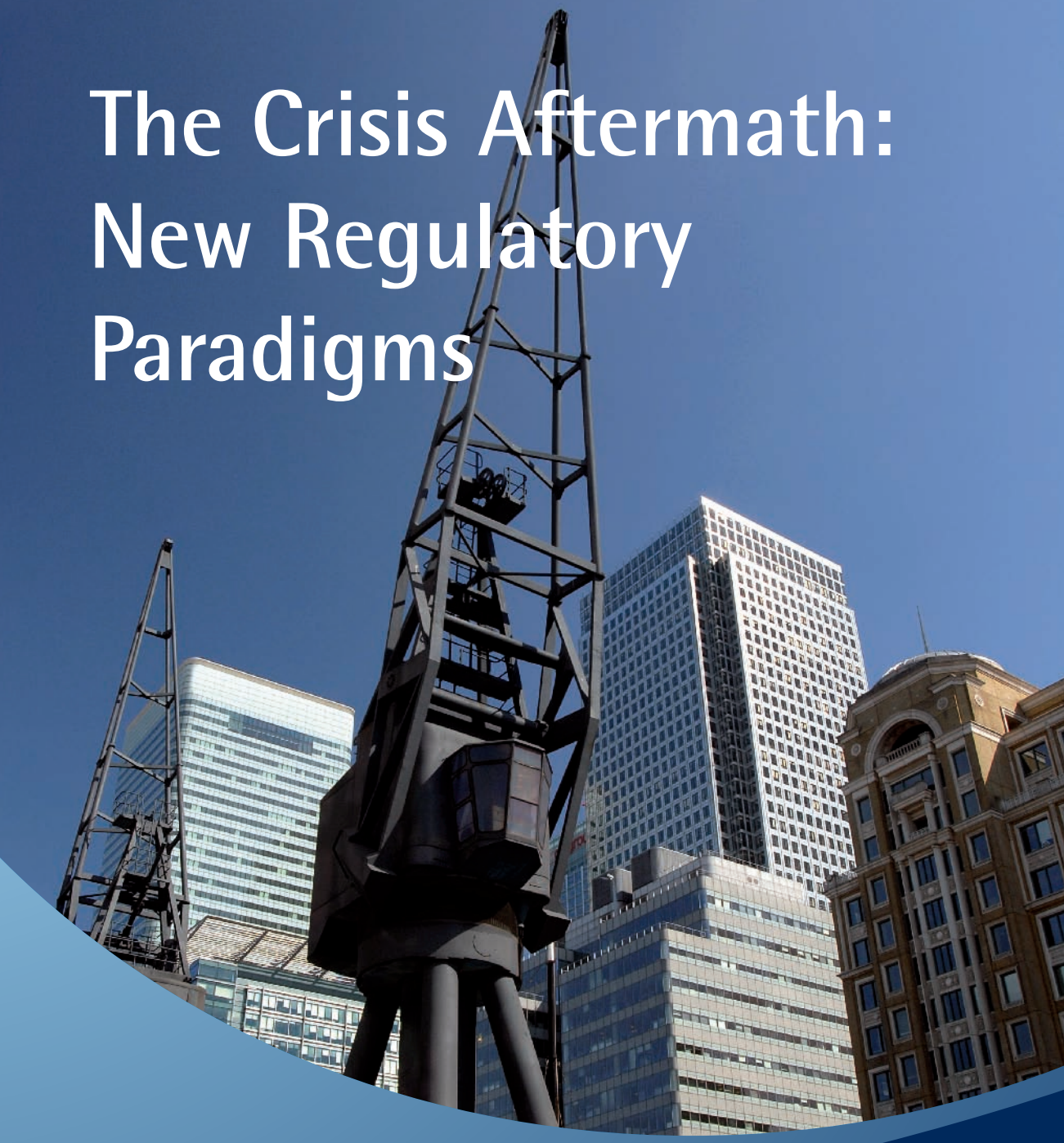
# The Crisis Aftermath: New Regulatory Paradigms



Edited by
Mathias Dewatripont and Xavier Freixas

# The Crisis Aftermath: New Regulatory Paradigms

**Centre for Economic Policy Research (CEPR)**

Centre for Economic Policy Research
3rd Floor
77 Bastwick Street
London
EC1V 3PZ
UK

Tel: +44 (0)20 7183 8801
Fax: +44 (0)20 7183 8820
Email: cepr@cepr.org
Web: www.cepr.org



ISBN: 978-1-907142-51-2

# The Crisis Aftermath: New Regulatory Paradigms

Edited by

**Mathias Dewatripont,** Université Libre de Bruxelles and CEPR

**Xavier Freixas,** Universitat Pompeu Fabra and CEPR




This book is produced as part of the project 'Politics, Economics and Global Governance: The European Dimensions' (PEGGED) funded by the Socio-Economic Sciences and Humanities theme of the European Commission's 7th Framework Programme for Research. Grant Agreement no. 217559.

## Centre for Economic Policy Research (CEPR)

The Centre for Economic Policy Research is a network of over 700 Research Fellows and Affiliates, based primarily in European universities. The Centre coordinates the research activities of its Fellows and Affiliates and communicates the results to the public and private sectors. CEPR is an entrepreneur, developing research initiatives with the producers, consumers and sponsors of research. Established in 1983, CEPR is a European economics research organisation with uniquely wide-ranging scope and activities.

The Centre is pluralist and non-partisan, bringing economic research to bear on the analysis of medium- and long-run policy questions. CEPR research may include views on policy, but the Executive Committee of the Centre does not give prior review to its publications, and the Centre takes no institutional policy positions. The opinions expressed in this report are those of the authors and not those of the Centre for Economic Policy Research.

# Contents

# About the Contributors

**Mathias Dewatripont** holds a Ph.D. in Economics from Harvard University, 1986. Before joining in 2011 the Executive Board of the National Bank of Belgium (in charge of Prudential Policy and Financial Stability), he was Professor of Economics at the Solvay Brussels School of Economics and Management, Université Libre de Bruxelles (where he still teaches part-time) and a member of its research centre ECARES. He was also part-time Visiting Professor at the Massachusetts Institute of Technology and Research Director of CEPR from 1998 until 2011.

Fellow of the Econometric Society, laureate of the 1998 Belgian Francqui Prize and of the 2003 Yrjo Jahnsson Prize for Economics, he was elected President of the European Economic Association for the year 2005 and appointed founding member of the Scientific Council of the European Research Council this same year He was a member of European Commission Presidents R. Prodi and J.M. Barroso's Group of Economic Policy Analysis (2001-09), and of the Economic Advisory Group for Competition Policy of DG Competition (European Commission) (2004-11). He was outside Director of CGER-Bank in Belgium (1992-99).

His general research area is the theory of incentives and organizations, with applications to banking in particular. His publications include *The Prudential Regulation of Banks* (with J. Tirole, MIT Press, 1994), *Contract Theory* (with P. Bolton, MIT Press, 2005) and *Balancing the Banks: Global Lessons from the Financial Crisis* (with J. Tirole and J.-C. Rochet, Princeton University Press, 2010).

**Xavier Freixas** is Professor at the Universitat Pompeu Fabra in Barcelona and at Barcelona Graduate School of Economics, and a Research Fellow at CEPR. He is past president of the European Finance Association and has previously been Deutsche Bank Professor of European Financial Integration at Oxford University, Houblon Norman Senior Fellow of the Bank of England and Professor at Montpellier and Toulouse universities. He has been a consultant for the European Investment Bank, the New York Fed, the European Central Bank, the World Bank, the Interamerican Development Bank, MEFF and the European Investment Bank. He is currently a consultant for the European Central Bank for its research network on Macroprudential Regulation (MARS). He was also Chairman of the Risk Based Regulation Program of the Global Association of Risk Professionals (GARP)

He has published papers in the main economic and finance journals such as *Econometrica, Journal of Political Economy, Journal of Finance, Journal of Financial Economics*, and *Review of Financial Studies*. He is Associate Editor of *Journal of Financial Intermediation*, *Review of Finance* and *Journal of Financial Services Research*.

His research contributions deal with the issues of payment systems risk, contagion and the lender of last resort and the He is well known for his research work in the area of banking, which has been published in the main journals in the field, as well as for his book Microeconomics of Banking (MIT Press, 1997, 2007 second edition), co-authored with Jean-Charles Rochet.

**Hamid Mehran** is Assistant Vice President in the Research Group of the Federal Reserve Bank of New York and a fellow of the Wharton Financial Institutions Center. He has been on the faculty of the Carroll School of Management at Boston College, the Kellogg Graduate School of Management at Northwestern University, MIT Sloan School of Management, and the Wharton School at University of Pennsylvania. Dr. Mehran was previously a Research Associate at Hewitt Associates. His central research interest is in corporate finance.

His research has been published in the *Economic Policy Review, Journal of Accounting and Economics, Journal of Corporate Finance, Journal of Finance, Journal of Financial Economics, Journal of Financial Intermediation, Journal of Financial and Quantitative Analysis, Journal of Financial Services Research, Financial Management, B.E. Advances in Economic Analysis & Policy, Journal of Regulatory Economics*, and the *Review of Financial Studies*. He has written widely on the governance of banks and edited the volume *Corporate Governance: What Do We Know, and What is Different About Banks?*

**Christian Laux** is a Professor of Finance at the Department of Finance, Accounting, and Statistics at the WU Vienna (Vienna University of Economics and Business). He was Professor at the Goethe University Frankfurt and held visiting positions at the University of Chicago Booth School of Business, Wharton School, University of Pennsylvania, London School of Economics, and Harvard University. Christian's current research interests include the role of fair-value accounting in the financial crisis and the structure of risk transfer. His work has been published in academic journals such as, for example, *The Accounting Review, Journal of Economics Perspectives* and *RAND Journal of Economics*.

**Alan Morrison** is Professor of Finance at the Saïd Business School, University of Oxford. His research interests are in the regulation of commercial banking, and the organization of the investment banking industry. He has published widely in academic journals, and his book *Investment Banking: Politics, Institutions, and Law*, co-authored with Bill Wilhelm, was recently published by Oxford University Press. He has performed consultancy work for a variety of financial institutions, and was recently specialist advisor to the House of Lords Economic Affairs Committee's inquiry into Banking Supervision and Regulation.

**Rafael Repullo** is Professor of Economics and Director of the Centre for Monetary and Financial Studies (CEMFI) in Madrid, Spain. He is Executive Vice-President of the Econometric Society, Fellow of the Econometric Society and of the European Economic Association, CEPR Research Fellow, member of the Financial

Economists Roundtable, and founding member of the European Corporate Governance Institute. He holds a PhD in Economics from the London School of Economics (LSE), and has worked in the Department of Economics of the LSE and the Research Department of the Bank of Spain. He has been a Houblon-Norman Fellow at the Bank of England, and has held visiting appointments at the European Central Bank, the Federal Reserve Board, the Federal Reserve Banks of Minneapolis and New York, the London School of Economics, and the Universities of Columbia, Pennsylvania, Princeton, and Tel Aviv. He is currently Co-Editor of the *International Journal of Central Banking*. His recent research is in the areas of banking and corporate finance, working on topics such as venture capital, market liquidity and shareholder activism, insider trading and real investment, central banks as lenders of last resort, capital requirements, competition, and risk-taking in banking, and the pro-cyclical effects of risk-sensitive bank capital regulation.

**Jesús Saurina** is Director of the Financial Stability Department at Banco de España. Among other duties, he is responsible for the Financial Stability Report, banking regulatory policy analysis and banking research. He is a member of the Advisory Technical Committee of the European Systemic Risk Board and of the Financial Stability Committee of the European Central Bank/Eurosystem, and a member of several working groups of the Basel Committee on Banking Supervision dealing with systemic institutions, pro-cyclicality of capital requirements and research in banking. He holds a Ph.D. in Economics at Universidad Complutense de Madrid and is a CEMFI postgraduate. He is a former Associate Professor at Carlos III University in Madrid, collaborates with the Financial Stability Institute in Basel and has worked as a short-term consultant for the World Bank.

He has a number of papers published at top economics, finance and banking journals, including *American Economic Review* (monetary policy and financial stability), *Review of Financial Studies* (credit lines), the *Journal of Financial Economics* (collateral), the *Journal of Financial Intermediation* (capital buffers), the Journal of Money, Credit and Banking (competition through interest rates and guarantees), the *Journal of Banking and Finance* (banking size and organization, determinants of credit risk), the *Journal of Financial Services Research* (impact of capital regulation on SMEs lending, procyclicality in mortgages), *European Accounting Review* (earnings and capital management), the *European Economic Review* (financial deregulation and risk taking), the *Review of Industrial Organization* (search cost in interest rates) and the *International Journal of Central Banking* (dynamic provisions), among others.

**Joel Shapiro** is a University Lecturer of Finance at the Said Business School, University of Oxford. He was previously a tenured Associate Professor at Universitat Pompeu Fabra and has been a visiting researcher at NYU Stern, and the Federal Reserve Bank of New York. Joel currently does research on the regulation and governance of financial institutions and has published in academic journals such as the *Journal of Finance, Journal of Financial Economics*, and the *Journal of Public Economics*.

# Foreword

One of the ways in which CEPR responded to the global financial crisis in early 2009 was to quickly establish a project on 'Financial Stability and Regulation'. At that time, in the aftermath of the Lehman Brothers debacle when the world was pretty much still in a state of shock, there was no clear-cut, synthetic view of the crisis, its origins or its potential impact. There were instead disparate perspectives with highly varying degrees of precision. It was clear that in order to draw reliable policy conclusions a more coherent view was required, one that was grounded in a clear theoretical model and which had been subject to empirical testing.

The 'Financial Stability and Regulation' project was led by one of the co-editors of this book, CEPR Research Fellow, Xavier Freixas, Professor of Economics at the Universitat Pompeau Fabra in Barcelona. Professor Freixas, with help from a range of other CEPR researchers (including, most notably, Thorsten Beck, Mathias Dewatripont, Marco Pagano and Richard Portes) organised a series of workshops around Europe – open to both academics and practitioners – in order to co-ordinate research efforts, to elaborate and test competing interpretations of the crisis and to explore the various policy implications. The opening conference was held at the Centre de Recerca en Economie Internacional (CREI) in Barcelona, with others following through 2009 and 2010 at Tilburg University, Duisenberg School of Finance, Amsterdam, IESE Business School, Madrid, and the Einaudi Institute for Economics and Finance (EIEF), Rome. The series culminated in a final conference held at the London Business School, at which the papers included in this current book, amongst others, were presented.

Whilst risk is essential for a well-functioning economy, it is now clear that excessive risk-taking, particularly in the banking sector, was a principal cause of the global financial crisis. Private sector risk has now become public sector crisis, particularly in Europe, with high social costs and implications. Moreover, the divorce between the management of risk at the level of an individual institution and the monitoring of financial stability has become more apparent than ever.

This book explores the general issue of the origins of excessive risk taking in the banking industry; it questions what went wrong with financial regulation and how overoptimistic expectations, short-termism and inaccurate risk models were implicitly encouraged. It focuses on four main issues that provide the incentives for excessive risk taking:

- The corporate governance of financial institutions.
- The misperception of risk in relation to business cycles.
- The apparent failure of supervisory authorities and market discipline.
- The relationship of risk taking to implicit bail-out guarantees.

We are very grateful to the editors of this book, Xavier Freixas and Mathias Dewatripont, both for their individual contributions and for bringing the various chapters together. We are particularly grateful to Xavier for his energy, enthusiasm and intellectual leadership in coordinating the series of workshops that led up to the final conference upon which the book is based. We are also grateful to the CEPR researchers who contributed chapters to this book and to the many others who contributed papers to the earlier workshops. We thank the institutions mentioned above for hosting the events, and last but certainly not least, we extend our thanks and appreciation to the CEPR Publications Team, in particular, Anil Shamdasani, who produced the report with characteristic efficiency and professionalism.

There has never been a more appropriate and opportune time for a rigorous reappraisal and re-examination of regulatory policy. It is very much our hope that this book goes some way towards contributing an appropriate and useful analytical basis for making informed regulatory policy decisions.

Viv Davies
Chief Operating Officer, CEPR

14 March 2012

# 1 Introduction

**Mathias Dewatripont and Xavier Freixas**
*Université libre de Bruxelles and CEPR; Universitat Pompeu Fabra and CEPR*

The current crisis and its high social cost have shattered the confidence of economic agents in the banking system and questioned the capacity of financial markets to channel resources to their best use. In particular, the financial industry investments have proven ex post to be excessively risky and the generally accepted view is that their risks were not ex ante sound, whether we refer to the subprime market or to the mortgages in markets characterised by real estate bubbles. The regulatory reforms that have taken place since the beginning of the crisis have intended, among other objectives, to curtail this excessive appetite for risk. Yet, for regulation to prevent future crises, it would be critical to know what the reasons were for this excessive risk-taking. The issue of judging whether this was the result of managers' incentives, shareholders' appetite for risk, a general culture of risk or the financial market's 'short termism' is still a complex one. This book is devoted to exploring the general issue of the origins of excessive risk-taking in the banking industry.

The need to understand better what triggers excess risk-taking has led researchers to tackle a number of key questions that appear to be central to the development of the recent crisis and to relate their findings to the main regulatory reforms that have been undertaken. The timing of writing this volume, four years since the start of the crisis, and thus covering the period from the first turmoil in the interbank market to the fully fledged sovereign crises of 2011, gives us sufficient perspective to make a better assessment of some of the main issues and challenges it has raised.

To begin with, it is necessary to give a more precise definition of 'excessive risk-taking' before trying to explore the reasons why banks choose to implement such a strategy. We will define excessive risk-taking as a level of risk such that, had it been known and taken into account ex ante by banks' stakeholders, it would have made the net present value of the bank's investment project negative. This view of 'excessive risk-taking' has the advantage of preserving the option for banks to invest in high risk ventures provided they result in a corresponding high return and do not jeopardise the continuity of the bank as a going concern. It does not emphasise financial institutions' possibly overoptimistic expectations but rather the risk-adjusted cost of funds, as well as the lack of transparency that characterises investment in banks: lending to a financial institution on the basis of a reputation of safe investments in the banking industry supported by

a tradition of bail-outs by the Treasury where even uninsured debtholders have been protected from the bankruptcy losses.

This overall exploration of financial institutions' excessive risk-taking has led us to examine four key issues we consider crucial for a deep understanding of both the roots of the crisis and the future of the banking industry.

First of all, excessive risk-taking is directly related to corporate governance. The decisions a bank takes regarding risk levels are ultimately the responsibility of managers and boards of directors. Whether in their strategic decisions managers consider their own bonuses, short-term stock price movements, shareholders' short-run interests (rather than stakeholders' long-run ones) or simply the financial institution's culture of risk, these are all decisions that are substantiated by the board and therefore result from the structure of financial institutions' corporate governance.

Second, the issue of excessive risk-taking may also be related to managers' and shareholders' understatement of the business cycle risk of downturn, as the procyclicality of capital may lead to excessive lending, the emergence of bubbles and a financial accelerator effect. The fact that banks did not have enough capital once the crisis unravelled is not only a failure of the Basel II regulatory framework and the models it is based on, but also evidence of how critical the issue of procyclicality is for financial stability. The regulatory proposal of Basel III on countercyclical buffers is intended to solve this issue. Still, rigorous analysis of the procyclicality of banks' capital may indicate that the issue is more complicated than it seems.

Third, it may be argued that the curtailing of excessive risk-taking was the joint responsibility of supervision and market discipline, and that neither did a proper job. Theoretically both firms and gatekeepers are supposed to provide accurate information to the market and to supervisory agencies. This information transmission issue has been a key one in the analysis of the crisis, as it has been argued that it was the opacity of some of the structured products, asset-backed securities, collateralised debt obligations and so on, that was in part responsible for the first stages of the crisis. It has also been stated that the use of fair value accounting by banks aggravated the crisis. So it is clearly important to assess to what extent these claims are valid.

Fourth, excessive risk-taking may be the result of another form of market discipline if all banks in distress are to be bailed out. This would, of course, be taken into account by a bank's managers and board of directors and completely distort the bank's decision since, in this case, bankruptcy threats are no longer credible. Consequently, how regulatory agencies and Treasuries organise banks' resolutions will determine future moral hazard. It is therefore worth considering how a bank in distress can be restructured in an orderly way, whether it is to be

closed or bailed out in such a way as to preserve banks' incentives and be credible while limiting contagion to other banks.

This volume will be structured according to these four topics. Each chapter aims at providing a survey of the key issues in the field, critically reviewing the existing literature, examining the regulatory reforms that have been put forward since the beginning of the crisis and providing policy recommendations. In what follows we review some of the key insights the following chapters offer.

## 1 Corporate governance

In their chapter on corporate governance, Mehran, Morrison and Shapiro explore the issue of excessive risk-taking in financial institutions. The starting point in their analysis is simply to consider the characteristics of corporate governance in financial institutions and the difference with respect to non-financial corporations. The authors identify two key differences: the multiplicity of stakeholders (insured and uninsured depositors, the deposit insurance company, bond holders, subordinate debtholders and hybrid securities holders), and the complexity of banks' operations. These two characteristics point to the possibility of a lower level of control by stakeholders over decisions by managers and boards of directors. In addition, the authors notice that the too-big-to-fail issue was a key element in the building of risks prior to the crisis and that the Gramm-Leach-Bliley Act promoted banks' conglomeration, which in turn reduced market discipline and allowed banks to borrow at a cost that did not reflect the effective riskiness of their assets. This corroborates the view that financial institutions have been under lower levels of market monitoring than non-financial corporations.

The first natural question is whether banks' executive compensation schemes were at the origin of their excessive risk-taking. The issue should be refined so as to be more precise. Indeed, there are two different questions to be addressed. Were managers taking too much risk because of the way executive compensation is designed, encouraging huge gambles? Or were managers following shareholders' directives for more risk-taking by banks, in which case the executive compensation is a perfect fit with the shareholders' objectives, even if those objectives may be socially biased?

The second question to be raised is that of the composition of boards. Boards differ in several dimensions, of which the main ones are the size of the board and the fraction of independent directors. Ideally, board composition should promote best practices and regulation should help to foster them. Still, supervisory authorities have not made much progress on that account, and one possible reason is that it is difficult to identify best practices for the board of directors. Here, the authors point out the importance of directors' expertise, their

ability to voice independent opinions and their engagement, that is, investment of sufficient time and effort.

The third issue developed by Mehran, Morrison and Shapiro concerns risk-taking by financial institutions. A number of relevant papers have explored the risk behaviour of financial institutions before and after the crisis and have found evidence linking the importance of the role of the chief risk officer in the organisation and the 'residual compensation' – that is, the part of compensation unexplained by observable characteristics such as size – to the level of risk-taking. This is analysed from two perspectives, first as a possible result of executive compensation, and second as the result of a 'culture of risk' within the bank, a culture that is permitted, if not encouraged, by the board of directors. In line with these findings, anecdotal evidence also points to the role of communication, prioritisation and lack of understanding of risk at the top levels as one of the key determinants of the overall attitude towards risk of managers and boards of directors.

The authors conclude by considering market discipline in its connection to corporate governance, and show why market discipline in large banks remains a serious challenge.

## 2 Procyclicality

Although there is general agreement that solvency regulation is necessary and that banks' risk weights should be improved, the inadequacy of a solvency regulation that is independent of the business cycle has become apparent with the crisis. Of course, credit crunches occurred in the United States at the beginning of the 1990s and in South East Asia after the 1997 crisis. Prior to the recent crisis, the issue of identification was still under discussion. Indeed, the observed decrease in lending characteristic of a credit crunch could have been the result of a tightening of the credit standards and of an increase in the risk of lending and the corresponding margins, quite in line with a downturn, so that the decline in the amount of credit could be demand driven. If this was the case no procyclical amendment would be required in the efficient design of capital regulation.

With the crisis, the perspective has changed as banks have experienced sudden losses that have bitten into banks' capital at an unprecedented speed. The observed reduction in the credit supply was therefore not to be attributed to the change in demand conditions, which could not happen as fast as the immediate tightening of the credit supply.

Once we agree that the lack of any anticyclical buffer in capital requirements aggravates the extent of banking crises, the specific type of buffer to be built should be considered. Three non-exclusive views are possible. First, because of the

distinction between expected losses to be covered by provisions and unexpected losses to be covered by capital, banks should make provision in an upturn for their expected losses in a downturn. Second, capital requirements should be tightened in an upturn so that banks accumulate capital in good times that they can deplete in bad times. Third, an additional capital buffer should be required if excessive credit growth jeopardises future financial stability. Notice that the fact that the credit cycle and the business cycle are not coincident is an additional complication in designing a well-functioning countercyclical mechanism to complement capital regulation.

Repullo and Saurina's paper is devoted to this third issue, that is, to the mechanisms that should be in place to attenuate excessive credit growth. As a consequence, it considers, in particular, how the Basel III proposal tackles this issue and to what extent it reaches its objectives. Basel III on countercyclical buffers stipulates that an increase in capital ratios is required by a country whenever an excessive deviation of the credit-to-GDP ratio to its trend is observed. While the Basel III capital conservation buffer is aimed at building capital in good times, the countercyclical capital buffer objective is to limit the extent of credit crises that are generated by excessive credit supply. The task of the paper by Repullo and Saurina is to check whether countercyclical regulation achieves its objective. They begin by observing that any countercyclical capital regulation has to be based on a macroeconomic variable that will trigger the building of a capital buffer and therefore slow down credit growth. But, surprisingly, their analysis of how the Basel III macroeconomic variable of deviations of the credit-to-GDP ratio to its trend relates to GDP growth shows that, for the majority of countries, the correlation between these two variables is negative. This opens a completely new perspective on the impact of the countercyclical buffer. As the authors state, 'a mechanical application of the buffer would tend to reduce capital requirements when GDP growth is high and increase them when GDP growth is low'. Of course, the Basel Committee leaves the ultimate decision to regulatory discretion, so that the application is not automatic. Nevertheless, if the objective is to have cross-country homogeneous rules so as to avoid a race to the bottom, regulatory discretion should be limited and countries will be expected to closely follow the deviations of the credit-to-GDP ratio to its trend to identify and correct excessive credit growth during a downturn.

From here Repullo and Saurina pursue their argument by simply considering an even simpler alternative to the deviations of the credit-to-GDP ratio to its trend, and that is the rate of growth of credit. They then show that the rate of growth of credit is positively correlated with the rate of growth. Thus the authors offer an insightful analysis to be considered in any discussion of the appropriateness of the Basel III countercyclical buffer.

## 3 Disclosure, transparency and market discipline

Prior to the crisis, market discipline was thought to be the perfect complement to supervision. Its role in channelling funds to sound institutions while penalising those taking excessive risks was recognised in Basel II, where it constitutes the third pillar. Yet, with the crisis, the perspective has completely changed and both regulators and academics have come to regard market discipline with some degree of scepticism. Airing this view, the Turner report was adamant when it stated: 'A reasonable conclusion is that market discipline expressed via market prices cannot be expected to play a major role in constraining bank risk taking, and that the primary constraint needs to come from regulation and supervision.' So, even if, in theory, an increase in market interest rate spreads and a limited access to funding should curtail banks' risk-taking, in practice the market response may lead to a complete run on the banking system. Thus, although the mechanism of market discipline as a way to get rid of lame ducks in good times and improve the overall efficiency of the banking system is sound, during the recent banking crisis it appears, rather, to have throttled the financial system and deprived it of access to liquidity. This has led to two lines of research: one is to explain the failure of market discipline on the basis of financial market imperfections (bank runs, etc), and the other is to consider the imperfection of the mechanisms that allow markets to obtain information regarding banks. The latter view is the one taken by the Freixas and Laux in their paper, and this has led them to focus on market discipline in the broad context of information provision to the market. Indeed, as it has often been argued, a key issue in the collapse of some markets has been the fact that the assets that were traded were opaque and might have been the object of asymmetric information, with some informed agents having an advantage in trading. Thus the paper is devoted to information transmission as a key ingredient of market discipline.

The manner of information acquisition and processing is critical to investors' trading decisions. Information regarding a firm reaches the market either because of disclosure by the firm itself or because of third-party (eg a credit rating agency) disclosure. Still, there is an element of processing in the use of publicly available information, as investors, possibly assisted by financial analysts, take their decisions only after carefully contrasting different sources of information and combining them. This leads the authors to distinguish the notion of disclosure from the notion of transparency. In their view, disclosure corresponds to the act of providing information on behalf of firms and issuers, while transparency arises when the disclosed information is effective in reaching the market and being adequately interpreted. Consequently, the analysis of transparency has to take into account not only the incentives and skills of firms and credit rating agencies in disclosing information to the market, but also the ability of the information receiver to invest into the processing of the disclosed information. Indeed, a failure at one of the two ends of the communication line is enough to make the information process fail.

In order to view the process of information transmission to the market, Freixas and Laux argue that the best way is to consider it as a complex game between information providers and investors, where each agent will act according to its best interest and its best interest will be defined in equilibrium. Indeed, in equilibrium market participants understand where information comes from and are not easily fooled by accounting information. So, in particular, the issue of supervision, certification (eg by auditing firms) and their impact on prices as well as on firms' behaviour (market discipline) is taken into account by firms choosing their disclosure strategy. The equilibrium financial markets' imperfections, in particular in the possible overreaction of prices to disclosure, will be taken into account by firms and guide their disclosure decisions. By the same token, price reactions may lead to signalling in some variables such as current income, while 'other comprehensive income' or some information included in the notes and a priori equivalent might be considered less relevant by financial analysts.

Once we take into account strategic disclosure by firms, it is necessary to acknowledge that transparency involves trade-offs that accounting standard setters have to take into consideration, since information disclosure has benefits but also has costs in equilibrium. From the perspective of the design of an information accounting system, the trade-offs imply the disclosure of a non-manipulable proxy rather than certain highly relevant but manipulable information. Yet the main difficulties with information communication stem from the fact that issuers prefer not to disclose information or to distort it and standard setters and regulators have to impose penalties, while markets have to rely on gatekeepers and use 'second-best information' the firm cannot manipulate.

With this perspective on information transmission as a background, the paper proceeds to focus on the main sources of information to the market: firms' financial reports and credit rating agencies.

The crisis has seen a number of criticisms levelled at the use of fair value analysis. The critics argue that fair value accounting (FVA) forced banks to write down asset values, thus eroding their capital, increasing their counterparty risk and contributing to the uncertainty in the market and to additional decreases in asset prices and in access to liquidity. The authors review the literature and observe, first, that FVA plays a limited role as it only affects the trading portfolio and, second, that FVA offers substantial discretion to banks if the losses are considered temporary. So, the case against the use of FVA is a weak one. This does not mean that information transmission during the crisis has been satisfactory. On this account, the authors conclude that 'information is more difficult to transmit when the market needs it most'. Their discussion addresses the issues of information aggregation, data reliability and interpretation through the crisis that have led to higher degrees of uncertainty. Overall, the quality of information worsens during a crisis because both firms and issuers have incentives to hide bad information.

Regarding the role of credit rating agencies during the crisis, the authors analyse the market for credit ratings and the incentives of each of the main actors, issuers, agencies and investors. They conclude that the institutional background is inadequate to cope with the incentives for issuers to 'shop' for the best ratings, and remark that, although it is impossible to prove wrongdoing by the credit rating agencies, the incentives to inflate rates on structured issues were present and might have weighed on the agencies' final rating. So, the regulatory policy on the role of credit rating agencies is particularly welcome.

## 4 Banking resolution

Banking resolution plays a key role in the whole of banking regulation, as the existence of a high social cost of a bank bankruptcy, in turn related to the existence of contagion, constitutes the raison d'être of banking regulation. Consequently, the first objective of regulation is to limit the impact of such an externality at the lowest possible cost. This is done by addressing the issue at the point where it originates, that is by reducing the cost of banks' bankruptcies. The issue of a banking resolution could be either the liquidation of the bank or its continuation as a going concern. Although Dewatripont and Freixas acknowledge that this is an important issue, their paper does not address this issue directly but focuses on how to limit the cost to society of any type of banking resolution.

To begin with, the authors describe the banking resolution process as a bargaining game between managers-shareholders on the one hand and regulatory authorities on the other, with different objectives, as shareholders want to maximise the value of their shares while regulatory authorities' main objective is to preserve financial stability at the lowest possible cost. This asymmetry in the objective functions, with time playing against the regulatory authority and to the advantage of shareholders, leads the authors to argue for a bank-specific bankruptcy rule, different from that for non-financial corporations, as otherwise the cost to regulatory authorities if the disagreement point is reached, possibly implying the malfunctioning of the payment system, is excessively large. In addition, the regulatory authority may be biased in its objectives as its perception of the welfare-maximising banking intervention may be incorrect either because of its overestimation of the costs of a bank's liquidation or its capture by the banking industry. Yet, in the aftermath of Lehman's bankruptcy, it is not clear that this is the case.

Next, even if a perfectly efficient bankruptcy procedure is in place, once a bank is in financial distress, regulatory authorities should take action quickly regarding its closure or its bail-out and, in the later case, regarding the way support is provided, whether as debt, equity or hybrid capital notes. The examination of the experiences of the banking crisis in different countries shows great variety in the procedures followed, while theory has no clear-cut recommendations to

offer. The action to be taken by regulatory authorities will be the result of a cost-benefit analysis, and it will be determined in the first place by whether the crisis affects a single institution or is pervasive and concerns all of them.

Finally, the ex ante design of the bank resolution mechanisms is critical. This is an area that has been the subject of new developments. Although some argue that a sufficient layer of capital is the best option to prevent future crises, the authors defend the possibilities opened by contingent capital (like contingent convertibles or capital insurance), arguing that these types of mechanisms would be an attractive way to limit moral hazard while enhancing financial stability and limiting the rise in the cost of extending credit. In any case, the very existence of a well-defined contingent bank resolution – rather than the regulators' discretion in the choice of closure versus bail-out – can undoubtedly reduce the banks' incentives to take risk.

The authors conclude by considering cross-country resolution and the challenges it implies and discuss the recent changes in the European banking resolution framework.

To conclude, although this volume is not intended to provide a comprehensive view of the causes of the crisis, by focusing on four critical topics it offers readers a thorough understanding of the main issues and provides them with arguments to sustain one or another policy option on the basis of academic research. The volume thereby contributes to the theory and policy debate by synthesising the main insights and views that have emerged from the crisis.

# 2 Corporate Governance and Banks

## What Have We Learned from the Financial Crisis?

**Hamid Mehran, Alan Morrison and Joel Shapiro**[1]
*Federal Reserve Bank of New York; Saïd Business School, University of Oxford; Saïd Business School, University of Oxford and CEPR*

### 1 Introduction

The financial crisis exposed flaws throughout financial markets and has instigated much investigation into the way banks work. In this paper, we will focus on one line of investigation, that of the corporate governance of banks. We examine why governance is different in banks from non-financial firms, where the governance of banks failed during the crisis and recommendations to improve the governance system. There has been much recent academic work (see, for example, Table 1 in the appendix to this chapter) and policy discussion (Senior Supervisors Group, 2008, 2009; Walker Report, 2009; Committee of European Banking Supervisors, 2010) on this topic. Due to their contemporaneous nature, there has been little connection between the two. Our role is thus to frame the policy debate drawing on scientific evidence.

We begin by providing a twist on the usual question of what is different about banks by asking what differences are important to governance. We discuss two themes – the multitude of stakeholders in banks and the complexity of their business – that run throughout the paper. The stakeholders in banks besides shareholders are numerous (depositors, debtholders, and the government as both insurer of deposits and residual claimant on systemic externalities) and large (over 90% of the balance sheet of banks is debt). Yet shareholders control the firm. Evidence shows that both the boards and the compensation package for CEOs represent

1 The views expressed in this paper are those of the authors and are not necessarily reflective of views at the Federal Reserve Bank of New York or the Federal Reserve System. We thank participants at the conference, The Crisis Aftermath: New Regulatory Paradigms, Xavier Freixas, Luis Garicano and Marco Pagano for helpful comments, and Renee Adams and Bernadette Minton, Jérôme Taillard and Rohan Williamson for sharing their board structure data with us.

the shareholders' preference for increasing risks. Those preferences are to increase risk, which is in conflict with those of other stakeholders. Shareholders respond to their incentives; Laeven and Levine (2009) and Ellul and Yerramilli (2010) show that the presence of institutional investors increases the risk of the bank. The goals of increasing risk were largely successful, even though the realisations of that risk during the crisis were not.[2]

The natural next question is to ask what is different about banking in the crisis period versus before? Here is where the issue of complexity becomes important. The business of banks has shifted to become more complex and more opaque. Moreover, banks have become much larger and expanded dramatically into other businesses since the passage of the Gramm-Leach-Bliley Act in 1999. The business of banks has also been taken up by non-banks in the 'shadow banking' sector, creating exposures that are unregulated and uninsured. This added complexity has made the job of boards and managers difficult for many reasons. First, the simple number of activities to manage has multiplied. Second, the knowledge needed to understand these activities has also increased substantially. Third, techniques used to manage these activities (such as Value at Risk (VaR) in the case of risk management and credit ratings for capital requirements) have not performed well under this level of complexity and duress.

We proceed by examining in depth four topics in the corporate governance of banks: executive compensation, boards, risk management, and market discipline. We provide policy recommendations where possible, although we raise several issues to which there are no clear answers. Throughout the paper, we will refer to Table 1, which surveys the very recent literature tying measures of governance with measures of risk and performance in the years just before and during the crisis. Ideally, our goal would be to gain a robust sense of the role of governance features in risk-taking, in order to suggest best practices and/or regulatory guidance. However, the notion of causation is a tricky one, as one might equally think that a characteristic may lead to risky choices just as much as a culture of risk-taking leads a bank to have certain characteristics. Due to this endogeneity problem, we will interpret most of these relationships as correlations. Several papers use lags to improve this interpretation. A few papers, denoted with **, use further econometric techniques to push this interpretation further. Also, most of these papers are about large financial institutions, not just banks. With that caveat, we will discuss the results as they apply to banks. Lastly, we note that almost all of the correlations display the expected (or at least consistent across datasets) sign.[3]

2 Cheng *et al* (2010) describe how the realisation of this risk was successful in the late 1990s.

3 The main exceptions are when the measures of risk are (i) writedowns and (ii) receiving TARP funds. Neither of these are surprising. The meaning of writedowns is debatable. While they signify the realisation of losses, a bank has a certain degree of discretion is taking writedowns, implying they could be a sign of ex-ante risk taking (realised in losses) or ex-post prudent behaviour (managing expectations of how a shock has affected the firm). Regarding TARP funds, it is not obvious that the worst-off banks were the ones receiving funds, as there is a survivorship bias and some recent evidence suggests initial mispricing of recipients (Ng, Vasvari, and Moerman (2010)). Therefore, we will not discuss these two measures due to their ambiguity.

We begin the discussion on governance failures by looking at executive compensation. We show trends in compensation packages and discuss recent evidence demonstrating how equity compensation promoted risk-taking. We then describe several recent papers that suggest that linking executive pay to the price of debt can reduce excess risk. Next, we discuss board characteristics. The major characteristics studied are the size of the board, the number of outside directors, the experience of the directors, and what else directors are doing. Most of the evidence does not point strongly in a way that suggests immediate reforms of the board. We also discuss the trade-offs that arise when board reform is discussed. Third, we look at risk-taking at the firm and the risk management function. Here there is unambiguous evidence for reform and strengthening of risk management roles within the firm. Fourth, we investigate the role of market discipline. We approach this by looking at two specific inputs that permit market discipline to function well (or not function well): capital requirements and the size and scope of banks. In recent years, banks have found ways to get around capital requirements, diminishing the effect of market discipline. At the same time, banks have increased their size, scope and complexity, making both regulation and market discipline less effective. At the same time, there is not much evidence that structurally changing the business of banks will improve matters because reduced banking also has its problems, and current banks may innovate around regulation. Lastly, we conclude.

## 2 Why is the governance of banks different from non-financial firms?

There are two key differences between banks and non-financial firms in terms of *governance*. The first is that there are many more stakeholders in banks than in non-financial firms. The second is that the business of banks is opaque, complex and can shift rather quickly. So while in the course of this paper we will obviously discuss the role of the board and executive compensation, we will also discuss the role of risk, incentives and regulation that may not be critical for non-financial firms.[4]

Let us first list the stakeholders in a bank beyond the shareholders. Banks consist of more than 90% debt (as opposed to an average of 40% for non-financial firms). The majority of debtholders are depositors and subordinated debt holders. The deposit insurance authority also has an interest in the bank's health, as its insurance will be called upon in the case of insolvency. In so far as there are negative externalities on the financial system as a whole from a bank's bankruptcy (certainly this is more relevant for larger institutions) and these externalities either need to be regulated, bailed out, or both at a sizeable cost to taxpayers, the government is also a stakeholder in the bank. Furthermore, as depositors are

4 See Adams and Mehran (2003) and Adams (2010) for a discussion on differences between governance of bank holding companies in the US and non-financial firms.

generally small and subject to free rider issues in monitoring, the importance of other non-equity stakeholders increases.

Despite the multitude of stakeholders, the board represents solely the views of shareholders (subject to regulatory constraints). Shareholders' interests may diverge substantially from those of other stakeholders. This is especially true on the topic of risk, where shareholders prefer volatility and may have short-termist perspectives. Clearly, debtholders and regulators prefer low volatility and take longer term views. Bolton *et al* (2011) demonstrate in a model that shareholders may not have the incentive to reduce risk-taking at a firm even if it is in their own interest due to commitment problems.

The role of leverage differs across industries: in a non-financial firm, leverage is a source of financing, while in the banking sector it is a factor of production. Banks will deploy the cheapest factor in their production function. While debt and equity would be equally expensive in a Modigliani-Miller world, this conclusion is not correct in banking firms for a number of reasons. In particular, because depositors have access to a state-funded safety net, they are less sensitive to bank risk than other investors, and hence do not demand adequate compensation for risk-taking when they invest. *Ceteris paribus*, this renders debt a cheap source of funds, and biases banks towards it. One could attempt to correct for this bias by charging banks an economic price for their deposit insurance protection. However, although a risk-based deposit insurance system was adopted in the United States in the mid-1990s, firms still pay a fixed protection rate on their deposits. Moreover, the structural opacity of banking assets makes it very hard to determine a fair price for deposit insurance.[5] As a result, it seems that for both practical and technological reasons, deposit insurance is underpriced, and banks are excessively willing to lever themselves. And, as a consequence of underpriced debt, many investment opportunities appear unrealistically attractive to bankers. Hence, one can argue that deposit insurance protection was an important force behind the recent rapid expansion in bank lending, and in the size of deposit-taking institutions.

At the same time, banks are both opaque and complex. Levine (2004) says that 'banks can alter the risk composition of their assets more quickly than most non-financial industries, and banks can readily hide problems by extending loans to clients that cannot service previous debt obligations'. Moreover, the business of securitisation has at its essence (1) sped up the process of lending at the origination stage and in interbank markets (*eg* repo), and (2) increased opacity by merging large amounts of information and relying on credit ratings.

