

Macroeconomic Stability and Financial Regulation: Key Issues for the G20

Edited by:

Mathias Dewatripont,

Xavier Freixas and Richard Portes

G20

Sustainable

quantitative easing

emerging markets

procyclicality

Basel

deflation

distressed banks

ratings

liquidity

governance

incentives

CDS

global imbalances



Macroeconomic Stability and Financial Regulation: Key Issues for the G20

Centre for Economic Policy Research (CEPR)

Centre for Economic Policy Research
2nd Floor
53-56 Great Sutton Street
London EC1V 0DG
UK

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

© Centre for Economic Policy Research 2009

Macroeconomic Stability and Financial Regulation: Key Issues for the G20

Edited by:

Mathias Dewatripont, Xavier Freixas and Richard Portes



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 organization 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.

CEPR is a registered charity (No. 287287) and a company limited by guarantee and registered in England (No. 1727026).

Chair of the Board	Guillermo de la Dehesa
President	Richard Portes
Chief Executive Officer	Stephen Yeo
Research Director	Mathias Dewatripont
Policy Director	Richard Baldwin

About the Contributors

Marco Becht is a Professor of Finance and Economics at Université Libre de Bruxelles, a Resident Fellow at ECARES at ULB, a Research Fellow of CEPR and the Executive Director of the European Corporate Governance Institute (ECGI). In 2003, he was Visiting Professor at the Saïd Business School, University of Oxford and in 2008 Max Schmidheiny Visiting Professor for Entrepreneurship and Risk at the University of St. Gallen. He is a member of the Belgian Corporate Governance Commission and has given expert briefings to the Group of Economic Analysis of the President of the European Commission, the European Parliament, Alcatel, BP, EDF, the board of Andra AP Fonden, Securities Regulators, the OECD and the World Bank, among others.

Markus K. Brunnermeier is the Edwards S. Sanford Professor at Princeton University. He is a member of the Department of Economics and affiliated with Princeton's Bendheim Center for Finance and the International Economics Section. He is also a research associate at CEPR, NBER and CESifo, and an academic consultant to the Federal Reserve Bank of New York. He was awarded his Ph.D. by the London School of Economics (LSE), where he was also affiliated with its Financial Markets Group. He is a Sloan Research Fellow, an associate editor of the *American Economic Review*, *Journal of European Economic Association*, *Journal of Finance*, *Journal of Financial Intermediation* and was previously on the editorial board of the *Review of Financial Studies*. His research spans economics and finance. He is primarily interested in studying financial crises and significant mispricings due to institutional frictions, strategic considerations, and behavioral trading. His research also explains why liquidity dries up when it is needed most and has important implications for risk management.

Willem Buiter is Professor of European Political Economy at the European Institute of the London School of Economics and Political Science and a CEPR Research Fellow. He obtained his PhD in Economics from Yale in 1975. He has served as a member of the Monetary Policy Committee of the Bank of England, and as Chief Economist and Special Adviser to the President at the European Bank for Reconstruction and Development, and as Co-Director of the CEPR International Macroeconomics Programme. He has held academic appointments at Princeton University, the University of Bristol, Yale University and the University of Cambridge and has been a consultant and advisor to the International Monetary Fund, The World Bank, The Inter-American Development Bank, the EBRD, and the European Commission. Since 2005, he has served as an Advisor to Goldman Sachs International. He has published widely on subjects such as open economy macroeconomics, monetary and exchange rate theory, fiscal policy, social security, economic development and transition economies.

Mathias Dewatripont is Professor of Economics at the Université Libre de Bruxelles where he is Vice-President of the Solvay Brussels School of Economics and Management and a researcher at ECARES. He has been Research Director of CEPR as well as part-time Visiting Professor at MIT since 1998. He holds a Ph.D. in Economics

from Harvard University and was awarded the Francqui Prize in 1998 and the Yrjö Jahnsson medal in 2003. He has served as Managing Editor of *The Review of Economic Studies* and as was President of European Economic Association. He is a member of European Commission DG-Competition's Economic Advisory Group on Competition Policy and of European Commission President J.M. Barroso's Group of Economic Policy Analysis. His research covers the theory of incentives and organizations, with applications to banking and corporate finance as well as to transition economics. He is the author (with Jean Tirole) of *The Prudential Regulation of Banks*.

Xavier Freixas (Ph D. Toulouse 1978) is Professor at the Universitat Pompeu Fabra in Barcelona (Spain) and Research Fellow of CEPR. He is also Chairman of the Risk Based Regulation Program of the Global Association of Risk Professionals (GARP). He has published a number of papers in the main economic and finance journals (*Journal of Financial Economics*, *Review of Financial Studies*, *Econometrica*, *Journal of Political Economy*,...) and 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 Associate Editor of *Journal of Financial Intermediation*, *Review of Finance*, *Journal of Banking and 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.

Stefan Gerlach is Professor of Monetary Economics at the Institute for Monetary and Financial Stability at the University of Frankfurt and a CEPR Research Fellow. He has served as Head of Secretariat to the Committee on the Global Financial System at the BIS, as Executive Director (Research) at the Hong Kong Monetary Authority and Director of the Hong Kong Institute for Monetary Research. He received his doctorate from the Graduate Institute of International Studies in Geneva in 1983, received tenure at Brandeis University, and has held visiting positions at Harvard and Brown Universities, and at the INSEAD. He has published some 50 articles and edited two books in the areas of monetary economics, international finance and financial stability. Much of his current research focuses on the role of asset prices in monetary policy. He is an External Member of the Monetary Policy Committee of the Bank of Mauritius.

Hendrik Hakenes is Professor of Financial Economics at the University of Hannover. He received his doctorate from the University of Münster and has worked at the University of Mannheim, the Max Planck Institute in Bonn, and University of Minnesota (as a visiting scholar). His research focuses on risk management, banking regulation and systemic risk, and on reputation and market structure.

Takatoshi Ito is Professor in the Graduate School of Economics at the University of Tokyo, and a CEPR Research Fellow. He received his Ph.D. from Harvard University, and has taught at Harvard, the University of Minnesota and Hitotsubashi University. Ito served as President of the Japanese Economic Association, Senior Advisor in the Research Department at the IMF, Deputy Vice Minister for International Affairs at the Japanese Ministry of Finance and as a member of the Council of Economic and Fiscal Policy (2006-8). He is an author of many books including *The Japanese Economy*, *The*

Political Economy of the Japanese Monetary Policy and Financial Policy and Central Banking in Japan, as well as more than 50 academic journal articles on international finance and the Japanese economy.

Philip R. Lane is Professor of International Macroeconomics at Trinity College Dublin. In addition, he is a managing editor of the journal *Economic Policy* and the founder of *The Irish Economy* blog. He is a research fellow of the Centre for Economic Policy Research (CEPR) and a member of the steering group for its Macroeconomics of Global Interdependence (MGI) working group. His research interests include financial globalisation, the macroeconomics of exchange rates and capital flows, macroeconomic policy design, European Monetary Union, and the Irish economy. He also serves on the editorial boards of the *International Journal of Central Banking*, *Empirica*, *Open Economies Review* and *Moneda y Credito*. He is also a member of the scientific advisory committee of CEPR. In 2001, he was the inaugural recipient of the German Bernacer Award in Monetary Economics. He is also a member of the Royal Irish Academy, the Bellagio Group and the EURO-50 group and is a former member of the Handelsblatt ECB Shadow Council. He has consulted for the International Monetary Fund, World Bank, European Commission, European Central Bank and a number of national central banks.

Marco Pagano is Professor of Economics at University of Naples Federico II, President of the Einaudi Institute for Economics and Finance (EIEF), and a CEPR Research Fellow. He holds a Ph.D. from MIT and has taught at Bocconi University and the University of Salerno. He is joint managing editor of the Review of Finance and chairs the Scientific Committee of EuroMTS and is an advisor to the Unicredit Group. He has advised the Italian Treasury on the reform of security markets, and has been a member of the Treasury's privatisation committee, the European Parliament's advisory panel on financial services, and has served as Co-Director of the CEPR Financial Economics Programme. His research is in the fields of corporate finance, banking and stock market microstructure. He has also done research in macroeconomics, especially on its interactions with financial markets. His publications have appeared in journals such as *American Economic Review*, *Review of Economic Studies*, *Quarterly Journal of Economics*, *Journal of Finance*, *Review of Financial Studies*, *RAND Journal of Economics*, *Journal of the European Economic Association*, *European Economic Review*, and *Economic Journal*.

Richard Portes, Professor of Economics at London Business School, is Founder and President of the Centre for Economic Policy Research (CEPR), *Directeur d'Etudes* at the Ecole des Hautes Etudes en Sciences Sociales and Senior Editor and Co-Chairman of the Board of *Economic Policy*. He is a Fellow of the Econometric Society and of the British Academy. He is a member of the Group of Economic Policy Advisers to the President of the European Commission, of the Steering Committee of the Euro50 Group, and of the Bellagio Group on the International Economy. He was Secretary-General of the Royal Economic Society 1992–2008. Professor Portes was a Rhodes Scholar and a Fellow of Balliol College, Oxford, and has also taught at Princeton, Harvard, and Birkbeck College (University of London). He has been Distinguished Global Visiting Professor at the Haas Business School, University of California,

Berkeley, and Joel Stern Visiting Professor of International Finance at Columbia Business School. His current research interests include international macroeconomics, international finance, European bond markets and European integration. He has written extensively on globalisation, sovereign borrowing and debt, European monetary issues, European financial markets, international capital flows, centrally planned economies and transition, macroeconomic disequilibrium, and European integration.

Rafael Repullo is Professor of Economics and Director of the Centre for Monetary and Financial Studies (CEMFI) in Madrid. He is also Executive Vice-President of the Econometric Society, Member of the Executive Committee of the European Economic Association, Fellow of the Econometric Society and of the European Economic Association, and CEPR Research Fellow. He holds a PhD in Economics from the London School of Economics. 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 Bank of Minneapolis, the Federal Reserve Bank of New York, the London School of Economics, and the Universities of Columbia, Pennsylvania, Princeton, and Tel Aviv. He has served as Co-Director of the CEPR Financial Economics Programme. His recent research is in the areas of banking and finance. He is currently Co-Editor of the *International Journal of Central Banking*.

Jean-Charles Rochet is Professor of Mathematics and Economics at Toulouse School of Economics. He holds a Ph.D. from Paris University and has been visiting professor in several universities and schools such as the London School of Economics and Political Science. His books include (with Xavier Freixas) *Microeconomics of Banking*; (with Guillaume Plantin) *When Insurers Go Bust* (Princeton) and *Why Are There So Many Banking Crises? The Politics and Policy of Bank Regulation*.

Jesús Saurina is Director of the Financial Stability Department at the Banco de España. He is a member of the Banking Supervision Committee of the ECB/Eurosystem. He is a PhD in Economics from the Universidad Complutense de Madrid and is a post-graduate from CEMFI (Madrid). He was an Associate Professor at the Carlos III University in Madrid. His research interests are banking and finance, regulation, and financial stability. He has published recently in the *Review of Financial Studies* (credit lines), the *Journal of Financial Economics* (collateral), the *Journal of Money, Credit and Banking*, the *Journal of Financial Intermediation* (capital buffers), the *Journal of Banking and Finance*, the *Journal of Financial Services Research* (Basel II impact on SMEs lending and procyclicality in mortgages), *Economics Letters* (risk premium and market power), *Review of Industrial Organization*, *European Accounting Review* (earnings and capital management), the *European Economic Review* (financial deregulation and risk taking) and the *International Journal of Central Banking* (dynamic provisions).

Isabel Schnabel is Professor of Financial Economics at Johannes Gutenberg University Mainz and a CEPR Research Affiliate. She received her doctorate from the University of Mannheim and has served as Senior Research Fellow at the Max Planck Institute for Research on Collective Goods in Bonn. She has been a visiting scholar at the International Monetary Fund (IMF), the London School of Economics, and Harvard University. Her research focuses on financial crises, bank regulation, and the history

of financial crises and institutions. Schnabel currently serves as Scientific Advisor to the German Federal Financial Supervisory Authority (BaFin) and as editor of *Economics of Transition*.

