the right to license *to investors* the regulatory benefits of dealing with the securities they rate, the question is how to induce them to perform this gate-keeping function correctly.

Aside from the largely irrelevant policies reviewed in the previous section, two measures for improving incentive-compatibility of ratings have been proposed. One is to make rating agencies legally liable for their mistakes,[129] which is clearly the direction in which – albeit with difficulties – US law is evolving. The other is to force rating agencies to disclose their default risk assessments more precisely, and to punish them by suspension or revocation of their regulatory rents when these assessments are systematically contradicted by the actual rates of default.[130] Given the traditional difficulties of private enforcement in Europe, this is a promising venue for the forthcoming EU-wide supervision of rating agencies.

Both approaches have the merit of hitting the key point: how to make ratings more responsible in certifying investments whose perceived 'safety' is a poten-

128 For two opposite views on this problem, compare Coffee, *supra* note 62, 40–45 (doubting about the possibility to effectively eliminate regulatory reliance on ratings), with Flannery *et al.*, *supra* note 62, *passim* (suggesting credit default swaps as a viable alternative).

129 Partnoy, *supra* note 87, 14–16.

130 Calomiris, *supra* note 8, 10–11.

tial source of externalities. However, they neglect the dynamics of financial innovation. The latter carries one or more uncertain components of default risk. While credit ratings cannot be expected to account for uncertainty in their quantitative models, under the proposed solutions they would be held liable or punished with hindsight bias whenever uncertainty turns out badly. That implies that ratings would be over-deterred from financial innovation. This is not exactly what we want. What we want is that ratings do not fuel the *externalities* of financial innovation. Essentially this depends on covering up a situation of asymmetric information *as if* that was lack of knowledge. There is evidence that this situation emerged well before short-selling on subprime mortgage risk begun, thereby triggering massive downgrades and the general panic.

One way to achieve deterrence without incurring in hindsight bias is holding rating agencies liable when they fail to demonstrate that their different judgment compared to market benchmarks (e.g. credit default swap spreads) was justified by superior knowledge. Knowledge subsequently proved wrong by unforeseeable events would qualify as exculpation. Only knowledge already incorporated in market price, but not in ratings, would not. As we have seen, long after markets had realized the underestimation of subprime risk, rating agencies kept sustaining securitizations based on knowingly outdated risk models. They had too little to gain from updating their assessment and too little to lose from not doing so. They would have been held liable – or punished by their supervisors – had the proposed standard been in force.[131]

Finally, uncertainty sheds some light on the problem of bankers' (and other professional investors') short-termism. In principle, those who engage in innovation have little reason to focus on the short term, because the markets are unprepared to price innovation and to allocate its rewards or losses. The problem is the so-called market discipline of corporate managers, which especially in banking has been a hallmark of modern regulation. Market discipline is supposed to complement prudential regulation in safeguarding stability because it induces managers to maximize returns on the equity capital that regulation forces shareholders to post against the risk-weighted amount of a bank's assets.

Despite this conventional wisdom, accountability of management to shareholder interest does not necessarily improve stability. Diversified shareholders demand a competitive rate of return on their investment, which is fine when risk-taking is effectively constrained by prudential regulation across the banking industry, but becomes dangerous when financial innovation is involved. Because the risk ratios cannot account for uncertainty, shareholders can de-

131 I am not entering the discussion on how liability of rating agencies should be capped financially, as it is clear that unlimited liability exposure would over-deter credit rating. See Goodhart, *supra* note 57, 124–133, and Coffee, *supra* note 62, 26–28.

mand anticipation of the returns on financial innovation through higher leverage, which externalizes the adverse effects of uncertainty to creditors and taxpayers. As liquid stock markets provide diversified shareholders with inexpensive exit options, failure to meet their demand would eventually result in bankers' losing their job.[132] A similar mechanism underlies the incentives to engage in regulatory arbitrage in order to increase the returns on equity.

Bank managers facing a flat compensation scheme stand to lose from shareholders' short-termism, because they are more deeply invested in the bank with their human capital. It is normal for them to demand performance-based compensation in exchange for the promise to deliver short-term profits. In this perspective, mandatory backloading of bankers' pay-per-performance could possibly counter the perverse alignment of managers' and shareholders' incentives against the interest of society. But this is unlikely to suffice. The empirical evidence shows that, before the crisis, bankers already reinvested big chunks of their bonuses in the companies that eventually became troubled.[133] This suggests that managers cashed in less than they could and established voluntarily the long-term commitments that now regulation seeks to impose on them. However, regulation of bankers' pay is not going to change the circumstance that managers have to provide shareholders with the quarterly results they expect in order to avoid being fired.

We probably do not know enough about the corporate governance of banks to draw more than tentative conclusions.[134] But it is telling that recent studies find that 'shareholder-friendliness' of corporate governance is associated with poorer performance of banks in the financial crisis.[135] As this goes well beyond the problem of bankers' performance pay, the question is whether making management accountable only to shareholders instead of to a broader range of stakeholders fails to account for the 'speciality' of banks.[136] If that is the case, we might have to reconsider the standard paradigm of shareholder empowerment in corporate governance in order for any discipline of bankers' pay to have an impact on managerial incentives and short-termism.

132 See Bratton and Wachter, *supra* note 76, 709–715.

133 Rüdiger Fahlenbrach and Rene M. Stulz, "Bank CEO Incentives and the Credit Crisis", NBER Working Paper w15212, July 2009, forthcoming in *Journal of Financial Economics*.

134 In the same cautionary vein, see Peter O. Mülbert, "Corporate Governance of Banks after the Financial Crisis – Theory, Evidence, Reforms", ECGI-Law Working Paper No. 130/2009, April 2010 (available at SSRN: http://ssrn.com/abstract=1448118).

135 Andrea Beltratti and Rene M. Stulz, "The Credit Crisis Around the Globe: Why Did Some Banks Perform Better?", Fisher College of Business Working Paper No. 2010-03-005, September 2010 (available at SSRN: http://ssrn.com/abstract=1572407).

136 Coffee, *supra* note 4, 8–14.

6. Conclusion

The analysis of the last financial crisis in the perspective of financial innovation improves our understanding of systemic externalities in banking, which is the ultimate rationale of regulation. In this perspective, I have shown that a major determinant of the financial crisis was the failure of regulation to address the choices of financial institutions under uncertainty. Differently from the mainstream explanations, which are variously based on unanticipated opportunism and/or irrationality of those institutions, the foregoing analysis contends that regulation has not been insufficient. On the contrary, regulation has been so overly demanding towards traditional banking to promote unregulated forms of financial intermediation, thereby exacerbating the externalities of financial innovation.

With a view to preventing this dynamics from reoccurring in the future, this article argues that the overhaul of financial regulation should immediately focus on the externalities of financial institutions' dealing with uncertainty. Regulation should avoid inducing banks to embark on new forms of short-term funding in order to compete with unregulated intermediaries. To this purpose, only banks subject to a strict regulation of leverage should be allowed to engage in the functional core of banking, maturity transformation, because this is the main source of systemic externalities. In relying upon ratings, financial regulation should correct the incentives it provides to rating agencies to inflate their grades and to support false conventions of safety. To this purpose, through private litigation or public oversight, rating agencies should be deterred from rating without verifiable background knowledge. Finally, regulation of corporete governance of banks should rather question than reinforce the power of shareholders to hold management to account. This approach could be more effective against short-termism than a strict discipline of bankers' pay.