There is an academic debate on how opaque banks truly are. Morgan (2002) shows that rating agencies disagree substantially more over ratings on bonds issued by banks than those of non-financial firms. Flannery *et al* (2004) show that the trading properties of banks and the accuracy of analysts' earnings forecasts

5 See also Freixas and Rochet (1995).

for banks are similar to those of non-financial firms. Nevertheless, Flannery *et al* (2010) show that this similarity broke down right at the beginning of the financial crisis in mid-2007. While not a bank, Lehman Brothers and the case of Repo 105 certainly highlighted the possibility of the manipulation of balance sheets.

Opacity and complexity play a role in governance in both the interaction between the board and management and the relationship between the bank and its regulators. The question of how well boards represent shareholders depends on whether boards understand the inner workings of the bank. While obvious, the notion of independent board members having more financial market experience has become an important issue (this is discussed in section 3.3).

# 3 Corporate governance failures in the crisis

## 3.1 Executive compensation

Compensation practices are viewed by many as a contributing factor to the current financial crisis. Conventional wisdom states that the executive pay structure was designed to enhance risk-taking and create value for shareholders but not to protect debtholders. This dynamic was particularly strong within the banking industry because banks are highly levered and their leverage is subsidised. What has not been as widely discussed is the fact that government subsidies directly affect compensation.

The level of executive pay in a non-financial firm is generally related to the size of the firm's assets (market value of equity or book value),[6] its asset complexity and the industry structure and competition. Leverage has an insignificant effect on the level of pay and, on average, firms judiciously choose their leverage for its effects on their credit ratings and potential costs of distress. An industrial firm on average has about 40% debt in its capital structure.

A bank's size and level of executive pay are highly correlated. Since the deposit insurance system contributes to the size and growth of the firm, it then contributes to the level of executive pay in the banking industry. It is for this reason that bank regulators have an economic argument for controlling the level of executive pay. In addition, bank boards should take into account the effect of compensation on solvency and capital adequacy, and banks should internalise the costs associated with risk-taking.

6 For example, see Gabaix and Landier (2008). For more on the relation between the governance of non-financial and financial firms, see Adams (2010).

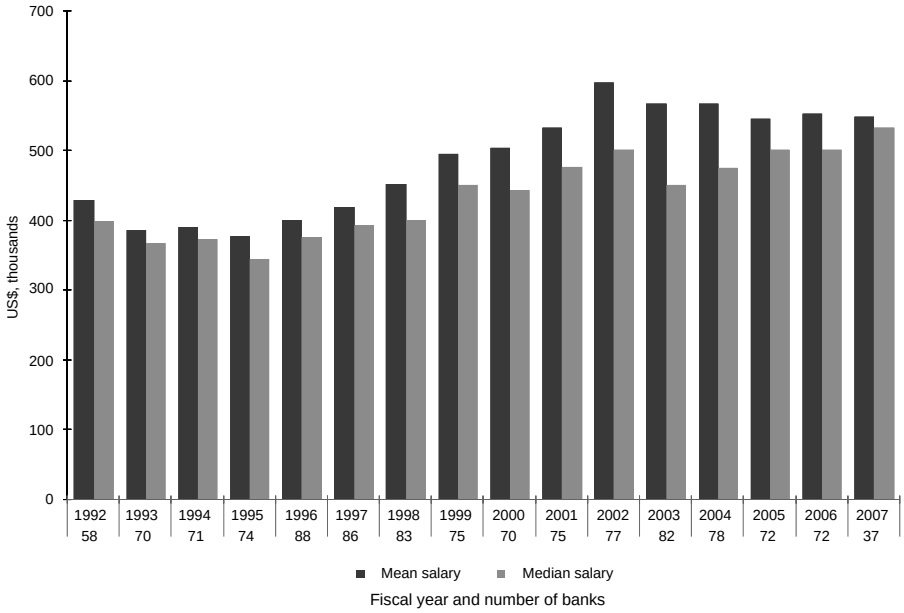
Capital structure can directly exert an influence on the bank holding company (BHC) executive compensation structure. According to agency theory, stockholders want the board to compensate a CEO with stock options since they increase the CEO's pay/performance sensitivity. A higher level of stock options, in theory, motivates the CEO to pursue riskier investment strategies. If the firm has debt in its capital structure, riskier strategies benefit stockholders at the expense of debtholders (*eg* Jensen and Meckling, 1976). In efficient capital markets, however, the incentive for risk-taking is anticipated by debtholders, and thus increased reliance on stock options gives rise to a debt premium or cost of raising debt (John and John 1993). The size of the premium is related to the leverage ratio. To reduce the cost of debt, leveraged firms may choose to scale back on their use of stock options. As BHCs are highly levered institutions, they may therefore want to limit their usage of stock options, since, for example, it could affect their cost of issuing subordinated debt. John and Qian (2003) and John *et al* (2010) provide support for this argument and document that the pay/performance sensitivity for CEOs of BHCs is lower the higher the ratio of the BHCs' debt to total assets.

*3.1.1 Compensation trends*

Figure 1 presents mean and median salaries for top executives of banking firms in Standard & Poor's Executive Compensation for the period 1992–2007. There is an upward trend in nominal terms in the 1990s and relatively stable pay in the 2000s. Figure 2 presents mean and median bonuses for the same period. While the median bonus is relatively unchanged, the mean bonus for the industry increases for the most part after 1992. However, there is a sharp drop in bonuses in 2006/7, suggesting that pay is related to performance or market forces are at work. Figure 3 presents the dollar (Black-Scholes) value of stock option grants. The trend follows that of non-financial firms, increasing rapidly through 2000, with a sharp drop thereafter. The cause of the drop is not fully clear. The increased scrutiny of pay following the dot-com bubble, particularly related to stock options, in the era of the Sarbanes-Oxley Act (SOX) beginning in 2002 is likely to be a contributing factor.

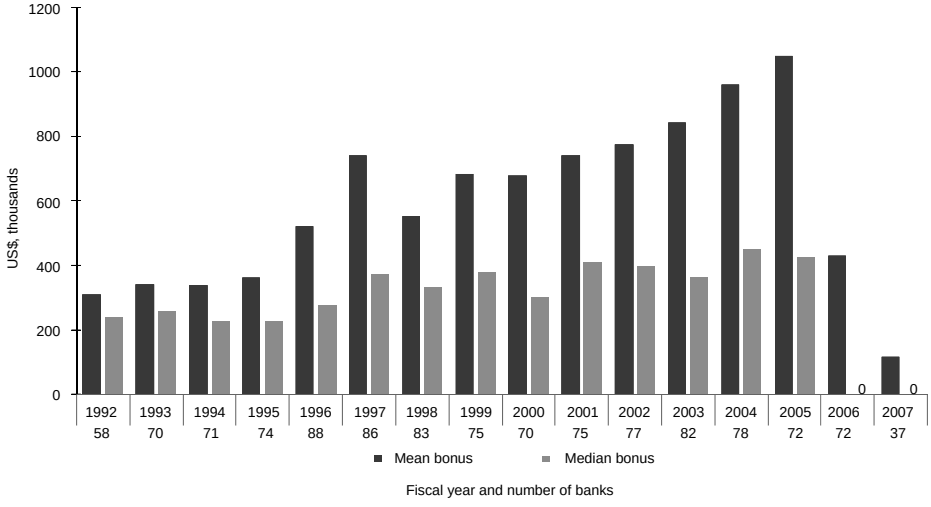
Figure 4 presents the vesting schedule of options granted in the period 1996–2007. Of options granted to the top five executives at each bank, 20% had immediate vesting and nearly 26% had vesting of one year. The short option vesting may have provided incentives to focus on short-term return. Figure 5 documents 7,254 exercises for the top five executives and documents how soon the options were exercised following vesting. About 34% of options were exercised immediately when they were vested. Another 15.5% of options were exercised in one year after vesting. The evidence in the two charts together suggests that stock options were not designed to promote decisions compatible with safety and soundness and the protection of creditors and taxpayers.

**Figure 1** Mean and median highest ranked executive salary in commercial banks, 1992–2007



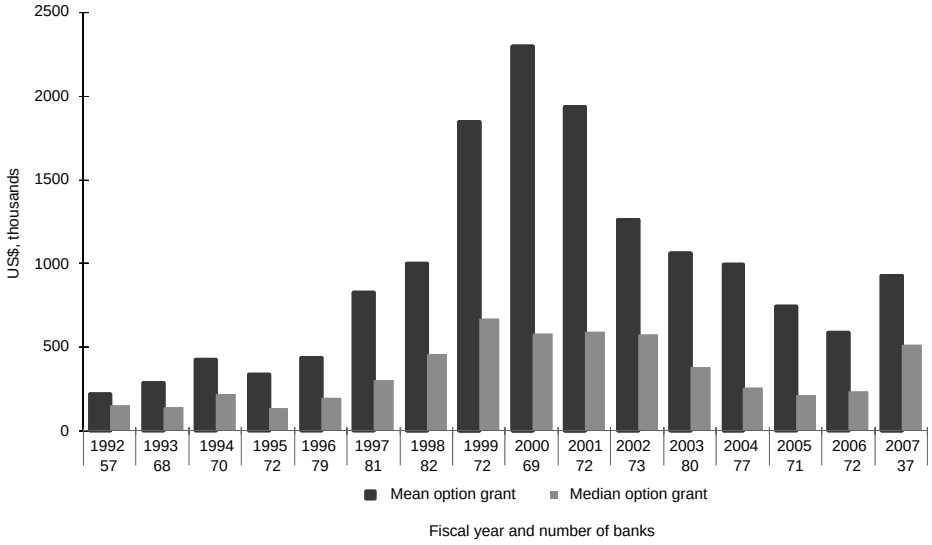

*Source:* Standard & Poor's Executive Compensation.

**Figure 2** Mean and median highest ranked executive bonus in commercial banks, 1992–2007



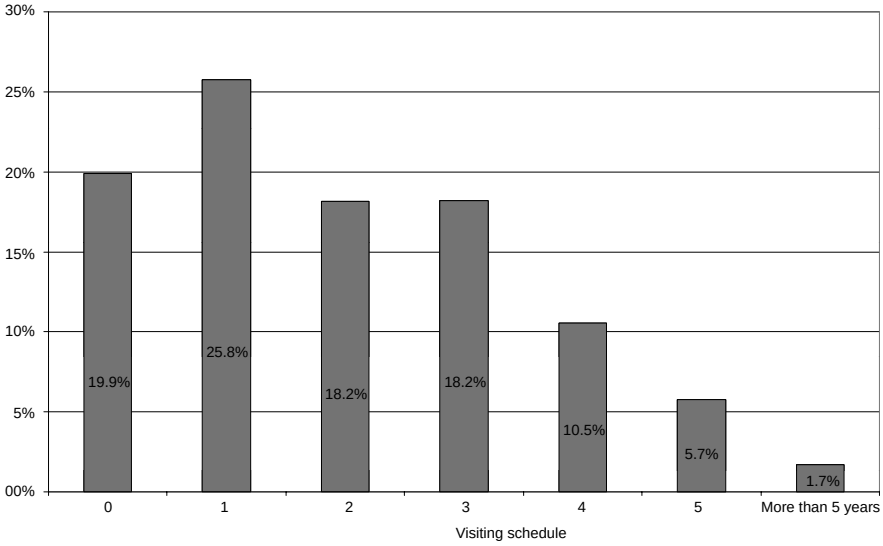

*Source:* Standard & Poor's Executive Compensation.

**Figure 3** Mean and median highest ranked executive option grant value in commercial banks, 1992–2007



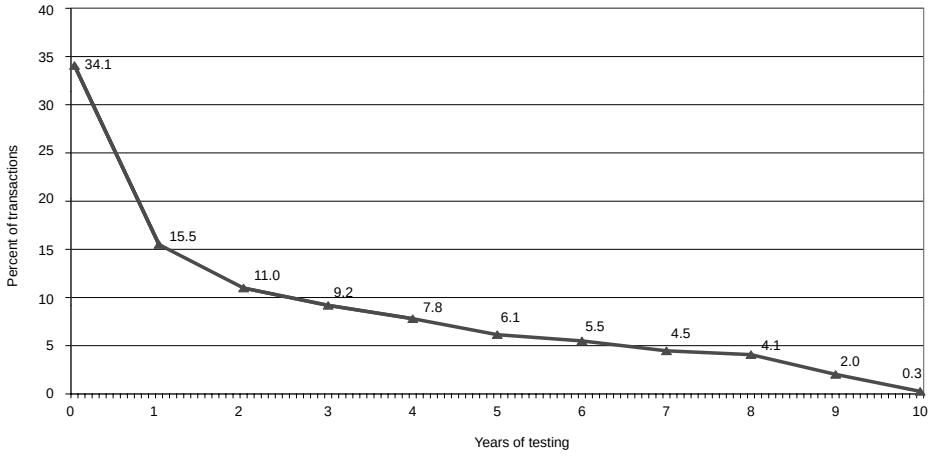

*Source:* Standard & Poor's Executive Compensation.

**Figure 4** Option vesting of all options granted in commercial banks, 1996–2007




*Source:* Thomson Reuters Insiders.

**Figure 5** Time until exercise – commercial bank vested in the money options (7,254 transactions)




*Source:* Thomson Reuters Insiders.

### *3.1.2 The link between compensation, performance and risk-taking during the financial crisis*

One might ask why we have observed a change in compensation trends. The fact is that the wave of deregulation occurring at the end of the 1990s created unprecedented opportunities for risk-taking in the banking industry. It follows that top executives wanted to exploit these risky opportunities, but did not want to risk their own compensation. Consequently, the landscape of compensation changed, with further reliance on cash compensation and bonuses. Moreover, CEOs in the banking sector have had the highest pay of all executives in the economy since 2006.

Fahlenbrach and Stulz (2010) find that banks with CEOs whose incentives were better aligned with the interests of shareholders performed worse and find no evidence that they performed better. Banks with higher option compensation and a larger fraction of compensation in bonuses for their CEOs did not perform worse during the crisis. Suntheim (2010) shows that institutions where CEOs had more incentives to take risks (higher Vega) performed worse. Moreover, a whole host of papers (cited in Table 1) find that higher risk-taking incentives did indeed lead to higher volatility. The only result that may be at first glance surprising is that of Fahlenbrach and Stulz (2010). Why would shareholders want give incentives to perform worse? The other papers answer this question succinctly: shareholders gave CEOs the incentives to take on risk, which happened not to pay out in this realisation. This notion that shareholders created an incentive system in their own interest is something we will discuss throughout the paper.

### *3.1.3 How should compensation be designed?*

As we noted earlier, the CEOs' incentives may be well aligned with shareholders' preferences, but are not aligned with other stakeholders.[7] To align the CEO's objective with social objectives in terms of risk choice, Bolton *et al* (2011) propose tying a CEO's compensation at least in part to a measure of default riskiness of the firm.[8] Specifically, excess risk-taking may be controlled by tying CEO compensation to the bank's CDS spread over the performance evaluation period. A high, and increasing, spread would result in a CDS lower compensation, and vice versa. They then demonstrate that shareholders would not choose to implement such a compensation scheme, instead preferring excess risk. Shareholders suffer from a commitment problem due to multiple factors: the ability to renegotiate the compensation contract and distortions in debt markets arising from deposit insurance and investors' misperceptions of risk. The benefit of the CDS spread is that it is a market price for the probability of default that is liquid for large institutions. Bebchuk and Spamann (2010) and Edmans and Liu (2011) suggest linking compensation directly to debt.

Bolton *et al* (2010) provide supporting evidence that increased CEO financial exposure to underlying bank risk is perceived by the market to reduce risk-taking, reflected in lower CDS spreads. They exploit greater disclosure requirements by the Securities Exchange Commission for CEO pay in 2007 with respect to both deferred compensation and executive pension grants to compute the fraction of CEO pay that is at risk if the bank fails, that is, deferred compensation and pension payments. The higher this fraction is, the more the bank's CDS spread decreases. Thus, as expected, the market believes that CEOs who stand to lose more financially in the event of the bank's failure take lower risks.[9] Tung and Wang (2011) provide additional evidence of reduced risk-taking by aligning the CEO's compensation with the value of the firm. Higher ratios of inside debt (deferred compensation and pension payments) to equity imply lower idiosyncratic risk and less risky loans.

## 3.2 Boards

### *3.2.1 The evidence*

A number of studies have argued that boards are shareholders' first line of defence in governance and focused on factors that influence board effectiveness (for a review of the literature see Hermalin and Weisbach, 2003; Adams and Mehran,

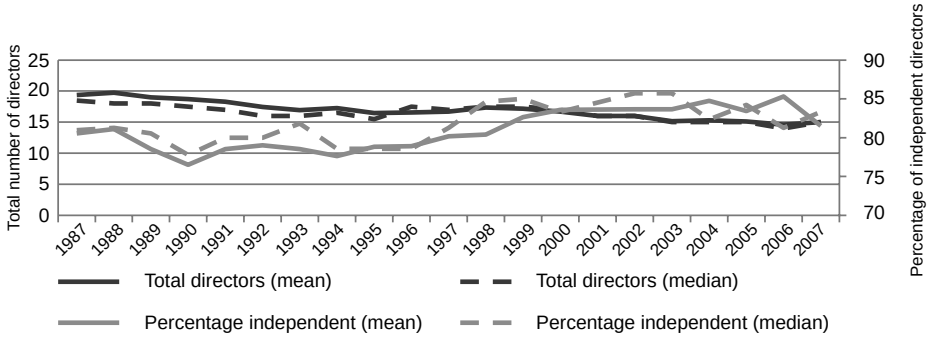
7 In section 3.4, we propose the use of options in compensation as backdoor equity financing to conserve capital. Here, we concern ourselves with incentive effects on CEOs.

8 There are, of course, other proposals for changing the composition of compensation, such as clawbacks. Clawbacks, however, may not be based on robust measures of risk-taking, especially since the amount clawed back may be determined by bank examiners.

9 One side-benefit of this approach is that it creates a built-in stabiliser using compensation. When banks are performing well and their credit quality is strong, bonuses will be paid out. However, when their performance deteriorates and their credit quality weakens (which would be reflected in an increase in their CDS spread), the banks will be forced to conserve capital through the automatic adjustment of bonuses. This is in a sense analogous to cutting dividends to protect the bank and its creditors. While cutting dividends imposes a cost on equity holders, this approach imposes a cost on risk-takers.

2003; Adams *et al*, 2010; Adams, 2010; , Becht *et al,* 2012). Among the crucial factors are board size and outside director ratio. Some authors argue that large boards are value reducing because of free-rider problems. Others posit that an increase in outside director representation should improve firm performance because outside directors are more likely to be strong monitors than firm insiders. Although it has been documented that large boards are value reducing, Adams and Mehran (2010) do not find a negative correlation between board size and performance (as proxied by Tobin's Q) for BHCs when using data spanning nearly four decades. Board size also has an ambiguous relationship with risk, as seen in Table 1. Consistent with studies on non-financial firms, Adams and Mehran also document that bank performance is unrelated to the outside director ratio. At the same time, several recent papers have found that the proportion of outside directors is negatively related to risk (see Table 1). As shown in Figure 6, the percentage of outside directors has had an upward trend since the mid-1990s, while the total number of directors has been declining over the past two decades.

**Figure 6** Size of board and percentage of independent directors, balanced sample of BHCs, 1987–2007




Adams and Mehran (2010) show that the performance of BHCs deteriorates when directors who are busier serve on the bank board (that is, busy directors serve on other boards). This finding within the banking industry is consistent with other studies in non-financials (see Fich and Shivdasani, 2006). In addition, banks with busy bank executives serving as directors of other companies also do poorly. Finally, Adams and Mehran document that interlocks[10] adversely affects bank performance. Minton *et al* (2010) find that a higher outside director ratio did not mean that a BHC fared better during the financial crisis.

While there is much discussion in policy circles that independent board members have little financial experience and that experience is crucial to understanding today's complex financial markets, there may be a dark side to expertise – further alignment with risk-taking incentives. We know (Guerrera and Larsen, 2008) that

10 An interlock is a situation where the chairman or the CEO of a BHC is a director in another company whose top management is on the board of the BHC.

Northern Rock's board included a former bank CEO, a top fund manager, and a previous member of the Bank of England's governing body, while Bear Stearns had a board where 7 of 13 members had a banking background (on average, 17.8% members of US boards had previous banking experience in 2006, according to Ferreira *et al*, 2010). Empirical evidence adds to this impression: Minton *et al* (2010) show a positive relationship between experience for independent directors and volatility.[11] These results do not imply causation. It may be that banks that want to take more risks hire board members with more expertise.

### *3.2.2 Governance from the supervisory point of view*

There has been a recognition among the supervisory community that governance practices were often rather weak prior to the crisis, and a number of supervisory groups have addressed these issues quite thoroughly.[12] However, while the supervisory community has made progress in the last several years in identifying stronger practices, many of the nuances of governance and incentive conflicts make the regulation and supervision of corporate governance difficult. Often, there are no hard and fast rules, and just when a practice becomes widely accepted as best practice, we start to see exceptions to the rules in precisely the firms most in need of good governance.

One of biggest challenges for supervisors is identifying and encouraging best practices while being mindful that one size cannot fit all: from a regulatory point of view, boards and management should be more focused on safety and soundness issues, but what governance structure is most conducive to achieving that end, and is it the same in all firms? What is the ideal make-up of a board of directors in a large and complex firm? And how far should supervisors go in criticising or endorsing firms' governance practices – particularly when it comes to the board of directors?

One of the components of effective governance cited most often is the ability and willingness of bank boards to challenge management and engage in good dialogue to ensure that the company's actions and decisions take into account the wide range of factors that could affect stakeholders. To gain comfort that a board is indeed capable of performing its duty to challenge and engage, one might ask the questions: Is the board composition conducive to achieving strong governance outcomes? Does it include the right people, with appropriate levels of independence and sufficient expertise? Do board members insist on receiving the kinds of information they need to understand the firm's risks and vulnerabilities?

11 Garicano and Cuñat (2009) find evidence for Spanish cajas that goes in the opposite direction, demonstrating that cajas which had chairmen without previous banking experience (or without postgraduate education) performed worse. The non-profit nature of the cajas and their close link with political institutions make this striking result difficult to generalise to international banks. Similarly, Hau and Thum (2009) find evidence that lack of financial experience of board members in German banks was strongly positively related to losses by the banks. This lack of experience is correlated with being a political appointment and was much more present in public banks (Landesbanken).

12 For instance, the Basel Committee's Corporate Governance Task Force updated its Principles for Enhancing Corporate Governance last year, and the Senior Supervisors Group has addressed governance weaknesses in three of its reports (Senior Supervisors Group, 2008, 2009, 2010).

First there is the question of expertise. Naturally a board member cannot be expected to know as much about the business as a member of management. However, if a board member is to carry out his or her responsibility to challenge management, that board member must have the expertise necessary to grasp the complexity of the business and thus the associated risks. The question, however, is what constitutes appropriate expertise. Are additional expectations required to ensure that the board's 'financial experts' are able to assess the risks posed by exposures to the more complex products at the larger securities firms? And how many 'experts' does a board need? Is there a role for non-experts? Some argue that the non-financial experts are the individuals who may ask the important, high-level strategic questions while all of the more technical members are focused on the details.

Furthermore, expertise is not enough to ensure that the board will engage with and challenge management. Another important prerequisite is a board member's ability to voice independent or potentially unpopular views. The idea that independence is important to good board governance is obviously not new and has been reinforced through law and regulations. Personal or informal loyalties can be just as detrimental to strong, independent views as more formal ties can be. The challenge for supervisors is how we assess whether board members, irrespective of *official* independence, exercise *intellectual* independence in carrying out their duties.

The level of board engagement is another component of a real challenge. Arguably, board members must invest sufficient time and energy to understand the risks to which their firms are exposed. Many have argued that board members at large financial institutions have too many other commitments to be able to devote sufficient time to carrying out their board responsibilities. On the other side of the argument, banks argue that their firms benefit from the input of individuals who understand global business trends and who can speak to some of the geopolitical issues these multinational firms face. They acknowledge that the most desirable individuals are by definition overcommitted, but regard them as crucial nevertheless.

How should supervisors address this tension? Should they limit the number of other directorships that a large bank board member can hold? Are gaps in a board member's knowledge due to a lack of expertise, insufficient time invested, or some other shortfall? For instance, is management providing the board with the background they need? Regulators expect management to share the right amount of information, at the appropriate level of detail, to ensure that directors are getting what they need to do their jobs. At the same time, it is incumbent upon a conscientious board to demand the information they find most useful in the form that works best for them.

Supervisors can gain insight into the level of board engagement, expertise and independence through more intensive interaction with board members,

but the question remains – are engagement, expertise and independence enough? An engaged, expert and independent board member may see his or her sole responsibility as to the shareholder. Supervisors are interested in other stakeholders – like creditors, depositors and the public. How do they ensure that boards and senior management consider the interests of other stakeholders? How do they align their interests – at least to some extent – with the goal of containing downside risk? This is definitely an open question that needs addressing.

## 3.3 Risk and risk management

In order to understand the crucial connection between governance and risk, we will take two approaches. First, we will look at the big picture and connect some of the strands in previous parts of the paper to clarify how incentives played a role in excess risk-taking. Second, we will discuss risk management as a specific role within the bank.

While we have discussed compensation in section 3.1, it is worth discussing the notion of 'residual compensation' used by Cheng *et al* (2010), as it relates to the notion of a risk-taking culture at a bank. Residual compensation is constructed as the residuals of a regression of compensation on firm size (defined by market capitalisation) and sub-industry level characteristics.[13] Hence it is the compensation unexplained by firm size (which also takes into account talent differences, as suggested by Gabaix and Landier, 2008). Interestingly, the firms with persistently high residual compensation include Bear Stearns, Lehman, Citicorp, Countrywide and AIG. The authors find that residual compensation is strongly correlated with several measures of risk-taking (summarised in Table 1) and is correlated with institutional ownership. They interpret this as a culture of short-termism present at these firms, in part due to the preferences of institutional shareholders. Ellul and Yerramilli (2010) and Laeven and Levine (2009) also find a significant positive relationship between institutional ownership and multiple measures of riskiness. The notion of a risk-taking culture is an important one. Official reports such as the Walker Report (2009) and those of the Senior Supervisors Group (2008, 2009) discuss risk supervision failures, incentives to take on excess risk and the need for a bank to define its risk appetite. However, little fault is placed on the firm for potentially having accurately represented the wishes of its shareholders (and having ignored other stakeholders, as we discussed in section 2).[14]

The importance of the chief risk officer (CRO) and the risk committee is examined in depth by Ellul and Yerramilli (2010). Using a sample of the 74 largest bank holding companies in the US from 2000 to 2008, they offer some details on

13 This is broken down into three groups: primary dealers, banks who are not primary dealers, and insurance companies.

14 The point that risk-taking was intentional and potentially supported by shareholders is also suggested by the evidence on the experience of independent board members in the section on boards.

the prioritisation of risk: 51.9% of the firms have a CRO as an executive officer, 19.5% have a CRO among the top five executives in level of compensation, and 23.2% of risk committees (they use audit if there is no risk committee) have at least one independent or grey director with banking experience. They construct a risk management index (RMI) using principal component analysis on the variables that define if a CRO is present, if the CRO is an executive officer, if the CRO is among the top five compensated, and the CRO's compensation divided by the CEO's compensation. In Table 1, we see that a higher RMI index means that three measures of volatility will be lower. This relationship also holds if the explanatory variable is just CRO compensation divided by CEO compensation. Similarly, Keys *et al* (2009) find that larger relative power for the CRO (measured by CRO compensation divided by the amount of compensation given to the top five executives in level of pay) implies lower default rates on loans (mortgages and home equity loans) originated by the bank. Moreover, Ellul and Yerramilli (2010) show that banks with a larger RMI had 'lower exposure to private-label mortgage backed securities and risky trading assets, and were less active in trading off-balance sheet derivative securities'. Lastly banks with higher 'quality of oversight' (the average of dummies whether the risk committee is experienced[15] and whether the risk committee is active[16]) had lower volatility as well.

The Senior Supervisors Group (2009) interviewed managers and executives in large financial institutions about risk management practices. The governance issues they point out are the following:[17]

- Risk management is often separated along product and organisational lines.
- The board and senior managers often do not specify what risk level is acceptable to the firm.
- Compensation practices are more related to attracting and retaining staff, not focused on sensitivity to risk. Moreover, risk-takers are rewarded with 'status and influence'.
- The board of directors did not correctly perceive the risks the firms were taking.

The second and fourth points emphasise the role of communication and prioritisation of risk at the top levels. This is in line with the work of Ellul and Yerramilli (2010) in relating the centrality of the role of risk management with less volatility. This also seems to point to a lack of understanding of the board about risk practices. As we discussed earlier, this is certainly an issue, but it is not clear that increased board experience with financial markets would improve matters. This is because of the risk culture of the firm, which the Senior Supervisors Group also emphasises in the description of rewards for risk-takers.

15 This is defined by the risk committee having at least one member with previous banking experience.

16 An active risk committee is defined by meeting more times during the year than the average risk committee in the sample.

17 Of course, they point out many institutional arrangements and practices which led to excess risk-taking. We only focus on the ones directly related to governance.

Other reports have made similar points. The Walker Report (2009) and papers by the Basel Committee on Banking Supervision (2009) and the Committee of European Banking Supervisors (2010) all highlight:

- The need to define the bank's risk appetite at senior levels and communicate it;
- that there should be a risk management function with an experienced and independent CRO who is given appropriate status and compensation in line with their important role.

These suggestions seem like the minimum that is needed for risk to become a priority in a bank.

## 3.4 Market discipline

Corporate governance can be defined as comprising the procedures by which ex ante agreements on corporate actions are created and enforced. These procedures exist in the context of markets for corporate control, for managerial talent and for financial capital. In general, the effectiveness of corporate governance procedures is closely bound up with the effectiveness of the signals and incentives generated by these markets or, in short, in the quality of *market discipline*. Market discipline is the subject matter of this section. We examine the impact of bank capital regulation and of the expansion in the scale and scope of financial institutions on market discipline.

### *3.4.1 Bank capital*

Bank capital is a particularly important source of market discipline in banks, and it is the focus of many regulations. A well-designed bank capital adequacy regime may serve as a partial substitute for formal corporate governance rules in banking, because capital regulation can strengthen market incentives for bank shareholders and managers to resolve governance problems. We investigate this possibility in this section.

Bank capital serves at least three purposes.[18] First, it serves as a buffer against bankruptcy, and the attendant social costs. Second, should bank failure occur, capital is a buffer against losses to the deposit insurance fund and, hence, the taxpayer. And, third, bank capital exposes bank shareholders to losses, and so should serve to counter the excessive risk-taking incentives that are engendered by a deposit insurance fund with risk-insensitive premia. The third of these purposes gives bank capital structure a role as a governance vehicle.

18 See Furlong and Keeley (1989) and Morrison and White (2005) on the relationship between capital requirements and risk, and Gordy and Heitfield (2010) and references therein for an analysis of risk-based capital requirements. Calem and Rafael (1999) calibrate a model that demonstrates a U-shaped relationship between capital levels and risk-taking incentives.

Several authors argue that because they expose shareholders directly to the risk of failure, bank capital requirements encourage good risk management practices (*eg* Rochet, 1992; Kim and Santomero, 1994; Morrison and White, 2005).[19] Higher capital requirements should therefore mitigate in favour of better bank governance. However, recent work appears to indicate that, over the years leading up to the financial crisis, the composition of bank capital altered so as to undermine owner incentives. Acharya *et al* (2011) examine the composition of bank capital and the effects of bank dividend policies upon bank capital in the years leading up to the financial crisis. They find that the composition of bank capital has changed: most of the new capital issues in response to the crisis are of debt or of hybrid securities such as preferred stock. Moreover, bankers continued to pay dividends throughout the crisis: Acharya *et al* argue that this policy has served to break the priority of debt over equity, and has served as a form of risk-shifting. Their conclusions are supported by Khorana and Perlman (2010), who argue that the 150 largest banks have engaged in pro-cyclical distribution strategies that have served to jeopardise long-term value.

In replacing their share-based capital with arguably weaker forms of capital, banks leave themselves open to severe losses in future crisis situations. Indeed, Demirguc-Kunt *et al* (2010) find in a multicountry study that better-capitalised banks fared better during the crisis, and that higher-quality capital, such as Tier 1 capital, was more relevant to their performance; Berger and Bouwman (2009) present evidence that bank capital is more important during financial crises, when it enables banks both to survive and to improve their market shares; Beltratti and Stulz (2009) show that banks with more capital, and from countries with stricter capital supervision, fared better during the crisis; Chesney *et al* (2010) also find a negative relationship between Tier 1 capital ratios and write-downs.

That banks failed to account for the effects identified in the previous paragraph suggests that capital requirements alone are not a sufficient bank governance mechanism. Reducing the quality of the bank's capital raises the value of the government safety net which, while it is socially sub-optimal, increases shareholder wealth. Macey and O'Hara (2003) argue that the right response to this problem would be to extend the fiduciary duties of banks beyond the usual shareholder-maximisation objective, to include an obligation towards the safety and soundness of their institutions. Hence, they argue, bank directors should explicitly account for solvency risk, and should be personally liable for failures to do so.

Macey and O'Hara's idea is an attractive one, but it may be subject to the same problems that hamper general governance arrangements in banks: namely, the opacity of banks and the non-contractibility of their activities. It may prove very difficult to prove in court that a bank's directors failed to fulfil a wider fiduciary

19 In addition, Boot and Marinc (2010) demonstrate higher capital requirements can raise stability by inducing entry by higher-quality banks, who believe themselves less likely to be undercut by poor bankers taking advantage of the deposit insurance fund, and so raise competition.

duty of this type: indeed, it is precisely this type of problem that makes bank capital an important governance tool. It may therefore prove simpler to address the problems that make equity capital an unattractive source of funds for banks. In the absence of tax advantages and government support for debt, there is no particular reason to believe that equity is a more costly bank liability than debt (see Admati *et al*, 2010). Further, Mehran and Thakor (2011) provide a theoretical argument showing that bank value and capital are positively correlated. Their empirical work supports their theory.[20] Hence, one way to reduce the propensity of banks for debt finance would be to reduce the value of the deposit insurance net. A simpler, and probably more effective, approach would be to abolish the tax advantage on corporate debt. This seems unlikely to occur.[21] Three alternative proposals have been advanced recently: (1) to extend the tax advantage to certain types of equity capital, which has been the effect of the contingent convertible bond, or CoCo bond,[22] and a related instrument, 'bail-inable' debt as a resolution mechanism (Ervin, 2011); (2) Special Capital Account, as in Acharya *et al* (2011); and (3) using options in compensation as backdoor equity capital.[23]

### *3.4.2 Scale, scope and corporate governance*

Recent years have seen a significant increase in the scale and scope of financial institutions. This has affected the formation of market prices, and as a result the functioning of market discipline, in several ways. Large banks are perceived as too-big-to-fail, and are possibly also too-complex-to-fail. They may also have succeeded in extending the reach of the deposit insurance net beyond its intended narrow use in retail deposit-taking. Each of these effects has reduced the sensitivity of bank investors to bank risk-taking, because investors anticipate a degree of state support even in failure states. The consequence is a severe attenuation of market discipline and, hence, in the ability of outside stakeholders to align the incentives of bank managers with their own. To the extent that this is the case, new governance arrangements are needed that either substitute for, or restore market-based incentives. In this section, we discuss the attenuation of market discipline in large financial firms, and we examine possible policy responses. We find no clear solutions to the governance problems that we identify, although we are able to identify areas upon which future research and policy discussions could focus.

Bank scope has expanded in recent years in both the US, where the November 1999 Gramm-Leach-Bliley Act dismantled the barriers to universal banking that were created in the US by the Glass-Steagall Act, and in Europe, where conglomeration has been occurring for at least two decades.[24] The repeal of Glass-Steagall reflected industry pressure, and also a realisation that contemporary justifications for its

20 See F Allen *et al* (2011) for another argument suggesting that banks with more capital are more valuable.
21 For a brief recent discussion of the politics of reform, see Surowiecki (2010).
22 See Flannery (2009), and Albul *et al* (2010), who argue respectively that CoCo bonds would reduce the incidence and the costs of financial distress in banking firms. Sundaresan and Wang (2011) discuss the difficulty of pricing contingent convertible bonds.
23 See Mehran and Rosenberg (2008) and Babenko and Tserlukevich (2009) for related evidence.
24 See Morrison (2010) for a survey of universal banking. Lown *et al* (2000) discuss the pressures that led to financial conglomeration.

passage had little empirical support.[25] But, as we note below, the repeal had some apparently unanticipated deleterious effects upon market discipline in financial institutions.

The crisis reinforced the fact that some large financial institutions are too big and systemically important to fail. Ben Bernanke (2009) acknowledged that 'in the present crisis, the too-big-to-fail issue has emerged as an enormous problem'. The inevitable consequence of this observation is an attenuation of market discipline in financial conglomerates. This can be addressed partly through improved bankruptcy procedures for large banks, but it is unlikely that very large and complex financially fragile institutions will ever be treated precisely as smaller banks are.

Bank conglomeration has not only expanded the scale of banks, but also the scope, and so potentially worsened a too-big-to-fail problem. By expanding the range of activities in which deposit-taking institutions participate, it may also have extended the reach of the deposit insurance safety net to securities businesses:[26] if a systemically important firm is engaged in securities business then the prudential authorities may feel that the securities business should be protected in the event of its failure so as to avoid damaging contagion to the deposit-taking business. In this way, conglomeration may serve to damage market discipline in businesses where it was formerly very effective. Moreover, it may prove a rationale for more conglomerate risk-taking: absent enforceable fiduciary responsibilities of the type envisaged by Macey and O'Hara (2003), banks will take advantage of opportunities to extend the deposit insurance safety net and, in particular, financial conglomerates might be expected to engage in more risk-shifting.[27]

The apparent diminution of market discipline caused by financial conglomeration has undermined traditional governance arrangements in banks. Several possible responses present themselves. First, shareholders and regulators could demand that bankers report their activities in greater detail, and so improve the ex ante contracting environment. Such reporting could be further strengthened by trusted third-party information providers. Second, regulators could attempt to alter the institutional structure within which banks operate, and so resolve some of the incentive problems caused by a weakening of market discipline. We examine these possibilities in turn below. Neither appears to be a panacea.

If better reporting would improve contracting, and so strengthen bank governance arrangements, one might ask why it has not already emerged through a process of market discovery. One explanation may be that, because shareholders and managers have a shared desire to extract a deposit insurance fund subsidy,

25 See Morrison and Wilhelm (2007, pp 196–215); Krozner and Rajan (1994); Ang and Richardson (1994).
26 For theoretical models of this effect, see Freixas *et al* (2007) and Dewatripont and Mitchell (2005).
27 Stiroh (2004) and DeYoung and Roland (2001) provide evidence that diversified financial institutions take more risks.

neither has an incentive to produce reports that might make it harder to do so. If this is the case then there is an argument to be made for state-mandated reporting, possibly by a neutral third-party information provider. But such a requirement would run up against two problems. First, regulatory intervention in market-based information generation can undermine the incentives that ensure its veracity; second, banks are increasingly too complex for outsiders to comprehend.

A greater investment in third-party information provision would certainly generate more information upon which shareholder and supervisor governance arrangements could be predicated. But such information is valuable only in so far as it is accurate. The evidence from a strong reliance upon credit ratings in financial regulations[28] suggests that it may not be: ratings for structured products had to be revised sharply downwards after the crisis, and firms that had relied upon them experienced significant losses.[29] If the credit rating agencies lowered their standards prior to the crisis, it is possible that they did so in response to the hard-wiring of their data into regulatory standards. Partnoy (1999) argues that when investors have a legally imposed mandate based upon a credit rating, they become less concerned with the quality of the rating than with its existence; as a result, the rating agency's concern for its reputation may be subordinated to its desire to attract business by selling regulatory certification, and the quality of ratings may diminish. Moreover, ratings shopping by issuers may exacerbate the conflicts of interest, as in Bolton *et al* (2010). Ratings accuracy is also likely to suffer most in booms, as in the recent crisis (Bar-Isaac and Shapiro, 2010). Issuers may design bonds so as to achieve the necessary rating by the lowest possible margin: consonant with this hypothesis, Benmelech and Dlugosz (2008) find a very high degree of uniformity in the design of loan-backed notes, and Coval *et al* (2009a, 2009b) and Brennan *et al* (2008) show that these notes were structured so as to maximise their market betas, and hence their yield.

Quite apart from the difficulties associated with mandated third-party information provision, it seems unlikely that it is technologically possible to generate data that could support better governance in large financial firms. There is plenty of evidence that such firms are now almost too complex to manage. For example, Herring and Carmassi (2010) note that Citi has nearly 2,500 subsidiaries, and that it operates in 84 countries. Bank officers faced with this sort of complexity naturally struggle to manage every aspect of their business effectively, so that additional agency problems are introduced into complex financial firms. It may be impossible to generate a report that an outsider could understand and use as the basis for a governance contract. Nevertheless, shareholders tolerate this situation. This may be because it is unclear to the regulatory authorities what

28 US banks were referred by the Comptroller of the Currency to the rating agencies to identify the speculative-grade bonds that should not form a part of their portfolio as far back as 1936 and, more recently, ratings have played an increasing role in the determination of regulatory capital ratios. See the Basel Committee on Banking Supervision (2006).

29 See, for example, Davies (2007), reporting the downgrade of over 2,000 securities in November 2008, over 500 of which moved down over 10 notches on the standard ratings scale.

the consequences of firm failure in a complex organisation would be, so that, when push comes to shove, complex firms may receive a bail-out. In short, a 'too-complex-to-fail' problem may exacerbate the governance problems caused by a too-big-to-fail problem.

The preceding argument suggests that governance problems deriving from a failure of market discipline in large firms is not susceptible to a formal, 'box-ticking' solution, precisely because it reflects an inability of regulators and bankers to contract ex ante upon banker actions. This suggests that the only effective governance responses to the expansion of scale and scope in financial firms are likely to be *institutional*: that is, banker incentives to engage in risk-shifting in large financial firms may be best countered by altering the structure of the firms and the regulatory landscape in which they operate.

Several authors have suggested that an effective institutional response to market discipline problems in large financial firms would be to completely separate commercial and investment banking;[30] some have even gone so far as to advocate narrow banking legislation.[31] The 'Volcker Rule' proposed a partial separation in the form of a ban on proprietary trading for banks with a deposit insurance safety net (see Group of Thirty, 2009); a watered-down version of this rule made its way into the Dodd-Franks Wall Street Reform and Consumer Protection Act of July 2010.