Carlos Trucharte is a senior economist of the Financial Stability Department in the Directorate General for Banking Regulation at the Banco de España. He holds an MSc. from the London School of Economics (Operational Research, OR) and a postgraduate degree from CEMFI (Madrid).

Paolo F. Volpin is Associate Professor of Finance and the JP Morgan Chase Research Fellow at London Business School. He holds a Ph.D. in Economics from Harvard University. His field of research is Corporate Finance. Currently, his interests focus on international corporate finance, corporate governance and political economy of corporate finance. His work has been published in the *Journal of Financial Economics* and the *Oxford Review of Economic Policy*.

Contents

<i>About the Contributors</i>	v
<i>Acknowledgements</i>	xii
Introduction, main policy proposals and summary	1
Global Imbalancess	19
<i>Richard Portes</i>	
The Global Crisis and Capital Flows to Emerging Markets	27
<i>Philip Lane</i>	
The Risk of Deflation	49
<i>Stefan Gerlach</i>	
Zero Interest Rate Policies and Quantitative Easing	67
<i>Takatoshi Ito</i>	
Fiscal Sustainability	79
<i>Willem Buiter</i>	
Financial Crises: Mechanisms, Prevention and Management	91
<i>Markus Brunnermeier</i>	
Mitigating the Procyclicality of Basel II	105
<i>Rafael Repullo, Jesús Saurina and Carlos Trucharte</i>	
The Regulation of Credit Derivative Markets	113
<i>Hendrik Hakenes and Isabel Schnabel</i>	
Credit Ratings Failures: Causes and Policy Options	129
<i>Marco Pagano and Paolo Volpin</i>	
The Treatment of Distressed Banks	149
<i>Mathias Dewatripont and Jean Charles Rochet</i>	
Corporate Governance and the Credit Crisis	165
<i>Marco Becht</i>	

Acknowledgements

As the financial crisis deepens, the temptations for each individual country to free ride increase and the need for coordination becomes more evident. The London Summit on 2 April should play a key role in generating such a coordinated response, by offering concrete, implementable results that can restore confidence and lead the way to recovery. Sound economic analysis is essential in designing this response, but delivering this analysis is a formidable challenge. It requires, first, a rigorous analysis of the key features of the financial crisis using the latest empirical evidence; and second, careful use of the theory and empirics as the basis for policy recommendations.

For this reason, CEPR was delighted to join the Reinventing Bretton Woods Committee in organizing a seminar with the G20 Deputies on 31 January, hosted by HM Treasury and the Bank of England, at which preliminary versions of the papers in this e-book were presented.

We are grateful to Stephen Pickford at HM Treasury and Charles Bean at the Bank of England who supported this workshop with enthusiasm. It was a pleasure to work with Marc Uzan of RBWC in planning the workshop and with Nicholas Joicey and his staff at the Treasury in organizing it. We are grateful as well to Nadine Clarke and Nav Sandhu at CEPR for the smooth preparations for the meeting, and to Anil Shamdasani for publishing this e-book so quickly. Stephen Yeo of CEPR oversaw all these activities and assisted us in editing.

Support for the preparation of the papers and for the meeting itself was provided under the auspices of the collaborative project "Politics, Economics and Global Governance: The European Dimensions" (PEGGED), funded by the European Commission's Seventh Research Framework Programme, with additional support to CEPR from the European Union's programme of "Support for bodies active at the European level in the field of active European citizenship." The views expressed in these papers are those of the authors and not those of the European Commission, HM Treasury, the Bank of England, the Reinventing Bretton Woods Committee or CEPR (which takes no institutional policy positions).

We hope the proposals and the underlying analysis will be useful in preparations for the London Summit on 2 April.

Xavier Freixas
Mathias Dewatripont
Richard Portes

Introduction, main policy proposals and summary

Mathias Dewatripont, Xavier Freixas and Richard Portes
*Solvay Brussels School of Economics and Management,
ECARES, Université Libre de Bruxelles and CEPR;
Universitat Pompeu Fabra and CEPR; London Business
School and CEPR*

1. Introduction and policy proposals

As the financial crisis deepens, the temptations for each individual country to free ride increase and the need for coordination becomes more evident. The London Summit will play a key role in generating such a coordinated response. Sound economic analysis is essential in designing the response. It will help to (i) eliminate policy options that are appealing yet inefficient or costly to tax-payers; (ii) identify the most efficient solutions, so that these can anchor the discussions and make it easier to reach a consensus; (iii) facilitate estimating the cost and benefits of each policy proposal.

Delivering this research is a challenge: it requires a rigorous analysis of the main features of the financial crisis, based on a careful interpretation of the latest empirical evidence, and using the theory and empirics as the basis for policy recommendations. Even if particular policy recommendations are not adopted, sound theory and careful empirics will be at the core of the debate on the present collapse of financial markets and its macroeconomic causes and consequences.

We face a systemic crisis. The standard textbook analysis of a systemic crisis involves two pillars: macroeconomic fragility and contagion. From that perspective, at least, the current crisis is no different from previous ones. The striking difference comes from the specifics of the macroeconomic fragility and the channels of contagion which are to some extent unprecedented. This is why this book, as the title indicates, covers the macroeconomic as well as the microprudential aspects of the crisis.

The systemic crisis is a global crisis. It involves the advanced countries, emerging market countries, and poor countries. There is no decoupling, and solutions must involve reciprocal commitments and actions. The G20 process offers the prospect of concrete, implementable results that can restore confidence and lead the way to recovery. These essays and our proposals are designed to be an input into the G20 process. They were first presented at a seminar with the G20 Deputies on 31 January, organised by the Centre for Economic Policy Research and the Reinventing Bretton Woods Committee, and hosted by HM Treasury and the Bank of England. We hope the proposals and the underlying analysis will be useful in preparations for the London Summit on 2 April.

1.1. Switching regimes

One of the most striking characteristics of the current crisis has been the complete freezing of liquidity in key markets, such as the interbank market for maturities beyond one day. This sudden change has been so remarkable that the best representation of the crisis is a model with two possible equilibria, one close to the perfect market paradigm and the other akin to Akerlof's adverse selection market for lemons, characterized by an absence of trade. The switch from one regime to another challenges all our views on economic and regulatory policy.

To understand how this switch in regime has come about, two main questions are to be answered: First, what macroeconomic features led to the dramatic regime switch from boom to total collapse? Second, to what extent have mechanisms intended to improve financial efficiency, either as innovations or as new regulatory measures, contributed to amplify the impact of the breakdown?

On the macro side, lax monetary policy led to the building of bubbles in a period of low interest rates and macroeconomic stability. Global imbalances - large current account surpluses and deficits - further contributed to the growth of international liquidity, the search for yield, and pressures on financial intermediation.

On the micro side, financial innovations such as securitization and credit default swaps have redefined the boundaries of the banking system. While it was thought that these innovations were beneficial because they transferred banking risk to non-banking institutions, we have to acknowledge now that in practice they imported systemic risk from non-banking institutions and securities markets to the heart of the banking system. Banking regulators stood by as financial innovations were transferred outside their reach, to financial markets. This was supposed to lead to a more efficient allocation of risks. That would only happen, however, if these risks were transferred to agents with well-diversified portfolios, sufficiently capitalized or with a lower social cost of bankruptcy than banks. Once those risks concentrated in undiversified portfolios of large non-banking institutions such as AIG or Lehman Bros, the passive attitude of the regulators was bound to lead to disaster.

The sudden transformation from markets that were perfectly transparent to complete opacity can be attributed to the complexity of instruments, the increased risk of the collateral on which the securities were based, the failure of credit rating institutions to perform properly, and the lack of adequate countercyclical prudential regulation. As information becomes more and more scarce, the switch to the market collapse and the (Akerlof) no-trade equilibrium was inevitable.

Three key factors combined to trigger the regime switch: liquidity shortages that occurred, despite generous liquidity injections by central banks all over the world; the buildup of huge portfolios of credit default swaps (CDS) in a small number of institutions that suddenly became vulnerable with the onset of the crisis; and the collapse of credit ratings awarded to structured securities as a basis for valuing and trading these securities. There were other causes too: the procyclical bias of Basel II regulation; the lack of a proper system for dealing quickly with insolvent banks; and the tendency of bank compensation systems to encourage excessive risk taking by employees, coupled with poor corporate governance and the failure of shareholders to act to protect their investments.

1.2. Addressing the crisis

This book analyzes a wide array of reform proposals the G20 should consider in order to address the crisis. The contributions are summarized below. Let us stress here several proposals that deserve special attention in our view (in addition to the set of recommendations discussed in Markus Brunnermeier's chapter, which summarizes the Geneva Report of Brunnermeier et al. 2009)¹.

Since the crisis is all-encompassing, we list these proposals, starting with the global perspective and continuing all the way to the individual bank.

These are for the most part either 'micro' or 'macro' proposals. But in keeping with the conception and the title of this book, we stress above all the short-run policy imperative. Here the two are deeply complementary. *Neither monetary nor fiscal policies will work unless and until the blockages in the supply of credit are resolved. Financial intermediation and the structure supporting it must be restored to near-normal conditions to stop the accelerating decline.*

1. *Addressing global imbalances and capital flows*

- Create *credible insurance mechanisms* for countries that forego further reserve accumulation and stimulate domestic expansion, along three possible lines: more central bank swap lines; 'reserve pooling'; and an expansion of IMF resources, together with IMF emphasis on a large, flexible, fast-disbursing facility that would come with little or no conditionality to countries that are adversely affected by global shocks. Large loans to the IMF by major reserve holders offer one way of funding this insurance until Fund quotas are raised, as they must be.
- Accelerate the development of emerging market country financial systems, with particular emphasis on local currency bond markets and on foreign currency hedging instruments. Promote regional cooperation in the design of common institutional standards for financial market development and work to lift barriers to cross-border asset trade within regions.

2. *The challenges of macroeconomic policy in the crisis*

- *Meet any threat of deflation promptly, before it takes hold, with a zero interest rate policy (ZIRP) and quantitative easing.* Establishing an inflation target may help to avoid expectations of deflation.
- A global ZIRP would raise a particular problem: not all countries can benefit from the stimulus of exchange-rate depreciation. A country with large trade surpluses with positive GDP growth should refrain from intervention to prevent appreciation, which would be a beggar-thy-neighbour policy.
- *International coordination of cooperatively designed fiscal stimuli is necessary* to allow the internalisation of the effective demand externalities of a fiscal stimulus through the trade balance and the real exchange rate. Fiscal stimuli should follow the 'fiscal spare capacity' of each country, i.e., its ability to generate larger future primary government surpluses.

¹ The references for the papers mentioned in this Introduction appear at the end of each of the relevant chapters.

3. Macroprudential regulation

- Mitigate procyclicality by adjusting the Basel II capital requirements using a simple multiplier that depends on the deviation of the rate of growth of GDP with respect to its long-run average.

4. Market reforms

- *Require without further delay a centralized clearing counterparty for CDS trades.* Consider going further to require that CDS be exchange- traded and consider prohibiting CDS that do not insure a holder of the underlying asset (naked CDS).
- Require that credit rating agencies (CRAs) be paid if possible by investors rather than by issuers, or at least that the link between CRAs and the issuer is severed, so that a CRA's rating does not affect its future business with a given client. Also, for structured instruments, force greater disclosure of information about the underlying pool of securities. Prohibit indirect payments by issuers to CRAs in the form of the purchase of consulting or pre-rating services. Consider an open-access, non-prescriptive approach by regulators, eliminating the NRSRO designation and the extensive 'hard wiring' of the CRAs in the regulatory system.

5. Controlling financial institutions

- *Establish a harmonized special bankruptcy regime for banks.* This would involve US-style 'prompt corrective action', giving the (independent and well-staffed) supervisory agency powers to limit the freedom of bank managers (possibly remove them) and shareholders (possibly expropriate them) *before* the bank is technically insolvent.
- Consider the creation of an *International Financial Stability Fund* that takes equity positions in the financial institutions of participating countries and monitors their activities.

2. Summary of the contributions

2.1 Global Imbalances

Richard Portes argues that global macroeconomic imbalances - in particular, large current account deficits and surpluses - were the major underlying cause of the crisis. Greed, incentive problems, financial innovation, deficiencies in regulation are not new, and they have played roles in past crises. But typically financial crises follow on booms and asset price bubbles, and in this case too, the macroeconomic environment created the conditions for the crisis. The specific feature of this crisis is that major saving-investment imbalances and consequent huge cross-border financial flows put great stress on the financial intermediation process. Even the sophisticated financial markets of the United States and United Kingdom could not cope with the pressures. The global imbalances *interacted* with the flaws in financial markets and instruments to generate the specific features of the crisis.

The dispersion of current account balances, positive and negative, increased great-

ly over the past decade. Gross capital flows have risen even more than the net flows implied by the current accounts. Loose monetary policies together with the large reserves accumulated by surplus countries brought excessive global liquidity. The global imbalances played a significant role in the fall in all major financial market volatilities that began in 2004. Together with low interest rates, that led to the 'search for yield' and rise in leverage. Portes rejects the various arguments justifying the global imbalances, or at least suggesting they were a sustainable equilibrium - 'Bretton Woods II', 'global asset shortage', 'savings glut'. Even more important than their flaws, they ignore the role of global imbalances in feeding financial market excesses.

This is not just a US-China story. The UK, Spain, and Australia have had large current account deficits; Germany, Japan, and several Asian emerging market countries as well as some commodity exporters have had large surpluses. Most of these imbalances continue. Household savings will doubtless rise in the US and UK, but so will their fiscal deficits. In the medium term, reducing the global imbalances will require a rise in domestic demand in the surplus countries, as well as their willingness to accept a fall or even a reversal of their current account surpluses. This is not primarily an exchange-rate issue. Rather, the surplus countries have been accumulating reserves since the Asian crisis of 1997-98 as a precaution against any further 'sudden stops' in capital flows, and the current crisis will only further encourage such behaviour.

Portes therefore argues that the key to reducing the global imbalances is to create *credible insurance mechanisms* for countries that forego further reserve accumulation and stimulate domestic expansion. There are three possible avenues: more central bank swap lines; 'reserve pooling'; and an expansion of IMF resources, together with IMF emphasis on a large, flexible, fast-disbursing facility that would come with little or no conditionality to countries that are adversely affected by global shocks. Large loans to the IMF by major reserve holders offer one way of funding this insurance until Fund quotas are raised. But the emerging market countries are unlikely to put their trust in the IMF until its governance and their representation in it are radically changed (see Philip Lane's chapter).

Financial regulation and global imbalances intersect directly in leveraging. Portes proposes direct limits on the borrowing and leverage of financial institutions. Any increase in balance sheets of systemically important financial institutions (balance sheets of intermediaries) should not exceed the fiscal capacities of host governments. That is not specifically external assets, but such a constraint would naturally limit the increase of external assets, because the institutions cannot expand their balance sheets much by relying exclusively on domestic capital markets (that would drive up interest rates). So this proposal is directly linked to global imbalances.

Policies ought also to control currency mismatches. Portes recommends a proposal due to Anne Krueger (2000). Advanced countries could require that their financial institutions accept liabilities abroad only in the currency of the borrower. Alternatively, borrowing countries could make foreign currency obligations incurred by domestic firms and households unenforceable in their courts.

2.2 Capital Flows to Emerging Markets

Philip Lane shows that the external balance sheets of emerging market economies are

far different today than during the international financial crises of the 1980s and 1990s. But the still limited role for local-currency debt in external financing means that the emerging markets remain highly exposed to international financial crises. He complements Portes in arguing that self-insurance (through reserve accumulation) is collectively inefficient and incomplete. That leads him to propose domestic and international reforms to improve the stability of capital flows to emerging market economies, so that international financial disturbances will have less impact on them in the future.

Lane points out that the risk profile of emerging market countries has improved greatly in the past decade: net liabilities are down, reserves are up, and they have exploited alternatives to foreign debt finance. They have partly overcome 'original sin' (inability to borrow abroad in their own currencies) through foreign direct investment and foreign investment in portfolio equity. Financial integration is still incomplete, however: these economies are sufficiently integrated into the global financial system to be exposed to severe financial shocks, but they are treated differently by the global system in comparison to the financial environment that faces the most advanced economies.

The external environment has indeed suddenly become much harsher. Exports and commodity prices have collapsed. The rise in risk aversion has brought a general widening in spreads and a moderation in the search for yield that reduces the appeal of investment in emerging markets. Deleveraging by the financial institutions of advanced countries has brought a pullback from foreign markets, and financial protectionism - pressure on banks to lend domestically rather than abroad - is a further threat.

The problems are most acute for entities that relied on short-term external funding to acquire longer-term illiquid domestic or foreign assets. The high level of reserves accumulated in recent years improves the capacity to manage balance sheet problems, however, both by enabling effective monetary expansion and through direct deployment of reserves. Although there is scope for domestic expansion (monetary and fiscal stimulus) in many emerging market countries, they need above all to safeguard medium-run fiscal sustainability.

Lane argues that the recent increase in the cost of external capital should motivate greater efforts to develop domestic financial systems. The improved domestic mobilisation of domestic savings reduces the importance of external capital as a funding source. Moreover, a deeper financial system increases the span of investment opportunities available to foreign investors. Lane puts particular emphasis on the development of local-currency debt markets, complemented by the development of the currency derivatives markets, in order to allow investors to separately trade currency risk and credit risk. The international financial institutions could do more to issue securities in the currencies of the emerging market economies, thereby expanding the depth and liquidity of the domestic-currency bond markets, as well as allowing the international financial institutions to make local-currency loans to clients in those markets.

Lane sees much scope for regional levels of financial integration. Regional capital flows may be more stable, in view of the underlying linkages between neighbouring economies and the lower level of bilateral exchange rate volatility. Accordingly, it is desirable that regional groups intensify efforts to cooperate in the design of common

institutional standards for financial market development and work to lift barriers to cross-border asset trade. He also endorses regional currency swap arrangements and reserve pooling, as well as IMF quota increases and the potential importance of the Fund's new Short-Term Liquidity Facility.

In regard to the broader G20 agenda, Lane argues that it is in the interests of the emerging market economies to support international reforms that improve stability in the major financial centres and at the global level. The strength of two-way international transmission mechanisms between advanced and developing countries means that this reform debate has to involve representatives of the emerging economies in a central role. To that end, a major shift in the distribution of voting power at the IMF would be clearly beneficial. It is incumbent on the advanced countries to accept this redistribution, with the obvious potential for the consolidation of representation by member countries of the European Union.

2.3 The Risk of Deflation

There is some risk that the rapid decline in inflation in many countries in recent months could turn into deflation with highly adverse real economic developments. Irving Fisher's (1933) debt deflation theory has come into fashion. Stefan Gerlach argues that the risk should not be exaggerated: so far, economic agents do not expect deflation, and that is one reason why it is unlikely. Even if the threat materializes, appropriate monetary and fiscal policies can deal with it.

Deflation is a fall of the economy-wide price level that is sufficiently persistent to trigger expectations that prices will continue to decline for some non-negligible period of time. This may reflect particularly large and persistent declines in the demand for goods and services. If so, deflation is merely an indicator, and not a cause, of slowing aggregate demand. Monetary and fiscal policy measures that raise demand will stimulate economic activity just as they would at a low, positive rate of inflation.

But deflation can induce non-linearities in the functioning of the economy. Thus a contractionary shock of a given size will be more difficult to handle if it pushes the economy into deflation than if the rate of inflation remains positive. In particular, nominal wages may be rigid downward and there is a risk that policy-controlled interest rates reach zero, which reduces the effectiveness of the interest rate channel of monetary policy.

Gerlach is not too concerned about downward nominal wage rigidities. If productivity growth is positive, real unit labour costs can still decline even if real wages are rising. Unit labour costs depend also on indirect taxes and social charges, which can be changed in a counter-cyclical manner to support employment. Furthermore, downward nominal wage rigidity is not a structural feature of the economy but rather a consequence of having experienced a long period of positive inflation. Indeed, the importance of downward nominal wage stickiness may decline if the economy enters deflation.

A more serious concern arises because central banks cannot reduce nominal interest rates below zero. If the nominal interest rate is zero, the real interest rate is equal to minus the rate of inflation. As deflation takes hold and turns increasingly severe, real interest rates rise, reducing aggregate demand and exacerbating the downward pressure on prices.

Gerlach dismisses the argument that central banks should avoid cutting interest rates to zero since they then have no policy lever left to use if inflation falls further. Additional policy easing is less likely to be needed if rates are cut aggressively at an early stage of the easing process, and quantitative easing can step in at the zero interest bound.

Inflation expectations are currently positive, despite the falls in commodity prices. Gerlach suggests that central banks that do not yet have inflation targets should adopt such a target now, in order to help maintain mild inflation expectations.

The monetary authorities have other options. By purchasing long-term government bonds, central banks can reduce their yields, leading to valuation gains for bond holders and an improvement of their balance sheets, and a fall in other interest rates that use them as reference rates. If concerns about credit risk limit the willingness of banks to extend credit even when *all* interest rates have reached zero, the central bank can provide credit directly to borrowers.

If deflation does take hold, despite aggressive monetary policies, then fiscal policy measures to shore up the banking system and to expand aggregate demand may be necessary. Situations in which fiscal policy is ineffective are not likely to be of much practical relevance.

Gerlach does have a particular word of caution for emerging market countries. They are more likely to have fixed exchange rate regimes than advanced economies. If the exchange rate is fixed, the entire burden of adjustment to a shock will fall on the nominal price level. Emerging market countries should be conscious of this deflation risk.

Past episodes of deflation are therefore best seen as reflecting policy mistakes or an inability to forge a political consensus about how policy should be conducted. The economics of stopping a deflation is clear and calls for aggressive easing of monetary and fiscal policy, and, when it is associated with financial instability, measures to support the financial system. The papers by Takatoshi Ito and Willem Buiter give detailed support to these conclusions.

2.4 Zero Interest Rate Policy (ZIRP) and Quantitative Easing (QE)

Takatoshi Ito emphasizes the importance of avoiding deflation. The prime example of the dangers and policy errors is Japan in the 1990s. Deflation impairs economic activity both by raising real interest rates and by increasing the burden of debt fixed in nominal terms. Like Gerlach, Ito stresses the importance of maintaining positive inflation expectations, and he elaborates on appropriate monetary policies (in particular, QE). But guided by the Japanese experience, he points out the obstacles to getting monetary policy right.

Ito considers what the central bank could do beyond ZIRP to stimulate the economy. There are many proposed variants of unconventional monetary policies. Most of them fall into a category of QE, broadly defined - that is, an expansion of the central bank balance sheet by purchasing risk assets that the central bank normally would not buy. QE variants differ with respect to (1) what is the primary purpose; (2) what would be the target instrument and communication strategy; (3) what assets to buy; and (4) how to influence inflation expectations.

The Bank of Japan tried one version of QE from 2001 to 2006. The US Federal

Reserve, followed by several European central banks, is now trying another version, which it says is "credit easing" (CE), rather than (a Japanese-type) QE. If the ECB - sooner rather than later - ends up with ZIRP and QE, and the Bank of Japan again goes into ZIRP/QE, we will enter an environment of global ZIRP and QE. This is uncharted territory in international macroeconomics and finance.

With adoption of ZIRP by several major central banks, the effectiveness of QE in one country would be diminished, since one channel of stimulus from ZIRP, namely, the exchange rate depreciation, would not be available. Coordination among central banks may become important for this reason. All countries, if possible, want to depreciate to help encourage exports and discourage imports under a deflationary environment, but not all of them can do so simultaneously. Thus, some currencies have to appreciate vis-à-vis others. Who should that be? Countries with large trade surpluses are obvious candidates. Under a *global* ZIRP environment, a country with large trade surpluses with positive GDP growth should refrain from large scale intervention, since intervention to prevent appreciation would be equivalent to a beggar-thy-neighbour policy.

The ZIRP/QE experiences of the Bank of Japan from 1999 to 2006 offer important lessons, some positive and some negative. Based on that experience and the ongoing experience of the Fed, and with some expectation of what is coming in Europe, Ito makes the following very clear policy recommendations.