The argument for narrow banking is seductive, as the evidence for scope economies in banking is mixed.[32] If the evidence for scope economies in banking is not compelling, then perhaps the incentive benefits from exposing risk-takers to better and more focused market discipline may outweigh their cost. However, this argument requires regulators to be able to credibly commit not to bail out non-narrow institutions. Recent evidence suggests that such a commitment is unlikely to be enforceable. An example that is particularly germane to this discussion is the *shadow banking sector,* comprising vehicles financed with short-term funds and holding in longer-term assets, but without deposit insurance and, hence, not regulated as banks. Most of the assets held in the shadow banking sector immediately before the crisis were bank-originated loans, transferred to the shadow banks via securitisations.

The shadow banking sector grew very rapidly in the years prior to the financial crisis,[33] and, while shadow banks were not subject to financial regulation, some

30 Herring and Carmassi (2010) report that some degree of separation between lending and securities activity is already commonplace in countries that permit banks to engage in both activities.

31 See, for example, Kay (2009).

32 Barth *et al* (2000) make a technological case for economies of scope, and Berger *et al* (2000) identify some potential economies in universal banks. However, L Allen and Rai (1996) and Vander Vennet (1999) find only limited evidence of scope economies in European universal banks, although Cyberto-Ottone and Murgia (2000) show that scope expansion can raise shareholder wealth.

33 Adrian and Shin (2009) show that immediately prior to the crisis, the shadow banking sector had more assets than the banking sector. Gorton (2009) tracks the evolution of the shadow banking sector.

received state support during the crisis.[34] The growth of the shadow banking sector has two related implications. First, it suggests that bankers will innovate their way around complex regulations. If so, such regulations cause a misallocation of human capital within the banking sector, and hence an exacerbation of governance problems. Second, the crisis experience of money market mutual funds indicates that, moreover, the lines have blurred between institutions that are supported by the state and those that are not. In light of this observation, one might expect regulated institutions to shift the regulated parts of their business outside the ambit of the supervisor, while retaining the assets that benefit most from government support.[35]

In summary, the case for legislation that restricts the activities of deposit-taking firms is mixed. Such legislation might be effective if it could be enforced. But the crisis experience of the shadow banking sector suggests that enforcement would be difficult, and that scope-restricting legislation may serve further to undermine market discipline.

An alternative institutional response to weakened market discipline in large banks might be simply to force them to shrink, so that they are once again small-enough-to-fail. In line with this suggestion, Čihák *et al* (2011) find evidence that market discipline is effective for smaller to medium-sized banks that are unlikely to receive a government bail-out: executives in such banks are more likely to be dismissed if they assume risks, and if they incur losses, cut dividends, have a high charter value, and hold high levels of subordinated debt.

While smaller banks would be less able to take advantage of government support, they would also be more competitive. Every economics undergraduate understands that heightened competition is good for consumers. However, starting with Keeley (1990), a strand of banking literature identifies a confounding effect in banking, suggesting that competition could result in more financial fragility, because it would lower the value of the bank's franchise, and so encourage risk-taking.[36] This effect might outweigh the governance benefits that flow from reduced access to government funds. However, recent theoretical work suggests that this effect is not cut-and-dried,[37] and recent empirical work indicates that,

34 Kacperczyk and Schnabl (2010) document a run on the money market mutual fund sector. Despite the fact that money market mutual funds were not formally covered by the deposit insurance fund, the US Department of the Treasury reacted to the run by announcing temporary insurance for investors in money market mutual funds.

35 Acharya, Schnabl and Suarez (2010) present evidence in line with this from the asset-backed commercial paper market, where securitisations prior to the crisis reduced capital requirements without reducing the riskiness of the originator's asset portfolio.

36 See also Besanko and Thakor (1993) and Hellman *et al* (2000).

37 See Boyd and De Nicolo (2005), who argue that heightened bank competition may reduce borrower risk-shifting, although Martinez-Miera and Repullo (2010) argue that this effect is ambiguous.

while bank competition may be associated with heightened financial fragility, the causal link is not certain.[38]

This section has identified a serious governance problem in large financial institutions stemming from the weakening of market discipline and the difficulty in implementation of formal regulations due to the extreme complexity of the institutions. The only effective approach to these governance problems may be institutional. However, the natural argument for narrower banks is undermined by the ability of banks to innovate their way around scope regulation, and the case for smaller banks is still unproven. Market discipline problems in large banks therefore remain a serious challenge. The crisis has at least generated plenty of data that will facilitate future research and inform future policy debates.

## 4 Conclusion

Shareholders in banks have created incentives for taking risks and maximising leverage due to the deposit insurance subsidy, at a substantial cost to other stakeholders. This has been amplified in recent years as banks have been able to push into newer, complex activities and broadened their scope. The nature of these businesses has made it difficult for regulators to keep up and analyse the implications of the expansion. In this paper we offer some suggestions based on the recent finance literature that may diminish governance issues. We also present problems which have no easy answers. Further research will be needed to make headway into such issues.

## References

Acharya, V V, Gujral, I and Shin, H-S (2011), 'Dividends and bank capital in the financial crisis of 2007–2009', *Journal of Applied Corporate Finance* (forthcoming)

Acharya, V V, Schnabl, P and Suarez, G (2010), 'Securitization without risk transfer', Working Paper 15730, National Bureau of Economic Research.

Acharya, V V, Mehran, H and Thakor, A (2011), 'Caught between Scylla and Charybdis? Regulating bank leverage when there is rent seeking and risk shifting', Working Paper, Federal Reserve Bank of New York.

Adams, R (2009), 'Governance and the financial crisis', mimeo, University of Queensland.

38 Berger *et al* (2009) find from their analysis of 8,235 banks in 23 developed countries that banks with higher market power also have less overall risk exposure. However, Beck (2008) argues that although the positive association between increased bank competition and risk has been associated in the past with financial fragility, this has been the consequence of regulatory and supervisory failures, and Boyd *et al* (2006) and De Nicolo and Loukoianova (2006) find an inverse relation between banking sector concentration and the risk of bank failure.

Adams, R (2010), 'Governance of banking institutions', in H K Baker and R Anderson (eds), *Corporate Governance: A Synthesis of Theory, Research, and Practice*, Hoboken, NJ, Wiley, pp 451–68.

Adams, R and Mehran, H (2003), 'Is corporate governance different for bank holding companies?', *Economic Policy Review* 9, pp 123–42.

Adams, R and Mehran, H (2010), 'Corporate performance, board structure and its determinants in the banking industry', mimeo, Federal Reserve Bank of New York.

Adams, R, Hermalin, B and Weisbach, M (2010), 'The role of boards of directors in corporate governance: a conceptual framework and survey', *Journal of Economic Literature* 48(1), pp 58–107.

Admati, A R, DeMarzo, P M, Hellwig, M F and Pfleiderer, P C (2010), 'Fallacies, irrelevant facts, and myths in the discussion of capital regulation: why bank equity is not expensive', Working Paper 86, Rock Center for Corporate Governance, Stanford University.

Adrian, T and Shin, H-S (2009), 'The shadow banking system: implications for financial regulation', Federal Reserve Bank of New York Staff Report 382.

Albul, B, Jaffee, D M and Tchistyi, A (2010), 'Contingent convertible bonds and capital structure decisions', mimeo, Haas School of Business, University of California at Berkeley.

Allen, F, Carletti, E and Marquez, R (2011), 'Credit market competition and capital regulation', *Review of Financial Studies* 24, 983–1018.

Allen, L and Rai, A (1996). 'Operational efficiency in banking: an international comparison', *Journal of Banking and Finance* 20, pp 655–72.

Ang, J S and Richardson, T (1994), 'The underwriting experience of commercial bank affiliates prior to the Glass-Steagall Act: a re-examination of the passage of the Act', *Journal of Banking and Finance* 18, pp 351–95.

Babenko, I and Tserlukevich, Y (2009), 'Analyzing the tax benefits from employee stock options', *Journal of Finance* 64(4), pp 1797–1825.

Balachandran, S, Kogut, B and Harnal, H (2010), 'The probability of default, excessive risk, and executive compensation: a study of financial services firms from 1995 to 2008', Columbia Business School Discussion Paper.

Bar-Isaac, H and Shapiro, J (2010), 'Ratings quality over the business cycle', mimeo, New York University.

Barth, J R, R D Brumbaugh, Jr. and J A Wilcox (2000), 'The Repeal of Glass-Steagall and the Advent of Broad Banking', *Journal of Economic Perspectives* 14, 191–204.

Basel Committee on Banking Supervision (2006), 'Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework – Comprehensive Version', Bank for International Settlements.

Basel Committee on Banking Supervision (2009), 'Enhancements to the Basel II Framework', Bank for International Settlements.

Bebchuk, L A and Spamann, H (2010), 'Regulating bankers pay', *Georgetown Law Journal* 98(2), pp 247–87.

Becht, M, Bolton, P and Roell, A (2012), 'Why Bank Governance is Different', *Oxford Review of Economic Policy* 27(3), 437-463.

Beck, T (2008), 'Bank competition and financial stability: friends or foes?' Policy Research Working Paper 4656, World Bank.

Beltratti, A and Stulz, R M (2009), 'Why did some banks perform better during the credit crisis? A cross-country study of the impact of governance and regulation', Working Paper 15180, National Bureau of Economic Research.

Benmelech, E and Dlugosz, J (2009), 'The alchemy of CDO ratings', *Journal of Monetary Economics* 56, pp 617–34.

Berger, A N and Bouwman, C H S (2009), 'Bank capital, survival and performance around financial crises', mimeo, University of South Carolina.

Berger, A N, De Young, R, Genay, H and Udell, G F (2000). 'Globalization of financial institutions: evidence from cross-border banking performance', in *Brookings-Wharton Papers on Financial Services*, vol. 3, pp 23–125.

Berger, A N, Klapper, L F and Turk-Ariss, R (2009), 'Bank competition and financial stability', *Journal of Financial Services Research* 35, pp 99–118.

Bernanke, B (2009), 'Financial reform to address systemic risk', speech at the Council on Foreign Relations, at *http://www.gees.org/documentos/Documen-03309.pdf* (accessed Feb 2012).

Besanko, D and Thakor, A (1993), 'Relationship banking, deposit insurance, and bank portfolio choice', in C Mayer and X Vives (eds), *Capital Markets and Financial Intermediation*, Cambridge, Cambridge University Press, pp. 292–318.

Bolton, P, Freixas, X and Shapiro, J (2010), 'The credit ratings game', mimeo, Columbia University.

Bolton, P, Mehran, H, and Shapiro, J (2011), 'Executive compensation and risk-taking', mimeo, Federal Reserve Bank of New York.

Boot, A W A and Marinc, M (2010), 'Capital Regulation and Competition in Banking: A Theory of Why More Capital Benefits Banks', working paper, University of Amsterdam.

Boyd, J and De Nicolo, G (2005), 'The theory of bank risk-taking and competition revisited', *Journal of Finance* 60, pp 1329–43.

Boyd, J, De Nicolo, G and Jalal, A M (2006), 'Bank risk taking and competition revisited: new theory and evidence', Working Paper WP/06/297, International Monetary Fund.

Brennan, M J, Hein, J and Poon, S-H (2008), 'Tranching and rating', *European Financial Management* 15, pp 891–922.

Calem, P and Rafael, R (1999), 'The impact of capital-based regulation on bank risk-taking', *Journal of Financial Intermediation* 8, pp 317–52.

Cheng, I-H, Hong, H and Scheinkman, J (2010), 'Yesterday's heroes: compensation and creative risk-taking', mimeo, Princeton University.

Chesney, M, Stromberg, J and Wagner, A (2010), 'Risk-taking incentives, governance, and losses in the financial crisis', Research Paper 10-18, Swiss Finance Institute.

Čihák, M, Maechler, A, Schaeck, K and Stolz, S (2011), 'Who disciplines bank managers?', *Review of Finance* (forthcoming).

Committee of European Banking Supervisors (2010), 'High level principles for risk management', CEBS.

Coval, J D, Jurek, J W and Stafford, E (2009a), 'Economic catastrophe bonds', *American Economic Review* 99, pp 628–66.

Coval, J D, Jurek, J W and Stafford, E (2009b), 'The economics of structured finance', *Journal of Economic Perspectives* 23, pp 3–25.

Cyberto-Ottone, A and Murgia, M (2000). 'Mergers and shareholder wealth in European banking', *Journal of Banking and Finance* 24, pp 831–59.

Davies, P J (2007), 'CDO downgrades break new records', *Financial Times*, 13 Dec.

Demirguc-Kunt, A, Detragiache E and Morrouche, O (2010), 'Bank capital: lessons from the financial crisis', Policy Working Paper 5473, World Bank.

De Nicolo, G and Loukoianova, E (2007), 'Bank ownership, market structure, and risk', Federal Reserve Bank of Chicago Proceedings, May, pp 377–95.

Dewatripont, M and Mitchell, J (2005), 'Risk-taking in financial conglomerates', mimeo, ECARES, Université Libre, Brussels.

DeYoung, R and Roland, K P (2001), 'Product mix and earnings volatility at commercial banks: evidence from a degree of total leverage model', *Journal of Financial Intermediation* 10, pp 54–84.

DeYoung, R, Peng, E Y and Yan, M (2009), 'Executive compensation and business policy choices at US commercial banks', mimeo.

Edmans, A and Liu, Q (2011). 'Inside debt', *Review of Finance* 15(1), 75–102.

Ellul, A and Yerramilli, V (2010), 'Stronger risk controls, lower risk: evidence from US bank holding companies', mimeo, Indiana University.

Erkens, D, Hung, M and Matos, P (2009), 'Corporate governance in the recent financial crisis: evidence from financial institutions worldwide.' mimeo, University of Southern California.

Ervin, W (2011), 'Fixing too-big-to-fail: the challenge at the heart of financial reform', mimeo, Credit Suisse.

Fahlenbrach, R and Stulz, R (2010), 'Bank CEO incentives and the credit crisis', Journal of Financial Economics 99(1), pp 11–26.

Faleye, O and Krishnan, K (2010), 'Risky lending: does bank corporate governance matter?', mimeo, Northeastern University.

Fernandes, N and Fich, E (2009), 'Does financial experience help banks during credit crises?' mimeo, IMD.

Ferreira, D, Kirchmaier, T and Metzger, D (2010), 'Boards of banks', mimeo, London School of Economics.

Fich, E and Shivdasani, A (2006), 'Are busy boards effective monitors?' Journal of Finance 61(2), pp 689–724.

Flannery, M J (2009), 'Stabilizing large financial institutions with contingent capital certificates', mimeo, University of Florida.

Flannery, M J, Kwan, S H and Nimalendran, M (2004), 'Market evidence on the opaqueness of banking firms' assets', *Journal of Financial Economics* 71, pp 419–60.

Flannery, M J, Kwan, S H and Nimalendran, M (2010), 'The 2007–09 financial crisis and bank opaqueness', mimeo.

Freixas, X and Rochet, J-C (1995), 'Fair pricing of deposit insurance. Is it Possible? Yes. Is it desirable? No', mimeo, Universitat Pompeu Fabra.

Freixas, X, Lóránth, G and Morrison, A D (2007), 'Regulating financial conglomerates', *Journal of Financial Intermediation* 16, pp 479–514.

Furlong, F T and Keeley, M C (1989), 'Capital regulation and bank risk-taking: a note', *Journal of Banking and Finance* 13, pp 883–91.

Gabaix, X and Landier, A (2008), 'Why has CEO pay increased so much?', *Quarterly Journal of Economics* 123(1), pp 49–100.

Garicano, L and Cuñat, V (2009), 'Did good cajas extend bad loans? Governance, human capital, and loan portfolios', mimeo, London School of Economics.

Gordy, M B and Heitfield, E A (2010), 'Risk-based regulatory capital', in A N Berger, P Molyneux and J O S Wilson (eds), *The Oxford Handbook of Banking*, Oxford, Oxford University Press, pp. 357–76.

Gorton, G (2009), 'Slapped in the face by the invisible hand: banking and the panic of 2007', mimeo, Yale University.

Group of Thirty (2009), *Financial Reform: A Framework for Financial Stability,* Washington DC, Group of Thirty.

Guerrera, F, and Larsen, P T (2008), 'Gone by the board? Why bank directors did not spot credit risks', *Financial Times*, 25 June.

Hart, O (1989), 'An economist's perspective on the theory of the firm', *Columbia Law Review* 89, pp 1757–74.

Hellman, T F, Murdock, K C and Stiglitz, J (2000), 'Liberalization, moral hazard in banking, and prudential regulation: are capital requirements enough?' *American Economic Review* 90, pp 147–65.

Hermalin, E B and Weisbach, M S (2003), 'Board of Directors as an endogenously determined institution: a survey of the economic literature', *Economic Policy Review* 9, pp 7–26.

Herring, R and Carmassi, J (2010), 'The corporate structure of international financial conglomerates: complexity and its implications for safety and soundness', in A N Berger, P Molyneux and J O S Wilson (eds), *The Oxford Handbook of Banking*, Oxford, Oxford University Press, pp 195–229.

Jensen, M C and Meckling, W H (1976), 'Theory of the firm: managerial behavior, agency costs and ownership structure', *Journal of Financial Economics* 3, pp 305–60.

John, T A and John, K (1993), 'Top-management compensation and capital structure', *Journal of Finance* 48(3), pp 949–74.

John, K and Qian, Y (2003), 'Incentive features in CEO compensation in the banking industry', *FRBNY Economic Policy Review* 9, pp 109–21.

John, K, Mehran, H and Qian, Y (2010), 'Regulation, subordinated debt and incentive features of CEO compensation in the banking industry', *Journal of Corporate Finance* 16(4), 383–399.

Kacperczyk, M and Schnabl, P (2010), 'Does organizational form affect risk taking? Evidence from money market mutual funds', mimeo, Stern School of Business.

Kay, J (2009), 'Narrow banking: the reform of bank regulation', Report 88, Centre for the Study of Financial Innovation.

Keeley, M C (1990), 'Deposit Insurance, Risk, and Market Power in Banking', *American Economic Review* 80, 1183-1200

Keys, B J, Mukherjee, T, Seru, A and Vig, V (2009), 'Financial regulation and securitization: evidence from subprime loans', *Journal of Monetary Economics* 56, pp 700–20.

Khorana, A and Perlman, M (2010), 'Replenishing the banking sector: managing bank capital in the post-crisis world', *Journal of Applied Corporate Finance* 22, pp 94–111.

Kim, D and Santomero, A (1994), 'Risk in banking and capital regulation', *Journal of Finance* 43, pp 1219–33.

Krozner, R S and Rajan, R G (1994), 'Is the Glass-Steagall Act justified? A study of the US experience with universal banking before 1933', A*merican Economic Review* 84, pp 810–32.

Laeven, L and Levine, R (2009), 'Bank governance, regulation, and risk-taking', *Journal of Financial Economics* 93, pp 259–275.

Levine, R (2004). 'The corporate governance of banks: a concise discussion of concepts and evidence', World Bank Policy Research Working Paper 3404.

Lown, C S, Osler, C L, Strahan, P E and Sufi, A (2000), 'The changing landscape of the financial services industry: what lies ahead?' *FRBNY Economic Policy Review* 6, pp 39–55.

Macey, J R and O'Hara, M (2003). 'The corporate governance of banks', *FRBNY Economic Policy Review*, April, pp 91–107.

Martinez-Miera, D and Repullo, F (2010), 'Does competition reduce the risk of bank failure?' *Review of Financial Studies* 23, pp 3638–64.

Mehran, H and Rosenberg, J (2008), 'The effect of employee stock options on bank investment choice, borrowing, and capital', Federal Reserve Bank of New York Staff Report 305.

Mehran, H and Thakor, A V ( 2011), 'Bank capital and value in the cross-section', *Review of Financial Studies* 24, pp 1019–67.

Minton, B, Taillard, J and Williamson, R (2010), 'Board composition, risk taking and value: evidence from financial firms', mimeo, Ohio State University.

Morgan, D (2002), 'Rating banks: risk and uncertainty in an opaque industry', *American Economic Review* 92, pp 874–88.

Morrison, A D (2010), 'Universal banking', in A N Berger, P Molyneux and J O S Wilson (eds), *The Oxford Handbook of Banking*, Oxford, Oxford University Press, pp. 171–94.

Morrison, A D and White, L (2005), 'Crises and capital requirements in banking', *American Economic Review* 95, pp 1548–72.

Morrison, A D and Wilhelm, W J, Jr (2007), *Investment Banking: Institutions, Politics, and Law*, Oxford, Oxford University Press.

Ng, J, Vasvari, F P and Moerman, R (2010), 'The participants in the TARP capital purchase program: failing or healthy banks?', mimeo.

Partnoy, F (1999), 'The Siskel and Ebert of financial markets? Two thumbs down for the credit rating agencies', *Washington University Law Quarterly* 77(3), pp. 619–712.

Pathan, S (2009), 'Strong boards, CEO power and bank risk-taking', *Journal of Banking and Finance* 33, pp 1340–50.

Rochet, J-C (1992), 'Capital requirements and the behaviour of commercial banks', *European Economic Review* 36, pp 1137–70.

Senior Supervisors Group (2008), 'Observation on risk management practices during the recent market turbulence', Basel, Financial Stability Board.

Senior Supervisors Group (2009), 'Risk management lessons from the global banking crisis of 2008', Basel, Financial Stability Board.

Senior Supervisors Group (2010), 'Observations on risk appetite frameworks and IT infrastructures', Basel, Financial Stability Board.

Stiroh, K J (2004), 'Diversification in banking: is noninterest income the answer?' *Journal of Money, Credit and Banking* 36, pp 853–82.

Sundaresan, S and Wang, Z (2011), 'Design of contingent capital with a stock price trigger for mandatory conversion', Federal Reserve Bank of New York Staff Paper 448.

Suntheim, F (2010), 'Managerial compensation in the financial service industry', mimeo, Bocconi University.

Surowiecki, J (2010), 'The debt economy', *New Yorker,* 23 Nov.

Tung, F and Wang, X (2011), 'Bank CEOs, inside debt compensation, and the global financial crisis', mimeo, Boston University.

Vander Vennet, R (1999), 'The Effect of Mergers and Acquisitions on the Efficiency and Profitability of EC Credit Institutions', *Journal of Banking and Finance* 20, 1531–1558.

Walker Report (2009), A Review of Corporate Governance in UK Banks and Other Financial Industry Entities, chair D Walker, London, HM Treasury, at *http://www.hm-treasury.gov.uk/d/walker_review_consultation_160709.pdf* (accessed Feb 2012).

## Appendix

**Table 1** The relationship between governance and measures of risk and performance

| | | | Risk measures | | | Performance measures | | |
|---|---|---|---|---|---|---|---|---|
| | Authors | Period | Measure | Period | Sign | Measure | Period | Sign |
| Board | | | | | | | | |
| % Independent directors | Erkens, Hung and Matos (2009)[a] | Dec '06 | Writedowns | Q1 '07-Q3 '08 | Positive | Stock returns | Q1 07-Q3 08 | Negative |
| | Pathan (2009) ** | '97-'04 | Std Dev. Stock returns | '97-'04 | Negative | | | |
| | | '97-'04 | Systematic (Beta) | '97-'04 | Negative | | | |
| | | '97-'04 | Idiosyncratic (residuals) | '97-'04 | Negative | | | |
| | Faleye and Krishnan (2010) | '94-'06 | Non-investment grade rating by S&P of borrowers (new loans) | '94-'06 | Negative | | | |
| | Minton, Taillard and Williamson (2010) | '01-'08 | Std Dev. Stock returns | '01-'08 | Negative | | | |
| | | '06 | Receive TARP funds | | Positive | | | |
| | Adams (2009) | '07 | Receive TARP funds | | Positive | | | |
| Board size | Pathan (2009) ** | '97-'04 | Std Dev. Stock returns | '97-'04 | Negative | | | |
| | | '97-'04 | Systematic (Beta) | '97-'04 | Negative | | | |
| | | '97-'04 | Idiosyncratic (residuals) | '97-'04 | Negative | | | |
| | Faleye and Krishnan (2010) | '94-'06 | Non-investment grade rating by S&P of borrowers (new loans) | '94-'06 | Positive | | | |
| | Minton, Taillard,and Williamson (2010) | '01-'08 | Std Dev. Stock returns | '01-'08 | Negative | | | |

| | | | Risk measures | | | Performance measures | | |
|---|---|---|---|---|---|---|---|---|
| | Authors | Period | Measure | Period | Sign | Measure | Period | Sign |
| | | '06 | Received TARP funds | | Positive | | | |
| | Adams (2009) | '07 | Received TARP funds | | Positive | | | |
| Experience | Minton, Taillard and Williamson (2010) | '01-'08 | Std Dev. Stock returns | '01-'08 | Positive | | | |
| | | '06 | Received TARP funds | | Positive | | | |
| | Fernandes and Fich (2009) | '06 | | | | Stock returns | '07-'08 | Positive |
| CEO also chair | Faleye and Krishnan (2010) | '94-'06 | Non-investment grade rating by S&P of borrowers (new loans) | '94-'06 | Positive | | | |
| Risk committee | | | | | | | | |
| Risk Management Index | Ellul and Yerramilli (2010) ** | '00-'08 | Mean Implied Volatility of Put Options | '00-'08 | Negative | Sharpe Ratio | '00-'08 | Positive |
| | | '00-'08 | Marginal Expected Shortfall | '00-'08 | Negative | | | |
| | | '00-'08 | Std Deviation Stock Returns | '00-'08 | Negative | | | |
| CRO pay/ CEO pay | Ellul and Yerramilli (2010) ** | '06 | Mean Implied Volatility of Put Options | '07-'08 | Negative | | | |
| | | '06 | Marginal Expected Shortfall | '07-'08 | Negative | | | |
| | | '06 | Std Deviation Stock Returns | '07-'08 | Negative | | | |

| | | | Risk measures | | | Performance measures | | |
|---|---|---|---|---|---|---|---|---|
| | Authors | Period | Measure | Period | Sign | Measure | Period | Sign |
| CRO pay/ Top 5 executives' pay | Keys, Mukherjee, Seru and Vig (2009) ** | '01-'06 | Loan Delinquency | '01-'06 | Negative | | | |
| Quality of oversight | Ellul and Yerramilli (2010) ** | '00-'07 | Mean Implied Volatility of Put Options | '01-'08 | Negative | | | |
| | | '00-'07 | Std Deviation Stock Returns | '01-'08 | Negative | | | |
| Executive compensation | | | | | | | | |
| Residual pay (taking out firm size) | Cheng, Hong,and Scheinkman (2010) | '92-'94, '98-'00 | Beta | '95-'00, '01-'08 | Positive | Excess returns | '95-'00 | Positive |
| | | '92-'94, '98-'00 | Volatility of stock | '95-'00, '01-'08 | Positive | Excess returns | '01-'08 | Negative |
| | | '92-'94, '98-'00 | Correlation of stock returns with ABX | '95-'00, '01-'08 | Positive | | | |
| Vega | Chesney, Stromberg and Wagner (2010) | '02-'06 | Writedowns | Q3 '07 - Q4 '08 | Positive | | | |
| | Suntheim (2010)**[a] | '00 - '06 | Std Deviation Stock Returns | '00 - '06 | Positive | Stock returns | Q3 '07-Q4 '08 | Negative |
| | | '00 - '06 | Beta | '00 - '06 | Positive | | | |
| | DeYoung, Peng and Yen (2009)** | '94-'06 | Beta | '94-'06 | Positive | | | |
| | | '94-'06 | CAPM Residual | '94-'06 | Positive | | | |
| | | '94-'06 | Private MBS holdings | '94-'06 | Positive | | | |

| | | | Risk measures | | | Performance measures | | |
|---|---|---|---|---|---|---|---|---|
| | Authors | Period | Measure | Period | Sign | Measure | Period | Sign |
| | Ellul and Yerramilli (2010) ** | '00-'07 | Std Deviation Stock Returns | '01-'08 | Positive | | | |
| | Mehran and Rosenberg (2008)** | '93-'01 | Std Deviation Stock Returns | '94-'02 | Positive | | | |
| | | '93-'01 | Residual Volatility | '94-'02 | Positive | | | |
| Delta | Chesney, Stromberg and Wagner (2010) | '02-'06 | Writedowns | Q3 '07 - Q4 '08 | Positive | | | |
| | Suntheim (2010)**[a] | '00 - '06 | CAPM residual (idiosyncratic risk) | '00 - '06 | Negative | | | |
| | | '00 - '06 | Beta | '00 - '06 | Negative | | | |
| | DeYoung, Peng and Yen (2009)** | '94-'06 | Beta | '94-'06 | Positive | | | |
| | Mehran and Rosenberg (2008)** | '93-'01 | Systematic volatility | '94-'02 | Positive | | | |
| | Fahlenbrach and Stulz (2010) | '06 | | | | Stock Returns | Q3 '07-Q4 '08 | Negative |
| | | '06 | | | | ROE | Q3 '07-Q4 '08 | Negative |
| | | '06 | | | | ROA | Q3 '07-Q4 '08 | Negative |
| % comp in deferred stock and options | Balachandran, Kogut and Harnal (2010)** | '95-'07 | Predicted default probability | '96-'08 | Positive | | | |
| Institutional ownership | Erkens, Hung and Matos (2009) [a] | Dec '06 | Writedowns | Q1 07 -Q3 08 | Positive | | | |

| | | Risk measures | | | Performance measures | | |
|---|---|---|---|---|---|---|---|
| Authors | Period | Measure | Period | Sign | Measure | Period | Sign |
| Ellul and Yerramilli (2010) ** | '00-'07 | Mean Implied Volatility of Put Options | '01-'08 | Positive | | | |
| | '00-'07 | Std Deviation Stock Returns | '01-'08 | Positive | | | |
| Cheng, Hong and Scheinkman (2010) | '92-'94, '98-'00 | Risk Score | '95-'00, '01-'08 | Positive | Excess returns | '95-'00 | Positive |
| | | | | | Excess returns | '01-'08 | Negative |
| Laeven and Levine (2009)[a]** | '01 | z-score | (i) '01, (ii) '02-'04 | Negative | | | |
| | | Equity volatility | '01 | Positive | | | |
| | | Earnings volatility | '01 | Positive | | | |

*Notes:* [a] indicates that authors use an international sample. Erkens, Hung and Matos (2009) have a 42% US sample, while Suntheim (2010) has a 31% US sample. ** indicates authors used econometric techniques other than lags to correct for endogeneity issue. Only coefficients that were significant are reported here. Lack of significance is also informative, but was not included for presentational purposes.

# 3 The Countercyclical Capital Buffer of Basel III

## A Critical Assessment

**Rafael Repullo and Jesús Saurina**[1]
*CEMFI and CEPR; Banco de España*

## 1 Introduction

Since their first meeting during the financial turmoil, which took place in São Paulo on the second weekend of November 2008, the G20 has been aware of the problem of procyclicality in the regulatory framework. They agreed that it was important 'to address the issue of procyclicality in financial markets regulations and supervisory systems'. One week later, in Washington, they referred again to this problem, now under one of the five principles for reform of financial markets, namely the principle of 'enhancing sound regulation'. They also instructed the International Monetary Fund (IMF), the Financial Stability Forum (FSF), later renamed Financial Stability Board (FSB), and the Basel Committee on Banking Supervision (BCBS) 'to develop recommendations to mitigate procyclicality, including the review of how valuation and leverage, bank capital, executive compensation, and provisioning practices may exacerbate cyclical trends'. Not only these institutions, but also the G20 finance ministers were requested to formulate recommendations on 'mitigating against procyclicality in regulatory policy'. Therefore, from the beginning of the crisis procyclicality was regarded as a key issue to be addressed.

Four months later, a progress report was more specific,[2] making reference to 'building buffers of resources in good times and measures to constrain leverage' in order to 'ensure that financial regulations dampen rather than exacerbate economic cycles'. This sentence would appear in the following G20 statements.

1 The views expressed in this paper are those of the authors and should not be attributed to the Banco de España or the Eurosystem. We would like to thank Ugo Albertazzi, Michael Gordy, Xavier Freixas, Michal Kowalik, Luis Servén and Javier Suarez for helpful comments, as well as Carlos Trucharte for his contribution to our related work on the procyclicality of Basel II, and Francesc Rodríguez for his excellent research assistance. Financial support from the Spanish Ministry of Science and Innovation (Grant No EC2008-00801) is gratefully acknowledged.

2 'Progress report on the immediate actions of the Washington action plan prepared by the UK chair of the G20', 14 Mar 2009. This and subsequent G20 documents referred to are available at http://www.g20.org/en/financial-track/documents (accessed Feb 2012).

The 'Progress report on the actions of the Washington Action Plan', presented on 2 April 2009 in London, stated that the FSF had formed three work streams to study the forces that contribute to procyclicality in the financial system, one of them focusing on bank capital. Moreover, a deadline of the end of 2009 was set to take forward 'implementation of the recommendations to mitigate procyclicality, including a requirement for banks to build buffers of resources in good times that they can draw down when conditions deteriorate'.

In September 2009, another progress report highlighted the efforts to come up with a proposal:[3] 'The BCBS has developed objectives for what a countercyclical capital buffer should achieve and concrete proposals for how it could work. An integrated proposal will be reviewed at the BCBS's September meeting.' It also added that 'the BCBS continues to work on approaches to address any excessive cyclicality of minimum capital requirements'. This was the first time that the G20 made an explicit reference to the cyclicality of minimum capital requirements. The statement of the following Pittsburgh summit called on finance ministers and Central Bank governors to reach agreement on an international framework of reform in four critical areas, the first one being 'building high quality capital and mitigating procyclicality'. It was also noted in the progress report of 25 September 2009 that

> 'the Group of Central Bank Governors and Heads of Supervision, the oversight body of the BCBS, reached agreement in September to introduce a framework for countercyclical capital buffers above the minimum requirement. The framework will include capital conservation measures such as constraints on capital distributions. The Basel Committee will review an appropriate set of indicators, such as earnings and credit-based variables, as a way to condition the build up and release of capital buffers.'

In December 2009, the Basel Committee published a consultative document that considered a series of measures to address procyclicality (BCBS, 2009), with the following four key objectives: dampen any excess cyclicality of the minimum capital requirement, promote more forward looking provisions, conserve capital to build buffers that can be used in stress, and achieve the broader macroprudential goal of protecting the banking sector from periods of excess credit growth. The third objective gave rise to the *capital conservation buffer* and the fourth to the *countercyclical capital buffer* of the new regulatory framework known as Basel III.

The rationale for the countercyclical capital buffer was presented in the following terms:

> 'As witnessed during the financial crisis, losses incurred in the banking sector during a downturn preceded by a period of excess credit growth can be extremely large. These can destabilise the banking sector, which in turn can bring about or exacerbate a downturn in the real economy, which

3 'Progress report on the actions of the London and Washington G20 Summits', 5 Sept 2009.

> can further destabilise the banking sector. These inter-linkages highlight the particular importance of the banking sector building up its capital defences in periods when credit has grown to excessive levels. As capital is more expensive than other forms of funding, the building up of these defences should have the additional benefit of helping to moderate credit growth.'

A key element of the proposal was to identify a macroeconomic variable or group of variables 'to assess the extent to which in any given jurisdiction there was a significant risk that credit had grown to excessive levels'. The buffer would operate as follows: 'For each jurisdiction, when the variable breached certain pre-defined thresholds this would give rise to a benchmark buffer requirement. This could then be used by national jurisdictions to expand the size of the capital conservation buffer.' The Basel Committee added that 'as an example, one variable which is being considered is the difference between the aggregate credit-to-GDP ratio and its long term trend', but they also noted that 'the proposal under development could not be implemented as a strict rules-based regime. Such an approach would require a high degree of confidence that the variables used would always, under all circumstances, perform as intended and would not send out false signals. This level of confidence will not be possible.'

In July 2010, the Basel Committee published for consultation the countercyclical capital buffer proposal (BCBS, 2010b). The proposal was justified by the aim 'to achieve the broader macroprudential goal of protecting the banking sector from periods of excess aggregate credit growth that have often been associated with the build up of system-wide risk'. The proposal, which will be described in detail in section 2 below, was to use the deviations of the credit-to-GDP ratio with respect to its trend as the macroeconomic variable that would drive the behaviour of the buffer. The consultative document also described how the buffer should be implemented for banks operating in different jurisdictions, as well as the principles that should govern the decisions on the buffer and its interaction with the capital conservation buffer. The proposal was incorporated with minor changes in the Basel III document issued by the Basel Committee in December 2010 (BCBS, 2010a). A guidance for national authorities operating the countercyclical capital buffer was published at the same time (BCBS, 2010c).

The interest in using macroprudential instruments to deal with the procyclicality of the financial system goes beyond the circle of G20/FSB/BCBS. The Bank for International Settlements (BIS) has consistently supported the use of macroprudential instruments to address procyclicality. For instance, BIS (2010) contains a list of such instruments, including the Spanish dynamic provisions. Also a recent report of the Group of Thirty (2010) notes that procyclical practices within the financial sector can be reinforced by regulatory practices, including, among others, risk-sensitive capital requirements à la Basel II and Basel III. For that reason, they support the adoption of countercyclical capital buffers.

On the academic front, there is the early work of Kashyap and Stein (2004) in which they propose a simple framework for optimal bank capital regulation according to which capital charges should depend on the state of the business cycle. In contrast with the normative approach of Kashyap and Stein (2004), the approach of Repullo and Suarez (2009) is positive. They show that under risk-based capital requirements banks hold larger buffers in expansions than in recessions, but these buffers are insufficient to prevent a significant contraction in the supply of credit at the arrival of a recession. They also show that cyclical adjustments in capital requirements can ameliorate these effects. More recent arguments in favour of time-varying capital requirements may be found in Hanson *et al* (2010) and in Shleifer and Vishny (2010). The work of Gordy and Howells (2006) addresses how to correct the cyclicality of minimum capital requirements over the business cycle. Using Spanish data, Repullo *et al* (2010) compare the different procedures to adjust capital requirements over the cycle, concluding that the best procedure is to use a business cycle multiplier based on GDP growth.

The purpose of this paper is to provide a critical assessment of the countercyclical capital buffer proposal agreed by the Basel Committee in December 2010. This buffer constitutes the most significant macroprudential element of the Basel III package. However, we argue that the key macroeconomic variable on which it based, the deviation of the credit-to-GDP ratio with respect to its trend, the credit-to-GDP gap, is for many countries negatively correlated with GDP growth. This result may be traced to the fact that credit usually lags the business cycle, especially in downturns, and that the use of deviations of the credit-to-GDP ratio with respect to its trend compounds the problem, because it takes some time before the ratio crosses the trend line. The implication is that a mechanical application of the new regulation would tend to reduce capital requirements in good times and increase capital requirements in bad times, so it may end up exacerbating rather than ameliorating the inherent procyclicality of risk-sensitive bank capital regulation.

The paper is organised as follows. Section 2 describes the Basel III countercyclical capital buffer. Section 3 presents and discusses the evidence on the correlation of the credit-to-GDP gap variable on which the buffer is based and GDP growth. Section 4 considers whether it would have been better to use credit growth as the macroeconomic variable driving the behaviour of the buffer. Section 5 reviews the approach in Repullo *et al* (2010) of addressing the procyclicality of minimum capital requirements with a business cycle multiplier based on GDP growth. Section 6 concludes.

## 2 The countercyclical capital buffer

This section presents a summary of the countercyclical capital buffer described in section IV of the Basel III document (BCBS, 2010a) and in the guidance document (BCBS, 2010c). Basel III requires national authorities 'to monitor credit growth and other indicators that may signal a build up of system-wide risk'. Based on this assessment they will put in place a countercyclical capital buffer which will extend the capital conservation buffer (described in section III of BCBS, 2010a), so banks will be subject to restrictions on capital distributions (dividends, share repurchases and discretionary bonus payments to staff) if they do not meet the additional capital requirement.

The countercyclical capital buffer will range from zero to 2.5% of risk-weighted assets. National authorities will pre-announce the decision to raise the level of the buffer by up to 12 months, but the decision to decrease the level of the buffer will take effect immediately.

The guidance document specifies five principles, the first restating the objectives of the buffer, the second noting that a useful common reference point for taking buffer decisions is the behaviour of the credit-to-GDP guide, the third warning about the possibility that this variable may give misleading signals, the fourth mandating the prompt release of the buffer in times of stress, and the fifth reminding authorities that they should also consider other macroprudential tools. Annex 1 of the guidance document presents a detailed description of the methodology developed 'to calculate an internationally consistent buffer guide that can serve as a common starting reference point for taking buffer decisions'. This methodology may be summarised as follows.

Let $x_t$ denote the aggregate private sector credit-to-GDP ratio, and let $\overline{x}_t$ denote the Hodrick-Prescott trend of $x_t$, computed using a smoothing parameter $\lambda$ = 400,000. Then the *credit-to-GDP gap* $z_t$ is defined as the deviation of the credit-to-GDP ratio from its trend, that is:

$$z_t = x_t - \overline{x}_t$$

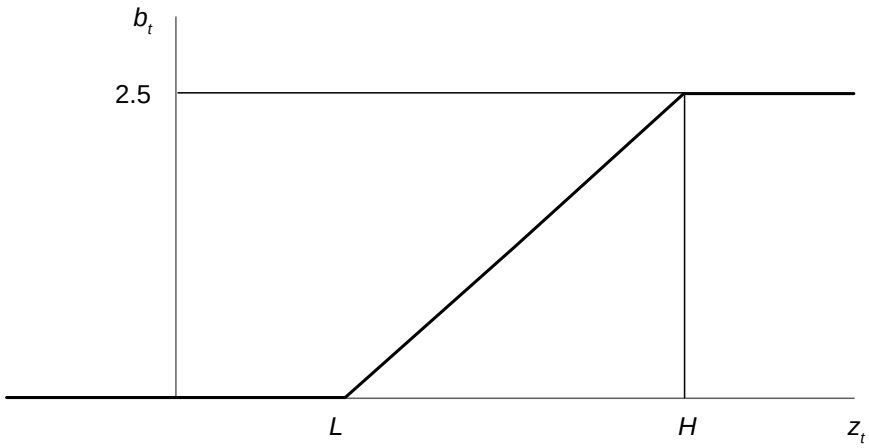
The benchmark countercyclical capital buffer $b_t$ will be set according to the following formula:

$$b_t = b(z_t) = \begin{cases} 0 & \text{if } z_t < L \\ \dfrac{z_t - L}{H - L} 2.5 & \text{if } L \le z_t \le H \\ 2.5 & \text{if } H < z_t \end{cases}$$

where $L$ and $H$ denote a lower and an upper threshold for the gap. The buffer $b_t$ will be zero when the gap $z_t$ is below the lower threshold $L$ and will be at its maximum level (2.5%) when the gap $z_t$ is above the upper threshold $H$. Between

these two levels, the buffer is a linearly increasing function of the gap. With respect to the values of $L$ and $H$ the guidance states: 'BCBS analysis has found that an adjustment factor based on $L = 2$ and $H = 10$ provides a reasonable and robust specification based on historical banking crises.' Figure 1 plots the relationship between the countercyclical buffer $b_t$ and the credit-to-GDP gap $z_t$.