1. The authorities should make unmistakably clear their do-everything attitude to avoid a prolonged deflation. Arriving at ZIRP should not be delayed until the inflation rate reaches zero. Ito joins Gerlach in saying that inflation targeting may be helpful as a clear, transparent message.
2. The authorities should not hesitate to expand the central bank's balance sheet by buying whatever risk assets would most effectively restore financial stability. Many variants of QE should be considered and attempted. In this respect, the FRB actions to purchase wide range of securities, without excessive concern for maintaining a risk-free balance sheet, are remarkable and commendable.
3. If deflation sets in, the authorities should commit to err on the side of late rather than early for the timing of exit from ZIRP and to an easier-than-usual monetary policy thereafter.
4. Trust between the central bank and the fiscal authority is important to induce the central bank to take bold actions in QE or CE. The fiscal authority must be willing to fill any holes in the central bank's balance sheet without using this as a lever to reduce the bank's independence. This may be particularly tricky in the euro area, where a single central bank faces 16 separate fiscal authorities.
5. Globally-coordinated fiscal stimulus is desirable, but room for sustainable fiscal deficits is quite different across countries. The higher the debt ratio is, the more constrained is the country in implementing fiscal stimulus. Even in high-debt countries, however, current fiscal spending associated with structural reforms removing inefficiencies and with subsidies to green innovations, with a promise to raise a less-distortionary tax in the medium run, may be prudent fiscal policy in the circumstances.

2.5 Fiscal sustainability

Willem Buiter argues that a fiscal stimulus is a key weapon in the policy arsenal used to address an undesirable weakening of aggregate demand. But the stimulus must be mindful of sustainability constraints. He conveniently summarises his analysis and recommendations in nine propositions, which we paraphrase here.

1. Countries with unsustainable external deficits (e.g., the United States) should seek to boost their trade balances and de-emphasize domestic demand relative to countries with unsustainable external surpluses (e.g., China), which should seek to boost domestic demand and reduce their trade surpluses.
2. Even operationally independent central banks must recognise that their profits or (equivalently) their monetary issuance are an important source of fiscal revenue. QE through purchases of government securities is an especially important source of revenue for the sovereign whenever short-term interest rates are well below long-term interest rates. Close cooperation between the monetary and fiscal authorities is necessary to achieve the right timing and magnitude of monetization of public debt and deficits, and the reversal of this monetization when the economy recovers. When done competently, these coordinated actions will not threaten the price stability mandate of the central bank.
3. To get the maximum impact in stimulating aggregate demand, while minimizing moral hazard, the fiscal authorities should guarantee or insure flows of new lending and credit, including securitisation, but not outstanding stocks of loans, credit, or securities.
4. Balanced-budget redistribution between households with different marginal propensities to spend out of current income can boost demand as effectively as deficit-financed tax cuts. Examples include: (i) an increase in social security retirement pensions financed fully by higher social security contributions by workers and employers (pensioners have a higher marginal propensity to consume); (ii) an increase in student grants financed fully through a levy on financial wealth (students are likely to be liquidity-constrained); (iii) an increase in short-term unemployment benefit financed by a reduction in long-term unemployment benefit (short-term and temporarily unemployed workers are more likely to be liquidity-constrained).
5. A temporary increase in public consumption or investment will always boost aggregate demand, even if the budget is kept balanced. If there are liquidity-constrained households, even a permanent balanced-budget increase in public spending on goods and services will boost aggregate demand.
6. International coordination of cooperatively designed fiscal stimuli is likely to be necessary to allow the internalisation of the effective demand externalities of a fiscal stimulus through the trade balance and the real exchange rate.
7. With Ito, Buiter argues that international fiscal stimuli must be cooperatively designed according to the 'fiscal spare capacity' of each country, that is, according to its ability to generate (and to commit itself credibly to generate) larger future primary government surpluses.
8. With Portes and Lane, Buiter is concerned that very large fiscal deficits and public debt issuance by rich countries will risk crowding out sovereign and private sector borrowers from emerging markets and developing countries.

Longer-term risk-free global real interest rates are likely to rise.

9. Because production takes time, working capital is essential. Policies to provide credit to the non-financial enterprise sector may therefore be a precondition for expansionary fiscal policy to have any material effect on production and employment. Quantitative easing or credit easing is therefore likely to be complementary to fiscal policy in economies badly affected by a credit squeeze.

2.6 Liquidity Crisis

Markus Brunnermeier offers an overall view of the crisis, its origins, possible mechanisms for its resolution and ways of preventing such crises in the future. The main vector of contagion has been the liquidity shortage: this is one of the most striking features of the current crisis. This contagion mechanism combines marking to market and forced sales to obtain liquidity. When the price of an asset falls, marking to market requires the bank to take the loss immediately, decreasing its equity and thus increasing its leverage beyond the target level. To improve its capital ratio the bank may be forced to sell some assets, but this will lead to a further decrease in the price of the asset. In addition, the increase in haircuts during a crisis implies that with the same assets the amount of liquidity available is lower, forcing even more asset sales. So liquidity spirals and margin/haircut spirals reinforce one another and lead to fire sale prices for securities. Brunnermeier emphasises two features of this channel of contagion: first, fire sales by one institution affect all other institutions and, second, contagion is not confined to the banking sector but propagates to the entire financial sector.

As the effects of liquidity shortages are clearly the main cause of contagion in the present crisis, we should not forget that other mechanisms may act to compound it: banks may hoard liquidity making the liquidity shortage more acute, and runs (possibly triggered by higher margins and haircuts) may develop. These represent rational behaviour on the part of individual financial institutions (they may, for example, fear demands for liquidity from SIVs to which they have granted credit lines) as well as from depositors, but individual rationality may lead to huge negative externalities for the banking system as a whole.

Notice that liquidity spirals create an important procyclical mechanism that makes Basel II capital requirement procyclicality even more severe. This issue is discussed in the Geneva Report written by Brunermeier at al. (2009). In his chapter, Brunnermeier summarizes the policy conclusions from the Geneva Report, distinguishing crisis prevention (with recommendations like the introduction of macro-prudential regulation or liquidity regulation among other topics) from crisis management (with analyses of nationalization, toxic asset purchases, asset guarantees or mortgage subsidies).

2.7 Mitigating Procyclicality

In their chapter, Rafael Repullo, Jesus Saurina and Carlos Trucharte compare various ways to reform the Basel II capital requirements in order to handle procyclicality. There is indeed broad agreement by now that one has to 'index' current capital requirements to take into account macroeconomic variables and thereby avoid the destabilizing effects of prudential regulation. How to do it is a key policy question.

The chapter by Repullo et al. is a step forward in this direction. They use data from the Credit Register of the Bank of Spain to analyze the effect of the leading alternative procedures that have been proposed to mitigate the procyclical effects of the Basel II capital requirements.

The empirical model provides an estimate of the point-in-time (PIT) probabilities of default (PDs) of the loans in the portfolio of commercial and industrial loans of the Spanish banks. They can then compute the corresponding Basel II capital requirements per unit of loans and estimate the credit risk profile of the Spanish banks over the sample period using the metric of Basel II.

Then they consider the effect of the two main procedures to mitigate the cyclical behavior of these requirements, namely: (i) smoothing the inputs of the Basel II formula, by using a through-the-cycle (TTC) adjustment in the PDs, or (ii) smoothing the output by using an adjustment of the Basel II final capital requirements computed from the PIT PDs (using macroeconomic variables, such as the rates of growth of GDP, of aggregate lending, or the returns of the stock market).

The results show that the best procedure is to use a simple multiplier of the Basel II requirements that depends on the deviation of the rate of growth of the GDP with respect to its long-run average. Specifically, the requirements would be increased in expansions (or decreased in recessions) by 7.2% for a one standard deviation change in GDP growth.

This chapter thus offers an interesting pragmatic solution to a key policy issue, namely how to introduce "macro-prudential" regulation into the Basel II philosophy. Since such macro-prudential regulation will have to be based on the macroeconomic specifics of each country (the business cycle in Spain, for example, being different from that in Germany, not to mention the US), it shows the way to go: identifying reasonably robust linkages between the state of the economy and the degree of solvency of banks, in order to provide buffers that will limit the procyclical effect of prudential regulation.

2.8 Credit Derivatives

In their chapter Hendrik Hakenes and Isabel Schnabel identify three key channels through which the credit default swaps (CDS) market has contributed to the crisis.

1. Concentration of counterparty risk: some financial institutions such as Lehman Bros or AIG were able to build up enormous risk positions, hidden from the eyes of regulators and their own shareholders. Efficient transfer of risk requires that they be transferred in a diversified way, held in reasonable proportions within diversified portfolios and in institutions able to absorb losses. This was clearly not the case. In practice, the main function of the credit derivative market was to allow institutions to engage in *regulatory arbitrage*.
2. Uncertainty and asymmetric information: the development of an active market for CDS has led to a complicated chain of linked exposures, as an institution may hedge one counterparty risk with another CDS. This complexity makes it impossible for a market participant to assess risk. Also, the legal status of the netted positions in case of default of one of the counterparties is unclear. The resulting uncertainty about banks' positions in the credit derivative market contributed to the disturbances in interbank markets. As the authors put it,

"instead of providing useful information, the opacity of CDS markets seems to have contributed to disruptions in interbank markets."

3. The CDS market contributed to the increase in "connectivity" of global financial markets. The collapse of a major dealer could potentially lead to severe domino effects, and - in an extreme scenario - to a complete unwinding of the CDS market.

The function of CDS is to reduce risk. Although this was apparent at the level of each individual institution, the overall impact of CDS has been to increase systemic risk. Because of the opacity of the credit derivative markets, neither market discipline nor the regulator could control the extent of risk.

The authors point out that 'naked' CDS - in which the purchaser does not own the underlying asset, but is simply betting that a firm or sovereign will default (or speculating on a rise in the market's estimate of the likelihood of default) - may create undesirable incentives. This would clearly occur if the buyer could influence the market assessment of credit risk or if widening CDS spreads themselves affected the health of the bond issuer. CDS allow investors to short debt without any restrictions. Banning naked CDS would prohibit such speculation and limit the purpose of CDS to hedging. The authors maintain, however, that speculation may yield useful information. In general, they prefer improvements in the infrastructure of CDS markets.

A natural policy recommendation here is to force all trades to go through an organized market. The authors carefully consider the three elements characteristic of organized markets: Transparency over exposures and netting, standardization, collateral and margin calls; and the existence of a centralized clearing counterparty. The centralized clearing counterparty would have to be subject to an *implicit government guarantee*.

Transparency over exposures would allow market discipline (and regulatory authorities in some cases) to penalize the excessive concentration of exposures. Switching to organized markets will have costs, particularly the opportunity costs of standardization and of holding eligible collateral. In addition, as mentioned by Brunnermeier and Pedersen (2009), margin requirements give rise to new risks, the most important being *funding liquidity risk*.

2.9 The Information Content of Credit Ratings

Marco Pagano and Paolo Volpin address the issue of why credit ratings have not been sufficiently accurate in the market for structured products. They argue that rating inflation and coarse information disclosure are the main reasons why trading on the basis of credit ratings has collapsed. The origin of the problem lies in conflicts of interest within the credit rating agencies (CRAs), since their clients are the issuers, who are directly interested in obtaining good ratings. Collusion between CRAs and issuers have led CRAs to disclose information on their models to their issuers, a measure partially promoted by the regulatory authorities themselves. This has led issuers to fine tune their packaging strategies so as to put together securitized assets that are just on the lower bound of the range of eligible AAA securities. Inflation in credit ratings might have been exacerbated by (i) the use of ratings by regulators, which confers an intrinsic value to ratings over and above their true ability to measure risk, (ii) the presence of naïve investors, whose number may have increased with the popu-

larization of finance in recent years, and ironically (iii) the increase in competition associated with the entry of Fitch, a third major Nationally Recognised Statistical Rating Organisation (NRSRO), as increased competition among the CRAs will lead them to provide issuers with more favourable ratings.

Information coarseness leads to market opacity, makes monitoring more costly and fosters adverse selection. The analysis of the typical prospectus for structured debt reveals that the quality of the information available to investors through the prospectus is quite limited. Notice that here information is coarse not only because of the low number of tranches, but also because only probabilities of default (PDs), not Loss Given Default (LGD) are provided. In addition, the models used by CRAs are based on assumptions of default correlation that are clearly underestimates in a downturn (Bemmelech and Dlugosz, 2008).

The question is then why information coarseness could be in the interest of CRAs, as this could limit the development of a secondary market. The answer provided by Pagano and Volpin (2008) is that limiting transparency at the issue stage shifts the adverse selection problem onto the secondary market. Thus, in choosing the degree of rating transparency, issuers effectively face a trade-off between primary and secondary market liquidity. In addition, information coarseness provides more opportunities for rating inflation.

The policy recommendations are, first, if feasible, to require that CRAs be paid by investors rather than by issuers (or at least constrain the way they are paid by issuers) and force greater disclosure of information about the underlying pool of securities. It will also be essential to prevent indirect payments by issuers to CRAs in the form of the purchase of consulting or pre-rating services.

Still, requiring that users pay for ratings leads to a number of well known complications, as there is a potential market for resale. This is why the authors suggest a second best policy related to the Cuomo plan, where "Credit rating companies should be paid an upfront fee irrespective of the rating issued and credit shopping (and paid advice by rating agencies to issuers) should be banned."

These more limited reforms may still be consistent with the current regulatory delegation of vast powers to a select group of CRAs. The authors believe, however, that their effectiveness in addressing the failures exposed by the current crisis is likely to be low. In contrast, an open-access, non-prescriptive approach by regulators, eliminating the NRSRO designation and the extensive 'hard wiring' of the CRAs in the regulatory system, would shift onto issuers and investors the burden of determining the pieces of information that are most relevant to evaluate the risk of each security, and would not run the risk of obsolescence. It would also reduce, instead of further increasing, the tangle of regulations in this area. This is an instance in which less regulation might also be safer and better regulation.

2.10 The Treatment of Distressed Banks

Mathias Dewatripont and Jean-Charles Rochet start from the observation that the current regulatory system is inconsistent because it has not attempted to harmonize the treatment of distressed banks. This stands in contrast with the efforts to harmonize capital ratios under Basel I and II. This harmonization has several significant flaws that must be addressed, but the idea of harmonized capital ratios is a sound one,

which should be extended to the treatment of distressed banks. This is a central issue, because of 'political economy' considerations: whether in good or bad times, supervisors always face pressure from lobbies and from politicians that undermine the proper functioning and stability of the financial system. There is therefore a cost in leaving the treatment of distressed banks vaguely specified or unspecified and therefore at the discretion of supervisors. Regulatory authorities need to be protected *ex ante* through a system of transparent rules. Of course, there is always a potential cost of such rules in terms of loss of flexibility. But the current system has clearly erred in the opposite direction. Dewatripont and Rochet offer a number of recommendations to move closer to a rule-based system that maintains some flexibility.

Dealing with *individual banks*, they argue that a harmonized special bankruptcy regime should be established for banks. This would involve US-style 'prompt corrective action': giving to the (independent and well-staffed) supervisory agency powers to limit the freedom of bank managers (and possibly remove them) and shareholders (and possibly expropriate them) *before* the bank is technically insolvent. Regarding the structure of regulation, they stress that, while consolidated supervision - bundling *ex-ante* monitoring and *ex-post* intervention - allows for cost savings and simpler coordination, it may reduce accountability. That can be countered by reducing discretion in terms of intervention by the supervisors (as in the US).

Finally, Dewatripont and Rochet argue for a limited number of simple indicators rather than highly sophisticated systems. The signals triggering intervention should be crude indicators of the risk of potential problems. Simplicity reduces manipulability and enhances transparency and credibility. Rather than a single, complex capital requirement, as in Basel II, they recommend relying on a battery of plain indicators, in order to provide simple signals of the various dimensions of banking risks (including liquidity and transformation risks, risks of large losses, exposure to macroeconomic shocks, ...). These would be used simultaneously to determine whether supervisory corrective action is needed.

Banking crises do happen, so Dewatripont and Rochet recommend explicit *ex-ante* provisions. This implies a coordinated mechanism (involving the central bank, the supervisor and the finance ministry) for declaring a crisis formally and triggering the release of public funds. Once in a crisis, undercapitalized banks may lack the incentives to be well managed. One should go for 'real' recapitalization, even if it is costly, rather than for low capital requirements. Maintaining adequate capitalization in bad times may have procyclical effects, however, as we see with current regulation. Avoiding this requires 'automatic stabilizers' in the regulatory system, such as higher capital ratios in good times, dynamic provisioning, capital insurance (privately or publicly provided), or procyclical deposit insurance premia.

Dewatripont and Rochet consider *international cooperation* in crisis management. For economic areas which are meant to be highly integrated, such as the EU, they recommend moving towards a centralized supervisor and a centralized deposit insurer. If one wants to keep integrating the world banking market, one should therefore also seriously consider partial centralization of supervision and deposit insurance at the global level. Without such centralization, it is important to foster best practices in establishing credible Memoranda of Understanding for cross-border banking crisis management between authorities that detail in particular the respective rights and obligations with respect to intervention thresholds and deposit insurance.

2.11 Corporate Governance

In the final chapter, Marco Becht stresses that the current crisis has brought to light classic examples of board failure on strategy and oversight, misaligned or perverse incentives, empire building, conflicts of interest, weaknesses in internal controls, incompetence and fraud. These corporate governance failures have not, however, followed a simple pattern. There have been problems at widely held banks, at banks with a large shareholder and at banks controlled by the state. There are robust banks and distressed banks with similar corporate governance arrangements. Equally there is no simple pattern across countries. Banks have collapsed in countries with weak shareholder rights and in countries with strong shareholder rights. Banks with weak governance have collapsed in one country, but banks with equally weak governance did not collapse in other countries.

Moreover, it is likely that systemic failure would have occurred even with perfect governance at the level of individual institutions.. Governance at the firm level did not take into account the systemic stability implications of selling or purchasing certain financial services. At the micro level it appeared that risk could be insured and lending expanded profitably. In many cases there was no agency problem at the firm level. Shareholders and boards encouraged executives to expand and leverage. Corporate governance at the firm level was never designed to internalize contributions to systemic risk.

Many non-bank institutions on the periphery of prudential regulation have contributed to the leveraging of the world economy. Pension funds and asset managers of all sorts purchased what turned out to be "toxic assets", either directly or by purchasing shares in institutions that did. Private equity firms drove up leverage in the corporate sector, with the consent of the buyout targets' shareholders and of their own investors. Central gatekeepers like credit rating agencies and analysts did not raise the red flag, for the reasons mentioned in Pagano and Volpin chapter. These developments pose new challenges for prudential regulation, which has traditionally focused on banks.

This diversity of experiences suggests that corporate governance failures have combined with regulatory failures in complex ways. This would explain why some banks within the same countries failed and others did not. It would also explain why some countries have avoided major bank failures while others could not. The failure to incorporate systemic risk into the corporate governance and incentive contracts of individual institutions amplified these problems. In many cases governance did not provide a failsafe means of offsetting regulatory failure.

This leads Becht to make several specific recommendations. First, on the corporate governance and prudential supervision of individual institutions: Banks need to recruit individuals of outstanding competence and integrity to run them, especially once they are recapitalized, nationalized or re-privatized. These individuals must be given appropriate pecuniary and non-pecuniary rewards to make themselves available and to succeed. The banks should follow the example of Union Bank of Switzerland (UBS) and conduct a detailed investigation of the sources of their write-downs and propose measures for their future avoidance to shareholders and regulators. The incentive contracts for executives must be analyzed at all levels, and perverse incentive schemes must be banned. Becht notes, however, the need to investigate the governance of regulators and the incentives they can provide for their staff

in parallel with the governance of financial institutions. Similarly, corporate governance failure at state-controlled banks in some G20 countries has undermined the credibility of government intervention in the banking sector. The corporate governance of state-owned or nationalized banks deserves special attention.

In order to build financial stability incentives into corporate governance structures, Becht makes an original proposal: the creation of an International Financial Stability Fund that takes equity positions in the financial institutions of participating countries and monitors their activities. The fund would have no controlling stakes but would act as a focal point for other institutional investors with significant influence. The fund could also provide the capital insurance recommended by Kashyap, Rajan and Stein (2008).

2. Global imbalances as the source of the crisis

2.1. The underlying problem in international finance over the past decade has been global imbalances, not greed, poor incentive structures, or weak financial regulation, however egregious and important these may be. The macroeconomic imbalances did *interact* with the financial sector problems. I pass by the debate whether the global imbalances and associated financial sector weaknesses could have been remedied gradually, without a crash, had Lehman Brothers not failed (as I believe). I simply argue here that global imbalances led to financial sector distortions, and avoiding the next crisis of this kind requires addressing them.

The Russian default of August 1998 and the LTCM near-death experience of September 1998 caused great instability in the financial markets. Fear was pervasive by the end of September, and in early October even the US Treasury market became illiquid briefly. The dollar fell by almost 15% relative to the yen in three days in October. There was a major spike in volatilities for almost all financial assets. In the major US banks, leverage was actually greater in 1998Q3 than in 2007Q3, and deleveraging in 1998Q4 went further than it has gone so far since autumn 2007.

But this 'crisis' had virtually no effects on the real economy. It was transmitted to Brazil, but even there, it was not a disaster. The major differences with the past six months are that there were no big global macroeconomic imbalances then (except perhaps for the weakness of the yen), and financial engineering had not yet developed the range of complex structured products we saw in 2005-07, nor were the banks holding such instruments in off-balance-sheet vehicles. I suggest that the global imbalances that built up in the past decade permitted and indeed stimulated the dysfunctional aspects of financial markets and instruments that are now troubling us. They brought low interest rates, the search for yield, high leverage in financial institutions, and an *excessive volume of financial intermediation*, which even the sophisticated American and British financial systems could not handle responsibly.

2.2. It is important to distinguish two separate features of the global imbalances:

- (a) The much greater *dispersion* of current accounts (absolute values). This puts a burden on financial systems to intermediate the large gross flows. In 1996, the US current account and emerging market plus developing country current account were each about zero. In 2008, the US current account was in deficit by \$ 600 bn, the emerging market/developing country current account in surplus by \$ 900 bn.
- (b) Capital flowing the 'wrong way', from developing countries and emerging markets to advanced countries. Both surplus and deficit advanced countries invest mainly in other advanced countries. And counterintuitively, developing countries with fast productivity growth show capital outflows, while those with slow productivity growth attract capital inflows (Gourinchas and Jeanne, 2008).

2.3. Much of the policy discussion has focused on the US deficit and the Chinese surplus, but the phenomenon of global imbalances is much broader. There are several other major advanced countries with large deficits (UK, Spain, Australia) and many Asian emerging market countries and (until recently) commodity exporters with large surpluses, as well as Japan and Germany.

This pattern and the data are well known (see Ferguson et al. 2007, Ch 3).

But until the crisis, the main concern seemed to be the potential rapid unravelling of imbalances and the associated risk of abrupt dollar depreciation. With the notable exception of the Bank for International Settlements, analysis seldom focused on the consequences of low real interest rates and the 'search for yield'; nor on the implications of global imbalances for financial intermediation in advanced countries. The latter turns out to be most important. In fact, the classic 'sudden stop' crisis (for the US), a reversal of capital flows, is the only one that has not happened! There is no dollar crisis (yet). The major exchange rate move so far is large yen appreciation, despite a 'flight to quality' into US Treasuries, with perhaps a new bubble there, and the dollar has appreciated significantly relative to the euro since its low.

2.4. In regard to financial intermediation, before autumn 2007 much attention focused on volatilities in advanced country foreign exchange, bond and equity markets, asking why they had been so low from mid-2004 onwards and considering the risks that rise in volatilities would pose. Global imbalances played a significant role in the fall of volatilities: they contributed strongly to a sharp rise in the volume of financial transactions and to a major increase in global liquidity, both of which brought lower volatilities. Moreover, low volatilities, together with lower and more stable inflation and low interest rates, led to the 'search for yield' that brought many of the financial excesses. The rise in volatilities since August 2007 has in turn been a significant part of the financial turmoil, although the volatility spikes were not extreme relative to historical experience until 15 September 2008. But before then, the rise in volatilities had killed the carry trade, with effects from Iceland and Turkey to the yen.