**Figure 1** Relationship between the countercyclical capital buffer and credit-to-GDP gap




The rationale for this specification of the buffer as well as for the choice of the credit-to-GDP gap as the 'common reference point' for taking buffer decisions is found in Drehmann *et al* (2010):

> 'The analysis shows that the best variables which could be used as signals for the pace and size of the accumulation of the buffers are not necessarily the best signalling the timing and intensity of the release. Credit seems to be preferable for the build-up phase. In particular when measured by the deviation of the credit-to-GDP ratio from its trend, it has proven leading indicator properties for financial distress.'

They also conclude that 'some measure of aggregate banking sector losses, possibly combined with indicators of credit conditions, seems best for signalling the beginning of the release phase'.

In other words, the strategy in their paper is to find the best leading indicator of systemic banking crisis, which they claim is the credit-to-GDP gap. They also acknowledge that this indicator does not perform very well in bad times, so they propose other indicators for the release phase. However, no consideration is given to the possible relationship between the credit-to-GDP gap and standard business cycle indicators such as the rate of growth of the GDP, which are key to

assessing the procyclicality of the proposed regulation. This will be the focus of our discussion in section 3 below.

It is important to note that the guidance document introduced some caveats with respect to the use of the credit-to-GDP gap. First, they state that 'authorities should look for evidence as to whether the inferences from the credit/GDP guide are consistent with those of other variables'. Second, they add that 'given that credit growth can be a lagging indicator of stress, promptly releasing the buffer may be required to reduce the risk of the supply of credit being constrained by regulatory capital requirements'. In other words, they warn that the credit-to-GDP gap may give misleading signals and should probably not be used for the release of the buffer. So judgement should be exercised in the build-up phase and especially in the release phase. In the Basel jargon, this means that the countercyclical capital buffer incorporates elements of both Pillar 1 (minimum capital requirements) and Pillar 2 (supervisory review process).[4]

## 3 The credit-to-GDP gap and the business cycle

In section 2 we noted that the choice of the credit-to-GDP gap as the 'common reference point' for taking buffer decisions was based on its properties as leading indicator of systemic banking crisis, without regard to how it might correlate with standard business cycle indicators such as the rate of growth of the GDP. This section looks at this correlation in order to assess to what extent the countercyclical capital buffer may have some undesirable side-effects on the procyclicality of the Basel III regime.

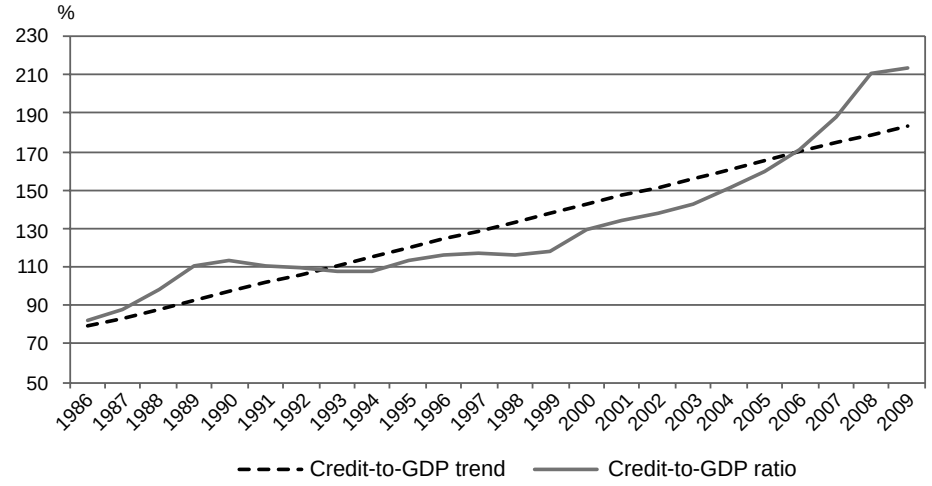
We use the data on domestic credit to the private sector as a percentage of GDP from the database of the World Bank[5] for a number of countries to compute the credit-to-GDP gap for the period 1986–2009, which we then correlate with the corresponding rate of growth of the GDP.

Let us take the United Kingdom as an illustrative example. The solid line in Figure 2 represents the evolution of domestic credit to the private sector as a percentage of GDP for the 24 years of the sample. This variable increases from 81.8% in 1986 to 213.4% in 2009. The dashed line is the corresponding Hodrick-Prescott (HP) trend computed, as suggested by the guidance document (BCBS, 2010c), with a smoothing parameter $\lambda = 400{,}000$ (which makes it essentially a linear trend).

4 In the words of the guidance document: 'The countercyclical capital buffer … is like a Pillar 1 approach in that it is a framework consisting of a set of mandatory rules and disclosure requirements. However, its use of jurisdictional judgement in setting buffer levels and the discretion provided in terms of how authorities explain buffer actions are more akin to a Pillar 2 approach.'

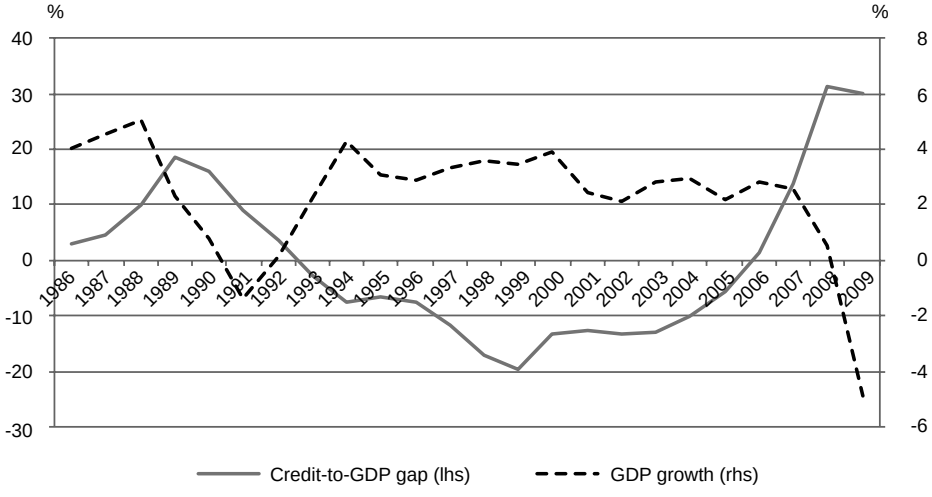
5 See http://data.worldbank.org/indicator/FS.AST.PRVT.GD.ZS (accessed Feb 2012).

**Figure 2** Credit-to-GDP ratio and its trend, UK, 1986–2009




The solid line in Figure 3 represents the evolution of the credit-to-GDP gap $z_t$ in the UK, that is, the difference between the credit-to-GDP ratio (the solid line in Figure 2) and its HP trend (the dashed line in Figure 2). The gap starts from 2.9% in 1986, it peaks at 18.5% in 1989, it then decreases until it reaches its minimum at –19.5% in 1999, thereafter increasing until it reaches its maximum at 31.4% in 2008. The dashed line in Figure 3 represents the corresponding evolution of real GDP growth, denoted $y_t$. It is pretty clear that the two variables are negatively correlated: when GDP growth is low (as in the two recessions in the sample) the credit-to-GDP gap tends to be high, and vice versa.

**Figure 3** Credit-to-GDP gap and GDP growth, UK, 1986–2009



To further illustrate this point, Figure 4 shows the scatter plot of the two variables, GDP growth $y_t$ in the horizontal axis and credit-to-GDP gap $z_t$ in the vertical axis, together with the corresponding regression line. The slope coefficient is negative and statistically significant, with a *p*-value of 0.003.

**Figure 4** Credit-to-GDP gap and GDP growth, UK, 1986–2009

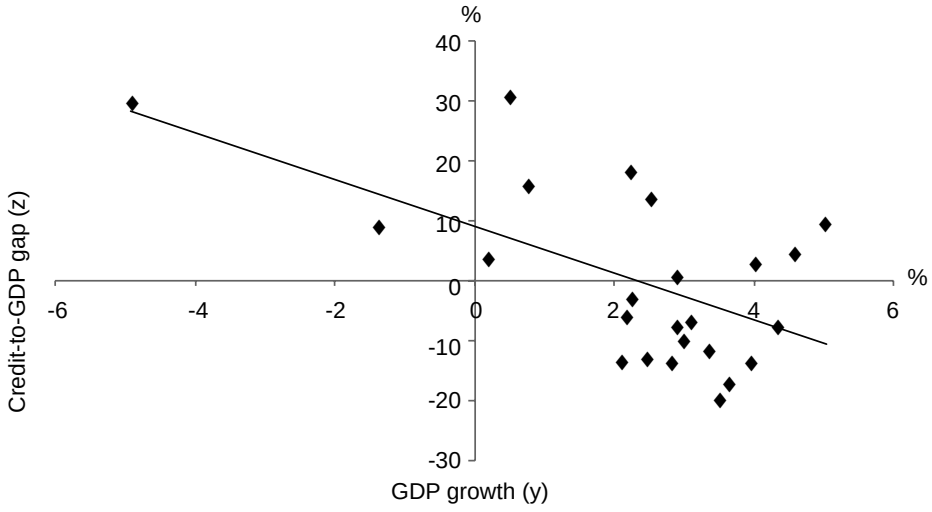
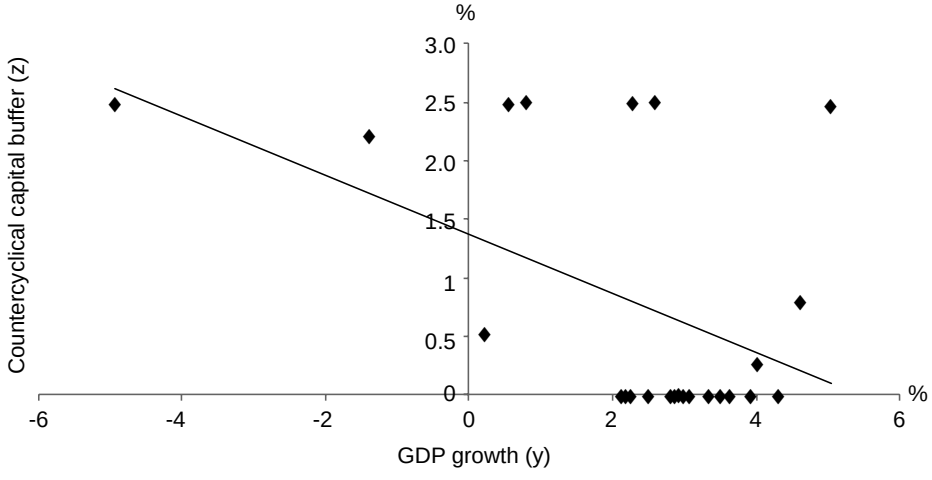



**Figure 5** Countercyclical capital buffer and GDP growth UK, 1986–2009



Finally, Figure 5 shows the scatter plot of GDP growth $y_t$ in the horizontal axis and the countercyclical capital buffer $b_t$ in the vertical axis. Note that the buffer $b_t$ is zero for those years in the sample for which the gap $z_t$ is below the lower threshold $L = 2\%$, and it is at its maximum (2.5%) for those years for which the gap $z_t$ is above the upper threshold $H = 10\%$. The corresponding regression line has a negative slope coefficient, which is again statistically significant, with a $p$-value of 0.017.

We have computed these correlations for six other countries: France, Germany, Italy, Japan, Spain, and the United States. The first column of Table 1 shows the correlations between GDP growth $y_t$ and the credit-to-GDP gap $z_t$ for these countries. All the correlations are negative, except the one for the US, but the average correlation across countries is –0.21. The second column of Table 1 shows the correlations between GDP growth $y_t$ and the countercyclical capital buffer $b_t$ for these countries. All the correlations are again negative, except the one for the US, with an average across countries of –0.19. Figures A1–A6 in the appendix represent the credit-to-GDP gap and GDP growth for the six countries.

**Table 1** Correlation between GDP growth $y_t$ and the credit-to-GDP gap $z_t$ and between GDP growth $y_t$ and the countercyclical capital buffer $b_t$ for selected countries, 1986–2009, using World Bank data on domestic credit to the private sector

| | Corr. ($y_t$, $z_t$) | Corr. ( $y_t$, $b_t$) |
|---|---|---|
| France | –0.42 | –0.48 |
| Germany | –0.06 | –0.04 |
| Italy | –0.22 | –0.35 |
| Japan | –0.19 | –0.22 |
| Spain | –0.29 | –0.01 |
| United Kingdom | –0.58 | –0.48 |
| United States | 0.30 | 0.26 |

To check the robustness of these results we have computed these correlations using the data on private credit by deposit money banks and other financial institutions as a percentage of GDP in the new database of the World Bank on Financial Development and Structure.[6] The first column of Table 2 shows the correlations between GDP growth $y_t$ and the credit-to-GDP gap $z_t$ for the alternative credit measure. All the correlations are negative, except the one for Germany, but the average correlation across countries is –0.21. The second column of Table 2 shows the correlations between GDP growth $y_t$ and the countercyclical capital buffer $b_t$ for the alternative credit measure. Here all the correlations are negative, except the one for Spain, but the average across countries is –0.19. The positive correlations for Germany and Spain are, in any case, very close to zero.

6 See http://go.worldbank.org/X23UD9QUX0 (accessed Feb 2012) and Beck and Demirgüç-Kunt (2009).

**Table 2** Correlation between GDP growth $y_t$ and the credit-to-GDP gap $z_t$ and between GDP growth $y_t$ and the countercyclical capital buffer $b_t$ for selected countries, 1986–2009, using World Bank data on private credit by deposit money banks and other financial institutions

| | Corr. $(y_t, z_t)$ | Corr.$(y_t, b_t)$ |
|---|---|---|
| France | –0.61 | –0.65 |
| Germany | 0.07 | –0.10 |
| Italy | –0.32 | –0.40 |
| Japan | –0.26 | –0.28 |
| Spain | –0.43 | 0.05 |
| United Kingdom | –0.72 | –0.67 |
| United States | –0.23 | –0.18 |

It is important to note that correlations for individual countries are very sensitive to the definition of the credit variable and the choice of sample period. For example, the ones for the US go from positive in Table 1 to negative in Table 2. Also, leaving out 2009 changes the figure for Germany in the first column of Table 2 from 0.07 to –0.29, and it changes the figure for the US in the second column of table 2 from –0.18 to 0.05.

The conclusion from these results is that the variable chosen by the Basel Committee as 'common reference point' for taking buffer decisions fails the Hippocratic dictum: 'First, do no harm.' Its correlation with GDP growth is generally negative, which means that the credit-to-GDP gap would tend to signal to reduce capital requirements when GDP growth is high, and to increase capital requirements when GDP growth is low. Thus, the countercyclical capital buffer of Basel III appears to contradict the mandate of the G20 to require banks 'to build buffers of resources in good times that they can draw down when conditions deteriorate'.

The problems with the credit-to-GDP gap variable may be traced to the following two sources. First, there is the empirical regularity that credit usually lags the business cycle (see, for example, the evidence in Giannone *et al*, 2010). In particular, in downturns the credit-to-GDP ratio continues to be high because of greater credit demand by households and firms (making use of credit lines, partly to finance inventory accumulation) and a slower, sometimes even negative, GDP growth. Second, the use of deviations of the credit-to-GDP ratio with respect to its trend compounds the problem, because it takes some time before the ratio crosses the trend line. This is clearly illustrated in Figures 2 and 3. In 2009, in the middle of the biggest recession since the Great Depression, the credit-to-GDP gap in the UK was 29.9%, way above the upper threshold $H = 10\%$ below which the buffer starts to be reduced from its maximum 2.5% level, and even more distant from the lower threshold $L = 2\%$ below which the buffer is completely released.

However, one should note the caveats of the Basel Committee with respect to the mechanical use of the credit-to-GDP gap. In particular, they acknowledged that the gap may not be a good indicator of stress in downturns and proposed to use supervisory judgement to release the buffer.

We have a number of concerns about this proposal too. First, the key role given to supervisory judgement may create an unlevel playing field at the international level. Second, the mixture of Pillar 1 and Pillar 2 elements may pose implementation problems in some jurisdictions. For example, in the US, the Federal Deposit Insurance Corporation Improvement Act (FDICIA) requires supervisors to undertake certain actions only when specified Pillar 1 capital ratio thresholds are breached. Third, a micro-oriented supervisor concerned about bank failures would naturally be averse to reducing capital requirements in a downturn. Finally, financial markets might react very negatively to a supervisory decision on release of the buffer due to the worsening of economic conditions. Thus, even a macro-oriented supervisor would probably do too little too late, which could contribute to further reducing the supply of credit in downturns.

## 4 Would credit growth be better?

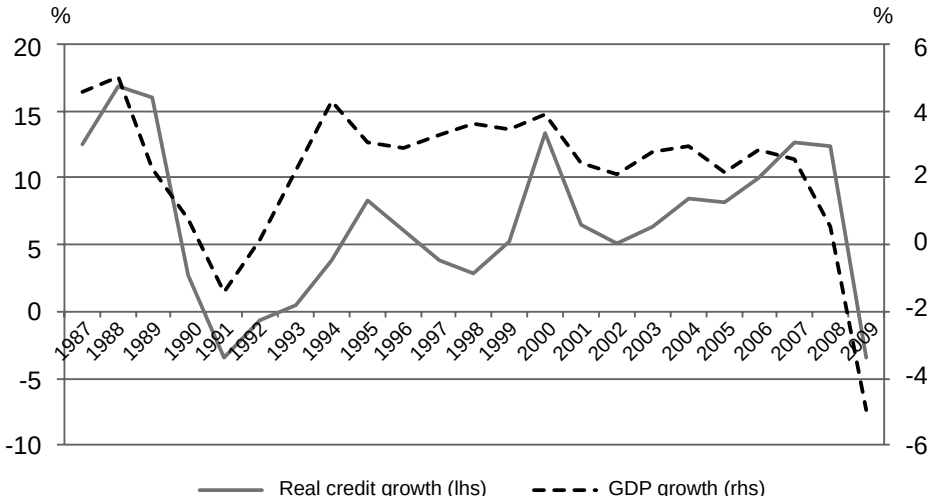
An obvious alternative to using the credit-to-GDP gap as the 'common reference point' for taking buffer decisions would be to use credit growth, or to be more precise the deviations of credit growth with respect to a long-run average. It would share the same rationale as the credit-to-GDP gap in terms of being a leading indicator of systemic banking crisis,[7] and it would also have the problem of lagging the business cycle, but at least it would not have the additional lag introduced by using deviations of the credit-to-GDP ratio with respect to its trend.

As in the previous section, we look at how credit growth correlates with GDP growth in order to assess to what extent a countercyclical capital buffer based on credit growth would contribute to the procyclicality of the Basel III regime. Again, we take the UK as an illustrative example, and use the data on domestic credit to the private sector from the database of the World Bank.[8] We use the GDP deflator to get from nominal to real values. The solid line in Figure 6 represents the rate of growth of real domestic credit to the private sector in the UK for the 24 years of the sample. The series exhibits four peaks, in 1988, 1995, 2000 and 2007, and shows negative values for 1991, 1992, and 2009. The dashed line in Figure 6 represents the corresponding evolution of real GDP growth. The two variables seem to be positively correlated, with a lagged response of credit apparent in 1988, 1995 and 2008.

7 Recent work by Jordà *et al* (2010), based on data on financial crisis in 14 countries during the past 140 years, concludes that 'credit growth generates the best predictive signals of impeding financial instability'.

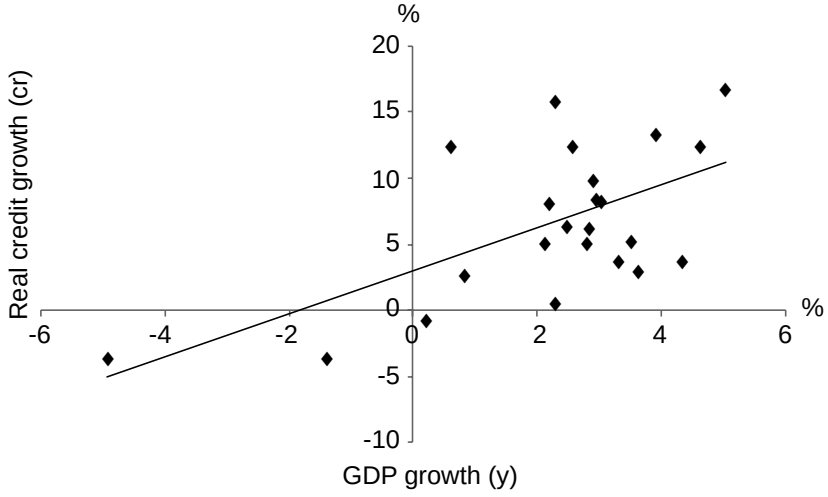
8 See http://data.worldbank.org/indicator/FS.AST.PRVT.GD.ZS.

**Figure 6** Real credit growth and GDP growth, 1986–2009




To further illustrate this point, Figure 7 shows the scatter plot of the two variables, GDP growth $y_t$ in the horizontal axis and real credit growth $cr_t$ in the vertical axis, together with the corresponding regression line. The slope coefficient is positive and statistically significant, with a *p*-value of 0.002.

**Figure 7** Real credit growth and GDP growth, 1986–2009



We have computed the correlations between credit growth (both in nominal and real terms) and GDP growth for the seven countries considered in section 3. The first column of table 3 shows the correlations between GDP growth $y_t$ and real credit growth $cr_t$ for these countries. In sharp contrast with the results for the credit-to-GDP gap in tables 1 and 2, all the correlations are now positive, with an average across countries of 0.51. The second column of table 3 shows the correlations between GDP growth $y_t$ and nominal credit growth $cn_t$ for these countries. Again, all the correlations are positive, with an average across countries of 0.55.

**Table 3** Correlation between GDP growth $y_t$ and real credit growth $cr_t$ and between GDP growth $y_t$ and nominal credit growth $cn_t$ for selected countries, 1986–2009, using World Bank data on domestic credit to the private sector

| | Corr. ($y_t$, $cr_t$) | Corr.( $y_t$, $cn_t$) |
|---|---|---|
| France | 0.62 | 0.60 |
| Germany | 0.32 | 0.52 |
| Italy | 0.30 | 0.43 |
| Japan | 0.61 | 0.62 |
| Spain | 0.67 | 0.69 |
| United Kingdom | 0.62 | 0.55 |
| United States | 0.43 | 0.44 |

The conclusion from these results is that credit growth appears to be a much better common reference point for the countercyclical capital buffer, in the sense that it is a good signal of the build-up of systemic risk and it does not exacerbate the underlying procyclicality of the minimum capital requirements. For purpose of regulation, it would make sense to introduce it in deviations with respect to a long-run average. Further work would be needed on the precise definition of the long-run average as well as on the choice between real and nominal credit growth.[9]

However, it is important to note that this improved common reference point for the countercyclical capital buffer leaves essentially untouched the really important problem, which is the cyclicality of the minimum capital requirement. We now turn to this issue.

9 One advantage of the latter would be that it is available with a shorter lag and it is not subject to the problem of revisions in the GDP deflator.

## 5 The procyclicality of the minimum capital requirement

As noted above, the December 2009 consultative document of the Basel Committee (BCBS, 2009) considered a series of measures to address procyclicality with four key objectives, the first one being to 'dampen any excess cyclicality of the minimum capital requirement'. They noted that 'it is still too early to opine on whether the Basel II framework is proving to be more cyclical than expected', adding that 'should the cyclicality of the minimum capital requirement be greater than supervisors deem appropriate, the Committee will consider additional measures to dampen such cyclicality'. No such measures were introduced in the Basel III document (BCBS, 2010c), which only repeats this last sentence. In fact, the document explicitly downplays the importance of the issue: 'It is not possible to achieve greater risk sensitivity across institutions at a given point in time without introducing *a certain degree of cyclicality* [our italics] in minimum capital requirements over time.'

In our view this is unfortunate. The work of Kashyap and Stein (2004), Gordy and Howells (2006) and Repullo and Suarez (2009) warns about the potential business cycle amplification effects of Basel II. More recently, the empirical work of Repullo *et al* (2010) shows that Basel II capital requirements are highly negatively correlated with the business cycle. The analysis is based on the results of the estimation of a logistic model of the one-year-ahead probabilities of default (PDs) of Spanish firms during the period 1987–2008, using information from the Credit Register of the Bank of Spain.[10] The explanatory variables used comprise characteristics of the firm (industry, location, age, credit line utilisation, and previous delinquencies and loan defaults), characteristics of its loans (size, collateral and maturity), characteristics of the banks from which the firm borrows (distribution of exposures among lenders and changes in the main provider of finance) and macroeconomic controls (the rate of growth of the GDP, the rate of growth of bank credit, and the return of the stock market). The estimated point-in-time PDs are then used to compute the corresponding time series of aggregate Basel II capital requirements per unit of loans. These requirements move significantly along the business cycle, ranging from 7.6% (in 2006) to 11.9% (in 1993). The variability of 57% from peak to trough in Basel II capital requirements contrasts with the flat 8% requirement of Basel I. Earlier work of Saurina and Trucharte (2007) had found an even larger variability for the mortgage portfolio of Spanish banks: minimum capital requirements based on point-in-time PDs could increase more than twice from peak to trough.[11]

All in all, this evidence suggests that the procyclicality of Basel II is a real problem. The same can be said about Basel III, since the new regulation does not change the risk sensitivity of minimum capital requirements. The result is that bank

10 This is a comprehensive database containing information of any loan granted in Spain by any bank operating in Spain above a minimum threshold of €6,000. Further details of this database may be found in Jiménez *et al* (2009b).

11 The effect could be even bigger if losses given default (LGDs) and exposures at default (EADs) also vary with the business cycle; see Repullo *et al* (2010) and Jiménez *et al* (2009a), respectively.

capital regulation may amplify business cycle fluctuations. The effect could be especially important in downturns, with banks possibly facing a 'capital crunch' that would further restrict their lending.[12]

Therefore, an outstanding policy issue is how to mitigate the procyclicality of minimum capital requirements embedded in Basel III. According to Gordy and Howells (2006) there are two basic alternatives: One can either smooth the input of the Basel III formulas, by using some sort of through-the-cycle adjustment of the PDs, or smooth the output by using some adjustment of the Basel III capital requirements computed from the point-in-time PDs.

A note published by the joint FSF-BCBS Working Group on Capital Issues in March 2009 recommended that 'the Basel Committee should monitor the impact of the Basel II framework and make appropriate adjustments to dampen excessive cyclicality of the minimum capital requirements', adding that 'the preliminary conclusion of the Committee is to maintain the risk sensitivity of the inputs of the Basel II capital requirements and instead focus on dampening the outputs'. Although this statement pointed in the direction of 'smoothing the output' approaches, nothing has been done along these lines, and the Basel Committee now seems to favour the alternative through-the-cycle approaches.[13]

The use of through-the-cycle approaches was criticised by Gordy and Howells (2006) on the grounds that they are 'less sensitive to market conditions than point-in-time ones, [so] they are less useful for active portfolio management and as inputs to ratings-based pricing models'. Moreover, they also noted that 'despite the ubiquity of the term "through-the-cycle" in descriptions of rating methods, there seems to be no consensus on precisely what is meant'. The UK Financial Services Authority (2009) found challenging adjusting PDs so that they reflect 'an average experience across the cycle', since it requires 'the ability to differentiate changes in default experience that are due entirely to the economic cycle from those that are due to a changing level of noncyclical risk in the portfolio'.

We share these concerns about through-the-cycle approaches. In particular, we believe that the proper assessment of risk, for both management and regulatory purposes, should be done conditional on the state of the economy, not in an unconditional manner. Doing the latter, which is the essence of through-the-cycle approaches, may contradict the Basel Committee requirement of using 'all relevant and material information in assigning ratings' (BCBS, 2006, para 426).[14]

12 For an earlier discussion of capital crunches and bank regulation see Bernanke and Lown (1991), Hancock and Wilcox (1994), and Peek and Rosengren (1995).

13 See BCBS (2010c), par. 20-22.

14 Also, forcing banks to use unconditional assessments of risk for regulatory purposes would contradict another requirement of the Basel II (BCBS, 2006, para 444): 'Internal ratings and default and loss estimates must play an essential role in the credit approval, risk management, internal capital allocations, and corporate governance functions of banks using the IRB approach.'

The preceding arguments suggest that 'smoothing the input' of the Basel III formulas has many shortcomings. Repullo *et al* (2010) analyse in detail the alternative of 'smoothing the output'. Their proposal is to adjust the point-in-time capital requirements with a multiplier $\mu_t$ defined by

$$\mu_t = \mu(g_t) = 2N\left(\frac{\alpha(g_t - \overline{g})}{\sigma_g}\right),$$

where $g_t$ is the rate of growth of the GDP, $\overline{g}$ its long-run average, $\overline{\sigma}$ its long-run standard deviation, $N(.)$ is the standard normal cumulative distribution function, and $\alpha$ is a positive parameter to be estimated.[15] The multiplier $\mu_t$ is continuous and increasing in $g_t$, so capital requirements would be increased in good times and reduced in bad times, it is equal to 1 when $g_t = \overline{g}$, so there would be no adjustment at the mid-point of the business cycle, and it is bounded between 0 and 2, so capital requirements would not increase without bound or become negative. The normalisation by $\sigma_g$ allows the expression of capital surcharges or reductions per standard deviation of GDP growth.

Repullo *et al* (2010) conclude that dampening the excess cyclicality of minimum capital requirements with a multiplier of this kind is better than through-the-cycle approaches in terms of 'simplicity, transparency, low cost of implementation, consistency with banks' risk pricing and risk management systems, and even consistency with the idea of a single aggregate risk factor that underlies the capital requirements of Basel II'.

It is important to stress that the proposal of smoothing minimum capital requirements using GDP growth is fully rule-based. There would be no intervention of supervisory authorities, and hence it would be a pure Pillar 1 approach. This is a significant advantage, since authorities may *de facto* be reluctant to adjust Pillar 2 surcharges with the state of the business cycle. Moreover, it would be completely transparent, so investors and analysts could at any point in the business cycle observe both the adjusted and unadjusted minimum capital requirements. Importantly, minimum capital requirements would retain the full risk-sensitivity of Basel III in the cross-section, but allow the capital charge curve to shift with the state of the business cycle. During expansions, minimum requirements would be above those based on point-in-time PDs, contributing to slow the lending cycle and to build up a higher cushion of capital to be used to protect banks' solvency in bad times. Conversely, during recessions, minimum requirements would be below those based on point-in-time PDs, helping to support lending during downturns.

15 Apart from GDP growth, they also consider bank credit growth and the return of the stock market, as well as proxies for the business cycle that are more closely related to banks' business activity, such as loan losses or profitability (ROA and ROE). Their empirical results show that GDP growth is better than any of the other alternatives.

## 6 Conclusion

The December 2009 consultative document of the Basel Committee on Banking Supervision (BCBS, 2009) considered a series of measures to address procyclicality with the following four key objectives: dampen any excess cyclicality of the minimum capital requirement, promote more forward-looking provisions, conserve capital to build buffers that can be used in stress, and achieve the broader macroprudential goal of protecting the banking sector from periods of excess credit growth. The third objective gave rise to the capital conservation buffer and the fourth to the countercyclical capital buffer of Basel III (BCBS, 2010c).

We have assessed the countercyclical capital buffer, focusing our discussion on the proposed common reference point for taking buffer decisions, which is the difference between the aggregate credit-to-GDP ratio and its trend (the credit-to-GDP gap). Our results show that the correlation between the credit-to-GDP gap and GDP growth is generally negative, which means that that the credit-to-GDP gap would tend to give a signal to reduce capital requirements when GDP growth is high, and to increase capital requirements when GDP growth is low. Thus, the countercyclical capital buffer appears to contradict the mandate of the G20 to require banks 'to build buffers of resources in good times that they can draw down when conditions deteriorate'.

The Basel Committee was aware of the shortcomings of the credit-to-GDP gap, in particular in downturns, and proposed to use supervisory judgement to release the buffer. We have examined this proposal, and concluded that a micro-oriented supervisor concerned about bank failures would naturally be averse to reducing capital requirements in a downturn, and that even a macro-oriented supervisor would probably do too little too late, which could contribute to further reducing the supply of credit in downturns.

Of course, banks may be able to use in downturns the flexibility provided by the capital conservation buffer, which amounts to an additional common equity requirement of 2.5% of risk-weighted assets. However, banks may prefer to reduce credit extension rather than being subject to restrictions on capital distributions (dividends, share repurchases, and especially discretionary bonus payments to staff) if they do not meet the additional capital requirement.

The Basel III document makes no progress on the first two key objectives to address procyclicality, namely to dampen any excess cyclicality of the minimum capital requirement and to promote more forward-looking provisions. And this decision seems to have been endorsed by G20. Despite the initial prominent role given to 'mitigating procyclicality', the Seoul communiqué simply stated:

> 'We endorsed the landmark agreement reached by the BCBS on the new bank capital and liquidity framework, which increases the resilience of the global banking system by raising the quality, quantity and international

> consistency of bank capital and liquidity, constrains the build-up of leverage and maturity mismatches, and introduces capital buffers above the minimum requirements that can be drawn upon in bad times.'

We have argued that this is unfortunate. Risk-sensitive capital requirements are, almost by definition, highly procyclical, so correcting this feature with a business cycle multiplier of the type proposed by Repullo *et al* (2010) combined by some version of the Spanish forward-looking loan loss provisions is, in our view, essential. Such mechanisms would work as 'automatic stabilisers', increasing the buffers of capital and provisions in good times and using them in bad times, without supervisory discretion in any phase.

By contrast, the countercyclical capital buffer of Basel III, in its current shape, will not help to dampen the procyclicality of bank capital regulation and may even exacerbate it. For this reason, the credit-to-GDP 'common reference point' should be abandoned. In fact, we believe that it will be abandoned, certainly in the US, where section 616 of the Dodd-Frank Act clearly states:

> 'Each appropriate Federal banking agency shall seek to make the capital standards required under this section or other provisions of Federal law for insured depository institutions countercyclical so that the amount of capital required to be maintained by an insured depository institution increases in times of economic expansion and decreases in times of economic contraction, consistent with the safety and soundness of the insured depository institution.'

## References

BCBS (2006), 'Basel II: International convergence of capital measurement and capital standards. A revised framework', Basel, Bank for International Settlements.

BCBS (2009), 'Strengthening the resilience of the banking sector', consultative document, Bank for International Settlements.

BCBS (2010a), 'Basel III: A global regulatory framework for more resilient banks and banking systems', Basel, Bank for International Settlements.

BCBS (2010b), 'Countercyclical capital buffer proposal', consultative document, Basel, Bank for International Settlements.

BCBS (2010c), 'Guidance for national authorities operating the countercyclical capital buffer', Basel, Bank for International Settlements.

Beck, T and Demirgüç-Kunt, A (2009), 'Financial institutions and markets across countries and over time: data and analysis', World Bank Policy Research Working Paper 4943.

Bernanke, B S and C. S. Lown, C S (1991), 'The credit crunch', *Brookings Papers on Economics Activity* 2, pp 205–48.

BIS (Bank for International Settlements) (2010), *Eightieth Annual Report*, Basel, Bank for International Settlements.

Caruana, J (2010), 'Macroprudential policy: could it have been different this time?', People's Bank of China Seminar on Macroprudential Policy, Bank for International Settlements.

Drehmann, M, Borio, C, Gambacorta, L, Jimenez, G and Trucharte, C (2010), 'Countercyclical capital buffers: exploring options', Bank for International Settlements Working Paper 317.

Fillat, J and Montoriol-Garriga, J (2010), 'Addressing the pro-cyclicality of capital requirements with a dynamic loan loss provision system', Working Paper QAU10-4, Federal Reserve Bank of Boston.

Financial Services Authority (2009), 'A regulatory response to the global banking crisis', Discussion Paper 09/02. London, Financial Services Authority.

Giannone, D, Lenza, M and Reichlin, L (2010), 'Money, credit, monetary policy and the business cycle in the euro area', mimeo.

Gordy, M and Howells, B (2006), 'Pro-cyclicality in Basel II: can we treat the disease without killing the patient?', *Journal of Financial Intermediation* 15, pp 395–417.

Group of Thirty (2010), *Enhancing Financial Stability and Resilience: Macroprudential Policy, Tools, and Systems for the Future*, Washington DC, Group of Thirty.

Hancock, D and Wilcox, J A (1994), 'Bank capital, loan delinquencies, and real estate lending', *Journal of Housing Economics* 4, pp 121–46.

Hanson, S, Kashyap, A and Stein, J (2011), 'A macroprudential approach to financial regulation', *Journal of Economic Perspectives* 25(1), pp 3–28.

Jiménez, G and Saurina, J (2006), 'Credit cycles, credit risk, and prudential regulation', *International Journal of Central Banking* 2, pp 65–98.

Jiménez, G, Lopez, J A and Saurina, J (2009a), 'EAD calibration for corporate credit lines'. *Journal of Risk Management of Financial Institutions* 2, pp 121–9.

Jiménez, G, J. Lopez, J A and Saurina, J (2009b), 'Empirical analysis of corporate credit lines', *Review of Financial Studies* 22, pp 5069–98.

Jordà, Ò, Schularick, M and Taylor, A M (2010), 'Financial crises, credit booms, and external imbalances: 140 years of lessons', NBER Working Paper 16567.

Kashyap, A and Stein, J (2004), 'Cyclical implications of Basel II capital standards', Federal Reserve Bank of Chicago, *Economic Perspectives*, 1Q, pp 18–31.

Peek, J and Rosengren, E S (1995), 'The capital crunch: neither a borrower nor a lender be', *Journal of Money, Credit, and Banking* 27, pp 621–38.

Repullo, R and Suarez, J (2009), 'The procyclical effects of Basel II', CEPR Discussion Paper 6862.

Repullo, R, Saurina, J and Trucharte, C (2010), 'Mitigating the pro-cyclicality of Basel II', *Economic Policy* 64, pp 659–702.

Saurina, J. (2009), 'Dynamic provisioning: the experience of Spain', in 'Crisis response: public policy for the private sector', Note 7, World Bank.

Saurina, J (2011), 'Working macroprudential tools', in S Claessens, D D Evanoff, G G Kaufman and L E Kodres (eds), *Macroprudential Regulatory Policies: The New Road to Financial Stability? World Scientific Studies in International Economics* 17, pp 157–80.

Saurina, J and Trucharte, C (2007), 'An assessment of Basel II procyclicality in mortgage portfolios', *Journal of Financial Services Research* 32, pp 81–101.
Shleifer, A and Vishny, R (2010), 'Unstable banking', *Journal of Financial Economics* 97, pp 306–18.

## Appendix

**Figure A1** Credit-to-GDP gap and GDP growth, France, 1986–2009

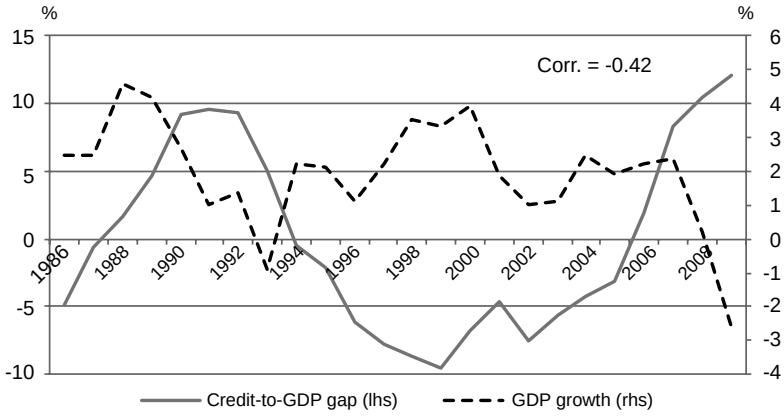



**Figure A2** Credit-to-GDP gap and GDP growth, Germany, 1986–2009

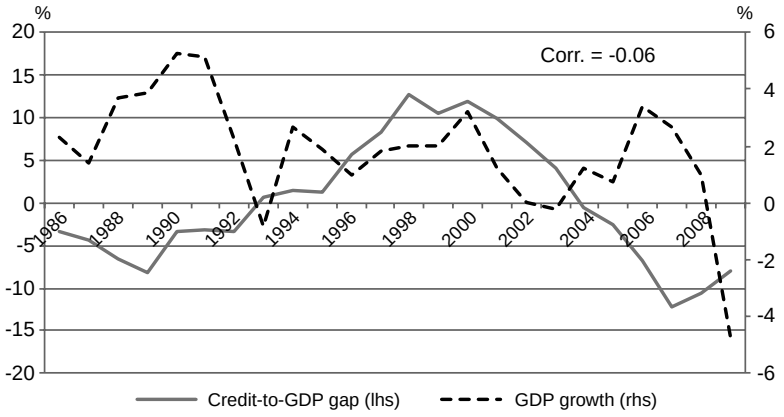



**Figure A3** Credit-to-GDP gap and GDP growth, Italy, 1986–2009

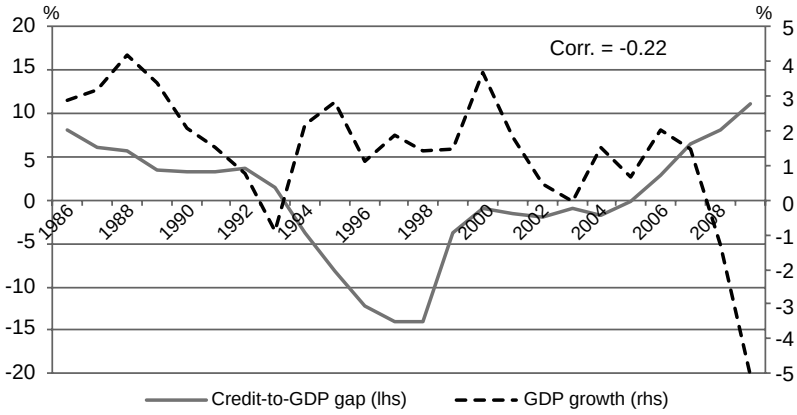


**Figure A4** Credit-to-GDP gap and GDP growth, Japan, 1986–2009

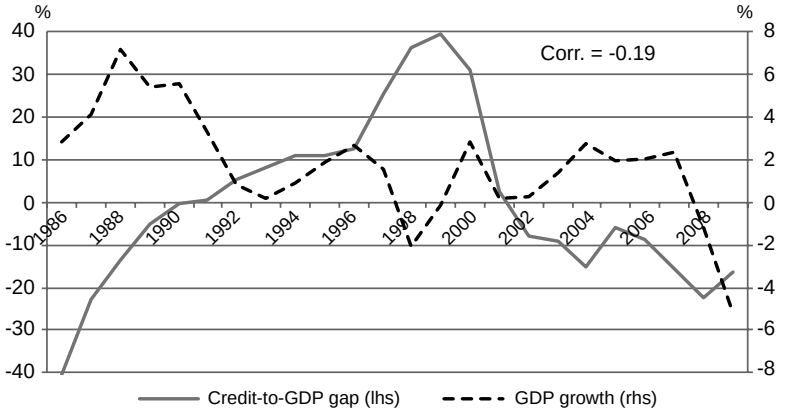



**Figure A5** Credit-to-GDP gap and GDP growth, Spain, 1986–2009

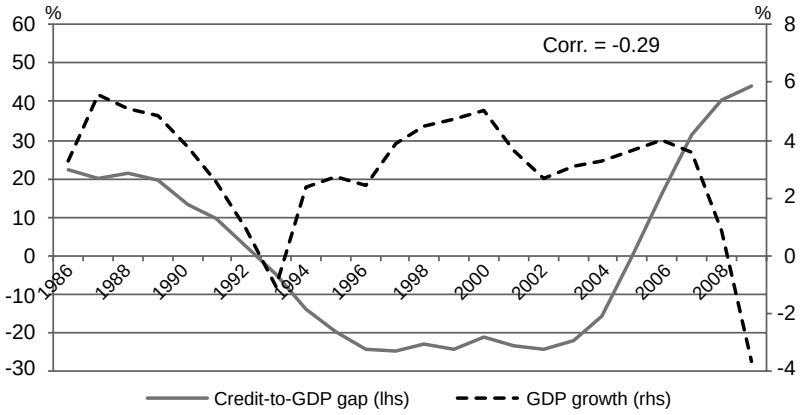
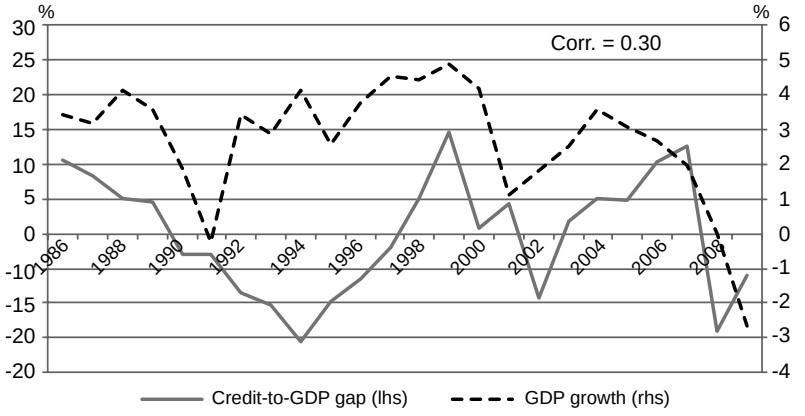



**Figure A6** Credit-to-GDP gap and GDP growth, US, 1986–2009



# 4 Disclosure, Transparency and Market Discipline

**Xavier Freixas and Christian Laux**[1]
*Universitat Pompeu Fabra and CEPR; Vienna University of Economics and Business*

## 1 Introduction

During the recent crisis we have observed how very liquid, highly rated financial assets all of a sudden became 'toxic assets', how ratings for structured products had to be continuously downgraded, how several markets, such as the interbank market, broke down, and how banks faced severe liquidity and funding problems. Information problems were at the heart of many of these problems. The opacity of structured products, which was not an issue in the boom, turned into a major drawback in the crisis; credit ratings were no longer trusted as providing reliable information about default risks; banks' reported losses were viewed with suspicion by investors. The decision to relax accounting rules in response to public and political pressure was welcomed by the banks but viewed with suspicion by many investors as an attempt to restrict the quality of information. In contrast, the stress tests conducted by banks that were made public constitute an attempt to improve the quality of information available. These stress tests were quite successful in restoring investors' confidence in the United States, but less so in Europe. It is important that stress tests are reliable as any doubt about their credibility undermines their effectiveness.