2.5. Two main stories appeared, however, to justify the pattern of capital flows that we have called imbalances. They saw the imbalances as a sustainable equilibrium. The first was the 'Bretton Woods II' argument (Dooley et al., 2003) that several major developing and emerging market countries, in particular China, were deliberately maintaining undervalued exchange rates as part of an export-led growth strategy – in the Chinese case, intended to absorb surplus labour coming out of agriculture. They were willing to invest the resulting foreign exchange reserves in the United States, and this 'vendor finance' could continue for a decade or more. *But this analysis misunderstood the rationale for trade surpluses: those surpluses were intended to build up precautionary reserves to deal with 'sudden stops' in capital flows, and policy-makers in the developed countries and international agencies encouraged this.* The effect may be the same, but the interpretation of imbalances and their policy implications are totally different. 'Excess' reserves safeguard against both 'sudden stop' and flight by domestic savers (when no capital outflow controls). The Bretton Woods II story was also too focused on China; it put excessive emphasis on exchange-rate policy; and it included odd views about foreign exchange reserves serving as 'collateral' for FDI coming from the US (so the US could expropriate those reserves in the case of foreign expropriation of FDI).

Caballero et al. (2007) posit a global 'shortage of reliable and tradeable assets', collateralisable assets. This shortage was a particular problem for the countries with excess savings and undeveloped financial markets. They were constrained to buy US

assets, because of the unparalleled breadth and depth of US financial markets and the abundance of appropriate financial instruments. Mendoza et al. (2007) stressed the asymmetry in financial market development. Both versions gave a rationale for an equilibrium transfer of capital from the excess savings countries to the low-savings advanced countries, especially the US. But this interpretation does not fit the patterns of capital flows.

- (a) Surplus country savings went into *all* advanced country financial assets, with a wide range of quality.
- (b) No one now believes in the exceptional quality of US private sector financial assets or intermediaries. Indeed, it is now abundantly clear that not only the Asian countries have difficulties with financial intermediation. But the capital inflow to the US continues, along with the current account deficit.
- (c) US *gross* capital outflows are very high – primarily to other advanced countries
- (d) Gross flows to the US did not come primarily from the private sector (before 2008), but rather mainly from foreign central banks (supposedly themselves intermediating on behalf of their savers). Recently central banks (except for the Peoples Bank of China) have apparently stopped buying Treasuries, but the foreign private sector is now doing so.

Moreover, the pattern was not benign. The inflows did not finance US investment, but rather consumption and government deficits. Nor did the process channel emerging market savings into emerging market investment projects – instead, a lot covered the US current account deficit, the rest went mainly through the US to advanced country markets.

Both of these interpretations of global imbalances – which do not really regard them as imbalances in the sense of disequilibria – ignore the stresses that the massive capital inflows created for financial intermediation in the US and other advanced countries. Neither story addresses the key questions about global imbalances going forward. In the light of the crisis and policy responses to it, can the US deficit continue – or will a collapse in trade go with rise in US savings, fall in investment, and a major recession? The rise in US government deficits goes in the opposite direction – but how will that be financed, by domestic or foreign investors? Indeed, what foreign investors, if commodity prices stay low and Asian surpluses fall? I address these short-run questions below.

2.6. Global imbalances, in particular the 'savings glut' (see below), together with loose monetary policies in the US and some other advanced countries, are the prime suspects as the cause of low real interest rates and consequently the search for yield. Globally, after 2000, the IS curve shifted to the left, and the LM curve shifted to the right (so both downwards). Global liquidity rose sharply, partly because of the monetary effects of reserve accumulation. Output was maintained at low interest rates. But interest rates were not in fact exceptionally low – compare the 1970s, when ex post real interest rates on sovereign borrowing were negative 1-2%. It was much remarked, however, that when US short rates went up, long rates did not (the 'Greenspan conundrum'). That was partly because of the increase in foreign central banks' demand for Treasuries and US agency securities, a consequence of the global imbalances.

The difference with the 1970s is *financial deregulation*. So is that the problem? Yes, insofar as elimination of capital controls and the advances of financial innovation permitted (financed) current account imbalances. But 'financial excesses' are as old as financial markets. Just because they became based on securities rocket science and ratings agency failures does not make the various manifestations of 'greed' new. So yes, we do need better regulation, but we should not imagine that will suffice unless we deal with the global imbalances. Yes, there was excessive leveraging, but deleveraging alone will not bring conditions sufficient for recovery. On the other hand, preventing excessive leveraging in future should help to reduce the global imbalances (see below).

2.7. Is the problem flows or stocks, the latter issue being the 'sustainability' of debt burdens, domestic as well as foreign? In fact, US net foreign debt did not rise in the period 2002-2007, because of valuation effects, although preliminary data suggest it did rise substantially in 2008 (Milesi-Ferretti, 2009). But the stocks of domestic debt will now rise substantially in the advanced countries. Although I shall not discuss sustainability (see Buiter's essay in this book), I shall consider how this relates to global imbalances. I also look at flows, which create problems for financial intermediation.

Current account imbalances are real imbalances. Exchange rate adjustment may be necessary but certainly not sufficient to reduce them.

We focus on net savings, i.e., savings minus investment. A well-known interpretation, related to those in Sec. 2.5 above, is the 'savings glut' story (Bernanke 2005). But this is oversimplified and asymmetrical. A savings glut in one region must have as a counterpart excess domestic demand in another, and unless one can demonstrate a causal relationship, it is not helpful to represent the former as prior.

Of course US net savings equals rest of world net investment. From the beginning of the decade, rest of world net investment did fall (with both investment down and savings up). But even this is not straightforward, since investment actually rose substantially in China, though it fell elsewhere in Asia. Chinese savings rose even more, however, from corporates as much as households. On the other hand, US net savings fell – there was both a credit-fuelled rise in household consumption and a fall in government saving due to tax cuts and rising expenditure, much of it war-related.

The US could grow without saving because of Asian finance (partly due to the international currency status of the dollar). Once we emerge from global recession, it is unlikely that this could continue.

3. Concerns looking forward

3.1. There are major unresolved macroeconomic issues. Fiscal stimulus in the advanced countries (both US and Europe) will generate a very large increase in net government debt issuance – a major asset supply shock. Who will absorb this debt? If it is to be domestic financial markets, then interest rates must rise, at least at the long end of the yield curve. Then we can envisage an increase in savings and possibly some fall in private investment, which could permit reducing current account deficits. In the medium run this is desirable: households should reduce their indebtedness, and

dealing with global imbalances requires raising savings in the advanced countries with current account deficits.

If real interest rates must rise, however, and if there is a zero interest rate policy, then there may be deflationary pressures as well as a sharp steepening of the yield curve. The deflationary impulse would be dangerous, as it could lead to Fisherian debt deflation. Alternatively, the domestic central banks could buy the government debt, as part of quantitative easing. Or foreign central banks and sovereign wealth funds buy the government debt, and we have 'twin deficits'. But inducing foreign investors to absorb this debt will require some combination of higher interest rates and exchange-rate depreciation. So the dollar, the euro, and sterling all fall in that scenario, while long rates rise.

Depreciation creates a potential inflationary pressure. This might be welcome, in limited measure: real rates fall, the burden of debt is somewhat eroded, and the depreciations facilitate current account adjustment, that is, a reduction in the global imbalances. To assess these scenarios, see the essays by Gerlach and Ito in this volume. The experience of the 1930s and of Japan in the 1990s may be relevant.

3.2. The markets indeed fear that the US might want to devalue or inflate its way out of crisis. Many G20 policy-makers fear that capital will be pulled out of emerging markets into the government bond markets of developed countries running large fiscal deficits. Could that provoke emerging market country defaults? Interest rates are low, but commodity prices are down, and it is harder to grow out of a debt crisis in a global recession.

3.3. This leads us to ask whether the rest of the world can do without US deficits. Is the major global imbalance not destabilising, but rather necessary? This breaks down into two questions. First, where will the 'replacement' demand come from? The answer is clear: it must be from *a rise in domestic demand in the surplus countries, achievable only if they are willing to expand and accept a fall, perhaps a reversal, of their current account surpluses* (see below). Second, where will international liquidity come from? This is not in fact a problem: the issuer of the main international currency (world banker) need not run current account deficits. It can instead just borrow short and lend long, as the UK did under the gold standard (while running large current account surpluses).

3.4. And will we eventually see the oft-foretold dollar crisis (as in Krugman 2007)? The safe haven effect will not last, short-run private inflows will turn around, and foreign central banks are unlikely to step in (partly because their surpluses are falling). So this is a real possibility still.

4. Policies

4.1. The key desiderata are clear.

- Limit both global imbalances and financial fragility.

- Avoid reversing financial development and financial integration.
- Avoid financial repression.
- But limit crises.
- Get capital flowing from advanced countries to emerging market and poor countries. So reduce emerging market surpluses, even go to deficits. But then we must assure the emerging market countries that they can safely accept current account deficits – i.e., that the international financial system and institutions will insure them against sudden stops.

4.2. Where financial regulation and global imbalances intersect directly: Limit borrowing and leverage of financial institutions. That is, limit the increase in balance sheets of systemically important financial institutions (balance sheets of intermediaries) to below the increase in the fiscal capacities of host governments. That is not specifically external assets, but such a constraint would naturally limit the increase of external assets, because the institutions cannot expand their balance sheets much by relying exclusively on domestic capital markets (that would drive up interest rates). So this proposal is directly linked to global imbalances. The institutions could not have expanded leverage without borrowing from abroad, which kept interest rates low and permitted leveraging up.

4.3. Control currency mismatches. One proposal made several years ago by Anne Krueger (2000) should be resurrected. Advanced countries could require that their financial institutions accept liabilities abroad only in the currency of the borrower. Alternatively, borrowing countries could make foreign currency obligations incurred by domestic firms and households unenforceable in their courts.

4.4. There are cogent arguments for countercyclical capital controls – on inflows in boom, on outflows in recession. This does suppose that there will be periods of significant inflows. As recent Chinese experience suggests, capital controls are often porous, but they still have some effect.

4.5. Most important, perhaps, is that the international financial system should provide *credible insurance* to countries that forego further reserve accumulation. With recent experience in mind, that will require some conviction and serious insurance schemes. After all, the emerging market countries might reasonably think now that they need even more precautionary reserves! The three avenues for this are:

- (a) central bank swap lines – with the Fed, ECB, BoJ, and among the emerging market countries themselves (as in the Chiang Mai initiative – but these would have to be on much larger scale and more automatic)
- (b) more ambitious 'reserve pooling' arrangements – would it be possible to go beyond swaps on a large scale? There are serious political obstacles here, but with some imagination and commitment, they might be overcome. The IMF looked carefully at the issues in 2006-07.
- (c) the IMF – we have proposed a 'lender of first resort' scheme (Cohen and Portes, 2006), and there are other 'insurance' proposals that avoid the pitfalls of the ill-fated contingent credit line.

4.6. For the longer run, the emerging market countries do need much greater financial development and effective domestic financial intermediation. This partly comes from international financial integration, so we should not want to limit that except in circumstances where it might have the potential to be seriously destabilising. These countries also need to be able to borrow in their own currencies – despite the 'original sin' view, this has proved to be possible (cf. Brazil). Domestic bond markets, however, need substantial domestic investors – pension funds, insurance companies, asset managers.

4.7. An addendum: in some policy discussions and comment, there has been emphasis on exchange rates, both swings and misalignments, as part and parcel of global imbalances. But although exchange rate stability is desirable, we are not going to get it among the key currencies. We cannot specify equilibrium exchange rates so as to get an agreed basis for policy (the IMF has three different models which typically give a fairly wide range of answers). Nor could an agreement be implemented – 'reference rates', 'grids' are all unreliable and unenforceable without effective capital controls (although occasional intervention might be useful). If that is what IMF surveillance focuses on, it will just be ignored or discredited. A useful policy in this domain would be to encourage smaller currencies to go into currency unions with large ones (euroisation could have made a great difference for Iceland).