The crisis experience has changed our view of information transmission, transparency and market discipline and raised a number of important questions at both the academic and the policy level on how to improve transparency.

The first general question that it is important to address is how information reaches the market both in normal times and during a crisis, because in order to improve transparency and efficiency it is not sufficient to merely increase the provision and disclosure of information. One of the points we emphasise here is that it is important to distinguish between disclosure and transparency. We interpret disclosure as an act of providing information on behalf of firms and issuers.

1 We appreciate helpful comments from Christian Leuz and Janet Mitchell. Christian Laux gratefully acknowledges research funding provided by the Frankfurt Institute for Risk Management and Regulation (FIRM).

Important characteristics of the level of disclosure are the timeliness, reliability and comprehensiveness of information. In contrast, we argue that transparency arises when the disclosed information is effective in reaching the market and being adequately interpreted. For a given level of disclosure, transparency depends on investors' information processing capability, behavioural biases and information needs. Thus, disclosure is a necessary but not a sufficient condition for transparency in the information transmission process.

This will lead us to address more specific questions regarding the incentives of firms and issuers to disclose relevant material information, as well as to ask how the market reacts to this information. The two sides of this communication process are intimately related. On the one hand, investors react to information by allocating capital and through corporate governance decisions, thereby affecting market prices and influencing managerial actions. On the other hand, a firm's incentives to disclose information depend upon investors' reaction, and investors' incentives to demand information depend on the expected value of this information for their decisions. Management may fear that investors herding and markets sentiment leads to an overreaction of market prices to this information. The market's reaction to negative information may be an increase of spreads or a liquidity shortage that may put the firm in an untenable position, thus generating the incentives not to disclose this information. The process is a complex one as the market reaction will result from a complex game between information providers and investors, where the nature of the equilibrium, pooling or separating, will prove to be crucial. Moreover, investors' incentives to demand, carefully collect and analyse information may be distorted by regulation, requiring for instance that some mutual funds invest exclusively in AAA issues, and by the expectations that some systemically important financial institutions would be bailed out by the government.

By developing this distinction between disclosure and transparency, we expect to clarify the role of information transmission when market discipline plays a limited role, as happened during the recent crisis. This is all the more important because, presently, regulatory authorities seem to promote disclosure, as in the case of the recent proposal by the Bank of England that also emphasises the greater role of market discipline. However, the efficiency of disclosure depends upon how information translates into transparency in terms of the correct assessment of the probability of counterparty risk in financial operations by investors providing market discipline.

The second general question to keep in mind is that transparency involves trade-offs, which accounting standard setters have to take into consideration. Information disclosure has benefits but also entails costs. Moreover, the different objectives of users and the ability of investors to interpret the information lead to a complex strategy of disclosing some information in the notes or of preferring to disclose a loss in 'other comprehensive income' rather than in the net income. The problem is reinforced by a heuristic focus on earnings by managers and,

possibly, users of accounting information (Verrecchia, 2010). One important trade-off is the level of reliability in the data disclosed by firms. It implies that regulators and users might require the disclosure of a non-manipulable proxy rather than the disclosure of highly relevant but manipulable information. Information has to be truthful, timely and material, and again there is a trade-off between, say, accuracy and timeliness.

In the information communication game the issue of market discipline is crucial. As is well known, market discipline is supposed to be, as the third pillar of Basel II, an essential ingredient of banking stability. As such, it plays a critical role in defining the market feedback to information disclosure. Yet, regulators are often silent about how market discipline should work. Possible problems arise on the two sides and include a lack of incentives for investors to use information, a lack of power or incentives for investors to discipline banks and a lack of incentives for banks to disclose information. The analysis of the effectiveness of market discipline has been the subject of a large number of contributions and is beyond the scope of this paper, as we focus on transparency and not on the mechanism by which this feeds into market discipline. (See *eg* Flannery, 1998, De Ceuster and Masschelein, 2003, Hellwig, 2005, and Admati *et al*, 2010, for a discussion of the underlying issues and evidence.) In any case, the faith in market discipline has been hit hard in the financial crisis. It seems that there was a lack of market discipline during the boom as well as in the crisis. In the crisis, access to liquidity was limited for all banks, thus creating more of a panic than an efficient disciplining device, which would discriminate between solvent and insolvent banks. However, it is important to note that the reasons for the lack of market discipline in the boom and in the crisis may be very different. In the boom it is quite likely that the major problem was a lack of market participants' incentives to use or demand information. In contrast, in the bust, the dominant problem seems to be that transparency is most difficult to achieve when it is needed most.

In order to analyse these major issues, it is critical to focus on the main source of information to the market. Our view is that the two main sources of information are financial reports and credit rating agencies.[2] Their roles and accuracy both before and during the crisis have been questioned for different reasons.

The regulatory authorities' view of financial reporting and its impact on the crisis has been mixed. On the one hand, in October 2008, by allowing financial institutions to reclassify some assets on their prices of July 2008, prior to the Lehman bankruptcy, regulatory authorities seemed to promote the opacity of financial institutions' balance sheets, prevent investors from distinguishing between different levels of counterparty risk in financial institutions and impair market discipline. On the other hand, the stress tests that regulatory authorities

2 Other third-party providers of information have a minor role. The role of auditing firms is to certify the accuracy of financial statements, and consequently does not provide additional information. Financial analysts focus on stocks, and the information they provide has only an indirect impact on an asset's probability of default.

implemented, first in the United States and one year later in the European Union, were crucial in providing the market with the ability to discriminate among different levels of bankruptcy risk for financial institutions, even if the ulterior Irish banking crisis reduced the credibility of the European stress test exercise.

Regarding credit rating agencies, the issues are completely different. Credit rating agencies played a key role in the development of the market for securitisation by providing good ratings to securitised issues that were later to become 'toxic assets'. The complexity of the structured issues made it difficult, if not impossible, for investors to rigorously identify the cash flows associated with each issue and their risks. This made ratings essential to the well functioning and liquidity of the market for mortgage-backed securities, asset-backed securities and collateralized debt obligations (CDOs). Once the crisis set off, credit rating agencies had to downgrade the issues in order to keep in line with the information provided by market prices.

In order to examine the different issues, we will start by discussing how information is disclosed by firms and issuers and how it is interpreted by investors, thus determining the allocation of capital. Next, in section 3, we examine the specific role of information transmission during the crisis. Section 4 is then devoted to policy recommendations regarding the provision of information to the market.

## 2 Transparency: benefits, costs and limitations

In order to clarify the role of transparency, we will first consider its role in the general process of resource allocation. We then consider the reasons why investors have to act upon limited information, and examine the impact of regulation on the information transmission process. However, we focus on selected issues and do not provide an exhaustive coverage. For surveys on transparency and disclosure and additional references, see, for instance, Healey and Palepu (2001), Verrecchia (2001), Hellwig (2005), Leuz and Wysocki (2008), Armstrong *et al* (2010).

### 2.1 The role of information

Information is of prime importance in making investment and production decisions and in allocating capital to its most productive use. Thus, it is crucial that market participants have access to the appropriate information. This is particularly true of the capital market, where financial information allows investors to identify the 'quality' of a potential investment in terms of risk and return.

The simplest way to view the role of information is to consider a neoclassical financial model like the capital asset pricing model, where information underlies investors' capital allocation decisions and ultimately affects asset prices. However, the implicit assumption of a stylised frictionless capital market where information can be collected, shared and verified at no cost leads to a simplistic view of the world. A richer approach is to see different parties as having heterogeneous information. The equilibrium information level then depends upon managers' incentives to disclose information, investors' incentives to collect additional information and, of course, on the informativeness of asset prices that depend upon the informational efficiency of financial markets. The equilibrium in a 'laissez faire' economy may be characterised by extreme forms of adverse selection and moral hazard and their resulting inefficiencies. It therefore seems natural to look for mechanisms that foster information disclosure and transparency and to define legally binding information standards.

In the presence of market frictions and incentive problems, information plays a particularly important role in guaranteeing that capital is used in the best interest of investors, which, in the absence of externalities, corresponds to putting capital to its most productive use. First, in addition to affecting market prices, information is used in contracts, such as in covenants on debt contracts, or to align incentives in management compensation schemes. For example, according to Holmström's (1979) informativeness principle, any piece of information that is related to the manager's unobservable effort level should be included in the compensation contract to reduce the cost of providing incentives. Second, information is relevant for investors to take actions that can discipline management. For example, investors can deprive management of financial resources by not providing or extending funds, withdrawing funds or firing a manager. Managers will take into account the impact of their decisions on investors' actions, which aligns the interests of management and investors. This form of market discipline can play an important role in corporate governance. Its prerequisite is investors' access to accurate, relevant and timely information, a condition that may not be met when market discipline is limited and managers run the banks.

In this framework, it is important to distinguish between public and private information. Public information reduces the level of asymmetric information, which is beneficial in dealing with incentive problems. It also reduces the risk of market participants in trading with a better informed market participant and thereby increases market liquidity. As public information and transparency usually result in a reduction of the heterogeneity of information, it can be desirable to impose regulation that increases market transparency.

It is also important to realise that investors often have multiple sources of information and can use this information in different ways. An example is the financial statement, which conveys information about a firm through the balance sheet, the income statement and the notes. Various parties use this information for investment and credit decisions, for private contracting, for corporate

governance and for regulatory purposes. But in addition, several other sources of information are available that market participants can use for that purpose. In addition, regulators and investors can and do adjust accounting numbers for regulatory and contracting purposes. It is certainly naive to argue that specific accounting rules are irrelevant as in the case without market frictions. However, it is equally naive to believe that market participants do not understand where the accounting information comes from, are easily fooled by different rules or blindly use accounting information for contracting purposes.

For financial statements, but also, more generally, for information disclosure, it is important to distinguish between voluntary and mandatory disclosures and whether information can be certified by third parties (auditors, credit rating agencies, credit registers, financial market regulators) or not.

The increasing perception of the importance of information in efficient capital allocation has been progressively incorporated in the regulation of financial markets, with rules for information disclosure, utilisation and dissemination becoming increasingly strict. This is now evidenced in the financial markets by the informed trading regulation, regulation FD (Fair Disclosure), to eliminate selective disclosure of material non-public information by public companies, or, in the banking industry by the third pillar of Basel II (market discipline). The Basel Committee on Banking Supervision has introduced new disclosure requirements for banks to make bank management accountable and allow markets to react if management does not act in investors' best interest. Market discipline was supposed to complement capital requirements and supervision in the prudential regulation of banks. One conclusion that might be drawn from the current crisis is that the market did not have sufficient information, or that it did not have sufficient incentives to discipline management. Indeed, both conclusions may well have merit. Market discipline is no panacea. First, transparency is not without cost. Second, market discipline will only be effective if the market has the right incentives to use the information effectively and the adequate mechanisms to affect managerial actions.

## 2.2 Restrictions on perfect information

As a communication process, information transmission might be hampered by restrictions at the receiving or the sending end of the communication line.

### *2.2.1 Market reaction to information*

Information is complex and costly to communicate, understand and interpret. It has to be communicated in a way that is both easy to understand and relevant (material), two features that can be in conflict, with different parties disagreeing about relevance. For market prices and capital allocations to be efficient, it is important that market participants process information in an efficient way. Therefore, a potential imperfection corresponds to market overreaction. If

market participants overreact to good or bad news, information can actually distort decisions and reduce efficiency. There is an active academic debate about the role of behavioural biases of investors and the efficiency of capital markets (see *eg* Shleifer, 2000; Barberis and Thaler, 2003). However, we are not aware of any academic papers that would argue that it is optimal for firms to disclose less information because of behavioural biases and potential overreactions. In contrast, some bankers and regulators seem to believe that it is reasonable not to disclose bad news in a crisis to avoid destabilisation from overreactions of market participants. Although there may be cases where this type of policy can be effective, it is not clear that overall efficiency is actually increased.

An alternative to assuming market overreaction is to consider the microeconomic foundations of information processing, which is a more interesting approach to investors' reaction to new information. This may take different forms, but basically it involves costly or limited information processing or moral hazard, which can result in situations where more information is detrimental.

In a world where investors have varying skills for the interpretation of complex public information, public information can increase the winner's curse problem if it increases the information advantage of sophisticated investors who are willing and able to read and understand it, a point made by Pagano and Volpin (2009) in the context of credit rating agencies. If information in a crisis is particularly complex, unsophisticated investors will be more wary and react more strongly than in normal times. This response might be interpreted as overreaction, but it is a rational response of unsophisticated market participants to increased informational heterogeneity in a crisis.

In a similar vein, if information is disclosed only to some agents, it may create an adverse selection problem leading to an equilibrium à la Akerlof. This idea has been developed by Dang *et al* (2009), who explore how asymmetric information may interact with the information sensitivity of a security.

Using the global games approach, Morris and Shin (2002) analyse the welfare effects of increased public information. They take as a starting point the coexistence of public and private information and then consider the impact of agents' decisions on the market allocation. Because agents' decisions will have an impact on the equilibrium allocation, the resulting allocation will not only reflect the averaging of individual information, but will also reflect the agents' decisions and the existing strategic complementarities or substitutabilities. In such a framework, it is not unambiguously optimal to increase the level of public information.

A different issue arises if users of accounting information amalgamate real performance and accounting measures of performance, or, for that matter, if managers believe that users can be misled and therefore put too much emphasis on earnings. Verrecchia (2010) refers to this phenomenon as 'accounting alchemy'

and documents cases where managers seem to believe that the disclosed earnings matter even when real performance is not affected and when it is straightforward for users to look through the accounting numbers.

*2.2.2 Incentives to disclose information*

The main difficulties in information communication stem from the fact that firms and issuers may prefer not to disclose information, or to distort it. Information, such as, for instance, management's expectations about the business outlook, is usually private and difficult to verify by outside parties. Whenever information is relevant, there is a legitimate concern that management might misreport and provide biased or even false information. If the market understands management's incentives and the costs and benefits of distorted information, the market may not be fooled and correctly interpret the information. However, this is no longer possible if the costs or benefits to management of distorting information are uncertain (Fischer and Verrecchia, 2000).

There are three ways of dealing with the problem, all involving their own costs and limitations and interacting with each other. First, incentives can be provided for management to reveal information truthfully. Providing incentives is usually costly because of risk aversion and rents earned by agents.

Second, information intermediaries and gatekeepers (such as auditors, credit rating agencies and financial analysts) can confirm and certify information and potentially produce additional information. This alternative has its own limitation, because, on the one hand, not all information can be verified, and on the other, even if certification is possible, the gatekeeper may not have the incentives to incur the monitoring costs and to reveal the information truthfully. Thus, a whole set of new incentive problems arise, limiting the use of information intermediaries.

Third, the market might use the proxy of 'second-best information', which is more difficult to manipulate or easier to verify. For example, investors can use interim earnings or cash flows to update their beliefs about the quality of an investment decision. However, such information can, again, cause incentive problems. For instance, Stein (1989) shows that if investors rely on interim earnings, management has an incentive to choose short-term over long-term projects. Investors are not fooled about the quality of the project, but the choice of the short-term project is inefficient. Also, additional information can be detrimental in the presence of managerial career concerns. For example, information that allows the market to update its beliefs about managerial ability can reduce managerial incentives. Potential reasons are that uncertainty about ability provides management with incentives to exert effort (Holmström, 1999) and makes it easier to be tough after low performance (Cremer, 1995). Thus, if costless first-best information is not available, second-best information can be detrimental and it is not possible to conclude that more information is always better than less information.

## 2.3 Market failure and regulation

A straightforward but important insight of the discussion above is that information transmission involves benefits and costs. The optimal trade-off is difficult to determine and depends on the specific setting. Therefore, it seems reasonable to leave the determination of the optimal level of disclosure to the market. So, a preliminary point is to understand why the level of disclosure has to be regulated and, in particular, whether there are specific aspects of the financial and banking industry that make regulation even more essential.

There are two basic arguments as to why the market for information has to be regulated: the allocation of the costs of information transmission, and the public good dimension.

The allocation of costs in information transmission is specific because the receiver's cost of decoding information depends upon the coding activity of the sender. So, in order to minimise total costs, regulation has a role in making firms and issuers commit to disclosing standardised information. Thereby investors can directly compare firms' performances and interpret information in a cost-efficient way. Also, information disclosure is potentially easier to enforce when disclosure is legally required rather than agreed to in a contract between private parties.

Potentially more important is probably the fact that information is often a public good and that information causes positive external effects that are not taken into account when the optimal level of voluntary disclosure is chosen. As a consequence, the privately optimal level of information is lower than the socially optimal level. This divergence of the privately and publicly optimal levels of information is an important reason for regulation.

A related problem in banking is likely to arise because of government intervention, in particular, government bail-outs. For example, for mortgage-backed securities, transparency is particularly important when house prices drop and the probability of default increases. Information disclosure helps to reduce market failure and inefficiencies in a crisis. Because of bail-outs and guarantees, the taxpayer is a main beneficiary of this information, but the cost of designing and issuing transparent products is borne by banks' stakeholders. Thus, voluntary transparency will be inefficiently low. More generally, banks have no incentives to voluntarily build up an information structure that would help in winding them up in a crisis. This includes providing detailed information about structured products such as securitised loan portfolios or a risk map that would help to value the products or identify the exposure of individual banks in a crisis. Put differently, information that would be valuable to investors and therefore provided by banks in the absence of bail-outs might not be voluntarily provided with bail-outs.

Government intervention can be a justification for regulating disclosure. However, for the same reason, even if banks have to disclose more information, transparency and financial stability may not improve by much. The reason is that investors' incentives to use the information will be limited for the same reasons that the market did not demand the information in the first place: government bail-outs. For example, if a financial institution's debt is explicitly or implicitly guaranteed by the government, debtholders do not need information about the bank's risk exposure. Thus, the need to provide the information is greatly diminished compared to a situation where no such guarantees exist. Consequently, a necessary condition for market discipline to work is that market participants bear the consequences of their decisions and not the taxpayers. But this condition is not sufficient. Market participants' reaction to information has to affect managerial behaviour. For a critical discussion of the possible channels through which investors' information may affect managerial actions and the limited role of market discipline and corporate governance see Hellwig (2005).

Another phenomenon that limits the effectiveness of regulation is the issue of regulatory competition. Firms and issuers may leave one financial market to operate in another that they consider to be friendlier, because it is less demanding in terms of disclosure and transparency. So, for instance, if disclosure requirements for firms that are listed on the stock exchange exceed the privately optimal level, some firms might avoid the stock market.[3] Although the purpose of higher transparency of publicly listed companies will be served, the potential detrimental effect of such a delisting or, more generally, delocalisation is that fewer firms use the stock market. Of course, the reverse is also possible, that is, more firms choose to list if higher transparency requirements reduce incentive and information problems by allowing firms to commit to provide information.[4] Financial institutions may shift business to shadow banks and hedge funds if disclosure requirements increase. In this case, a counterargument for the reverse effect of higher disclosure requirements is more difficult to make.

## 3 Lessons from the crisis

The recent crisis has challenged the usual role of information transmission. Information has been scarcer, less accurate and less timely. The sudden illiquidity of the financial market and its impact on asset prices has definitely had an adverse

3 Chemmanur and Fulghieri (2006) present evidence on the role of listing standards in the presence of competition between stock exchanges, and Leuz *et al* (2008) find evidence of firms going dark in response to the Sarbanes-Oxley Act of 2002, which increased the disclosure requirements for publicly held companies in the US.

4 The possibility of these two types of outcomes is reminiscent of Morrison and White's (2009) result that shows how, in a set-up of international integration, imposing a 'level playing field' in terms of deposit insurance and capital requirements will lead to a race to the bottom, while laissez-faire will give efficient regulators incentives to signal themselves by tough regulatory requirements, so that, depending on the efficiency level of the regulators, it is efficient or not to impose common minimal regulatory standards.

effect on the level of transparency. In this section, we examine how the crisis has affected transparency by considering, first, financial reporting and, next, reporting of ratings by credit rating agencies.

## 3.1 Financial statements

As mentioned in the previous section, a key aspect of information transmission is the way market participants react to the information provided by banks' financial statements. For example, in the context of the crisis, was uncertainty in the market fuelled by accounting? And, if yes, what was the dominant factor, the reporting of losses due to fair value accounting or the fear that banks were hiding potential risks and losses?

Critics argue that fair value accounting (FVA) forced banks to (excessively) write down asset values, jeopardising their financial health and contributing to the uncertainty in the market. At the other extreme, users argue that the implementation of FVA allowed banks too much flexibility and that banks used this flexibility to hide losses and their true risk exposure, thereby contributing to the uncertainty in the market. However, the use of historical cost allows banks to sell winners and keep losers, a practice called 'gains trading' that permits banks' profits to be inflated while hiding their losses. The two perspectives show that transparency is neither a panacea nor easy to achieve.[5]

One important critique addressed to marking to market is that it has caused downward spirals and contagion as banks were forced to write down the value of their assets to distorted market prices. These problems have been formalised by Allen and Carletti (2008) and Plantin *et al* (2008). In the following subsection we discuss how banks' fair value accounting as implemented in practice radically differs from marking to market, and why some objections of opponents to fair value accounting are often simplistic and ill-founded. Another issue, which we will address in section 3.1.2, is the relevance, reliability and timeliness of accounting information and the reaction of investors to this information.

### *3.1.1 Assessing the impact of FVA on the severity of the crisis*

In its pure form, fair value accounting involves reporting assets and liabilities on the balance sheet at fair value and recognising changes in fair value as gains and losses in the income statement. Fair value accounting in its pure form only applies to assets that financial institutions hold in their trading portfolio. Thus, it is only relevant for investment banks and very large bank holding companies and commercial banks with large proprietary trading or investment banking activities. Assets held for trading are generally assets that are traded in liquid markets for which market prices are available from orderly transactions (Level 1 inputs) that have to be used as the measurement for fair value. It is this archetype

5 See Laux and Leuz (2009) for a discussion of the different arguments surrounding the use of FVA and references.

of FVA that most people have in mind when they talk about mark-to-market accounting.

When Level 1 inputs are not available, models are used to determine fair value. Models have to use observable inputs (Level 2), which include quoted prices for similar assets and other relevant market data. If observable inputs are not available, unobservable inputs including model assumptions have to be used (Level 3). According to the International Monetary Fund's Global Financial Stability report, on average, financial institutions value some 69% of their fair-valued assets using the Level 2 methodology.

Laux and Leuz (2010) analyse the role of FVA for US banks in the financial crisis. Based on their analysis and the available evidence in the literature, they conclude that it is unlikely that FVA contributed to US banks' problems in the financial crisis in a major way, for two reasons.

The first reason is that FVA plays a much more limited role for most bank assets and regulatory capital than often claimed. Loans (including mortgages) and held-to-maturity securities are reported at amortised costs so that historical cost accounting applies. Like trading assets, available-for-sale securities are reported in the balance sheet at fair value. But unrealised fair-value changes of available-for-sale securities only affect book equity, not the income statement. Moreover, unrealised losses of available-for-sale debt securities do not affect regulatory capital. Fair-value changes of available-for-sale securities have to be realised when the asset is sold or other than temporarily impaired. A bank can treat fair-value losses of an available-for-sale debt security as temporary and avoid the effect of these losses on its income and regulatory capital if the bank has the intent and ability to retain the security for a period of time sufficient to allow for a recovery of its market price. Full FVA only applies to trading assets, since for trading assets there is no real alternative to FVA and even the American Bankers Association acknowledges that FVA is appropriate in this case. To be clear, many banks did have huge problems in their trading portfolios, but historical cost accounting for the trading portfolio would not have been an effective or reasonable solution to the problem for reasons that are discussed in greater detail in Laux and Leuz (2010) and below.

The second reason is that FVA offers substantial discretion that was used by banks in the financial crisis. In particular, banks argued that losses related to mortgage-backed and other securities were temporary, switched to models to value assets, and reclassified assets. For example, Citigroup reported its first other than temporary losses on available-for-sale and held-to-maturity securities in the financial crisis in the fourth quarter of 2008, and the amount was only $2.8 billion compared to a decrease in fair values of these assets of $19 billion. In the same quarter, Citigroup reclassified debt securities with a carrying value of approximately $60 billion to held-to-maturity, for which historical cost accounting applies unless the asset is other than temporarily impaired. Moreover, from the third quarter

of 2007 to the first quarter of 2008, Citigroup transferred assets with a value of $53 billion into Level 3 and moved to an 'intrinsic cash-flow methodology' to value their mortgage-related securities by the fourth quarter of 2007. Thus, the 'problem assets' were largely marked to models and not mechanically marked to distorted market prices.

In light of this observation the fierce critique that FVA received in the crisis is surprising. The limited role of FVA for many bank assets and the discretion it offers provide a cushion for banks. This cushion may be good when dealing with procyclicality and market distortions but bad for transparency and market discipline.

### *3.1.2 The shortcomings of information disclosure during the crisis*

One of the main lessons of the crisis regarding the communication of information to the market is the bleak prospect that information is more difficult to transmit when the market needs it most. Of course, it may be the case that the current crisis was 'special', as the level of opacity in financial assets was particularly high. Thus, a second lesson in the crisis is that once a crisis unfolds it is too late to turn opaque assets into transparent assets.

When, in 2007, US house prices plummeted and mortgage default rates skyrocketed, there was huge uncertainty in the market for complex, mortgage-backed securities and the market for these securities dried out.[6] Part of the reason why the market for securitised products dried out was uncertainty about the valuation of these assets and the fear of adverse selection due to the opacity of the products and underlying assets and the complexity of the financial arrangements and contracts. (See Ashcraft and Schuermann, 2008, Rajan *et al*, 2008, Hellwig, 2009, and Gorton, 2009, for a discussion of these problems.)

Many of these securities were held by investment funds and financed with short-term capital and redeemable funds. In the crisis, investors withdrew their funds, and refinancing of the assets became a huge problem. The originators of the funds bailed out the investment funds by providing guarantees and secured loans and by taking on the special investment vehicles on their balance sheet. Thereby the refinancing problems associated with asset-backed securities spilled over to the originators, who themselves relied heavily on short-term financing. It was virtually impossible to use some of the asset-backed securities as collateral. In addition, other assets that could have been used as collateral were already leveraged up to the limit and, as price volatility increased, haircuts for these assets increased as well. Thus, as the role of collateralised lending decreased, the level of counterparty risk became more important to obtain financing. However, counterparty risk and uncertainty regarding counterparty risk increased jointly with uncertainty about the exposure of individual banks. As the crisis unfolded, the uncertainty about individual assets migrated to financial institutions. Because of the lack of collateral, financial institutions needed unsecured lending, but in

6 Parts of the discussion in this section are based on Laux and Leuz (2010).

order to grant a loan, investors will first check the financial institution's financial statements to obtain information regarding the financial institution's health, and the information was either lacking or unreliable. Indeed, financial statements did not provide the level of transparency needed to eliminate potential problems of asymmetric information or to calm investors in the financial crisis.

Opponents and proponents of FVA take different views about the source of the problem and its possible solution. Critics fear that FVA forced banks to report excessive losses which contributed to the uncertainty in the market. At the other extreme, there is the fear that FVA allowed banks too much flexibility, which banks used to hide losses and their true risk exposure, thereby contributing to the uncertainty in the market. It is interesting to look at the way information was communicated during the crisis to understand some of the limitations and trade-offs that regulators face.

First, financial statements are not the only source of information that investors use. Thus, it is not possible to calm investors by a mere change of accounting rules. The uncertainty about the value of structured subprime products did not originate from the balance sheet of investment banks or bank holding companies. It is certainly naive to believe that Bear Stearns, Merrill Lynch and Lehman Brothers could have been saved if they could have reported their problem assets at historical cost. All three investment banks had substantial subprime exposure and experienced bank runs by other large and sophisticated financial institutions (Morris and Shin, 2008; Brunnermeier, 2009; Gorton and Metrick, forthcoming). These investors are not easily fooled by accounting numbers and are concerned about a bank's exposures to certain assets and risks. In making this assessment, investors are interested in (market) expectations of the future values of the assets and cash flows of the bank. So, even if not disclosing negative information was desirable, an assumption with which we do not agree, the availability of other sources of information would constrain the possibility of controlling the flow of information to the market through accounting.

Second, financial statements provide information in an aggregate and condensed way to reduce the costs of providing and processing information. This is especially true for the balance sheet where financial assets are aggregated instead of being reported individually and where, in addition, they are reported using a single number (usually their fair value or their historical cost). Thus, the balance sheet does not provide detailed information regarding the types of financial assets or their risks. However, as we will discuss below, additional information is provided in the notes to the financial statement.

Third, accounting numbers always have to be interpreted. It is not straightforward to interpret and compare even seemingly straightforward accounting ratios such as a bank's book debt/equity ratio. First, the debt/equity ratio has little meaning if the risks of the underlying assets are not taken into account. Second, the de facto leverage ratio is directly affected by the types of assets. For example, a long

position in a forward contract on a stock market index is akin to a debt-financed position in the index, but the book leverage ratio in each case looks very different. Third, the book equity depends on the accounting rule. For example, the effect of unrealised fair value losses of debt securities on book equity and regulatory capital depends on whether it is held as trading asset, available for sale, or to maturity. Views about what is appropriate and meaningful differ. Those who are interested in the leverage ratio might therefore want to make appropriate adjustments. Accounting rules should not be based on the presumption that market participants are systematically naive.

Another example is the interpretation of profits due to a decrease in banks' liabilities after an increase in their own credit risk. There was a big outcry about the craziness of FVA when banks chose the fair value option and reported profits from a loss on their liabilities. However, it is unclear what the fuss was all about. These profits did not relax bank's regulatory capital constraints because the relevant rules require banks to take these profits out when calculating their regulatory capital.[7] Wary investors can certainly do the same and, given the extensive coverage in the press, even naive investors should have been aware. Indeed, proponents of FVA for liabilities argue that profits that stem from a bank's liabilities are an important piece of (negative) information that market participants should have. To be clear, if a bank's assets decrease in a crisis, the burden is typically shared between debt and equity. From the perspective of informing investors about the effect that the decrease in asset values has on the value of equity, it can therefore be reasonable to deduct the change in the fair value of liabilities from the (fair) value change of assets. However, the deduction is problematic and should be undone when the objective is to calculate the regulatory capital or to get an idea about a firm's financial health.

Fourth, reliability of information is a big concern in any crisis. Both opponents and proponents of FVA criticise models for not being reliable. However, the conclusions drawn by the two parties differ. Opponents of FVA say that historical cost accounting (HCA) would have been more reliable in the crisis. But this argument ignores the fact that impairments also have to be recognised under HCA and that, in a crisis, when asset prices decrease and counterparty risk increases, the flexibility of determining the level of impairments is conceptually similar to the flexibility of using models to determine FVA. Being concerned about this flexibility, proponents of FVA propose a stronger reliance on market prices and stricter impairment rules. The perspective depends on the level of trust in markets and market prices, but also on the objectives of different users.

As noted in Laux and Leuz (2010), anecdotal evidence suggests that market participants feared that the investment banks were downplaying their losses and exposure. For example, investment banks and rating agencies continuously revised their valuations and ratings downwards (for example, Benmelech and

7 A possible concern might have been that these gains increased managerial bonuses. However, we are not aware whether this was the case.

Dlugosz, 2009). One reason for the gradual subsequent downward revisions was certainly that negative news arrived gradually. However, there was also the concern that financial institutions strategically tried to report inflated assets values for as long as possible. Specifically, the hedge fund manager David Einhorn, who sold Lehman's shares short, criticised Lehman for overstating the value of its $39 billion commercial mortgage-backed securities portfolio as they wrote down only 3% when an index of commercial mortgage-backed bonds fell 10% in the first quarter of 2008 (Onaran, 2008). Another example is Merrill Lynch, which in the first quarter of 2007 reported a potential exposure of $15.2 billion to certain subprime investments only to revise this number to $46 billion three months later (Story, 2010). Merrill Lynch thought that it had protected itself against the difference through hedges and therefore did not report it; many of these hedges later failed. It seems that Merrill Lynch overestimated the effectiveness of the hedges. If it had reported the gross positions and the hedges separately, the market could have made its own judgement. Of course, given the uncertainty in the market, it is possible that the market underestimated the effectiveness of the hedges, but the revision of the 'exposure' might have been an even bigger problem if investors felt deceived.

Although the empirical evidence, which is discussed in greater detail in Laux and Leuz (2010), is not conclusive, it is consistent with the concern that investors feared that banks used accounting discretion to overstate the value of their assets. For example, Huizinga and Laeven (2009) find that, in 2008, investors discounted the reported values of banks' real-estate loans by over 15% and of mortgage-backed securities by about 13%.

Fifth, the notes of the financial statements are important for providing information to the capital market. Some of the content is regulated and involves mandatory disclosures. But managers can also use the notes in the financial statements to provide additional voluntary information about the types of assets banks hold, their perspective on asset values and market conditions, assumptions underlying the models they use to derive fair values, exposures to specific risks, etc. This information could be used to reduce the level of asymmetric information in the market and make it possible for market participants to draw their own conclusions.

It is surprising that this possibility was not used more extensively by banks. An example is the stress tests, which helped to calm the market, as the evidence by Greenlaw *et al* (2011) and Peristian *et al* (2010) suggests. Why did (individual) banks not do stress tests voluntarily and provide information about the result to the market? One possible reason is that in a crisis, the cost of disclosing information by revealing proprietary trading strategies and compiling information may exceed the benefits to banks. First, during a crisis, banks may have more difficulties in credibly disclosing information. In particular, the market may believe that voluntary information is rigged. Moreover, incentives for bad banks to provide the same information as good banks increase in a crisis, leading to a pooling

equilibrium (Spargoli, 2010). Second, the market might be so depressed that the positive reaction would be slim if a single bank increased its transparency. For example, because of systemic linkages between banks, the benefit of providing information for an individual bank depends on the transparency of other banks. Third, another important effect is that much of the benefit would accrue to taxpayers, given the bail-outs of banks.

Consequently, truthful information communication appears to be more difficult during a crisis, because firms and issuers have incentives to hide bad information and because once the market coordinates on this adverse selection Akerlof type of market, it is even more difficult to produce a piece of information that clearly reveals that an institution is solvent. To improve the market equilibrium level of information in a crisis, energetic regulatory action may be required, in terms of information provision, commitment to bail out certain types of institutions and guarantees for counterparties. This is why the stress tests succeeded where private information did not. Indeed, stress tests were based on clear-cut identical scenarios for all financial institutions, and were implicitly certified by regulatory agencies so that they were credible and allowed market participants to compare the extent of the damage the crisis did to the different institutions.

## 3.2 Credit rating agencies

The role of credit rating agencies (CRAs) in providing information to the market has been increasing, in particular in the process of securitisation and rating of structured products. With the development of the market for these products, the CRAs' role has become more dominant, with record high levels of activity and profits. Thus, Moody's profits, for example, tripled between 2002 and 2006 (Lowenstein, 2008).

The key function of CRAs has been recognised by financial regulation, making the rating of an issue a prerequisite for it to be eligible as an investment vehicle. Also, the standardised approach in Pillar 1 of Basel II requires a rating from eligible rating institutions.

The collapse of many AAA-rated structured products in 2007/8 has brought CRAs into the limelight. It was well known that the CRAs' models were imperfect, and that the ratings were sometimes revised too late, once the credit event had taken place, as happened for the East Asian crisis of 1997. Yet, in the recent crisis, the number of securities that underperformed was unprecedented. So, in hindsight, the information provided by CRAs appeared to be misleading, and this was quite in contrast with the much more accurate performance of corporate bond ratings. So, a number of competing explanations have been put forward to understand the specific issues CRAs were facing, which we examine below.

Before doing so, two points need making. First, it is of course difficult to identify whether the collapse in ratings in 2007 was due to the CRAs' bad models, bad practices or to the crisis itself. Still, even if the crisis may have been the trigger for the breakdown of subprime-based asset-backed securities (ABS), the existence of a number of conflicts of interest that are detrimental to the proper functioning of the rating industry was bound to generate ratings inflation, thus amplifying the subsequent downfall. As we argue below, the conflicts of interest were particularly critical for structured products.

A second caveat concerns the extent to which the market was misled by ratings. After all, the spreads on some AAA-rated ABS were above those of AAA corporates. Clearly, the higher spreads meant that some agents did not view AAA-rated ABS securities as being equivalent to AAA-rated corporate bonds. Instead they were aware of the higher default or liquidity risk. Of course, with hindsight, the spreads may still have been too low compared to the fundamental risk underlying the issues, possibly because investors were also using the same incorrect models and model assumptions as the CRAs. But it is more likely that investors' incentives also played a role. Investors who were constrained to invest in AAA securities or had committed to this specific mandate 'for summarizing their risk appetite' (CGFS, 2008, p 8) but wanted to earn a higher return might have been pleased to take the opportunity. In addition, unsophisticated investors who blindly trusted the rating as an unbiased measure of risk are likely to have been misled. We do not consider this point further, as it is beyond the scope of this paper. Still, it should be clear that AAA structured products were not considered a completely different class of investment vehicle when compared to traditional AAA corporates or sovereigns, which, ex post, appears as a clear mistake on the part of investors. For example, using Monte Carlo Simulation, Krahnen and Wilde (2010) find a significant and systematic difference between the risk properties of ABS tranches and the risk properties of corporate bonds with the same rating. It has been argued that CRAs should not have used the same rating notation that they used for corporates, but there was a huge demand in the market for AAA securities that issuers tried to cater for.

### *3.2.1 The institutional environment*

A striking feature of the credit rating industry is that, since the 1970s, it has not been the user (the investor), the one who has a demand for precise and unbiased information, who pays for the service, but the issuer, who has an interest in obtaining favourable ratings. Before the 1970s the rating industry was based on the investor pays principle, providing rating agencies with the right incentives, but information resale problems set a limit on possible expansion for this market. As the technology reduced the cost of redistributing information, the industry had to switch to an issuer pays scheme.

A second key characteristic of the industry is that issuers are able to 'shop' for the best rating, choosing not to disclose ratings that are less favourable to their issue.

A third, and surprising, feature of CRAs' institutional structure is the lack of accountability. Indeed, under the protection of free speech, CRAs were immune to prosecution, a feature that makes them completely different from other gatekeepers, such as auditing firms. This has now been suppressed by the provisions made in the Dodd-Frank Act.

### *3.2.2 Explaining the collapse of structured products ratings*

In addition to the risk underestimation factor (see CGFS, 2008), there are several competing explanations for the downfall of ratings in 2007, but two of them, related to the structure of the market and to agents' incentives, are at the centre of the current regulatory debate: conflicts of interest, and shopping.

**Conflicts of interest**

As the industry is based on an issuer pays model, the incentives for a CRA to accurately report the rating it has obtained may be in conflict with its corporate objective to serve the issuer that is its client. In the long run the issuer is better served by an impeccable reputation for the CRA that makes the market value the rating. Still, as modelled in Bolton *et al* (2012), in the short run the CRA may face a conflict of interest and be tempted to inflate its ratings to benefit its client. As there is no legal liability attributable to a CRA report, the trade-off the CRA faces is between increasing current profitability by inflating ratings, and jeopardising its future reputation. So, when it comes to giving a rating for a structured product where, because of opacity, ex post verification of the accuracy of the rating is more difficult, ratings inflation seems a natural strategy for CRAs.

The empirical evidence of Griffin and Tang (forthcoming) supports this point as they show that CRAs used noisy credit risk models, to which they made frequent adjustments before determining the final rating, and these adjustments tended to shift the rating upwards relative to the model-predicted rating.