References

- Caballero, R., E. Farhi, and P.-O. Gourinchas (2008), 'An equilibrium model of 'global imbalances' and low interest rates', *American Economic Review*.
- Cohen, D. and R. Portes (2006), 'A lender of first resort', CEPR Discussion Paper no. 4615, 2004. Revised version as IMF Working Paper WP/06/66, March 2006.
- Dooley, M., D. Folkerts-Landau, and P. Garber (2004), 'The Revised Bretton Woods System,' *International Journal of Finance and Economics*, 307-313.
- Ferguson, R., et al. (2007), International Financial Stability, CEPR and ICMB.
- Gourinchas, P.-O., and O. Jeanne (2008), *Capital Flows to Developing Countries: The Allocation Puzzle*.
- Krueger, A. (2000), 'Conflicting demands on the International Monetary Fund', *American Economic Review Papers and Proceedings*.
- Krugman, P. (2007), 'Will there be a dollar crisis?', *Economic Policy*, July.
- Mendoza, E., et al. (2007), 'Financial integration, financial deepness, and global imbalances', CEPR Discussion Paper no. 6149.
- Milesi-Ferretti, G.-M. (2009), 'A \$2 trillion question', *VoxEU.org*.

The Global Crisis and Capital Flows to Emerging Markets

Philip Lane

IIS, Trinity College Dublin and CEPR

Introduction

The traditional approach to analysing capital flows to emerging market economies has been to distinguish between push and pull factors. The former refers to factors relating to conditions in the major financial centres which affect the propensity of global investors to allocate funds towards the emerging markets asset class, while the latter refer to the fundamentals in the host economies that affect the expected return and volatility on investment.

In truth, both types of factor are at play during any given episode but their relative weights vary substantially over time and across countries. During the 1980s, the initial negative push factor of the increase in dollar interest rates during 1981-1982 helped to trigger the Latin American sovereign debt crisis. However, negative pull factors (macroeconomic instability, inward-looking policies) prolonged the lost decade. In turn, the resumption of capital flows to emerging market economies in the early 1990s was in part facilitated by the low dollar interest rate associated with the US recession. However, there were also many positive pull factors, due to the attainment of macroeconomic stabilisation and the adoption of more liberal and reformed policy packages.¹

The three major crises emerging market financial crises during 1994-1998 also exhibited different mixes of push and pull factors. While the sharp rise in US interest rates during 1994 doubtless contributed to the Mexican crisis, the main factors related to concerns about the scale of the current account deficit and domestic political uncertainty. Negative pull factors (fears of current account sustainability, banking stability and investor protection) were to the fore in the origins of the 1997-1998 Asian financial crisis, even if these were compounded by contagion effects and fickleness on the part of international investors. Similarly, the proximate cause of the 1998 crisis was the negative pull factor of the Russian default. However, its transmission around the world was driven by negative push factors, with the retrenchment of global investors, especially in the aftermath of the LTCM collapse.

The past decade has seen a transformation in the external financial profile of the

Author's note: I am grateful for useful comments from the conference participants, especially the session discussants Rakesh Mohan, Jeyoon Shin, Ousméne Mandeng and Stephen Pickford. Agustin Benetrix, Christiane Hellmanzeik and Peter McQuade provided helpful research assistance. I am especially indebted to Kevin Daly for his help in sourcing data.

1 See Calvo et al (1996) for an account of this episode.

emerging market economies. With the exception of Central and Eastern Europe, the scale of net foreign liabilities fell in many emerging market economies, levels of reserves were improved and alternatives to foreign-currency debt financing were developed. With stronger fundamentals in other emerging market economies, the 2001 Argentina crisis was not widely transmitted across this group of countries, primarily adversely affecting only its close neighbour Uruguay. Similarly, the 2001 Turkish crisis was largely contained in terms of its international impact.

Moreover, the willingness of global investors to remain invested in other emerging market economies also indicated that the sophistication of this asset class had improved, with a deeper pool of investment analysts better able to discriminate across economies with very different fundamentals. Accordingly, there were grounds for hope that any future crises that would be triggered by negative pull factors in specific economies might not unleash the contagion forces that played a role during earlier crises.

The positive pull factors that have operated over the past decade have been reinforced by positive push factors. In particular, the low interest rates in the core financial centres during 2001-2006 and the compression of spreads between low-risk and higher-risk domestic securities increased the perceived attractiveness of investing in emerging market economies in the search for yield. The boom in commodity prices acted as another positive development for those emerging market economies that were positive net exporters of commodities.

Symmetrically, emerging market economies are negatively affected by the current global financial crisis by the reversal of these positive factors. The severe problems in the major financial centers represent a negative push factor, in the sense that financial crises in these core markets have led to several mechanisms by which capital is pulled back from foreign markets. In particular, risk aversion has increased such that the spread between low-risk and higher-risk securities have widened. Moreover, investment institutions are seeking to liquidate assets, in order to improve liquidity, reduce leverage ratios and satisfy redemption and margin calls. In terms of negative pull factors, the global recession hurts the short-term growth prospects of export-orientated emerging market economies, while the collapse in commodity prices is a further blow to net commodity exporters. Accordingly, the emerging market economies now face a much harsher external financial environment.

The structure of the rest of this paper is as follows. In Section 2, I outline some conceptual issues in thinking about capital flows to emerging market economies. Section 3 reviews recent empirical trends in the international financial integration of emerging market economies. I turn to the impact of the global financial crisis in Section 5, while the major policy challenges are discussed in Section 6. Finally, Section 7 offers some concluding remarks.

Some conceptual issues

In keeping with the distinction between push and pull factors, the academic literature has paid considerable attention to both dimensions. In relation to positive and negative pull factors, the greater vulnerability of emerging market economies to cap-

ital flow reversals has been attributed to a number of factors. First, there is a significant risk of re-offending in terms of default: the historical incidence of default has been a good predictor of default probabilities in recent decades (see, amongst others, Reinhart and Rogoff 2004). Second, less-developed economies tend to be more volatile in terms of economic performance. In part, this can be explained in terms of the composition of industrial structure and, in some cases, a greater reliance on primary commodities for export revenues.

However, it is also case that it is just more difficult to make trend output projections for countries that are far from the frontier (Aguilar and Gopinath 2007). While the output growth of leading-edge economies such as the United States is bounded by the rate of global technological progress, a less-advanced economy has the potential to grow very quickly if it has the right combination of good policies and good luck. Equally, by the nature of the institutional limitations that explain why countries have not already joined the group of advanced economies, there is considerable scope for an economy to experience a downward slide in its relative economic standing. Accordingly, foreign investors may react with considerable elasticity to perceived shifts in the potential economic performance of an emerging market economy: good news stories may stimulate a capital inflow windfall, while bad news may trigger a major reversal.

This fragility has historically been compounded by the traditional external funding mechanism for developing countries. In particular, until recent years, external liabilities typically took the form of foreign-currency debt. Accordingly, negative economic events that induce currency depreciation lead to a deterioration in balance sheets, which amplifies the impact of the bad news.² Accordingly, a negative shock of the same magnitude that hits both an advanced economy and an emerging market economy has a more severe negative impact on the latter, such that capital may flow out more quickly.

A further amplification mechanism is provided by the historical tendency towards procyclical fiscal policies in many emerging market economies. Under this pattern, governments boost public spending and cut taxes during booms, only to be forced into fiscal contractions during downturns.³ This destabilising pattern provides an additional reason why foreign investors may flee at the first signs of a deterioration in economic performance.

The reliance on foreign-currency debt has been termed original sin to connote that this may be an intrinsic feature of the capital market environment that faces emerging economies (see the contributions contained in Eichengreen and Hausmann 2005). However, it is important to emphasise that the external balance sheets of emerging market economies have been radically restructured over the last decade. While domestic-currency foreign borrowing remains extremely limited, the share of non-debt instruments (FDI and portfolio equity) in total foreign liabilities has climbed. In addition, the gross foreign asset position has expanded, much of which is held in the form of liquid foreign-currency assets (official reserves, private-sector

2 There are many models of this balance sheet effect. See Devereux et al (2006) for a recent example.

3 There is a considerable debate as to whether this pattern can be attributed to pro-cyclical sovereign access to credit or to distortions in the political system that disable governments from operating counter-cyclical fiscal policies.

liquid assets). Finally, the net foreign asset position of most emerging market economies is much less negative than in the mid-1990s (with the major exception of the Central and Eastern European economies). We describe these trends in more detail in the next section but their overall impact should be to reduce the vulnerability of emerging market economies to dislocations in international financial markets.

Turning to negative push factors, an adverse shift in the financial markets of the advanced economies negatively affects capital flows to emerging market economies through several channels. First, a decline in advanced-economy financial markets may be associated with projections of a slowdown in advanced-economy output growth. This negatively affects the emerging market economies through the trade channel, especially for those emerging markets that pursue export-orientated growth strategies that rely on the advanced economies as a primary source of demand. Second, an increase in investor risk aversion tends to be general in nature, with higher-risk domestic corporate debt and emerging-market instruments grouped together as investors switch into the most liquid and safest domestic assets.⁴ Third, even if professional asset managers do not downwardly revise return projections for emerging markets, these may be forced to sell positions in order to meet redemption calls from clients or improve liquidity. Fourth, even if there are zero direct financial linkages, a common analysis channel may exist by which shifting views of equilibrium asset prices in the advanced economies are also adopted by domestic investors in emerging market economies. Since the size of domestic financial markets has expanded over the last decade, the negative wealth effect from domestic asset prices declines is now potentially much larger compared to previous crisis episodes.

This dynamic is compounded for highly-leveraged institutions, since declines in the value of other holdings trigger margin calls and the forced sales of otherwise-sound assets. A similar mechanism operates in relation to bank claims. These forces operate more intensely, the greater the degree of leverage in the portfolios of the investor institutions (Krugman 2008). Accordingly, the liquidity premium that has characterised the current global financial crisis may exert an especially powerful negative push factor on capital flows to emerging market economies. An international bank that must write down impaired assets in its advanced-economy operations may be compelled to call in loans to emerging-market clients simply to rebuild capital adequacy ratios.

McGuire and Tarashev (2008) provide evidence that the level of foreign bank claims in emerging market countries is indeed influenced by funding conditions in the interbank markets of the advanced economies and by the general health of the advanced-country banking systems.⁵ Similarly, Chapter 4 of the IMF's October 2008 Global Financial Stability Report reports econometric estimates that shows that equity prices in emerging markets are systemically linked to advanced-country factors such as measures of global excess liquidity, the credit risk premium (the level of the 10-year U.S. dollar swap spread) and the market risk premium (the implied volatility of the S&P 500 index [VIX]).

4 The econometric model of Felices and Orskaug (2008) confirms the importance of factors such as US high-yield spreads in determining the volume of capital flows to emerging market economies.

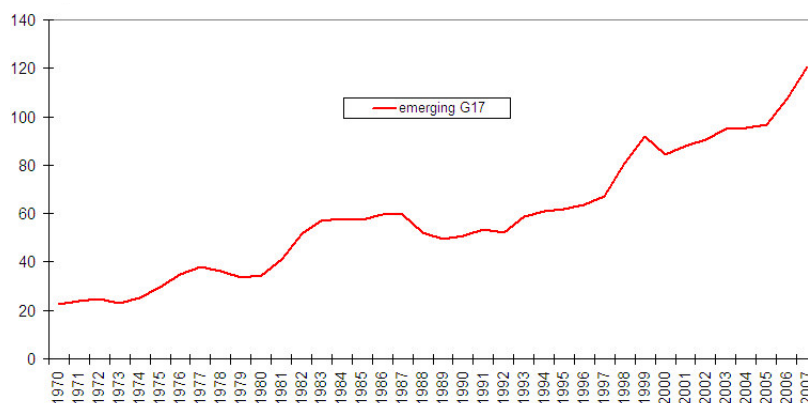
5 The McGuire-Tarashev study also reviews the earlier empirical contributions on this topic.

In summary, the historical evidence indicates that emerging market economies are highly vulnerable to directional shifts in international capital flows, with a tightening of credit conditions in the major financial centres leading to a pull-back from the emerging markets. Moreover, the vulnerability is compounded by fiscal pro-cyclicality during boom periods and the reversal in capital flows is often associated with substantial economic distress.⁶ In relation to the current global crisis that began in Summer 2007, the major open question has been whether the steps taken by emerging market economies to self-insure has enabled this group to avoid the worst of the crisis. We return to this issue in subsequent sections of this paper but next describe the patterns in international capital flows in the period running up to the current crisis.