One of the implications of the reputation-based incentives is that competition, by decreasing future profits, may exacerbate the conflict of interests and make CRAs more subservient to the issuers. This is shown by Bolton *et al* (2012) and confirmed empirically by Becker and Milbourn (2010), who show that the greater competitive threat posed by Fitch in the corporate bond market coincides with a deterioration in ratings quality. So, a recommendation of increasing competition may backfire if the prerequisite of avoiding conflict of interest is not met. From this perspective the European Commission recommendation to promote competition in this market is ill-advised, because it does not hinge on the prerequisite of solving the conflict of interest and shopping issues.

Another empirical prediction of the reputation-based incentives is that CRAs will presumably inflate their ratings in good times when the probability of getting caught is lower and the demand for ratings is high. This result is consistent with the findings of Ashcraft *et al* (2009a), who show that ratings of mortgage-backed securities were less accurate at the peak of the real-estate boom, whether

measured by actual performance or by ulterior downgrades. It is intuitively clear that at the peak of the real estate boom a higher volume of business generates incentives to inflate ratings. But the result is also consistent with all three CRAs making systematic mistakes by, for example, underestimating correlations and overestimating expected house price increases in the boom. We will return to this issue below.

As spreads are determined in equilibrium by demand and supply, the issue of why sophisticated market participants did not take advantage of the distorted incentives should be addressed. With Goldman Sachs charged with fraud for misleading investors into buying shares of the ABACUS 2007-AC1 CDO, we now know that some hedge funds did bet against presumably overpriced ABS. In this particular case, the allegation of the Securities and Exchange Commission (SEC) is that the hedge fund Paulson & Co was involved in structuring the portfolio in which it took a short position. Nevertheless, the amount of the bets and their impact on the spreads is limited because of risk aversion, costs and restrictions on short selling. In addition, some agents might take the opposite view and consider the assets to be perfectly safe and the market overreaction to be transitory. This was the view of Lehman, which led it to increase its investment in the so-called 'toxic assets'. So, on average, it is not unreasonable to claim that the market at large used the same wrong models that rating agencies used.

**Shopping**

The complexity of structured products implies that different CRAs will give different ratings to the same issue. In addition, if the subordinated first loss tranche is broadened, some CRAs may be willing to reconsider the initial rating and report an improved rating for the issue. Consequently it is in the interest of the issuer to solicit formally or informally some pre-rating information and then choose the best ratings available, while the less favourable ones will be concealed from the market.

Notice that shopping reinforces the CRA's conflict of interest because the CRA might lose its client if it offers an accurate but potentially unfavourable rating.

**Investor's confidence**

When investors are perfectly rational, they discount for the ratings inflation that CRAs perform, so that investors read through the inflated ratings, whose bias is then discounted. So, part of the problem is due to investors' overconfidence in taking the ratings at face value, since even if there are constraints on short-selling and incentive issues that limit the power of information disclosure, in a world of perfectly rational investors, the market spreads should be informative on the quality of the issue, as in the Grossman and Stiglitz (1976) framework.

It is true that the role of CRAs is to improve market efficiency by avoiding duplication of investors' efforts in identifying good opportunities. Yet, if this leads to overconfidence in the CRAs' ratings, the resulting allocation is inefficient.

Evidence on investors' overconfidence is provided by Ashcraft *et al* (2009a), who show that mortgage-backed securities deals with opaque characteristics, such as a high fraction of low-documentation mortgages, underperform their rating, consistent with the predictions of recent theoretical literature.

**Two other possible causes**

The simplest possible explanation for the downgrade is the fact that models for structured products were incorrect. It is clear that CRAs' models based on the statistical properties of pre-crisis real estate prices could not accurately predict either the end of the real estate boom and its impact on structured products, or the impact of liquidity dry-ups in the secondary market for ABS and CDOs. But it seems that the ratings systematically underestimated the potential risks. If the problem was a reliance on insufficient data (rather than distorted incentives), CRAs should have either abstained from computing a rating or disclosed the limited accuracy of the rating for that type of issues. Even if it is clear that CRAs' models are imperfect, the fact that models for structured debt issues lacked the precision of models for corporates does not invalidate the existence of a conflict of interest and a shopping issue. Indeed, the underlying incentive problems may have reduced incentives to avoid systematic mistakes in rating models.

The second reason invoked to account for the failure of ratings to inform investors of the potential risks inherent in structured products is the lack of transparency of the rating process, a point already emphasised in the report of the Committee on the Global Financial System (CGFS, 2008). The issue of lack of transparency is complex as it may be interpreted in different ways. First, the argument is clearly legitimate when it concerns disclosure by CRAs to regulatory agencies. This point has repeatedly been made by the SEC in justifying its difficulties in regulating Nationally Recognized Statistical Rating Organizations (NRSROs). Second, transparency could provide information, such as the level of income documentation in residential mortgages, that is critical to investors if they are to assess how accurate and rigorous the rating is and to update their view of the CRA's reputation. Yet, on the other hand, better knowledge of the CRAs' models will allow issuers to fine-tune their issues, knowing the deficiencies and imperfections of the models and beating them on those points. Of course, it may be argued that issuers that aim at an AAA rating on a given issue will fine-tune their issue anyway (possibly with the help of rating agencies), but then the cost of doing so may be higher. Even without playing against the deficiencies of the models, more transparency would allow the issuer to structure an issue in such a way that it just gets the AAA rating, a phenomenon called 'rating at the edge'. Rating at the edge is often criticised, but it is less clear what the problem is. For example, assume that, in the process of securitising a given portfolio of assets, the tranches are chosen such that each tranche is rated at the edge. If investors anticipate rating at the edge, they can adjust their default probability for each tranche. Indeed, one could argue that rating at the edge makes the ratings for the different tranches more precise and is only a problem if investors are naive and misled. Another reason why rating at the edge could be problematic is if it

induces inefficient risk-taking by the issuer. Third, more transparency combined with limited information on behalf of investors may lead to a situation where some investors have better information than others, which makes trading in the secondary market more costly for the uninformed investors, as suggested by Pagano and Volpin (2009).

## 4 Policy recommendations

As discussed in Section 2, it is generally agreed that market transparency leads to more efficient allocations and that transparency should be increased. Of course, market feedback, with overreaction, asymmetric information and market discipline that is not based on reliable information, attenuates this general view, especially during a crisis. Yet, the impact of the stress test exercises in the US and in Europe suggests that increased transparency is better in terms of capital allocation than the lack of trading that occurs when no information is available. Indeed, as stressed by Greenlaw *et al* (2011), US financial institutions did not raise any capital before the stress tests, but $50 billion in the months after the stress test results were announced. Assuming that the need for new capital did not take management by surprise, the fact that management waited until after the stress test information was revealed suggests that management felt that this information would help to raise capital by reducing uncertainty and asymmetric information in the market.

Against this general background it is important for regulators to recognise that compulsory disclosure may be ineffective if market participants do not understand it, do not trust it, or do not use it. More information does not automatically yield more transparency. Indeed, when market participants are characterised by limited or different levels of skills in processing the information available, providing additional information may be useless, and additional transparency may actually come from increasing market participants' ability in processing existing information. As discussed in section 2, market participants may have no incentives to use information. Thus, it is important for regulators to consider market participants' incentives to use it. Compulsory disclosure may also be ineffective if it is impossible or too costly to verify its accuracy, as sometimes courts are unable to enforce penalties when the imputed party wrongdoing is not verifiable. In this case, information disclosure regulation should, instead, focus on agents having, ex ante, the right incentives to disclose information and to signal its quality. This is obviously true at the level of corporations, but the recent crisis has shown that it is also true of the so-called 'gatekeepers', and in particular of credit rating agencies.

These provisions constrain our recommendations in a 'realistic' way and constitute the background against which we will assess the existing proposals.

## 4.1 Improving market feedback

As mentioned in section 2.2, overconfidence, overreaction, behavioural biases and, broadly speaking, financial market informational imperfections might partially characterise the way financial markets react to new information. This is why, as a prerequisite for the improvement of information transmission, the first recommendation is to reconsider investors' incentives and the agency problems they may face (for instance, in collective undertakings, such as mutual funds and pension funds, as these agents may have a huge impact on the market). At least two areas are critical where it has been clear during the crisis that investors have not been able to cope with the information that was produced. Although for completely different reasons, the market perception of credit ratings and the market perception of counterparty risks for financial intermediaries appear to have been based on erroneous preconceptions. We discuss credit ratings in greater detail below and only briefly mention counterparty risk here.

In the case of financial institutions counterparty risks, the contrast between the idyllic vision of perfect markets and the agency problems that limit transparency is particularly striking. Investors know that too-big-to-fail or, more generally, systemically important financial institutions (SIFIs) will end up being bailed out. This may lead to a lower level of effort in processing information regarding these institutions, as the information is possibly irrelevant. Alternatively, when the expected bail-out does not take place, as happened with the bankruptcy of Lehman Brothers, the market collapse may be exacerbated by the investors' lack of previously accumulated precise information on these institutions.

As a consequence, in order to improve the market reaction to information, the recommendation is to introduce a clearly defined speedy resolution mechanism, so that financial institutions counterparty risks are adequately taken into account by investors. This should be introduced while protecting depositors from panics, which implies a recommendation to implement procedures for the deposit insurance not only to guarantee the complete reimbursement of deposit funds, but also to guarantee its reimbursement in a short period of time, thus avoiding the panic of Northern Rock, which was triggered by co-insurance and the lack of any guarantee regarding the time when depositors would have access to their funds.[8]

## 4.2 Improving financial statements

Setting accounting standards always involves trade-offs. Historical cost accounting and discretion in FVA might help to avoid procyclicality and facilitate compliance with capital regulation while increasing the risk of asymmetric information and market collapse. In contrast, a strict implementation of FVA

8 Notice that the Icelandic crisis shows that residual risks still exist.

increases transparency and makes it more difficult to hide problems, thereby allowing a timely reaction.

*4.2.1 New proposals*

In its proposals for changes of US generally accepted accounting principles (GAAP) after the crisis, the Financial Accounting Standards Board clearly focuses on transparency (FASB, 2010). The objective is to provide financial statement users with more timely and representative information about banks' exposure. The proposal distinguishes between 'derivatives and financial instruments held for trading', on the one hand, and 'financial instruments that are held for collection of payments of contractual cash flows', on the other. The second group would, in particular, include loans. Derivatives and financial instruments held for trading would be recognised at fair value with all changes in fair value reported in net income. For financial instruments held for collection of cash flows both amortised costs and fair value would be recognised on the balance sheet; interest accruals, credit impairments, and realised gains/losses would be reported in net income, and all other fair value changes would be recognised in other comprehensive income. Moreover, credit impairments would become stricter as impairments should be recognised when a credit loss is expected and not, as previously, when it is probable. In addition, reclassifications would no longer be permitted.

Thus, there are two important changes with respect to the discussion in the present paper. First, the available-for-sale category would no longer exist. For assets that, under the new rules, would instead be classified as being held for trading, unrealised changes in fair value would no longer be reported in other comprehensive income but as net income. Second, fair values of loans and leases would also be recognised in the balance sheet and not merely reported in the notes, and unrealised changes in the fair values would be reported in other comprehensive income and thus affect book equity. Opponents of an extension of fair value accounting may warn that the risk of contagion and procyclicality increases and that the inclusion of a 2.5% capital buffer under Basel III is not sufficient or too costly for banks. However, proponents may stress that the reduction in opacity may limit the risk of a market collapse, a point to be also considered. More research is needed, but it seems more appropriate to tackle the concern of opponents of FVA by increasing the capital buffer or adopting an appropriate prudential filter rather than reporting historical cost.

*4.2.2 Improving transparency in the financial statements*

In general, market prices are more reliable than managerial estimates. However, in a crisis, markets can be very illiquid and price distortions would directly affect a bank's balance sheet, net income, and bank equity through marking to market. But is this a reason not to use these market prices? Models and historical cost also have their shortcomings.

A complete understanding of the way information improves capital market allocation requires additional research on bubbles, panics and runs. In particular, more research is needed on whether investors are more likely to overreact to bad news or to opacity (ie the fear that bad news is not revealed). With today's understanding of what the nature of market feedbacks is, it seems to be the case that a lack of information leading to a paralysis of trading may be more harmful than disclosure. In addition, even if the market overreacts at times, disclosure of fair-value information acts as an early warning system. That is, even if banks' shareholders would have been calmer in the absence of fair-value disclosure, fair value accounting may nevertheless be preferred to historical cost accounting (Laux and Leuz, 2010).

It seems to be important that investors have the information to draw their own conclusions. The interesting question is whether this information has to be provided in the notes or the balance sheet and whether it should affect net income or other comprehensive income.

Could it be sufficient to report the fair values of all assets in the notes to give justice to transparency? Opponents argue that investors ignore the notes, that information in the notes is less reliable because accountants audit the notes less diligently, that important information is hidden among less important information (as in the Enron case), that information alone does not give investors sufficient leverage to take actions (eg if contractual rights are based on accounting numbers) and that the balance sheet is published prior to the notes. However, these arguments are not really convincing. If the hypothesis is correct that the information is important, investors should look at the notes; accountants could be made accountable for the information in the notes; and regulators could require that the notes are structured so that information is easy to extract, for example in a virtual balance sheet with full fair value accounting, and this information could then also be used in contracts and published at the same time as the balance sheet. As emphasised all along in this paper, it is our view that the decoding of information by the receiver and the incentives of this receiving party to use this information when making decisions determine the level of transparency of the market, jointly with the disclosure requirements imposed on firms and issuers.

Alternatively, banks can recognise all financial assets at both historical cost and fair value in the balance sheet and report realised fair value changes and impairments in net income and unrealised fair value changes in other comprehensive income. This approach is followed in the FASB (2010) proposal for financial instruments that are held for collecting contractual cash flows. But, in principle, banks could use this approach for all financial instruments and report the information for different asset classes separately, so that users of financial statements have flexibility to decide for themselves how to use the information for regulatory and contracting purposes. However, this approach is not pursued by the FASB for financial instruments that are held for trading. In particular, it is proposed

to drop the available-for-sale category where fair value changes only affected net income when they were realised or other than temporarily impaired and were otherwise reported in comprehensive income.

One reason why many users might not feel comfortable with splitting fair value changes for each asset class in separate entries in total comprehensive income are complexity of information and the cost of communication. For example, users talk about and compare net income, or, synonymously, net earnings or (net) profits. However, it is not obvious what a reasonable definition of net income is. By changing the accounting rules (eg treatment of unrealised fair value changes of financial assets and own credit risk), the content and economic meaning of net income is also affected. But this should not per se preclude standard setters and regulators from changing the rules. It is very likely that the market will adjust.

There is no single information that would be optimal for all purposes. Therefore, it is important to give users reliable, timely and clear disaggregated information. Both FASB and International Financial Reporting Standards (IFRS) acknowledge this point by reporting both fair values and amortised cost for loans and leases. Laux and Leuz (2010) compare the expected loan losses of major US bank holding companies as implied in the fair values reported in the notes with expected loan losses for these banks as derived by analyst reports. The comparison shows that banks are systematically more optimistic about loan losses than external analysts. It is unclear whether this systematic bias can be resolved merely by recognising the fair values of the loans in the balance sheet rather than reporting them in the notes. After all, models and assumptions have to be used to value these loans that are not traded in the market. For the market to trust the fair values in a crisis, the market must have the information to verify them, as happened in the stress tests that were performed during the crisis (eg knowledge of the types of loans and underlying assumptions). An alternative approach to tackle the concern that the disclosed information may not be credible in a crisis is a sensitivity analysis (as proposed by FASB and IFRS) or the reporting of homogeneous stress tests based on reasonably unfavourable scenarios. This information would allow the market to assess how critical the model assumptions are for the health of a financial institution.

Disaggregated information is also important for contracting and regulatory purposes. For example, regulators might want to implement prudential filters and distinguish fair value changes due to credit risk and liquidity premiums. Even if the distinction is subject to managerial discretion, for regulatory purposes, this discretion might pose a lower problem than a mechanical use of fair values.

## 4.3 Improving the role of credit rating agencies

The existence of an objective measure of risk, such as the ratings of an issue, enhances efficiency as it avoids effort duplication. Indeed, if reliable, the benefit

of a rating is that investors can invest in the issue without spending time and effort to verify the information, which would not be worthwhile for many investors anyway. However, a downside is that incentives of rating agencies and issuers increase to issue distorted ratings without effective monitoring by market participants.[9] Based on this observation and the analysis in section 3, recommendations regarding credit rating agencies should be based on four points: first, improving market feedback; second, eliminating or at least reducing conflicts of interest; third, eliminating shopping; fourth, monitoring the quality of credit rating agencies' information production.

We will examine hereafter how these points should be addressed and to what extent the recent regulatory proposals may lead to an improved system of ratings.

*4.3.1 Improving market feedback for credit ratings*

The concern about investors' reduced incentives to obtain additional information has led to a diffidence of regulators regarding the use of ratings by institutional investors. As mentioned in the first recommendation of the CGFS report, investment fund trustees and managers should review their internal procedures concerning how rating information on structured finance products should be used. Also, as the de Larosière report (2009) states, 'the fact that regulators required certain regulated investors to only invest in AAA-rated products also increased demand for such financial assets'. This negative externality of ratings on institutional investors' due diligence in the management of their portfolio has led some experts to the radical recommendation of removing AAA (or investment-grade) ratings requirements for institutional investors. The Dodd-Frank Act considers a less extreme version of this requirement and imposes the removal of references to credit ratings in federal agencies' regulation, although their substitution by alternative standards of creditworthiness is at best intricate and at worst wishful thinking. Also, the Dodd-Frank Act requires each NRSRO to establish procedures that clearly define the meaning of any rating symbol and to disclose the associated probability of default by the issuer. If adequately monitored, such a procedure would provide investors with probabilities of a downgrade and even the associated confidence intervals, thus establishing the accuracy of the rating, and would allow ratings based on a 50-year record, as for corporates, to be distinguished from those based on a six-year record, as for structured products, and even make the rating depend upon available documentation.

The recommendation here is to increase transparency by designing the disclosure of information that really matches the effective requirements of the industry. As mentioned, this may involve some trade-off between information precision and the difficulty for the market in interpreting and acting upon it. The difficulty is related to the argument by Pagano and Volpin (2009): an excess of information

9 It has been argued that reports of auditors also led to excessive confidence. Yet, there is no evidence of wrongdoing on behalf of auditors in the crisis (European Commission, 2010) in the detection of fraud and the responsibility of management, although the presence of an audit might have engendered an expectation gap because of investors' ignorance of the role and responsibilities of auditors. Here the problem is clearly the misinterpretation of what an audit report is, not the quality of the audit.

disclosure imposed by regulation may lead to less transparency if the relevant information is obscured by the immaterial information. An excess of information disclosure imposed by regulation may lead to less efficient markets if it implies less liquidity.

The best way to envision such a trade-off is to consider that some agents are able to invest in information production, as in Grossman and Stiglitz (1976), while others benefit from prices reflecting information. This implies that the choice between transparency and liquidity would be endogenous. In equilibrium, a number of traders will trade on the basis of confidence, while others will use information to benefit from their transactions. The case of a hedge fund (Paulson) designing a portfolio of low quality CDOs (Abacus) and betting against it is then part of the equilibrium strategies. Such a paradigm is helpful in understanding the limits to regulation. First, it is impossible to limit the information of the sophisticated traders by regulation. Second, it does not help to require an increased disclosure of detailed specific information if confidence-based traders do not use it because it is too costly or complex. Third, it is important to disclose potential conflicts of interest. In this respect, an important piece of information is the stake that an issuer holds, be it long or short.

This is why our recommendation here is that rating agencies should report information in a consistent way, indicating the length of historical data, the models' underlying macroeconomic assumptions and the sensitivity of the rating to changes in macroeconomic conditions, in line with the CGFS report. Moreover, rating information on structured products and corporate bonds should be comparable where the ratings have a similar meaning, but also highlight limitations and differences in the default characteristics of structured products and bonds.

### *4.3.2 Avoiding conflicts of interest*

The regulation directed at eradicating conflicts of interest could be structured either as ex ante rules or as ex post penalties. Some of the current proposals emphasise the later, while from the point of view of incentives, ex ante restrictions are easier to monitor and to enforce and therefore seem to dominate.

**Ex ante restrictions**

Two obvious recommendations to be put in place to limit conflicts of interest are:

1. Setting a limit on the provision of advisory services that is now prohibited both by the Dodd-Frank Act and the European Commission.
2. The creation of firewalls so as to prevent sales and marketing considerations from influencing the production of ratings, a rule stated in the Dodd-Frank Act and to be enforced by the SEC. Failure to implement such firewalls may result in the NRSRO registration being suspended or revoked.

Still, it is not clear that these limitations will solve the bulk of the existing conflicts of interest. As the problem is that CRAs want to serve their clients, there is a natural tendency to inflate ratings. So the main recommendations have to address the issue.

1. CRAs should not obtain higher profits if they issue a better rating. The Cuomo agreement between the New York State Attorney General Andrew Cuomo and the three major CRAs states precisely that CRAs cannot charge different prices for 'good' and 'bad' ratings. Of course, because of repeated business and the creation of relationships between a CRA and its customer, the issuer, this may be difficult, but at least it goes in the right direction as it softens the main conflict of interests.
2. In addition, a supervisory board that has a long horizon and is determined to preserve the CRA's reputation will complement the scheme. The board will have to oversee policies and procedures for the management of conflicts of interest. This consideration has led recent regulation to require a fraction of CRAs' board members to be independent, where the required fraction is at least a third in the European regulation and at least 50% in the Dodd-Frank Act. In addition, the Dodd-Frank Act also requires NRSROs to designate a compliance officer with no responsibility either for sales of for models to be fully assigned to verify the mechanisms by which the NRSRO copes with the current regulation.

Finally, as mentioned in Bolton *et al* (2012), increasing competition among CRAs could be hazardous from a conflict of interest point of view, as this will increase the bargaining power of the issuers while decreasing the value of reputation to the CRAs, thus providing incentives to inflate ratings. This does not mean that limits to competition and barriers to entry should be imposed. Rather it is the current relationship between the issuer and the CRA that has to be reconsidered.

**Ex post surveillance**

Ex post surveillance will complement the ex ante regulatory rules. So, the European regulation requires CRAs 'to comply with rigorous rules to make sure (i) that ratings are not affected by conflicts of interest', which is a weak form of self-regulation. In addition, and presumably more effective, the European regulation includes an effective surveillance regime whereby European regulators will supervise credit rating agencies (European Parliament, 2009). But of course, if their compliance with regulation is to be assessed on the basis of their publication of an annual transparency report, the report will clear the CRA of any wrongdoing.

### *4.3.3 Eliminate shopping*

As shopping is, jointly with conflicts of interest, one of the major causes of ratings inflation, this is one of the key recommendations. The recommendation here is that once a rating is asked for it should be publicly displayed. Unfortunately this may be difficult to enforce, as it requires a process of cooperation and information

transmission between the issuer and the CRA. Still, publicly announcing that a rating has been solicited for an issue obviously goes in the right direction.

In recent regulation, the most radical and challenging proposal here is the Franken amendment to the Dodd-Frank Act, that has been relegated to the status of a two-year study. The proposal gives to an NRSRO overseen by the SEC the power to provide initial ratings for structured products on a rotating basis. In this way the issuer is unable to select the initial rating, even if it is allowed to solicit additional ratings. The system, if suitably designed, could also provide the CRAs with the right incentives, because the probability of a given CRA being chosen for an initial rating may depend upon its past accuracy record for similar products. The Franken amendment has thus the advantage of (a) solving the shopping problem, as the announcement of the initial rating is public, and (b) solving the conflicts of interest as rotation breaks the collusion between a CRA and an issuer and provides incentives for accuracy if a CRA with a better record has a higher probability of being selected for the initial rating.

*4.3.4 Monitoring the quality of ratings*

Although certification of CRAs through the NRSRO has been criticised as a barrier to entry, once CRAs are accountable for their ratings, their registration has the benefits of strict regulation, with the ability of the designated regulatory agency, under the supervision of the newly created European Securities and Market Authority (ESMA), to verify the CRAs' procedures. This has led European regulation to introduce a registration procedure for credit rating agencies, which will be the European equivalent of the NRSRO. In addition, because of the diversity of legal and regulatory regimes in Europe, on 2 December 2009 the Council of the Economics and Finance Ministers of the European Union Member States (ECOFIN) proposed the centralised supervision of CRAs, so as to avoid duplication of monitoring, risk of inconsistent or divergent application of CRA regulation across countries, red tape and home biases in CRA regulation. The new proposals establish the possibility of applying penalties to CRAs, including suspension of registration to enforce compliance. Also, the Dodd-Frank Act makes it easier for plaintiffs to engage in legal action for money damages against rating agencies if they have not fulfilled their due diligence by knowingly or recklessly failing to conduct a reasonable investigation of the characteristics of the issue. Consequently, by putting in place a system of ex post penalties, current regulatory proposals go in the right direction and provide ex ante incentives to produce accurate ratings.

Still, it is not clear from the reading of the regulatory proposals how accuracy is to be measured ex post. Here a simple straightforward recommendation to be put forward is to stick to statistical properties of ratings, a recommendation related to the Dodd-Frank suggestion of establishing procedures that clearly define the meaning of any rating symbol. If this is the case, it is easy to make it compulsory to disclose the confidence intervals provided by the CRA, their basic assumptions and the rules the CRA explicitly establishes for rating upgrades and downgrades.

This approach would allow measurement of whether rating changes are within some confidence interval. Although it would not be possible to monitor the accuracy of rating of a specific issue, it does allow monitoring of the quality of the ratings process when applied to multiple issues. As a consequence, CRAs might be reluctant to rate instruments without sufficient information and have incentives to improve their models, two recommendations that are explicitly made in the European regulation.

## 4.4 Stress test recommendations

It is important to define a stress test scenario that is realistic, informative to the market, and which allows precise conditional information to be provided. In our view, the European stress test of 2010, in spite of benefiting from the previous US experience, was ill-designed as it limited the access of the market to the financial industry's performance under the stress test scenario (see also the discussion in Greenlaw *et al*, 2011). It was a mistake that only a fraction of the banking industry, amounting to 50% of the respective national banking sectors, was forced to take the test. Clearly, there is no need to impose the cost of the test on every single small institution, but it is of paramount importance to disclose the result of the stress test for all relevant institutions, in particular SIFIs, but also those institutions that cover more than, say, 10% of the market, which also involves institutions that the European test did not include. This was all the more important in Europe because financial institutions needed access to cross-border funding. So, our stress test recommendation is that it should be characterised by

1. disclosure to the market;
2. being compulsory for all institutions requiring access to the money market;
3. being exhaustive regarding the different types of assets, whether on banks' trading books or on the assets held to maturity;
4. allowing financial analysts and portfolio managers to perform 'what if' simulations with the information disclosed.

In part, market forces have already promoted these rules. Nevertheless, the issue that arises is that some countries may have an interest in hiding information. In particular, countries facing a situation of budgetary restraint so that the bailing out of systemically important institutions is not guaranteed, as was the case in Iceland, will clearly oppose a rigorous transparent stress test. Still, the alternative of not running the stress tests only leads to increased market diffidence, liquidity shortages and the perspective of a worsening of the crisis.

## 5 Conclusion

Information problems were at the heart of many problems during the recent financial crisis, and, quite naturally, the immediate reaction from the G20 general recommendations to regulatory authorities has been to require that market participants have access to better information. While this seems a natural implication of basic microeconomic theory on efficient resource allocation, we argue here that transmission of information may be a more involved process, related to asymmetric information, moral hazard, and incentives. In particular, one of the points we emphasise in this paper is that it is important to distinguish between disclosure and transparency. We interpret disclosure as providing information, while transparency arises when the information is effective in reaching the market, being adequately interpreted and used. Both parts of the communication process are ultimately linked. However, it is useful to distinguish them when discussing possible regulatory measures as regulators often seem to believe that disclosure is sufficient for transparency. As we discuss in the paper, there are several obstacles to a simple mapping of the former to the latter.

The regulators' highlight of transparency and its role in providing market discipline is not without contradictions, as regulatory authorities do not seem to trust in market discipline during a crisis and use the argument of market inefficiencies as a justification for intervention (regulatory forbearance). Although there might be a point in the possible overreaction of market participants and resulting distortion of market prices, changing the rules of the game by selective intervention can be preposterous. Market participants will foresee the chance to relax the rules and try to take actions to influence them, which can have detrimental ex ante and ex post incentive effects. More research is needed on the reactions of the market in a crisis and the involved trade-offs, but clearly, the universal claim of 'better information' has to be nuanced and better qualified.

To be more specific, two obstacles seem to hinder market participants' use of better information. The first obstacle is government intervention and regulation itself. For example, because of government bail-outs and regulation based on ratings, investors' incentives to use, scrutinise and demand certain information are limited. To improve transparency, this issue has to be understood and taken into account. Regulation has to tackle the problem of markets failing, potentially because of intervention and regulation.

The second obstacle is the cost of processing information, in particular, of providing reliable information on the part of the issuer as well as collecting and understanding information on the part of the investor. There a several issues involved: what type of information should be disclosed, how do investors react to the information, and what are the consequences for market efficiency? These questions provide a challenge to regulators as they involve complex trade-offs. An example is the classical 'winner's curse' problem, that better information can only be understood and processed by sophisticated market participants. When

this is the case, it is not clear any longer that better information increases market efficiency, as it may come at the cost of lower liquidity, since the existence of informed insiders will tax uninformed agents on every trade they engage in. Another example is the potential overreaction of market participants. Should information be hidden to avoid overreaction or would this cause even greater overreaction in a crisis? While regulators might demand the disclosure of additional information, it is impossible to limit access to different sources of information that investors might use.

Because of these obstacles, regulating disclosure and providing a framework for better transparency is difficult. We have discussed several of the underlying issues for two main sources of information to the market, financial statements and information provided by credit rating agencies. Of course, we are not able to 'solve' all the issues, but understanding the obstacles and trade-offs is an important move towards designing better regulation and guiding future research.

## References

Admati, A R, DeMarzo, P M, Hellwig, M and Pfleiderer, P (2010), 'Fallacies, irrelevant facts, and myths in the discussion of capital regulation: why bank equity is not expensive', mimeo, Stanford Graduate School of Business.

Allen, F and Carletti, E (2008), 'Mark-to-market accounting and liquidity pricing', *Journal of Accounting and Economics* 45, pp 358–78.

Armstrong, C S, Guay, W R and Weber, J P (2010), 'The role of information and financial reporting in corporate governance and debt contracting', *Journal of Accounting and Economics* 50(2–3), pp 179–234.

Ashcraft, A and Schuermann, T (2008), 'Understanding the securitization of subprime mortgage credit', Federal Reserve Bank of New York Staff Report 318.

Ashcraft, A, Goldsmith-Pinkham, P and Vickery, J (2009a), 'MBS ratings and the mortgage credit boom', mimeo, Federal Reserve Bank of New York.

Ashcraft, A, Goldsmith-Pinkham, P and Vickery, J (2009b), 'The role of incentives and reputation in the rating of mortgage-backed securities', mimeo, Federal Reserve Bank of New York.

Barberis, N and Thaler, R (2003), 'A survey of behavioral finance', in G M Constantinides, M Harris and R M Stulz (eds), *Handbook of the Economics of Finance,* vol. 1, Amsterdam, Elsevier, pp 1053–1128.

Becker, B and Milbourn, T T (2010), 'How did increased competition affect credit ratings?', *Journal of Financial Economics*, 101(3), 493-514.

Benmelech, E and Dlugosz, J (2009), 'The credit rating crisis', NBER Working Paper 15045.

Bolton, P, Freixas, X and Shapiro, J (2012), 'The credit ratings game', *Journal of Finance* 67(1), pp 85-112.

Brunnermeier, M K (2009), 'Deciphering the liquidity and credit crunch 2007–2008', *Journal of Economic Perspectives* 23(1), pp 77–100.

CGFS (Committee on the Global Financial System) (2008), 'Ratings in structured finance: what went wrong and what can be done to address shortcomings?', CGFS Paper 32, Bank for International Settlements.

Chemmanur, T J and Fulghieri, P (2006), 'Competition and cooperation among exchanges: A theory of cross-listing and endogenous listing standards', *Journal of Financial Economics* 82(2), pp 455–89.

Cremer, J (1995), 'Arm's length relationships', *Quarterly Journal of Economics* 110(2), pp 275–96.

Dang, T V, Gorton, G and Holmström, B (2009), 'Opacity and the optimality of debt for liquidity provision', working paper.

De Ceuster, M K and Masschelein, N (2003), 'Regulating banks through market discipline: a survey of the issues', *Journal of Economic Surveys* 17(5), pp 749–66.

de Larosière, J (chair) (2009), *Report from the High-Level Group on Financial Supervision in the EU*, Brussels.

European Commission (2010), 'Audit policy: lessons from the crisis', Green Paper COM(2010) 561, Brussels.

European Parliament (2009), Regulation (EC) No 1060/2009 of the European Parliament and of the Council on credit rating agencies.

FASB (Financial Accounting Standards Board) (2010), 'Accounting for financial instruments and revisions to the accounting for derivative instruments and hedging activities', Financial Accounting Series, Exposure Draft: Proposed Accounting Standards Update, 26 May.

Fischer, P E and Verrecchia, R E (2000), 'Reporting bias', *Accounting Review* 75, pp 229–45.

Flannery, M J. (1998), 'Using market information in prudential bank supervision: a review of the US empirical evidence', *Journal of Money, Credit and Banking* 30(3), pp 273–305.

Gorton, G B (2009), 'The panic of 2007', in Maintaining Stability in a Changing Financial System, Proceedings of the 2008 Jackson Hole Conference, Federal Reserve Bank of Kansas City, pp 131–262.

Gorton, G B and Metrick, A (forthcoming), 'Securitized banking and the run on repo', *Journal of Financial Economics*, forthcoming.

Greenlaw, D, Kashyap, A K, Schoenholtz, K and Shin, H S (2011), 'Stressed out: macroprudential principles for stress testing', conference draft prepared for the US Monetary Policy Forum.

Griffin, J M and Tang, D Y (forthcoming), 'Did subjectivity play a role in CDO credit ratings?', *Journal of Finance*, forthcoming.

Grossman, S J and Stiglitz, J E (1976), 'Information and competitive price systems', *American Economic Review* 66(2), pp 246–53

Healy, P M and Palepu, K G (2001), 'Information asymmetry, corporate disclosure, and the capital markets: a review of the empirical disclosure literature', *Journal of Accounting and Economics* 31, pp 404–40.

Hellwig, M F (2005), 'Market discipline, information processing, and corporate governance', mimeo, Max Plank Institute for Collective Goods.

Hellwig, M F (2009), 'Systemic risk in the financial sector: an analysis of the subprime-mortgage financial crisis', *De Economist* 157(2), pp 129–207.

Holmström, B (1979), 'Moral hazard and observability', *Bell Journal of Economics* 10(1), pp 74–91.

Holmström, B (1999), 'Managerial incentive problems: a dynamic perspective', *Review of Economic Studies* 66(1), pp 169–82.

Huizinga, H and Laeven, L (2009), 'Accounting discretion of banks during a financial crisis', IMF Working Paper 09/207.

Krahnen, J P and Wilde, C (2010), 'CDOs and systematic risk: why bond ratings are inadequate', mimeo, University of Frankfurt.

Laux, C and Leuz, C (2009), 'The crisis of fair-value accounting: making sense of the recent debate', *Accounting, Organizations and Society* 34(6–7), pp 826–34.

Laux, C and Leuz, C (2010), 'Did fair-value accounting contribute to the financial crisis?', *Journal of Economic Perspectives* 24(1), pp 93–118.

Leuz, C and Wysocki, P (2008), 'Economic consequences of financial reporting and disclosure regulation: a review and suggestions for future research', working paper.

Leuz, C, Triantis, A and Wang, Y (2008), 'Why do firms go dark? Causes and economic consequences of voluntary SEC deregistrations', *Journal of Accounting and Economics* 45, pp 181–208.

Lowenstein, R (2008), 'Triple-A-failure', *New York Times Magazine*, 27 Apr.

Morris, S and Shin, H S (2002), 'Social value of public information', *American Economic Review* 52(5), pp 1521–34.

Morris, S and Shin, H S (2008), 'Financial regulation in a system context', *Brookings Papers on Economic Activity*, Fall, pp 229–61.

Morrison, A D and White, L (2009), 'Level playing fields in international financial regulation', *Journal of Finance* 64, pp 1099–1142.

Onaran, Y. (2008), 'Lehman cuts $130 billion of assets to end bear stigma', at Bloomberg.com, *http://www.bloomberg.com/apps/news?pid=20601087&sid=aUaJYcbwzbjI&*, 8 June (updated version accessed Feb. 2012).

Pagano, M and Volpin, P F (2009), 'Securitization, transparency and liquidity', mimeo, Università di Napoli Federico II and London Business School.

Peristian, S, Morgan, D P and Savino, V (2010), 'The information value of the stress test and bank opacity', Federal Reserve Bank of New York Staff Report 460.

Plantin, G, Sapra, H and Shin, H S (2008), 'Marking-to-market: panacea or Pandora's box?', *Journal of Accounting Research* 46, pp 435–60.

Rajan, U, Seru, A and Vig, V (2008), 'The failure of models that predict failure: distance, incentives and defaults', Chicago Graduate School of Business Research Paper 08-19.

Shleifer, A (2000), *Inefficient Markets: An Introduction to Behavioral Finance, Oxford*, Oxford University Press.

Spargoli, F (2010), 'Information disclosure and market discipline of banks', mimeo, Universitat Pompeu Fabra.

Stein, J C (1989), 'Efficient capital markets, inefficient firms: a model of myopic corporate behavior', *Quarterly Journal of Economics* 104, pp 655–69.

Story, L (2010), 'Merrill's risk disclosure dodges are unearthed', *New York Times*, 9 Aug.

Verrecchia, R E (2001), 'Essays on disclosure', *Journal of Accounting and Economics* 32, pp 97–180.
Verrecchia, R E (2010), 'Accounting alchemy', Bank for International Settlements Working Paper 302.

# 5 Bank Resolution:

## Lessons from the Crisis

**Mathias Dewatripont and Xavier Freixas**
*Université Libre de Bruxelles (Solvay Brussels School and ECARES) and CEPR; Universitat Pompeu Fabra and CEPR*

### 1 Introduction

In the aftermath of every banking crisis the effectiveness of the procedures to deal with financially distressed banks is questioned. The 2007/9 banking crisis has been no exception and the issue has been revisited with an important number of contributions and original proposals designed to redress the inefficient transfer of resources from taxpayers to private banks' claimholders. The aim of this paper is to review bank resolution procedures, defined here as the mechanisms that are used to prevent the impact of a banking crisis and its ultimate effects on economic activity. Whether banks facing financial distress should be liquidated or bailed out, and how, is clearly a critical issue. This is not only because of the huge amounts of taxpayer transfers that are involved in the process, but also because it defines the expectations other banks have to be bailed out in the future, and therefore their incentives for risk-taking. Yet, in spite of the commonly shared view that the issue is of paramount importance, the analysis of how regulators and government authorities deal with a banking crisis does not reveal a common pattern. Indeed, the study of bail-out interventions showed rather an amalgamation of procedures – private, public and mixed, dealing with assets or with liabilities – and does not provide a way to identify the entities to be liquidated and the ones to be bailed out. In addition, there is no clear consensus on which procedures are the preferred ones, even if the generally accepted view is that the Swedish banking crisis in the 1990s was expertly dealt with, while the cost of other crises was much too high. This lack of consensus on the efficiency of resolution policies is in our view the consequence of our relative ignorance, while bank resolution regimes are nevertheless of paramount importance, and this for two reasons.

First, because the main justification of banking regulation is the existence of the externalities that originate in banks' bankruptcies, whether because of the existence of small uninformed depositors or because of contagion effects. Since, according to standard microeconomic theory, externalities should be dealt with

at the originating point, it is crucial to start by correcting at least partially this core externality, even if other externalities turn out to require reliance on other instruments. Second, as alluded to above, considering bank resolution regimes is critical for the management and prevention of possible future banking crises, because these regimes have implications for incentives of shareholders, board of directors and managers regarding risk, compensation and dividend policies.

In order to analyse bank resolution procedures it is necessary, first, to point out that by 'bank in distress' we mean a bank that is facing difficulties in continuing its usual activities because of lack of funding or lack of capital. The period during which the bank is in distress will end up either with the bank's bankruptcy or with its return to normal conditions of capital and funding. We are then able to define a bank resolution procedure as any public intervention that is intended to restore the bank's normal business conditions or to liquidate it, thus restoring normal business conditions for all other banks. Bank resolution procedures should therefore be designed so as to minimise the cost to society of distress episodes.

The need to cope with banks in distress was already identified in the nineteenth century, with Bagehot's rules on lender-of-last-resort policies. At that time, the main issue was the existence of a lender of last resort to avoid the bankruptcy of a solvent bank unable to meet its payment obligations. Since then, the view has significantly changed because, first, the payment system nowadays relies much more heavily on banks' transactions, thus increasing the social cost of a bank's bankruptcy; second because the modernisation of financial markets facilitates access to funding (eg through repo operations); and third, because today's monetary policy implementation in a world of fiat money does not have much in common with the management of the stock of gold in the nineteenth century.

More than ever, the current crisis has brought to light the significant potential costs and benefits of the resolution of a bank to the various 'constituencies'. In the aftermath of the banking crisis we are bound to acknowledge that academic research in the area of banking has so far failed to identify a 'best regulatory response' to each type of banking crisis. Although such a goal is ambitious, and clearly beyond the scope of this paper, it has provided us with the motivation to clarify the key issues surrounding bank resolution. The aim of our paper is precisely this: to provide a framework of analysis to understand the main issues, the main tensions and the main trade-offs involved in a bank resolution procedure. Indeed, a bank resolution should be seen in all its complexity, with three main types of parties involved: the bank and its shareholders, the regulator (particularly the deposit insurance company), and the Treasury, with bank managers and bank debtholders at times entering the picture. In addition, the dynamic dimension of a bank resolution, starting with a bank being in distress, defines a bargaining game among the parties involved. Consequently, our approach has been to address the bargaining game by backward induction, which justifies the structure of our paper. Starting first with bankruptcy, we then move to the 'bank in distress' stage

of the bargaining game and end up by examining the mechanisms and rules that the regulator should set ex ante in order to maximise the social welfare function.

Our paper will be structured as follows. We first address in section 2 the general issue of bank distress and the procedures that are most commonly implemented to avert its social cost. Next, in section 3, we turn to the bankruptcy procedure and argue why banks' bankruptcies are different. Section 4 is devoted to the comparison of bank resolution schemes and section 5 explores the ex ante design of the bank resolution rules. Section 6 surveys the specific issues of cross-border bank resolution and section 7 concludes.

## 2 Broad principles

We begin by pointing out some of the complexities of a bank resolution procedure that a rigorous analysis has to address. These concern the timing of the resolution, the possible biases in the regulator's objectives, as well as the constraints the efficient design of a bank resolution procedure has to acknowledge.

A bank resolution regime can be seen as the result of a constrained cost–benefit optimisation. Regulatory authorities' most common mandate is the preservation of both financial activity and financial stability, in such a way that the objective function weighs both the total surplus from the banking industry and the possible expected cost of financial instability. This social cost of banks' bankruptcy is the cost of real economic activity and reflects, first, the cost of the possible impairment of the payment system, with some agents lacking the liquidity to operate in the market for goods and services. Second, it takes into account the costs in terms of lower lending, lower growth, higher unemployment, lower investment levels and so on.

This implies that bank resolution should occur while allowing the bank to remain in operation. This requirement of a special resolution regime where activity is preserved is not specific to banks. Indeed, utilities such as power or water supply face the same type of constraint. Yet, there are two key differences. First, the banking industry is susceptible to contagion. Second, a distressed bank that is kept in operation faces a high cost of funding that generates losses for as long as it continues being distressed. The implication is that resolution should take place rapidly.

The complexity of the problem stems from three broad classes of problems that we examine in turn: (1) the time dimension of resolution options; (2) possible biases in the regulatory objective function; and (3) 'misspecification' of the regulator's decision-making framework.

## 2.1 The time framework of bank resolutions

Because a bank resolution occurs in response to a bank crisis, it is useful to clarify the different stages, from the ex ante stage of the design of the bank resolution rules and their implementation to the final outcome of the crisis.

We distinguish three phases where policies can impact bank resolution: (i) stage 1, the initial stage when the regulatory rules of intervention are designed; (ii) stage 2, a phase of distress where bankruptcy is not inevitable, and where other types of resolution can be implemented with a continuation of bank activities in some form; and (iii) stage 3, a phase where bankruptcy has become inevitable.

Proceeding by backward induction, consider first the last stage. When bankruptcy is inevitable, the regulator has to apply the bankruptcy laws and its only choice is determining (i) what accrues to each type of claimholder, and (ii) how the portfolio of the bank's assets is to be managed or sold.

In stage 2, by contrast, when the intervention concerns a bank in distress that is threatened by bankruptcy but not yet in default, the regulator has additional options open, as it can transfer resources to the bank and renegotiate with the different types of claimholders. If successful, that is, in particular, if the commitment to support the bank in the future is credible, this allows the regulator to restore market confidence by reducing a bank's probability of default and the existing agency problems (gambling for resurrection) and, therefore, improve its access to funding. The precise definition of when a bank is in distress is, to some extent, open to interpretation. Nevertheless, whatever the definition, it is important to keep in mind that this second stage is a time interval that begins with the bank being in distress and ends with the bank being either back to normal business conditions or in bankruptcy. One natural way to envision this process is to think that during this time interval the bank's assets will follow a stochastic process that results in losses and that during this process information is either voluntarily disclosed by the bank or is obtained by financial analysts and passed on to the market. During this interval, both the bank and the regulator will make choices: the former regarding its investments (eg gambling for resurrection) and the latter in deciding whether or not to support the bank, and, in the first case, with which associated conditionality.

As far as this stage is concerned, three remarks are important: First, the outcome of bankruptcy is the result of an equilibrium process involving depositor coordination, as illustrated by the Diamond and Dybvig (1983) model. Second, the intervention by regulatory authorities is the result of a bargaining process that takes time, generates rents to shareholders and, therefore, determines the ultimate cost to taxpayers. Third, by backward induction, the disagreement point, that is, the bank bankruptcy regime, is a critical determinant of the equilibrium of the bargaining game, and thus of the cost of resolution.

Coming now to the initial stage, note first that, even if the regulator wants to commit to a specific set of rules, it is not clear that, once confronted with a bank in distress situation and under all kinds of pressures, it will follow them, so that the non-commitment approach may sometimes be the correct one. Still, how bankruptcy and intervention rules are defined at the initial stage is vitally important, because this determines the environment of the resolution, the relative bargaining positions, the extent of the ability of the regulator to commit to pre-existing rules and, in the end, the final cost of resolution. Obviously, each claimholder will use his or her rights as a bargaining tool. So, for instance, shareholders may claim that they are expropriated through the dilution of their shares if the possibility for the regulator to inject additional capital at the current market prices of assets has not been clearly defined and turns out to penalise shareholders. Because the regulator's objective may be a speedy resolution, this may lead to an increase in the amount transferred to shareholders at the cost of taxpayers. The European Council's highlighting of the need for 'certainty and predictability around bank resolutions for all stakeholders: owners, creditors and counterparties'[1] reflects this concern. The Basel core principles define some basic characteristics these rules should satisfy, but because of their generality, they have the drawback that each country has to apply them within its bankruptcy law and in accordance with its overall legal structure and this may lead ex ante to legal uncertainty and ex post to huge litigation costs. (Basel Committee on Banking Supervision, 2006).

## 2.2 The regulatory objectives

Broadly speaking, the objective of any bank intervention should be to minimise the social cost of bank distress by choosing the best procedures to cope with it, which might imply transferring funds to some of the bank claimholders. Ex ante contingent planning will be critical at the time of intervention, as it will define the negotiation framework. Yet, ex post, once confronted with a banking crisis, the regulatory authorities and the Treasury may have different perceptions as to what the benefits of intervention are.

First, the regulator may want to allow the bank to continue operating by providing the market with sufficient guarantees so as to give the bank access to funding at a reasonable cost and thus avoiding a bank run and preserving the value of borrower–lender relationships. Second, alternatively, the regulator's overriding concern may be to avoid a disorderly liquidation of a bank in distress that would imply a high cost generated by the disruption of the payment system, contagion, litigation and the complexity of unwinding the bank's contracts. Third, the regulator's objective may be more generally to avoid a credit crunch and a severance of firms' access to credit, a point that has been repeatedly emphasised by political authorities during the crisis. Fourth, the regulator may be concerned with its own reputation (and the fact that intervention may indicate a failure of

1 2981st Council meeting, Economic and Financial Affairs, Dec 2009, p 19.

earlier monitoring). Fifth, the regulator's objective may be to protect the banks' interests as assumed in the theory of regulatory capture.

Notice that these objectives are intertwined, so that, for instance, in the case of the resolution of Bear Stearns in March 2008, it is impossible to identify whether the decision to avoid bankruptcy and go instead for the absorption by J P Morgan Chase was motivated by the cost of a bankruptcy or by the preservation of Bear Stearns's borrower–lender relationships.

## 2.3 'Model misspecification'

Note that the regulator may be unaware of some constraints that it might face, a point we refer to as 'model misspecification'. The first cause of model misspecification is to ignore the feasibility constraint: the Icelandic crisis showed that it was impossible for the Icelandic deposit insurance fund to guarantee the Icelandic deposits and also for the government to bail out the defaulting deposit insurance fund because of the obvious fiscal imbalances it would have caused. Allowing the banking industry to grow to the extent it did in Iceland was ignoring the fact that the deposit insurance fund could not fulfil its commitments under the European rules (the 'too big to save' problem).

Second, the model could be misspecified because the ex post bargaining game itself is not well understood. Thus, for instance, at the initial stage the regulator may expect banking crises to be solved at a low cost because it is confident it has the legal instruments to deal with them efficiently but may find out later on that this is not the view of the courts. More generally, the regulator may underestimate the capacity of claimholders to extract rents from taxpayers, as this is the result of a complex game.

Third, the model could be misspecified because of time inconsistency. Indeed, the regulator may want to commit to liquidating banks that are not systemic but, ex post, find itself in a position where this is not the best option. The Northern Rock crisis of 2007 illustrates this point.

## 2.4 Principles of interventions

As Bulow and Klemperer (2009) and Beck *et al* (2010) put forward, a bank resolution can (i) operate either through asset revaluation or through a liability devaluation; (ii) be contingent or not; and (iii) involve bankruptcy or not.

Note first that recapitalisation can be accomplished unilaterally by the banks themselves, through one of three means: by issuing new equity, by liquidating assets to pay off current liabilities, or by negotiating with debtholders to convert some debt into equity.

However, in a crisis, the first of these means is at least initially extremely difficult and the second risks worsening the situation, both by freezing new lending in the interim and by forcing the sale of assets at fire sale prices, much below their hold-to-maturity value. The third means (debt–equity conversion without public intervention) is often difficult too, because debtholders have an incentive to hold out in the hope of receiving the full value of their claim, and in doing so do not internalise the costs their resistance imposes on other stakeholders in the same bank and on other banks.

If policymakers wish to bring about a different outcome without allowing automatic insolvency procedures to run their course, some public intervention[2] for recapitalisation may be unavoidable. This does not imply that all undercapitalised banks should be recapitalised; indeed it is likely that the cost of recapitalisation will exceed the benefits for some banks, which should therefore be closed. Sometimes this may need to take place via a staged procedure, as in the case of the US' prompt corrective action, in order to avoid any risk of systemic panic brought about by a disorganised process for closing a bank that, in itself, does not have a good claim to recapitalisation.

An intervention will thus be characterised by (i) whether it affects assets or liabilities; (ii) how it affects the rights of liability holders; and (iii) how assets are managed. Interventions may differ in their conditionality, and also in their appropriateness for individual or systemic crises.

### *2.4.1 Asset revaluation*

Asset revaluation through public intervention could in theory take place in a completely transparent way, through a cash injection financed by the government budget. This policy, which is lenient on shareholders if they keep a positive equity stake and is costly to taxpayers, has the disadvantage of introducing a distortion in the bank's cost of capital, with bankruptcy not a credible option any longer and the bank given a right to issue debt with the implicit guarantee of the government.

Asset purchases and price guarantees by the state involve a cost to taxpayers and a benefit to shareholders. The difference is that both the cost and the benefit are much less easy to predict in advance. The shareholders clearly benefit from receiving prices (or obtaining guarantees) that private markets would not currently provide, but because it is typically not clear at what price well-functioning private markets would buy the assets and provide the guarantees, both the real value of the shareholder benefit and the real cost to taxpayers cannot easily be calculated. Governments (especially but not only the United States government) have been claiming that these costs are lower than they appear on paper because asset prices are artificially depressed. This means that price guarantees may not need to be

2 We leave aside here liquidity facilities through open market and related operations that are nowadays a standard tool in the implementation of monetary policy and in the provision of emergency liquidity assistance.

called, and asset purchases may involve the possibility of future upside gains for the taxpayer if prices rebound. But there are very strong incentives for politicians to exaggerate the likelihood of this outcome.

Asset purchases can also be made by other private sector institutions, which can be given incentives to do so, either by price guarantees (which raise the same concerns as above) or by other inducements such as a likely increase in market power (which would raise the value of assets, for instance by raising the fees and interest rates the bank could charge or lower the rates it would have to pay on deposits). In the latter case, those who bear the costs would not be taxpayers but the bank's customers (borrowers and depositors). Unless some inducements of this type are offered, other private sector institutions will participate only under political pressure, which would imply some transfer from the shareholders of the banks buying assets to the banks selling them (and would evidently do nothing for the capitalisation of the sector as a whole). Asset purchases by other private sector institutions are therefore typically very non-transparent. In spite of this, the benefit of a general asset purchase is that it can be credibly made once and for all and does not discriminate among banks. Consequently, the distortion in terms of marginal cost of funds is theoretically non-existent.

Note finally that, as well as raising issues of equity accountability, this lack of transparency in burden-sharing raises two types of efficiency concerns. First, there is the standard moral hazard issue: if shareholders and managers of the bailed-out banks are more aware of the benefits than the counterparties are aware of the costs, future behaviour may be riskier than is envisaged by the safeguards set up to restrain it. Secondly, a desire to minimise transparency may lead to recapitalisation being insufficient: a reluctance to admit the poor quality of assets may encourage bank management to lobby for repeated piecemeal recapitalisations in order to protect shareholders without having to be in a weaker bargaining position to recapitalise once and for all for the required amount of capital that would allow the bank to restart its activity efficiently.

### *2.4.2 Liability revaluation*

The simplest and most transparent form of revaluation of liabilities is a bail-in consisting in the transformation of some or all unsecured liabilities into equity. The burden of recapitalisation is then borne by those who had made the unsecured loans to the banks in question. This has the merit of being highly transparent as far as the first-round effects are concerned. Still, the regulatory authorities may not have the legal instruments required to force this type of debt/equity swap. To the extent that some banks would still be undercapitalised (because they have very few unsecured liabilities), authorities could be forced to be transparent as to the sharing of the remaining burden through the mechanisms for the securing of those liabilities (eg via deposit insurance). This would strengthen the presumption that at least some of the junior creditors would be expected to share responsibility for monitoring banks in the future, thereby alleviating the moral

hazard problem, and by so doing probably also making it more expensive, or less subsidised, for banks to raise unsecured finance in the future.

Moreover, there are second-round issues. A significant proportion of the liabilities of banks have their counterpart in assets of other banks. Therefore, such a forced recapitalisation may threaten the solvency of other banks. In practice, it is not clear how serious the problem is. If regulators are doing their job, loans to currently seriously undercapitalised banks should already be marked down on the balance sheets of the creditors in question. However, if this is not the case, other methods may be used (such as corralling the liabilities in a 'bad bank' and therefore leaving open their ultimate status and value (see below)).

Some other liability restructuring methods change the rules of precedence for existing creditors without formally revaluing their claims (for instance by issuing preferred equity or various convertible instruments). These are typically less transparent than forced debt-to-equity conversions, but may have the advantage, when combined with asset revaluations, of mitigating some of the costs if bank solvency improves by more than implied by current asset valuations on unchanged policies.

Note also that the regulatory authority can commit to use a specific scheme and this can be publicly announced in advance. For example, Hart and Zingales (2009) suggest introducing mandatory CDS-triggered equity issues, under the threat of a liability revaluation. In the same vein, Kashyap *et al* (2008) put forward a capital insurance proposal, as an alternative to higher, non-contingent, capital ratios.

Finally, liability revaluations can be combined with contingent asset revaluations: Caballero (2009) has proposed that if the bank issues new equity in a given amount to private investors, the government could provide a loss guarantee for the new equity owners by promising to buy back the new equity at a fixed price in the future. In other words, the government distributes free put options to the new equity holders.

### *2.4.3 Joint assets and liabilities restructuring*

Obviously, the two previous methods can be combined, thus providing the sum of their benefits. Still, there is a case where the combination may allow greater benefits to be obtained than the sum of assets and liabilities restructuring, and this occurs when the bank is split into two component parts, dividing the balance sheet so as to create a 'good bank' capable of continuing a profitable activity and a 'bad bank' as a shell for the residual assets and claims. A number of proposals have argued in favour of this form of resolution, thus moving away from a going concern perspective. This was the solution adopted in Ireland, where bad loans have been transferred to the National Asset Management Agency (NAMA).[3]

3 The Irish government's decision to guarantee all bank liabilities, which was at the origin of the Irish sovereign debt crisis, is independent of the transfer of assets to the bad bank.

Perhaps a better classification would be 'good banks' and 'uncertain banks', where the latter concentrates all the valuation uncertainty either of a specific bank or of all distressed banks in the economy.[4] In principle, the division of the bank can take place on the asset side of the balance sheet, with 'troubled assets' being separated from the rest. It can also take place on the liability side, with the existing assets (or a subset thereof) being grouped with a subset of the most senior liabilities, and the remaining junior liabilities being placed in a 'bad bank'.

## 3 Final resolution and absorption

In this section, we focus on the last of our three stages, where the objective of keeping the bank as a going concern is abandoned and the bank files for bankruptcy. Bankruptcy is triggered by debt. It occurs either because an institution cannot face the payment of its debt, or because the total value of debt is larger than the value of the institution's assets, yielding a negative value for its equity. We first clarify the role of debt in the funding of a firm. Next, given the social cost of bankruptcy in banks, we study the specific characteristics of bankruptcy when it concerns banks.

### 3.1 Debt, market discipline and bankruptcy for non-financial firms

To begin with, let us recall the obvious fact that bankruptcy is intrinsically associated with the existence of debt as a hard claim that can force managers to make payments out of non-verifiable profits. The existence of debt in an optimal liability structure may therefore be justified because of its positive impact on managers' incentives, as put forward, for example, by Jensen (1986), Hart and Moore (1995) or Kose *et al* (2007).

One should stress that there is a tension between the debt and bankruptcy literatures. On the one hand, models of debt emphasise that, for debt to have maximum impact on managerial incentives, the renegotiation of its terms should not be too easy: otherwise, this could lead to a 'soft budget constraint', with debtholders realising that ex post debt maximisation may require 'being soft', that is, accepting refinancing/forgiveness, which in turn reduces managers' incentives to put in effort earlier on. This argues in favour of 'hard-to-renegotiate' debt, for example because it is widely held (see Bolton and Scharfstein, 1996; Dewatripont and Maskin, 1995). On the other hand, the bankruptcy literature, for example

4 Khan and Winton (2004) show how the separation of an opaque bank into two subsidiaries, one with the high risk assets and another with the low risk assets, can be efficient by allowing a reduction in asymmetric information and moral hazard. Under the critical assumption that investors know the characteristics of the assets in each subsidiary, the pricing of the debt for each institution will be more accurate than in the combined entity, thereby reducing the banks' incentives to invest in high risk, negative NPV projects and increasing incentives to screen and monitor loans more accurately within each subsidiary, as there is less cross-subsidisation among different types of loans.

Bebchuk (1988) or Aghion *et al* (1992), devise schemes that try to induce ex post *efficiency*, that is, the maximisation of creditor proceeds in bankruptcy (as well as the respect of priority rules). But of course, if ex post efficiency were to be the goal ex ante, we should observe much simpler capital structures. Instead, it looks as if ex ante structures are almost 'meant' to make renegotiation more difficult, which seems attractive if, as in the debt literature, fighting moral hazard is the objective.

Interestingly, in banking the tension is not the same. Indeed, there is an agreement that one cannot afford to have banking panics, so short-term claimholders cannot be hit (this agreement has been around since the 1930s, and the 'Lehman experiment' has generally reinforced the general consensus). Banks are really in a stronger position than non-financial firms: thanks to the understanding by short-term claimholders that they will be rescued in case of trouble, they can avoid financial distress by raising funds at roughly risk-free rates even when they are not in good health. This means that there is a strong bias towards leniency as far as the bank is concerned. The main regulatory goal should therefore be to put in place mechanisms that penalise managers and claimholders when things go wrong, while ensuring 'continuity' for short-term depositors. This is precisely the aim of a well-defined bank bankruptcy procedure.

Notice that in equilibrium any variation of the bankruptcy procedure and its costs to claimholders will have an impact on the banks' debt strategy (see Acharya *et al*, 2011). Still, the key issue here is to try to align private and social costs of bankruptcy in such a way that bank managers and shareholders internalise the social cost of banks' bankruptcy.

## 3.2 Bank-specific bankruptcy procedure

How should a bank-specific bankruptcy procedure be structured? From a legal perspective, bankruptcy might be triggered by the failure to pay obligations when due (equitable insolvency) or by a negative value in a bank's equity (balance sheet insolvency). The two types of bankruptcies are often concomitant for non-financial firms but need not occur simultaneously in the case of a financial institution. In theory, bankruptcy, whether triggered by a firm's inability to fulfil its commitments, possibly due to lack of access to liquidity, or triggered by a negative value of its equity, should not be considered as a perfectly defined event, but rather as the outcome of a game with multiple equilibria. The simplest model where this happens is due to Diamond and Dybvig (1983), where a bank is solvent or not depending on the coordination equilibrium selected by its depositors, that choose whether to run the bank or not. While this is true for every corporation, the externalities generated by financial intermediaries' bankruptcies are higher, and therefore –except in the case of Lehman – for the last 75 years bank depositors have been protected from such runs and, most often, from bankruptcy altogether.

### *3.2.1 Burden-sharing in the absence of bankruptcy*

From a legal point of view, a bank is either bankrupt or not. If it is not bankrupt, claimholder rights cannot be ignored. So, it was not surprising to see in 2007 a bank in a dire financial condition distributing generous bonuses to its managers and dividends to its shareholders (Acharya *et al*, 2009), or later on, in 2008, to see that banks receiving government support were distributing generous bonuses to their staff.

The fact that, from a legal point of view, in the absence of bankruptcy, banks are committed to fulfilling their obligations vis-à-vis their claimholders has also been observed recently regarding the payment of coupons on the so-called hybrid securities. So, although the issue of this type of securities has been fostered as a good compromise between cost and flexibility, with the understanding that the bank could stop paying the coupon, in fact the legal structure in some countries is such that this was not the case. A possible lesson to be learnt is the existence of an ex ante conflict of interests facing the government and regulatory authorities typical of a political economy situation. Regulators agreed to include hybrids in capital, but in order to facilitate banks' access to inexpensive funds they did not clarify that the rights of hybrid securities holders to a coupon payment were contingent on the bank not being in distress.

As regulators learn from their mistakes, it may be the case that, despairing of resolving this legal uncertainty and worried about future financial innovations to 'beef up' capital, they might decide it was safer to go for 'better capital' and insist on Tier 1 capital, a point repeatedly made in the motivation of Basel III. Still, notice that this is not a substitute for a clear-cut transparent bankruptcy procedure: if a choice between the two were to be made, better bankruptcy procedures would dominate the better capital option because equity is more expensive than hybrid securities. Fortunately, no such choice is necessary and once the right bank resolution procedures are in place, it is possible to fine-tune capital regulation.

### *3.2.2 Designing bank-specific resolution procedures*

We now examine the characteristics of a bank-specific resolution procedure. Such a procedure will stipulate a number of steps that a bank has to take as its financial conditions deteriorate, in such a way that lack of compliance will suffice for regulatory authorities to declare the company bankrupt, thus wiping out shareholders and probably replacing the management team. Because of the global approach of this step-by-step procedure, a bank-specific bankruptcy procedure leaves open the possibility of a bank's recovery if it complies with all the regulatory requirements. As such, a bank-specific bankruptcy procedure can also be seen as a set of pre-emptive measures to avert the crisis. However, we regard the main characteristic of a staged bank-specific bankruptcy procedure to be the fact that the regulator has the right to declare the bank bankrupt at every stage, not the fact that the bank might recover and avoid bankruptcy.

The inadequacy of general bankruptcy procedures is well described by Wall (2010):

> The bailouts and costly failure of nonbank financial firms during the recent crisis arose in large part because their failure could be resolved only through the bankruptcy courts using laws designed for nonfinancial firms. The bankruptcy courts are set up to provide a fair distribution of a firm's claimants. These laws are not designed to take into account the effects of a firm's failure on the rest of the economy. Commercial and savings banks are not resolved under the bankruptcy code, however, but instead by the FDIC [Federal Deposit Insurance Corporation] (Dwyer 2010). The agency's procedures have proven reasonably efficient for creditors while providing a mechanism that can take into account systemic externalities.

A number of countries like Canada, Italy, Norway, the US and now the UK have a specific bank bankruptcy code (lex specialis), while others lack one and are under the regime of the lex generalis. A number of contributions have underlined that because banks are different they do require a different bankruptcy procedure. In fact, this very general assertion should be qualified, as the key relevant issue here is the social cost associated with the bankruptcy process for banks. The recent crisis has confirmed the need to have a special procedure to deal with *systemic institutions*. The externalities stemming from a bank's bankruptcy have long been acknowledged (see *eg* Freixas and Rochet, 2007), as it affects uninformed depositors and the payment system, triggers contagion and impacts the overall stability of the financial industry.

The bank-specific bankruptcy procedure has to be set not only to maximise value to creditors and provide a fair treatment to claimholders, but also to minimise the social cost of banks' bankruptcies and preserve the safety and soundness of the banking system. This implies the procedure has to be speedy in order to avoid speculation and bank runs, and it has to be orderly, characterised by legal certainty and no renegotiation. In particular, this may be crucial for large complex financial institutions (LCFI) and systemically important financial institutions (SIFI), since unwinding their positions may be a Promethean task. According to Claessens *et al* (2010), 'The administrators of the Lehman bankruptcy in the US have estimated that at least $75 billion have been wasted because of the complete lack of any preparation for bankruptcy.' This has led the Bank of England to require banks to write living wills so as to reduce the cost of unwinding the different contracts and the overall cost of a bank's bankruptcy, thus increasing the credibility of such a threat. Finally, the *liquidity* of claims involved in the procedure should also be preserved (see Diamond and Rajan, 2005). Indeed one of the lessons of Lehman's bankruptcy is that the liquidity of derivatives markets greatly simplified the unwinding of Lehman's derivative positions (see Summe, 2010).

A good example of bank-specific insolvency procedure is the US system put in place in 1991 (ie after the Savings and Loan crisis of the 1980s) under the Federal Deposit Insurance Corporation Improvement Act (FDICIA), and it has been influential in various other countries. It is centred around the important notion of PCA, or 'prompt corrective action'. This system has the advantage of starting to address a crisis gradually, classifying banks in five categories depending on (various measures of) capital ratios that roughly could be referred to as well-capitalised (capital ratio >10%); adequately capitalised (>8%); undercapitalised (<8%); significantly undercapitalised (<6%); and critically undercapitalised (<2%). The first two categories face no restrictions, but the bottom three categories face more and more severe restrictions on actions (eg dividend payments, asset growth, acquisitions, and, in the extreme, receivership). The key idea is to allow the supervisor to intervene before things become too bad. There is broad agreement that PCA has had a beneficial effect (see for example Benston and Kaufman, 1997, and Aggarwal and Jacques, 2001).

Note however that even PCA is not a panacea. This is because the accounting system is imperfect and lags evolutions in an institution's financial condition that can be very rapid. On the one hand, banks' losses may be higher than their capital. Indeed, there is a wide consensus that bank losses in an FDIC resolution average some 30% of their assets (see James, 1991, and Bennett and Unal, 2009), which does not really fit in with the prompt corrective action's thresholds. On the other hand, in the recent crisis, Kuritzkes and Scott (2009) stress: 'The five largest US financial institutions subject to Basel capital rules that either failed or were forced into government-assisted mergers in 2008 – Bear Stearns, Washington Mutual, Lehman Brothers, Wachovia and Merrill Lynch – had regulatory capital ratios ranging from 12.3 per cent to 16.1 per cent as of their last quarterly disclosures before they were effectively shut down.'

The bottom line is therefore that, while PCA is helpful as a way to reduce the probability and magnitude of insurance fund and/or taxpayer intervention, we cannot hope for a foolproof system.

## 4 Comparing interim banking resolution schemes

In this section, we discuss the second of our three stages, the pre-bankruptcy one, where distress has occurred but it is still an option to keep the bank running as a going concern. The analysis differs from the initial stage in that we look here at what supervisors can be expected to do when initial conditions have not succeeded in committing them to maximising the ex ante objective function. We start from the key question: is the situation one of systemic crisis or not? A systemic crisis is characterised by a higher probability of contagion, and consequently, a larger social cost of banks' distress and liquidation. We first examine the financial distress of a single bank (although one sufficiently large for

its liquidation to be problematic) and consider why, how and when a resolution procedure will be helpful. Then we turn to the systemic risk case.

## 4.1 In the absence of a systemic crisis

The regulatory intervention that is aimed at preventing the worst effects of a financial crisis of an individual bank raises some questions we briefly address hereafter. First, are the regulator's objectives in line with the maximisation of social welfare? Second, would a liquidity injection through exceptional lender of last resort mechanisms be sufficient to restore the investors' confidence in the bank and end the bank's crisis? Third, what type of intervention should be preferred, and fourth, when should it be implemented. Last, and not least, what information is needed in order to implement an efficient resolution?

### *4.1.1 Welfare maximisation versus cost minimisation*

At the level of an individual bank, an intervention is expected to restore market confidence by restructuring the bank's balance sheet and by clarifying its investment strategies (reducing excess capacity, excessive leverage and excessive risks). In assigning an intervention mandate to the regulatory authorities two possible avenues are open with a clear trade-off.

To begin with, the mandate may reasonably define welfare maximisation as the objective the regulatory agency has to pursue. Yet, measuring 'welfare' may be difficult and may leave too much latitude to the regulator in the interim stage. Indeed, welfare means not only trying to defend the bank debtholders' interests (the regulator being the 'representative' of debtholders, as suggested by Dewatripont and Tirole, 1994), but also trying to avoid contagion effects and ensure a proper supply of credit. The combination of these objectives can lead to a 'fuzzy' mission and make it difficult to assess the results of the regulatory activity, leading to a lack of accountability and an impossibility of monitoring the regulatory authority.

If there is a risk of bias or even capture, a 'tighter' mission can be preferable, like an explicit cost-minimising objective. This ties the regulator's hands and limits regulatory capture. Because of the perceived risk of capture, we observe a recent trend from a general mandate for regulators to look after the stability of the financial system to a more specific mandate of cost minimisation, as in FDICIA.

### *4.1.2 Lender of last resort financing*

Lender of last resort interventions consist in providing banks with funds when the market sources of liquidity dry up for some of the banks. This implies replacing private investor financing by Central Bank or Treasury financing. The structure of assets and liabilities remains the same, so that the bank's solvency position is

unchanged. Gorton and Huang (2004) argue that the government is in a better position than the market because it can provide liquidity more effectively.[5]

Liquidity provision helps prevent bank runs. Depositor bank runs like the one that developed at Northern Rock in 2007 are the exception in contemporary banking systems. More frequently, banks face sudden difficulties in accessing funds in the wholesale market (a problem that Northern Rock also faced) and are therefore at risk of defaulting on their debt. This was the case, for instance, on 24 September 2008 when access to interbank funding for Fortis suddenly collapsed in the aftermath of the Lehman bankruptcy. Of course, as previously mentioned, distinguishing between illiquidity and insolvency is an impossible task as illiquidity implies insolvency, and the very expectation of the bank being in distress, even if ill-founded, condemns it to insolvency by increasing the cost of funding.

Still, at this stage, the objectives of the different parties involved may differ: while the regulator is concerned about contagion and even systemic effects and therefore is ready to make concessions to obtain a speedy orderly resolution that will restore the bank's access to funding, shareholders have no time constraint and will use all possible legal options to protect the value of their shares, as did happen in the Fortis case. This makes liquidity injections more costly to taxpayers.

#### *4.1.3 Choosing the right resolution instrument*

When a bank is insolvent, what kind of mechanism is desirable? In a perfect market without asymmetric information, the Modigliani-Miller theorem tells us that a debt/equity swap will solve the bankruptcy issue and, if in addition there are bankruptcy costs, will increase the bank's expected value. Of course, this benchmark is unrealistic. When departing from it, the answer will depend on assumptions concerning the regulator's objective function and on the bargaining game between the regulator and the banks.[6] However, it can be said that if contingent capital mechanisms like the ones we explore in 5.2 are in place, efficient resolution will first take advantage of this source of additional equity to reduce the capital shortage.

#### *4.1.4 Optimal timing of intervention*

Once a bank is in distress, three elements intervene to aggravate or to alleviate the state of its financial affairs. First, its assets evolve following a stochastic process

5 See also Diamond and Rajan (2005), Repullo (2005), Rochet and Vives (2002), and Philippon and Skreta (2009).

6 Landier and Ueda (2009) assume the regulator's objective function is to decrease the probability of bankruptcy beyond some threshold while respecting the shareholders' right to block any proposal that does not assure them at least the same value for their claims. Assuming no debt renegotiation, they find that asset sales are the most expensive form of intervention, followed by guarantees and by debt buybacks. Instead, in Philippon and Schnabl (2010), the regulator's concern is that when the bank's returns fall below some level, the bank faces a debt overhang problem. Also assuming away debt renegotiation, as well as adverse selection on the value of the bank's asset in place, they show that the optimal intervention mechanism is a combination of preferred stocks and warrants.

which, typically, implies a decrease in value over time. Indeed, distress means a sharp rise in the cost of funds (if the bank still has access to funding), so that the intermediation margin becomes negative. In addition, as already pointed out by Rochet (1992) and as observed in the 1980s S&L crisis, when a bank's capital is eroded, the convexity of its profit function due to its limited liability may prevail over the risk aversion behaviour of the managers, so that it will prefer to take high risks or, in an asymmetric information framework, engage in gambling for resurrection. Second, as the prospect of a bankruptcy becomes more likely, the bargaining positions of the bank's shareholders and of the regulatory authorities may vary in one way or another, increasing or reducing the cost of a bail-out. Third, information about the bank's financial position will be made available to the market by the banks themselves, by the regulator or by financial analysts.

The consequence is that it is difficult for the regulator to fine-tune the timing of the recognition of the crisis, as well as the timing, the amount and the type of intervention designed to restore investors' confidence. As with the exercise of an option, it will be necessary for the regulator to weigh the risk of an early intervention against the cost of forbearance. Waiting has the benefit of providing a chance for recovery, possibly a better bargaining environment and, above all, better information. Of course, with hindsight it will be easier to accuse the regulator of doing 'too little, too late', but the ex ante trade-off is there and injecting taxpayer money into private hands has a cost to society.

Boot and Thakor (1993), Dewatripont and Tirole (1994) and Morrison and White (2010) point out an additional reason for regulatory forbearance: the fact that intervention may signal the incompetence of the regulatory authority, because it has failed to monitor the bank properly. In these models, 'rules' make more sense than 'discretion': the distortion in closure policy arises because the regulator manipulates the closure decision to obscure possible ineptitude in his asset-quality monitoring. An obvious way to eliminate this distortion is to separate responsibility for bank closures from that for asset-quality monitoring. This is done in the US where the Office of the Comptroller of the Currency (OCC) is responsible for ex ante monitoring and the FDIC for ex post intervention.

#### *4.1.5 Information disclosure*

A lesson of the 1980s Savings and Loan crisis is that 'liberal' accounting changes, designed to 'beautify' bank balance sheets, are dangerous. Indeed, when in January 1982 the Federal Home Loan Bank Board allowed S&Ls to use the more liberal regulatory accounting principles (RAP) instead of the generally accepted accounting principles (GAAP), several insolvent S&Ls took advantage of this to gamble for resurrection, thereby significantly raising the losses for taxpayers. However, in spite of the strong criticisms of this change in accounting rules, in the recent crisis, a change in the accounting of portfolio loans was allowed in some countries in November 2008, following the declaration of a 'rare event' by the International Accounting Standards Board on October 2008. This allowed the assets in the trading portfolio to be reclassified in the loan book on a cost basis,

that is using pre-Lehman bankruptcy asset prices. Although improving the banks' balance numbers, this type of measure increased uncertainty and did beautify bank accounts. In a similar vein, the illiquidity of markets allowed banks to use non-market information to determine the value of their assets, also increasing the uncertainty surrounding the solvency of banks (Laux and Leuz, 2010). So far, bank misbehaviour linked to these accounting changes has not been identified, but one cannot claim it has not occurred or will not occur.

From the perspective of information provision, another theoretical question has been addressed by Aghion *et al* (1999) and Mitchell (2001). They show how bail-outs can be designed so as not to distort ex ante lending incentives, in a setting where regulators have to rely on banks to provide relevant information on their asset values. Interesting, the stress-testing exercises implemented first by the US in April/May 2009 and a year later by the European Union have shown that the regulator is best placed to extract rigorous information out of banks and this exercise allows for a reduction in the uncertainty in financial markets, particularly in the US.

## 4.2 Intervention in a systemic crisis

A systemic banking crisis is characterised by three elements: macroeconomic fragility; contagion; and a triggering event that acts as a coordinating device. It is possible to distinguish different types of systemic risk depending on what the main factor is (a bubble, a macroeconomic shock or contagion, and whether the latter is based on expectations or balance sheet interconnection), but these distinctions are irrelevant for the analysis of resolution issues. Although macroprudential regulation allows a reduction of macroeconomic fragility and limits the probability of a crisis, once a systemic crisis unravels, the contagion dimension is so important that it is dangerous for the regulatory authorities to take the risk of declaring the bankruptcy of a financial institution. As a consequence, the cost-benefit analysis of bank restructuring operations has to be adapted to this crisis environment where a bank's bankruptcy has a much higher cost. So, it would be efficient for the regulatory authorities to intervene at an earlier stage in the crisis, as the cost of a bankruptcy outweighs the benefits of forbearance. This would be in line with the findings of Borio *et al* (2010), which show that interventions in the recent crisis occurred earlier with respect to the business cycle than those during the Scandinavian crisis.

The emergency of a systemic crisis raises additional issues. Since the likelihood of contagion is much higher, regulatory authorities should use tougher mechanisms to contain it, for example monetary policy. This is true in particular since the amount of resources required for some interventions could be so large that it could have an impact on a country's budgetary stability.

### *4.2.1 Fostering a favourable macroeconomic environment*

The recent crisis has been characterised by aggressive monetary policy with low interest rates, generous liquidity provision and coordination among the major central banks. While conventional wisdom prior to the crisis was that it was efficient to separate monetary policy from prudential regulation, a number of recent theoretical papers give support to the use of monetary policy to attain a prudential objective by combining liquidity injection (quantitative easing) and reduced interest rates. Allen *et al* (2008) show that in the presence of idiosyncratic shocks as well as aggregate shocks, in order to attain constrained efficiency in the interbank market, the Central Bank must intervene and set interest rates at a level the market cannot reach because of the non-existence of a market for hedging liquidity risks. Freixas *et al* (2011) also consider the role of the interbank market, which they introduce into the Diamond and Dybvig (1983) model. They demonstrate the existence of multiple rational expectations equilibria, only one of which is Pareto optimal. The Central Bank is then able to select the efficient equilibrium by setting interest rates (this allows banks to fulfil their commitments to depositors without generating a bank run).

While these papers make the interesting point that, in a liquidity crisis, it is efficient for the Central Bank to provide liquidity at a low interest rate, note that this policy is tantamount to a generalised bail-out, with a cost to the taxpayer which may be higher than the cost of a selective bail-out policy (see Fahri and Tirole, 2009). In fact, the policy of low interest rates may have been abused by banks that had access to funding at the market rates. Low interest rates have allowed some banks to accumulate profits during the crisis, as Greek bonds allowed a high return without the cost of high capital requirements, while the bonds could be repoed to obtain revolving liquidity. The release in late 2010 of details concerning the access to Fed liquidity lines made clear how in the US sound banks also benefited from the subsidised liquidity lines.

### *4.2.2 Limiting contagion*

While in the case of the bankruptcy of an individual institution, the main channel of contagion is the interconnection of bank assets and liabilities through the interbank market, OTC derivative contracts and the payment system, in a systemic crisis there are three additional channels of contagion to be considered: expectations updating, liquidity shortages and the collapse of the prices of assets used as collateral. Each of these channels will have a reaction and amplify the effect of the others. Consequently, if a bank bankruptcy is inevitable, the regulatory authority will have to define a number of accompanying measures so as to prevent or minimise contagion through any of the three channels. While in an individual bank crisis the efficient closure policy is to provide liquidity support only for institutions that are expected to remain solvent, the risk of contagion in a systemic crisis leads to a policy of liquidity support for solvent and insolvent institutions that might be accompanied by a generalised guarantee to all bank creditors.

In addition, as in a crisis loan officers use stricter credit standards and the supply of credit is reduced, the possibility of a credit crunch has to be considered. Philippon and Schnabl (2010) analyse this issue in a model of debt overhang where, because of the structure of debt seniority, under asymmetric information, banks may prefer not to invest in positive net present value projects. In this case, they demonstrate the optimality of government intervention. In a similar vein, if banks are constrained by capital requirements, the link between recapitalisations and credit supply is critical (see Berrospide and Edge, 2010, for an empirical analysis of the elasticity of credit supply to banks' capital) in order to assess the impact of a government recapitalisation programme.

*4.2.3 Budgetary constraints in a systemic crisis*

The implication of a generous liquidity and capital injection in the banking system is an additional level of intermediation: instead of banks borrowing from households, they borrow from the Treasury, which in turn borrows from households. This implies that there is a cost of a systemic bail-out in terms of budget deficit. This has become apparent in the US, and in a more dramatic way in the Irish crisis of 2010. It is true that a Keynesian budgetary policy might be perfectly welcome, but the feasible amount of bail-outs has a limit beyond which a sovereign debt crisis will be triggered. If this is the case, it simply implies that the resolution of a banking crisis may end up in devaluation and inflation for those countries that are able to use their monetary policy. For those countries in the euro area, the dilemma is either to be bailed out by the other countries or to face the consequences of financial instability.

## 5 The ex ante design of a bank restructuring system

Let us now turn to the design of *ex ante mechanisms*, drawn up prior to a crisis but with a realistic anticipation of the *interim* bargaining game that will occur between regulators and claimholders. Committing to such mechanisms will decrease the uncertainty surrounding the process and will possibly improve upon the interim equilibrium solution. A well-defined bank restructuring system (with possible liquidity and/or capital injection) allows an enrichment of the class of contracts available to banks' stakeholders for two reasons. First, it allows the definition of (legally acceptable) state-contingent contracts such as debt/equity swaps. Second, it allows the regulator to limit its own freedom and enhance its credibility (eg the Dodd-Frank Act limits the ability of the Federal Reserve to bail out a single bank), thereby reducing both the probability of future crises and their cost to taxpayers.

The ex ante perspective on intervention has to acknowledge that, once confronting a crisis, a number of mechanisms will be put in place to rescue banks, thereby benefiting bank claimholders. Consequently, as mentioned by Borio *et al*, 'Interventions should strike a balance between limiting the adverse impact on the real economy and containing moral hazard' (2010, p 5). The key

issue in this careful balance between ex ante and ex post costs is to acknowledge the outcome of the bargaining game between regulatory authorities and the bank claimholders that will take place at the time of intervention. The use of contingent securities and contingent contracts will, presumably, improve the efficiency of the ex ante design.

The optimal mechanism will result from cost-benefit analysis. Consequently, it should be stressed that having multiple ex ante mechanisms might be expected: one mechanism to cope with the crisis of small institutions that are not systemic (like the US prompt corrective action scheme), a second one to deal with the crisis of a systemically important financial institution and a third one to manage a systemic crisis, a point related to macroprudential regulation. This in turn may require legal adjustments.

## 5.1 The (ex ante) moral hazard issue

Consider, first, the impact of the bank resolution procedure on banks' risk-taking. A lenient ex post resolution procedure where shareholders are not penalised for excessive risk-taking will clearly generate incentives to depart from efficient investment decisions and risks for taxpayers. Indeed, a generous bail-out can be seen as a put option written by the government in favour of shareholders. Even in cases where shareholders are wiped out but debtholders are bailed out, this will still increase risk-taking incentives, as the bank will maximise the net present value of investment projects plus the value of the put.

This is illustrated by the empirical literature on deposit insurance and on government bank guarantees. First, empirical evidence establishes that more generous deposit insurance schemes generate moral hazard, namely higher risk-taking. According to Hoggarth *et al* (2005):

> an explicit unlimited deposit protection scheme increases the likelihood of banking crises. The next most likely group to have a crisis is that without any scheme ex ante, which might seem paradoxical. But most countries without an ex ante deposit protection scheme introduce blanket government guarantees during a crisis and this is therefore likely to be built into market expectations and to create moral hazard. The group least likely to experience a crisis is that with an explicit but limited deposit protection scheme, and within that group those countries that require depositors to co-insure. Pre-committing to providing only limited cover therefore appears effective in limiting moral hazard.

The same conclusion is reached by Demirgüç-Kunt and Detragiache (2002) and Barth *et al* (2006), who conclude that more generous deposit insurance is associated with a higher probability of a systemic banking crisis.

Government guarantees, whether implicit or explicit, may have an impact akin to deposit insurance, as the bank benefits from a put option on its losses. Gropp *et al* (2010) empirically illustrate this point using the fact that in 2001 the guarantees for German savings banks were removed.[7]

Still, the existence of moral hazard does not mean that the ex ante bank resolution scheme should not include some form of bail-out, as a way to counter financial instability: there is a trade-off involved in limiting moral hazard, as is the case for managerial compensation, where the trade-off is between effort provision and risk-bearing.

## 5.2 Characteristics of an efficient restructuring system

Should contingent capital play a role as part of an efficient bank resolution? Theoretically speaking, the use of contingent investment vehicles endows banks with additional instruments to meet capital requirements and decrease the cost of restructuring by eliminating the costs and delays associated with the bargaining procedure. This will improve the efficiency of any procedure aimed at dealing with systemically important financial institutions (SIFIs) and global SIFIs. Indeed, the procedures are based on a restructuring of liabilities while the bank is kept as a going concern, and therefore do not impose losses on taxpayers.

### *5.2.1 Bail-in procedures*

The simplest way to automatically provide capital to a bank facing financial distress is to have a contingency clause in the different claims it issues. This allows the debt charge of a financial institution to be diminished without the need to enter into a complex renegotiation process.

A bail-in procedure is a contract that triggers the conversion of some of the bank's claims in such a way as to provide additional equity while reducing the amount of debt. A simple example would be the conversion of equity into an out-of-the-money warrant, the conversion of subordinated debt and a fraction of long-term debt into equity and the conversion of the residual fraction of long-term debt into subordinated debt. As it is based on a contract, the bail-in prevents the declaration of bankruptcy and the cumbersome renegotiation process associated with it. Of course, the contract has to have two key characteristics. First, it has to have legal certainty, so that a court in New York and a court in Hong Kong will interpret it in the same way. Second, it has to fine-tune the write-down of claims so that the bank is provided with an adequate capital buffer when needed, while avoiding an excessive conversion that will increase the ex ante cost of the bank funds.

7 According to the authors, the impact was that (i) the Z-Score of average borrowers increased by 7%; (ii) the average loan size declined by 13%; (iii) remaining borrowers paid 57 basis points higher interest rates, despite their higher quality; and (iv) the effect was larger for banks that benefited more ex ante from the guarantee.

As is clear, the definition of the trigger will play a key role in the contract. It could be automatic and based, for instance, on the market value of equity, or subject to the regulatory authorities' discretion. If it is automatic, speculative attacks on equity with short sales might lead to the wipe-out of shareholders, making it highly profitable; if it is regulatory based, it could lead to forbearance or to a decision that is taken too late and might be contested in foreign jurisdictions. Consequently, although bail-ins open new contracting possibilities, how to avoid the associated drawbacks is still a matter of concern.

*5.2.2 Contingent convertibles*

First advocated by Flannery (2005), contingent capital securities are defined as securities that, once some threshold is reached, convert into capital or allow a loss to be sustained. A typical example of contingent securities concerns the reverse convertibles issued by Deutsche Bank in 2005, that is, bonds that convert into equity once a firm's equity reaches a floor. Another example concerns the bonds issued by Rabobank that are redeemed below par, say at 25 cents to the dollar, if a low capital level threshold is reached. Contingent securities are interesting because they correspond to a debt or insurance contract in the good states of nature and provide capital when the financial institution is in distress. Consequently, while protecting the institution in case of a capital shortfall, they allow debt to play its role both as a tax shield and as a protection mechanism against the agency costs of free cash flows.

A necessary condition for contingent capital to play its role is legal certainty. This may simply mean a legal requirement when the contingent capital is structured as a debt/equity swap (or a similar instrument) which does not involve any external investor. Instead, as illustrated by the AIG crisis, if an external institution is to provide funds, as in the case of capital insurance, it does require the costly supervision of such an institution.

Note that the definition of the threshold that gives the bank the right to obtain additional capital will be critical in determining the speed of conversion, as well as the possibilities for investors in financial markets to manipulate the price or to cause a run on the securities. Alternative triggers are based on (i) accounting measures of capital; (ii) market measures of capital; (iii) declaration by regulators; or (iv) aggregate banking industry performance.

As the objective of a convertible security is to provide capital automatically and quickly in case of distress while preserving the incentive effects of debt and market discipline, it is clear that accounting based triggers should be avoided, as the conversion might take place too late. As the crisis has illustrated, if accounting rules are not clearly defined and can be manipulated, financial institutions will use their leeway for window dressing, in order to increase their accounting capital and profits, thus postponing the necessary restructuring and instead bargaining for a better treatment of its shareholders. The use of repo 105 by Lehman Brothers is a good example of the case in point. As previously

mentioned, the crisis has also shown the limits of capital regulation based on accounting measures, as investment banks in the US were defaulting with an accounting capital that satisfied Basel II capital requirements.

Regulatory triggers should also be avoided as regulators may be reluctant to declare a systemic crisis. Consequently, it is generally accepted that conversion should be rule-based and market-based, although not necessarily based on the stock price of the financial institution, as other market indicators (like CDS spreads) could also be used. Thus, for instance, MacDonald (2010) puts forward the idea of a dual trigger mechanism where the conversion is only triggered when both the market value of equity is below a given threshold and aggregate industry performance also reaches a floor, so that conversion occurs only in the case of financial fragility.

The level of the trigger may reflect the regulator's view: a high trigger means a high probability of conversion and early recapitalisation, while a low trigger means a focus on critically undercapitalised banks. The first option makes the convertible closer to equity and the second closer to debt.

The literature on contingent securities has identified a number of caveats regarding the design and characteristics of contingent securities. First, multiplicity of equilibria: Sundaresan and Wang (2010) have shown that for a unique equilibrium to exist, mandatory conversion cannot result in any value transfers between equity holders and contingent capital investors, and that, in fact, the uniqueness of price is only obtained for a par value conversion, while the multiplicity of equilibria when this condition is not met would make the security susceptible to price manipulation. Second, the trigger of a contingent security may lead to a death spiral if it implies dilution and a new decrease in the value of equity. Third, stock price manipulation may be an issue in the presence of a market for derivatives. Fourth, bondholders may have an incentive to force the bank into bankruptcy. This could be corrected by setting a sufficiently low recovery rate on the convertible securities. Finally, as shown by Pennacchi (2010), when the return of the banks' assets follows a jump-diffusion process, a bank that issues contingent capital has incentives to increase its assets' risk of jumps, particularly when the value of equity at the conversion threshold is low (but this effect is lower than for the issue of subordinated debt).

Beyond these questions, it should be stressed that, compared to bankruptcy, contingent capital will never wipe out shareholders, who will therefore be penalised only by the dilution of their shares. In the same way, regarding bank managers, there is no threat of a dismissal automatically triggered by distress as under bankruptcy, nor is there any clause regarding limits or clawbacks on bonuses. Consequently it is necessary to complement this instrument with additional supervision and regulation to provide managers and the board of directors with correct ex ante incentives.

Finally, next to contingent securities, the ex ante design of banks' restructuring mechanisms may require *contingent regulatory rules*, as is the case with US-style prompt corrective action. Indeed, upon the occurrence of a contingent event, defined here as a shortage in regulatory capital, a number of restrictions as well as a commitment to increase capital come into place.

Notice that a strong case in favour of higher capital requirements to be preferred to contingent capital is build by Admati *et al* (2010). To understand their point we should first recall that there are three classical arguments that go beyond the classical indifference of the Modigliani-Miller theorem and put forward justifications for debt: the tax shield, the market discipline and agency costs argument, the dilution cost, and a fourth, additional one, in favour of the issue of safe debt by banks.

The first argument is that firms use debt because it is not subject to corporate taxation, and Admati *et al* are right in stating that the problem to be addressed is the one of debt, not the one of the excessive cost of capital.

The second justification of debt, as providing market discipline and thus helping to reduce the agency costs, is dismissed because of the very weak evidence on which this notion is based. Indeed, during the crisis, if there has been any market discipline it has been rather counterproductive.

The third justification, the dilution cost of equity, is also weak according to the authors because, first, if the issue of new equity is regulated and its timing pre-specified, there would be no stigma associated with the issue of equity. In addition, a higher capital implies larger retained earnings that may allow an increase in capital provided the dividend policy is not proportional.

The fourth justification, the fact that banks provide 'safe' securities, by using deposit insurance provided by the deposit insurance company usually backed by the government, is, as the authors state, somewhat independent of their holding of additional capital, as the boost of the balance sheet generated by an increase in banks' equity may be matched by an increase in the banks' holding of market securities.

Although the argument is quite correct, two caveats should be made. First, that their point is conditional on changing the regulation elsewhere: changing debt taxation or changing the regulation of equity issuance by banks. So, this implies balancing the cost and feasibility of one versus the other, and requires some additional justification on the likelihood of an international agreement on the neutral taxation of debt and equity or on banks' equity issues. Second, once we agree that the conditions for the Modigliani-Miller theorem are not satisfied (otherwise banks are redundant), then any decrease in the cost of bankruptcy and more generally in the cost of banks' resolution will improve the efficiency of the banking industry. So, our argument is that even if bank interventions

are less likely with a higher equity buffer, decreasing the cost of banks' distress is still worth it and a lower cost of bankruptcy will then lead to a lower capital requirement.

So, once we agree that there might be some merit in debt financing, their argument that straight capital requirements dominate contingent capital becomes rather weak.

## 5.3 Limits in the design of a bank restructuring system.

Finally, we should be careful in stressing the limits to the possibilities of banks' resolution procedures. Any realistic approach to bank restructuring should consider a number of legal and institutional constraints. While some of these can be lifted in order to foster a cost-efficient banking resolution, some fundamental informational and incentive constraints will always remain. In particular, those pertaining to multi-agent decision-making and its decentralisation, and those concerning limited commitment, have to be taken into account in the design of a bank resolution system.

**Multiple regulators**
The existence of multiple domestic regulators, and possibly more importantly the choice of banks regarding the country where they will be regulated will always limit the regulator's bargaining power and ability to supervise banks effectively (see for example Dell'Ariccia and Marquez, 2006).

**Commitment ability**
As in the case of central banking, the issue of rules versus discretion is relevant here too. As argued for example by Freixas and Parigi (2008), while discretion is always preferred if the regulator has an unbiased objective function, committing it to rules implies a verifiable objective which, although limiting its leeway, will eliminate biases. However, a policy of no bail-out means some bank liabilities will be risky. Making this policy credible implies informing investors who may otherwise not believe it. This may generate a conflict for regulators and governments who desire a growing, prosperous banking system where every investor feels its banking assets are safe, even if this conflicts with efficient lending. Indeed, the prospect of a prosperous economy with booming credit will always be supported as a political economy equilibrium. Here, institution-building in order to guarantee the independence of regulatory authorities, at both the microprudential and macroprudential levels, is essential to limit the cost of the bias in the government objective function.

## 6 Cross-border resolution

Globalisation has underlined both the current limits of, and need for improvements in, international cooperation in the treatment of distressed banks. There is indeed a tension between the tendency to favour the growth of international banks (through global or regional pro-trade and pro-capital mobility policies) and the reliance on national (whether 'home' or 'host' country) supervisors. In fact, the need for coordination in times of crisis – and in particular 'who takes care of depositors' – is crucial, especially between closely integrated countries which have limited means of effectively guaranteeing deposits. A crisis in one such country where depositors would fail to be protected could have devastating effects, by triggering bank runs on other, 'similar' countries. The problem is less severe for intercontinental relations involving large rich or emerging economies, because (i) they have more ammunition to tackle crises; and (ii) they have more limited cross-banking relations, even though these have been growing over time, especially with the opening up of banking markets and the spread of risks through securitisation.

However, unfortunately, the regulatory and supervisory safeguards have not been raised to match the evolutions linked to globalisation: harmonisation still has not taken place concerning the treatment of banks in distress, leading to several problems, especially since crisis management has to take place under great time pressure. A first key problem concerns the time when public intervention can take place and using which public intervention powers. As stressed earlier, the US prompt corrective action system is an efficient way to deal with banks in distress below a critical size. However, this system is not generalised, making such prompt action unavailable in many countries. A second key problem, discussed below, concerns depositor protection. There are clear potential incentive problems faced by the home supervisor in terms of consolidated supervision, with the risk of being pressured to 'limit damage' and leaving part of the mess to foreign countries, with potential dangers in terms of contagion.

### 6.1 Cross-border bankruptcy

As bankruptcy codes are national, cross-border bankruptcy resolutions raise a number of issues concerning the boundaries of application of these codes. Addressing these issues implies defining what assets and liabilities are affected by the bankruptcy procedure. Two key points are therefore to be considered. First, whether bankruptcy refers to a single country or to a single bank; second, how the legal structure, of the bank as a single entity with branches abroad or of a bank holding company, affects the claims of the different types of claimholders and their priority in bankruptcy.

Of course, the bankruptcy procedure will generate incentives for a bank to use its multinational structure to benefit from the wider range of strategies it provides.

So a bank may engage in shifting losses and gains between the different countries or shift assets and liabilities from one country to another.

### *6.1.1 Universality versus territoriality*

A multinational bank bankruptcy code has to define how the value of the bank's assets has to be assigned to the claimholders, not only according to priority, but also according to the countries of residence. Two possible ways to deal with international insolvencies exist: the universal or single approach and the territorial approach. In the universal/single approach the totality of the assets are allocated to claimholders independently of the country where their claim has been contracted. Under territoriality, instead, the value of the assets in one country is assigned to the claimholders in that country. Universality is the insolvency resolution procedure that is consistent with financial integration, while territoriality is associated with segmentation of the international financial market. Consequently, the European objective of a unique financial market should require the legal structure to be designed in such a way as to ban territoriality. Regrettably, the Icelandic crisis has shown that anti-terrorist legislation can be used to restore partial territoriality and that emergency legislation can be used to instantly change the bankruptcy rules and to protect domestic claimholders, a point summarised in Mervyn King's statement that 'global banks are global in life, but national in death'.

### *6.1.2 Branches versus subsidiaries*

In their cross-country operations banks have the possibility of operating as branches or as subsidiaries. The branch structure implies a unique institution that in Europe is supervised by the home country. Note however that, as stated for example by Krimminger (2008, p 384), even for branches, deposit insurance rarely extends beyond a country's borders:

> Under most national deposit insurance systems, deposits of domestic branches are insured by the domestic deposit insurance system and deposits in a host country are insured, if at all, by the host country's deposit insurance scheme. Thus, for instance, under US law, depositors in foreign branches of a US bank are not insured under the FDIC's deposit insurance and are subordinated to uninsured depositors of the US branches in the distribution of the proceeds from the sale of the bank's assets. Depositors in foreign branches of US banks are covered by FDIC deposit insurance only if the deposit is payable in the US in addition to the foreign branch.

If, instead, a subsidiary is created, since it is a distinct legal entity, the subsidiary may go bankrupt without leading to the insolvency of the parent company. As a distinct legal entity in the host country, the supervision of a subsidiary is the responsibility of the host country, so that the bank's choice of its multinational structure determines who will be the regulator and supervisor in charge.

## 6.2 Cross-border resolution and the financial trilemma

Schoenmaker (2011) has put forward the idea that the three objectives of financial stability, financial integration and national financial policies are incompatible, thus giving rise to what he refers to as a 'financial trilemma'. Any two of the three objectives can be achieved, but not all three. Of course, the precise meaning of the three objectives has to be rigorously defined, but the intuition carries over to most definitions: financial stability in a cross-border set-up may imply the coordinated bail-out of systemic financial institutions. This implies that national financial autonomy is not possible.

The idea of a financial trilemma is relevant and quite realistic, and implies the need to put in place a mechanism against financial instability in the presence of financial integration. If the cost of financial instability is considered to be sufficiently high, this means that either we curtail financial integration, or financial authorities commit to coordinating their bail-outs of systemic institutions in distress (or a combination of these two avenues). Implicitly, the financial trilemma relies on the impossibility of a well-orchestrated bail-in and on the unavailability of a sufficient amount of contingent convertibles, thereby leading a bank in distress to bankruptcy. Note also that the existence of a bail-in or of contingent convertibles for some financial institutions may put them at a disadvantage as their cost of funds may be higher, thus limiting the level playing field hypothesis of financial integration.

Committing to coordinating the bail-out of systemic institutions implies ex post fiscal transfers only if no mechanism has been put in place beforehand. If instead countries offer one another insurance against the default of their SIFIs, there is no ex ante transfer of resources and through time the fiscal transfers should cancel out. The problem is then, of course, that national supervisors may tend to be lenient, a problem which could be partially solved by the existence of a deductible for the supervisor. Creating an insurance mechanism for the bail-out of SIFIs, possibly complemented by the issue of contingent convertibles, is therefore possible and can foster efficiency, provided the computation of insurance premiums means that SIFIs obtain funding at their risk-adjusted cost.

## 6.3 International cooperation and competition among supervisory agencies

The legitimacy of the regulatory structure stems from the banking and financial legislative framework that decentralises some powers to the banking regulatory authorities. As a consequence, the mandate of the banking regulator consists in preserving financial stability while fostering the expansion and health of its own banking industry. This has to be kept in mind in any analysis of cross-border cooperation as the acknowledgement of this conflict of interests and the

resulting conflict among countries is a necessary condition for an orderly cross-border bank bankruptcy resolution.

Each country's supervision, regulation and deposit insurance schemes not only influence its own financial stability and banking industry surplus, but they also generate an externality on the other countries. No national supervisor will take into account the impact of the quality of its supervision on the financial stability of other countries, with the classical implication that a positive externality creates an underinvestment in the level of supervision. The effect of other instruments such as deposit insurance or capital ratios is more involved. A more generous deposit insurance scheme generates more moral hazard in the country and thus a higher probability of a crisis and of a crisis spillover to the other country. As the effect in the other country is disregarded, the implication will be that each country will provide excessive deposit insurance resulting in excessive risk. The mechanism for capital requirements is akin to the one on deposits: because the cost of a spillover to the other country is not taken into account, capital will be set at an inefficiently low level.[8]

Nevertheless, if customers are sensitive to the quality of regulation and supervision, an equilibrium might emerge where, as suggested by Morrison and White (2010), supervisors choose strong regulation in order to attract additional foreign customers. This effect will counteract the existence of the externality and its possible 'race to the bottom' implication. Considered in the aftermath of the crisis, with the lessons of Iceland and Ireland in mind, this framework of analysis would justify countries with large banking systems investing more on prudential regulation than those less affected by cross-country banking competition. The case of Switzerland, with its imposition of large buffers of contingent capital on its systemically important financial institutions, is a perfect illustration of the reputational dimension of a country's choice of regulation and supervision.

All in all, the above externalities mean that, while a global supervisor and deposit insurer may be beyond reach, it has to be considered seriously if there is a real desire to integrate the global banking market further. Namely, real powers could be given to a supranational authority like the Basel Committee on Banking Supervision. And if centralisation happens to be either impossible or undesirable, at least joint crisis management should be taken seriously, keeping in mind the two goals of avoiding contagion and avoiding regulatory arbitrage by banks. Beyond harmonising intervention thresholds along the lines of PCA, if the idea of domestic deposit insurance is retained, whatever the legal form of cross-border banking relationships, it is crucial to think of a more even-handed approach between home-country and host-country supervision. Indeed, the decision of whether to 'save' the bank, and therefore fully protect all its depositors, and on which conditions, should in fact be taken jointly by the various authorities. More generally, in the absence of a supranational supervisor, what is required

8 One can argue, however, that if possible, host countries will insist on high capital requirements for foreign bank subsidiaries as they do not have to bear their cost.

is an ex ante credible agreement, or memorandum of understanding, between the various countries about how to share supervisory and deposit-insurance responsibilities. Such an MoU should be as explicit as possible in order to have a chance of functioning in times of crisis. And there should be standardisation of such MoUs to spread best practices.

## 6.4 Europe at a crossroad

The recent crisis has put European structures to a test. The Icelandic crisis, as well as the crisis of some cross-border banks such as Fortis, have been an important lesson for European authorities. As a consequence the de Larosière Report has put forward recommendations to strengthen the resilience of European financial integration. Although a number of issues are yet to be solved, some progress has been achieved in identifying the drawbacks of the current financial institution resolution mechanisms and the way to improve them.

### *6.4.1 Lessons from the Icelandic crisis*

The Icelandic banking system developed in the 1990s and became a key part of the country's economy. The complete failure of the Icelandic banking industry with assets worth ten times the country's GDP has important lessons for European coordination. The fact that the UK's best option when confronting the crisis, on 7 October 2008, was the use of anti-terrorist legislation to protect UK interests indicates how poor the European cross-border bankruptcy procedures are.

Still, the single European passport implies that foreign bank branches are not supervised by the host country, and in this case it implies that the inadequacy of the Icelandic regulation and supervision was unknown to UK and Dutch regulatory authorities.[9]

Indeed, according to Danielsson (2010), the Icelandic regulatory framework was far from satisfactory (notwithstanding the rating the credit rating agencies bestowed on Icelandic banks), leading to several critical reasons for the development of the crisis. First, supervision was particularly lax. In particular, banks were allowed to invest in their own shares as well as in cross-holdings, and their management and boards had limited experience in international banking. Second, the deposit insurance fund did not have the means to cover all the deposits insured without generating an unsustainable fiscal deficit. Third, cross-border expansion based on high-yield internet accounts in the UK and in the Netherlands was dramatic. The UK could not prevent the expansion of Landsbanki through attractive deposit rates (Kaupthing, instead, chose to hold deposits in subsidiaries that were under the host countries' regulation and supervision). Interestingly, and while everyone advocates transparency, note that informing British depositors that in

9 Notice that some governments, like France, were less diligent in processing the paperwork for these banks and therefore avoided the problems in the UK and in the Netherlands.

case of bankruptcy their uninsured deposits might not be covered could have been interpreted as a barrier to entry!

Finally, the Icelandic emergency legislation passed on 6 October 6 2008 created 'new banks' to hold domestic deposits and loans, while the old banks kept the foreign operations and were on their way to normal bankruptcy. This was in clear conflict with the equal treatment of domestic and foreign deposit holders required by the EU Deposit Insurance Directive.

*6.4.2 The tensions in European banking integration*

In the European Union, the tension between the prevalence of national regulators and the emergence of cross-border banks, which has been encouraged by the Single Market initiative, is very significant. This is particularly problematic because two competing policy rationales have been witnessed over recent years: the first saying that the potential of the Single Market, and its associated productivity gains, could only be realised through synergies resulting from cross-border mergers; and the second one worrying that it is important for Member States to retain national ownership of their big banks, for 'strategic control' reasons or mere national pride motives.

In this respect, what happened to the banking and insurance group Fortis is very instructive. The 2007 takeover battle over ABN-Amro, which was ultimately 'won' by the trio Royal Bank of Scotland, Santander and Fortis, was hostile and controversial (and, ex post, an operation that turned out to be much too expensive for the acquirers); but it was very much in line with the Single Market programme, since it accelerated cross-border banking ties. However, by breaking up a 'Dutch jewel', it was definitely not popular in the Netherlands. And the question of who should be the lead supervisor of the Belgian-Dutch Fortis was a subject of debate between the two countries. This did not facilitate cooperation between public authorities when the crisis came in September 2008, a crisis which the Dutch authorities did take advantage of in order to reassert control over 'their' share of the bank.

The lesson of this episode is that one can expect competition to be at times 'controversial', especially when things go sour ex post, because of business mistakes or market reversals. In such circumstances, nationalistic reactions can be expected, especially since national authorities see the acquisition of national firms by foreign ones quite differently from the acquisition of foreign firms by national ones.

Just as with protectionism in general, such adverse asymmetric reactions have to be kept under control through a credible set of legal provisions. These should take as a starting point the fact that national supervisors can be expected to be pressured to pursue national objectives, just as public supervisors can be expected to face lobbying by national industry.

However, current practices until the crisis have not been reassuring in this respect. Indeed, relying on national supervisors (which is currently the case, with consolidated oversight by the home country supervisor supplemented by domestic oversight by the host country supervisor) requires coordination and cooperation that is going to be tested in times of crisis, as the Fortis example demonstrates. Note that the Fortis crisis happened just after the introduction of the European 'Memorandum of Understanding', which was meant to promote cooperation in financial stability and crisis management! While this MoU was full of good intentions (on information exchanges, involvement of all interested parties, the pursuit of the interests of the banking group as a whole, 'equity' …), its enforceability was clearly questionable. And while beefing it up is possible, if the aim is really to promote the Single Market in banking (which does make sense if one wants to pursue the Single Market in non-financial sectors), and therefore the emergence of European and not just national banks, one should simultaneously favour the emergence of a European supervisor and of a European deposit insurer. How far have we gone in this respect since 2008?

*6.4.3 EU financial regulation reform: the de Larosière Report and its follow-up*

These issues have been discussed at length in the de Larosière Report (2009), which has prompted regulatory reform in the EU. The report acknowledges the need for better coordination among Member States, in order to allow for a well-functioning Single Market in banking, while falling short, however, of recommending full centralisation of EU regulation and supervision.

The report discusses many issues linked to the financial crisis. Recommendations relevant for the treatment of distressed cross-border banks include the call for harmonising crisis prevention and crisis intervention tools; the call for harmonised, pre-funded deposit guarantee schemes that provide high, equal protection to all bank customers throughout the EU; the call for improved MoUs in terms of burden sharing; and the call for increased coordination through a European System of Financial Supervision, meant in particular to upgrade the quality of national supervision and harmonise enforcement (with a detailed roadmap to achieve these goals).

The report thus recognises the need to harmonise crisis management, and recommends steps that clearly help progress in this direction. By sticking to national supervisors, albeit increasingly coordinated, the report clearly internalises existing EU political constraints, which begs the question of systemic cross-border crisis management: when deposit insurance funds are exhausted and taxpayers have to come to the rescue of banks, how will the fiscal burden among Member States be shared in these circumstances? Can we really hope that MoUs will provide credible ways to do this? This remains an open question. One can only hope that vigorous crisis prevention, coupled with substantial deposit insurance premiums, would make this an infrequently tested matter.

This problem is related to the Single Market, that is, it applies to the entire European Union and not just the euro area. We understand that this complicates things, since there would be an asymmetry between central banking, which would involve several players, and an EU-wide supervisor and deposit insurer. The case for a euro-area supervisor and deposit insurer therefore seems stronger. However, it is important to stress the crucial need for much stronger coordinated mechanisms of enforcement than exist now whenever two territories face significant cross-border banking relationships.

As far as the follow-up to the influential de Larosière Report is concerned, it is worth stressing that it has not yet settled issues directly linked to bank resolution. Indeed, following proposals put forward by the European Commission in October 2009, which constitute a clear step forward in its aim to design an efficient new regulatory and supervisory framework, both a microprudential and a macroprudential structure have been set up. The European Banking Authority (EBA) is concerned with micro regulation issues, while a European System Risk Board (ESRB) is in charge of macroprudential issues. Since these proposals are not directly concerned with bank resolution, we do not discuss them in detail here.

Concerning bank resolution, let us wait and see whether the reforms will match (or even improve upon) the de Larosière proposals. We can take some comfort in the December 2009 Council Declaration:

> The Council agrees with the Commission's suggested approach to focus on developing a crisis management framework to deal with cross-border banks, covering both cross-border banking groups as well as single entities which only operate cross-border through branches, and to give further consideration as to the case for extending and adapting this framework to other types of financial institutions. The Commission is invited to address the need to revise, and develop, resolution tools. In addition, the Commission should also consider working over the medium-to-long term towards introducing and implementing a common set of tools for all national authorities. With a view to their consistent application, appropriate conditions could provide a basis for the use of such tools. In particular, subject to appropriate caveats, intervention should be possible before the relevant threshold for the purposes of ordinary insolvency proceedings is reached.[10]

As for the Bank Crisis Management (BCM) Communication of 20 October 2010, it is a consultation document concerned with the way the European framework copes with financial institutions in distress, pointing at key issues and opening a consultation on a number of critical questions directly related to the treatment of financially fragile institutions in the light of the recent multinational bank bankruptcies (such as Fortis or the Icelandic banks). While the process has not yet converged, let us stress the Communication's acknowledgement of the need for

10 2981st Council meeting, Economic and Financial Affairs, Dec 2009, p 20.

ex ante 'recovery and resolution plans', which would be coordinated between the various national resolution authorities grouped into 'resolution colleges'. While these plans would not be binding, the Communication also points to the need, in the medium term, to move towards the harmonisation of bank insolvency law across jurisdictions and, in the longer term, to go for 'a more integrated framework', which 'could involve a European resolution authority', which could rely on a European resolution fund (which, as stressed in the Communication, may be distinct from the supervisory authority, as a way to minimise the risk of forbearance). We can only welcome such a direction, which seems to us a necessary counterpart of a Single European Market in banking. Note, however, that one can question the ability of Europe to set up such a system while respecting the 'fiscal safeguard' that guarantees fiscal sovereignty of Member States, a principle which is explicitly restated in the Communication.

## 7 Conclusion: What should be done?

The crisis has challenged regulatory authorities all over the world, forcing them to improvise, think 'out of the box' and implement unorthodox microprudential and macroprudential policies. From this a number of lessons have been drawn that lead to our main policy conclusions.

First, it is efficient to define a bank-specific bankruptcy code able to cope with the specificities of such bankruptcies. The lesson learnt from Lehman's bankruptcy is that a bank bankruptcy code should allow every investor to fully understand the risks they are bearing. This allows a move to a speedy resolution that decreases uncertainty as well as the liquidity freeze associated with bankruptcy and therefore limits contagion. By defining an efficient bankruptcy procedure the social cost of bank bankruptcies is reduced which is the raison d'être of banking regulation.

Once the bankruptcy code is in place, contingency planning is essential. If they are part of banking regulation, contingent convertibles allow for an increase in bank capital in case of bank-specific or systemic trouble. Similarly, living wills (as required by UK regulatory authorities) simplify the liquidation of bank assets and reduce bankruptcy costs.

Of course, the issue is more involved when we refer to global institutions, as bankruptcy extends over different legal constituencies implying possible conflicts of rules. The coordination of these bankruptcy procedures should be planned in advance, knowing that when the bank is in distress, MoUs are not enforceable and only perfectly clear-cut commitments will be acceptable in the face of taxpayer pressure. From that perspective, the European Union has appeared in the light of the crisis as a particularly fragile structure that requires urgent changes. Fortunately the recent decisions of the Council meeting indicate that

this is the road that may be followed. Still, we would advocate the centralisation of both resolution and deposit insurance mechanisms, so as to provide more credible discipline for banks and legal certainty for depositors over Europe.

Contingent convertibles and contingent capital will be a definite improvement upon a framework where the basic externality has already been contained. In addition, Basel III new capital rules will obviously go in the right direction. Yet, to conclude, let us stress that because the origin of banking regulation is the social cost of bank bankruptcy, the first point where regulation should act is in decreasing the externalities generated by such bankruptcies by defining a specific, well-designed bankruptcy code.

## References

Acharya, V, Gujral, I and Shin, H (2009), 'Dividends and bank capital in the financial crisis of 2007–2009', mimeo.

Acharya, V, Sundaram, R and Kose, J (2011), 'Cross-country variations in capital structures: the role of bankruptcy codes', *Journal of Financial Intermediation* 20(1), pp 25–54.

Admati, A, DeMarzo, P M, Hellwig, M F and Pfleiderer, P (2010), 'Fallacies, irrelevant facts, and myths in the discussion of capital regulation: why bank equity is not expensive', Rock Center for Corporate Governance at Stanford University Working Paper 86, Stanford Graduate School of Business Research Paper 2065.

Aggarwal, R and Jacques, K T (2001), 'The impact of FDICIA and prompt corrective action on bank capital and risk: estimates using a simultaneous equations model', *Journal of Banking and Finance* 25, pp 1139–60.

Aghion, P, Bolton, P and Fries, S (1999), 'Optimal design of bank bailouts: the case of transition economies', *Journal of Institutional and Theoretical Economics* 155, pp 51–70.

Aghion, P, Hart, O and Moore, J (1992), 'The economics of bankruptcy reform', *Journal of Law, Economics, and Organization* 8(3), pp 523–46.

Allen, F, Carletti, E and Gale, D (2008), 'Interbank market liquidity and central bank intervention', mimeo, Wharton School of the University of Pennsylvania.

Barth, J R, Caprio, G, and Levine, R (2006), *Rethinking Bank Regulation: Till Angels Govern*, Cambridge University Press.

Basel Committee on Banking Supervision (2006), 'Core principles for effective banking supervision', Bank for International Settlements.

Bebchuk, L (1988), 'A new approach to corporate reorganizations', *Harvard Law Review* 101, pp 775–804.

Beck, T, Coyle, D, Dewatripont, M, Freixas, X and Seabright, P (2010), Bailing out the Banks: Reconciling Stability and Competition, London, CEPR.

Bennett, R J and Unal, H (2009), 'The effects of resolution-method choice on resolution costs in bank failures', mimeo.

Benston, J G and Kaufman, G J (1997), 'FDICIA after five years', *Journal of Economic Perspectives* 11, pp 139–58.

Berrospide, J and Edge, R (2010), 'The effects of bank capital on lending: what do we know? And, what does it mean?', *International Journal of Central Banking* 6, pp 5–54.

Bolton, P, and Scharfstein, D (1996), 'Optimal Debt Structure with Multiple Creditors', *Journal of Political Economy*, 104, 1-26.

Boot A W A and Thakor, A V (1993), 'Self-interested bank regulation', *American Economic Review* 83, pp 206–12.

Borio, C, Vale, B and Peter, G von (2010), 'Resolving the financial crisis: are we heeding the lessons from the Nordics?', Bank for International Settlements Working Paper 311.

Bulow, J and Klemperer, P (2009), 'Reorganising the banks: focus on the liabilities, not the assets', at *http://www.voxeu.org/index.php?q=node/3320* (accessed Feb 2012).

Caballero, R J (2009), 'A (Mostly) Private Capital Assistance Program (CAP)', *RGE Monitor*, 17 March.

Claessens, S, Herring, D. Schoenmaker, D and Summe, K A (2010), *A Safer World Financial System: Improving the Resolution of Systemic Institutions*, Geneva Report on the World Economy 12, Geneva, International Center for Monetary and Banking Studies.

Danielsson, J. (2010), 'The Saga of Icesave', *CEPR Policy Insight* 44.

de Larosière, J (chair) (2009), *Report from the High-Level Group on Financial Supervision in the EU*, Brussels.

Dell'Ariccia, G and Marquez, R (2006), 'Competition among regulators and credit market integration', *Journal of Financial Economics* 79, pp 401–30.

Demirgüç-Kunt, A and Detragiache, E (2002), 'Does deposit insurance increase banking system stability? An empirical investigation', *Journal of Monetary Economics* 49(7), pp 1373–1406.

Dewatripont, M, and Maskin, E (1995) 'Credit and Efficiency in Centralized and Decentralized Economies', *Review of Economic Studies*, 62(4), 541-55.

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

Diamond, D and Dybvig, P H (1983), 'Bank runs, deposit insurance and liquidity', *Journal of Political Economy*, 91(3), pp 401–19.

Diamond, D, and Rajan, R (2005), 'Liquidity Shortage and Banking Crises', *Journal of Finance,* 60(2), 615-47.

Dwyer, G P (2010), 'Too Big to Fail', *Notes from the Vault*, FRB of Atlanta.

Farhi, E and Tirole, J (2009), 'Leverage and the central banker's put', *American Economic Review, Papers and Proceedings* 99(2), pp 589–93.

Flannery, M (2005), 'No pain, no gain? Effecting market discipline via "reverse convertible debentures"', in H S Scott (ed), *Capital Adequacy beyond Basel: Banking, Securities, and Insurance*, Oxford, Oxford University Press, pp 171–96.

Freixas, X and Parigi, B M (2008), 'Banking regulation and prompt corrective action', mimeo.

Freixas, X and Parigi, B M (2010), 'Lender of last resort and bank closure policy', in A Berger, P Molyneux, and J Wilson (eds), *Oxford Handbook of Banking*, Oxford, Oxford University Press, pp 278–314.

Freixas, X and Rochet, J C (2007), *Microeconomics of Banking*, 2nd edn, Cambridge, MA, MIT Press.

Freixas, X., Martin, A and Skeie, D (2011), 'Bank liquidity, interbank markets and monetary policy', *Review of Financial Studies* 24(8), pp 2656–92.

Gorton, G and Huang, L (2004). 'Liquidity, efficiency and bank bailouts', *American Economic Review* 94, pp 455–83.

Gropp, R, Gruendl, C and Guettler, A (2010), 'The impact of public guarantees on bank risk taking: evidence from a natural experiment', Working Paper 1272, European Central Bank.

Hardy, D C and Nieto, M J (2011), 'Cross-border coordination of prudential supervision and deposit guarantees', *Journal of Financial Stability* 7(3), pp 155–64.

Hart, O and Moore, J (1995), 'Debt and seniority: an analysis of the role of hard claims in constraining management', *American Economic Review* 85, pp 567–85.

Hart, O and Zingales, L (2009), 'A new capital regulation for large financial institutions', CEPR Discussion Paper 7298.

Hoggarth, G, Jackson, P and Nier, E (2005), 'Banking crises and the design of safety nets', *Journal of Banking and Finance* 29, pp 143–9.

James, C (1991), 'The losses realized in bank failures', *Journal of Finance* 46, pp 1223–42.

Jensen M C (1986), 'The agency costs of free cash flow: corporate finance and takeovers', *American Economic Review* 76(2), pp 323–9.

Kashyap, A, Rajan, R G and Stein, J C (2008), 'Rethinking capital regulation', mimeo.

Khan, C and Winton, A (2004), 'Moral hazard and optimal subsidiary structure for financial institutions', *Journal of Finance* 59, pp 2531–75.

Kose, J, Mehran, H and Qian, Y (2007), 'Regulation, subordinated debt, and incentive features of CEO compensation in the banking industry', Federal Reserve Bank of New York Staff Report 308.

Krimminger, M H (2008), 'The resolution of cross-border banks: issues for deposit insurers and proposals for cooperation', *Journal of Financial Stability* 4, pp 376–90.

Kuritzkes, A and Scott, H (2009), 'Markets are the best judge of bank capital', *Financial Times*, 23 Sept.

Landier, A and Ueda, K (2009), 'True taxpayer burden of bank restructuring' International Monetary Fund Staff Position Note SPN/09/12

Laux, C and Leuz, C (2010), 'Did fair-value accounting contribute to the financial crisis?', *Journal of Economic Perspectives* 24, pp 93–118.

McDonald, R (2010), 'Contingent Capital: with a Dual Price Trigger', Working Paper, Northwestern University.

Mitchell, J (2001), 'Bad debts and the cleaning of banks' balance sheets: an application to economies in transition', *Journal of Financial Intermediation* 10(1), pp 1–27.

Morrison, A and White, L (2010), 'Reputational contagion and optimal regulatory forbearance', European Central Bank Working Paper 1196.

Pennacchi, G (2010), 'A structural model of contingent bank capital', Federal Reserve Bank of Cleveland Working Paper 10-04.

Philippon, T and Schnabl, P (2010), 'Efficient recapitalization', mimeo, New York University.

Philippon, T and Skreta, V (2009), 'Optimal bailouts under adverse selection', work in progress, NYU Stern School of Business.

Repullo, R (2005), 'Liquidity, risk taking, and the lender of last resort', *International Journal of Central Banking* 1, pp 47–80.

Rochet, J-C (1992), 'Capital requirements and the behaviour of commercial banks', *European Economic Review* 36, pp 1137–70.

Rochet, J-C and Vives, X (2002). 'Coordination failures and the lender of last resort: was Bagehot right after all?' *Journal of the European Economic Association* 2, pp 1116–47.

Schoenmaker, D (2011), 'The Financial Trilemma', *Economics Letters*, Jan.

Summe, K A (2010), 'Appendix to chapter 3', in S Claessens et al, *A Safer World Financial System*, Geneva Report on the World Economy 12, Geneva, International Center for Monetary and Banking Studies.

Sundaresan, S M and Wang, Z (2010), 'Design of contingent capital with a stock price trigger for mandatory conversion', Federal Reserve Bank of New York Staff Report 448.

Wall, L D (2010), 'Too Big to Fail: No Simple Solutions', *Notes from the Vault*, FRB of Atlanta.

White, L and Morrison, A (2009), 'Level playing fields in international financial regulation', *Journal of Finance* 64(3), pp 1099–1142. Abstract.

The current crisis and its high social cost have shattered the confidence of economic agents in the banking system and questioned the capacity of financial markets to channel resources to their best use. While it is essential for the well functioning of economic activity that financial institutions do take risk, the decisions taken by financial intermediaries have proven ex post to be excessively risky. So, what was wrong with financial regulation? How were overoptimistic expectations, short termism and inaccurate risk models implicitly encouraged?

This book is devoted to exploring the general issue of the origins of excessive risk-taking in the banking industry. The four years since the start of the crisis, covering the period from the first turmoil in the interbank market to the fully fledged sovereign crises of 2011, gives us sufficient perspective to make a better assessment of some of the main issues and challenges it has raised. We focus here on the four main issues that provide the incentives for excessive risk-taking.

Because it is the board of directors that is ultimately accountable for the level of risk that is taken in a firm, we start with financial institutions' corporate governance. We analyse whether, in their strategic decisions, board members consider their own bonuses, short-term stock price movements, shareholders' short-run interests (rather than stakeholders' long-run ones) or simply the financial institution's culture of risk.

We next turn to the misperception of risks, related to managers' and shareholders' understatement of the business-cycle risk of downturn, as the procyclicality of capital may lead to excessive lending, the emergence of bubbles and a financial accelerator effect. The regulatory proposal of Basel III on countercyclical buffers is intended to solve this issue. Still, rigorous analysis of the procyclicality of banks' capital may indicate that the matter is more complicated than it seems.

In a third chapter, we ask why neither supervisory authorities nor market discipline, which was given a preeminent role in Basel II, did a proper job. Is it true that information disclosure was inaccurate?

Finally, in our last chapter we consider whether excessive risk-taking was the result of implicit guarantees such that all banks in distress expected to be bailed out. This implies that the way regulatory agencies and treasuries organise banks' resolutions is critical in determining future moral hazard. It is therefore worth considering how a bank in distress can be restructured in an orderly way – whether it is to be closed or bailed out in such a way as to preserve banks' incentives and be credible while limiting contagion to other banks.

This volume will provide the analytical ammunition required to rigorously examine regulatory policy at a time when it is undergoing a complete metamorphosis.

ISBN 978-1-907142-51-2