Recent empirical trends

Figure 1 shows the degree of international financial integration of the major emerging market economies has trended upwards over time, where the IFI index is the sum of foreign assets and foreign liabilities expressed as a ratio to GDP.⁷ As is analysed by Lane and Milesi-Ferretti (2008a), the level of international financial integration remains far below that exhibited by the major advanced economies. However, it is much higher in terms of gross positions than was the case during previous crisis episodes in the 1980s and 1990s. The scale of gross positions grew rapidly over the last five years, which was mainly generated by an acceleration in gross capital flows.

Figure 1. International Financial Integration Ratio (5 of GDP)

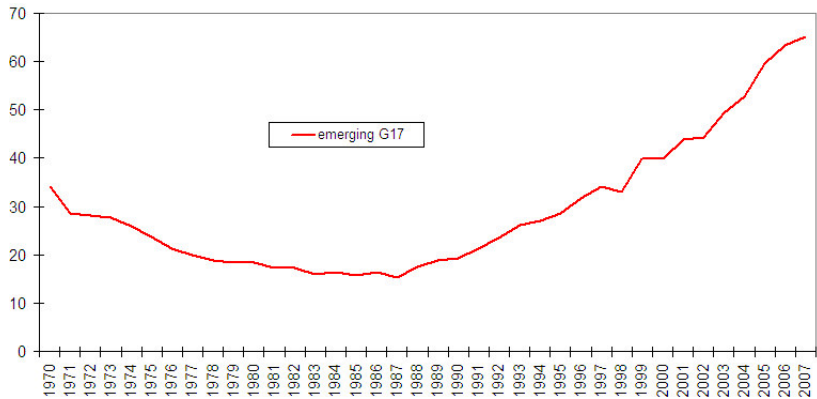


Source: Based on updated version of dataset developed by Lane and Milesi-Ferretti (2007).

6 See Reinhart and Reinhart (2008) for a comprehensive empirical study of the behaviour of emerging market economies during and after capital flows 'bonanza' episodes.

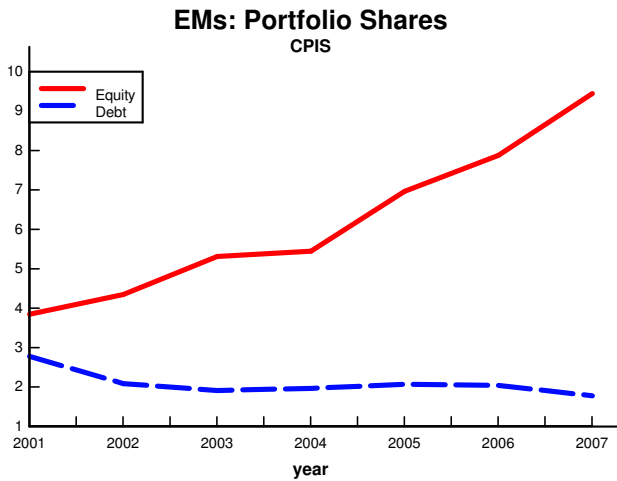
7 In what follows, the group of major emerging market economies typically comprises the following members of the G20: Argentina, Brazil, Mexico, India, Indonesia, China, Korea, South Africa, Saudi Arabia and Turkey.

Figure 2. Equity Share in Foreign Liabilities (% of total liabilities)



Source: Based on updated version of dataset developed by Lane and Milesi-Ferretti (2007).

Figure 3. Portfolio Allocations to Major Emerging Markets



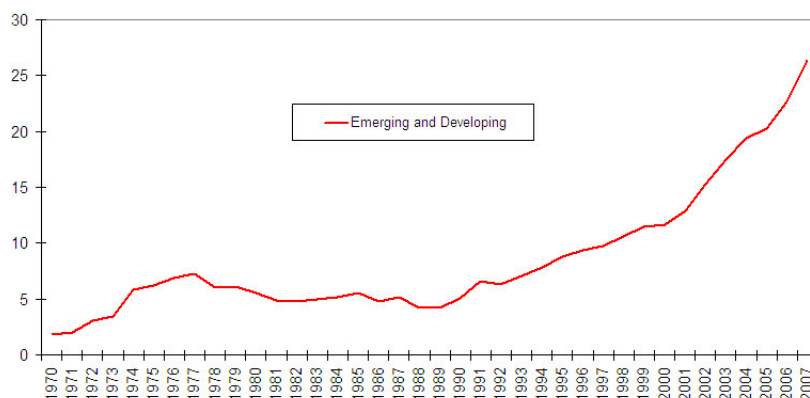
Source: Based on updated version of dataset developed by Lane and Milesi-Ferretti (2007).

Note: Portfolio holdings of major investor nations(US,UK,EuroArea,Japan) in selected emerging markets(Argentina, Brazil, Mexico, Turkey, SouthAfrica, Russia, Saudi Arabia, India, Indonesia, China, Korea). Source: Author's calculations based on IMF's Coordinated Portfolio Investment Survey.

In addition, rising global asset values increased the scale of balance sheets relative to GDP. Accordingly, in terms of gross cross-border positions, the emerging market economies were much more integrated into the global financial system at the onset of the current global crisis.

As was noted in the previous section, the composition of the international investment position of emerging market economies underwent a major shift. A major trend has been the growing importance of FDI and portfolio equity as a source of finance (Figure 2). This has been a positive development in terms of risk profile, since the foreign investor absorbs the risk of state-contingent returns on these positions.

Figure 4. Foreign Exchange Reserves (% of GDP)



Source: Based on updated version of dataset developed by Lane and Milesi-Ferretti (2007).

We can gain further insight by inspecting the scale of the portfolio holdings by advanced-economy investors that are located in the major emerging market economies. Figure 3 expresses these holdings in terms of their weight in the total international portfolios of the major investor nations. We observe the increasing importance of emerging market destinations in portfolio equity assets, while these countries are much less important in international portfolio debt holdings.

Figure 4 shows that the risk profile has been further improved by the rapid growth in foreign-exchange reserves, which have increased from 5 percent of aggregate GDP in the 1980s to over 25 percent by 2007.⁸

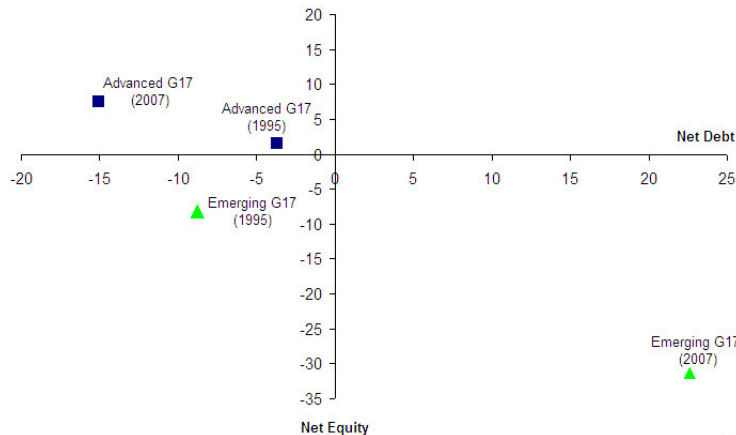
Taken together, these trends have led to a striking shift in the international configuration of portfolios.⁹ Figure 5 shows that the major emerging market economies have shifted from a position in 1995 in which these countries were both net debtors and net recipients of equity investments to a profile in which a much larger negative net equity position is nearly matched by a very large long position in foreign debt holdings. The mirror-image trend is evident for the major advanced economies, which increased their long position in foreign equity while also taking on a larger short position in foreign debt.

The transformation of the external financial profile of emerging market economies also included a major reduction in net foreign liabilities (Figure 6). This was achieved by a sustained period of running current account surpluses (Figure 7). While the long-term allocative efficiency of capital running uphill may be open to question, it should have reduced the vulnerability of emerging market economies to capital flow reversals, since the net external position has been a historical predictor of the incidence of crises.

8 There is a rapidly-growing literature that seeks to explain the determinants of reserve accumulation. The recent study by Obstfeld et al (2008) highlights financial development as a driver of external reserves, in order to offer investors protection against the risk of a double drain. See also the recent analysis in ECB (2009).

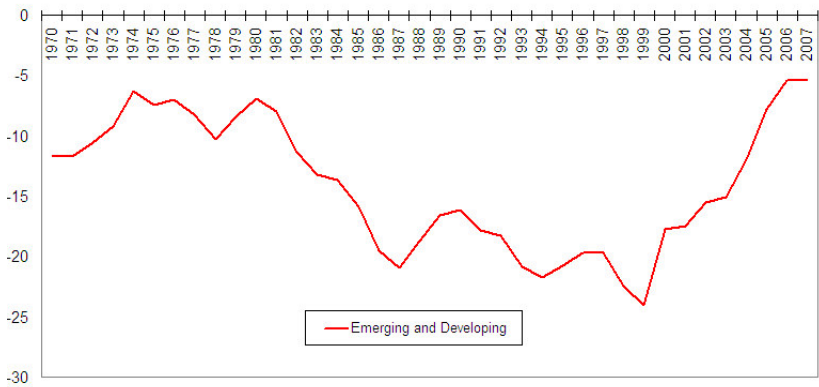
9 See also the analysis in Lane and Milesi-Ferretti (2007a).

Figure 5. Composition of External Balance Sheets



Note: Advanced G17 comprises US, UK, Euro Area, Japan and Canada. Emerging G17 is group of major emerging market economies. Source: Author's calculations based on updated version of dataset compiled by Lane and Milesi-Ferretti (2007a).

Figure 6. Aggregate Net Foreign Asset Position of G17 Emerging Market Economies (% of GDP)



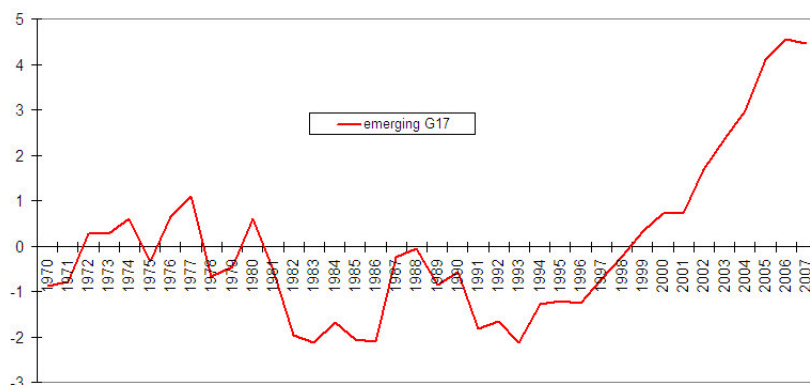
Source: Author's calculations based on updated version of dataset compiled by Lane and Milesi-Ferretti (2007a)

The impact of these shifts in external capital structure has been to transform the aggregate foreign-currency position of emerging market economies. Lane and Shambaugh (2008) have developed an index of the foreign-currency exposure that is embedded in a given level of foreign assets and foreign liabilities. This FXAGG index has the range (-1,1) where a country that has only foreign-currency liabilities and zero foreign-currency assets would score the value -1, while a country with zero foreign-currency foreign liabilities and all of its foreign assets denominated in foreign currencies would score the value 1. Table 1 shows the FXAGG index has become much less negative for most major emerging market economies and indeed is substantially positive for a number of countries. For this latter group, the depreciation of the domestic currency would actually generate a positive balance-sheet effect, since the capital gain on its foreign-currency assets would exceed the capital loss on its foreign-

currency liabilities.

At one level, this general reconfiguration may be viewed as involving a major risk transfer from the emerging markets to investors in the advanced economies. In turn, this should be welfare improving to the extent that investors in the higher-income economies with more developed financial systems should be better equipped to manage risk. However, the build up in large two-way gross positions also meant that failures in risk management and illiquidity problems in the advanced economies would be transmitted quickly to counterparts in the emerging market economies.

Figure 7. Current Account Balance of G17 Emerging Market Economies (% of GDP)



Source: Author's calculations based on updated version of dataset compiled by Lane and Milesi-Ferretti (2007a)

Table 1. Foreign Currency Exposures

	FXAGG										
	ARG	BRA	CHN	IND	IDO	KOR	MEX	RUS	S.Ar.	S.Af.	TUR
1995	-0.01	-0.13	0.15	-0.48	-0.56	0.00	-0.32	-0.02	0.59	0.02	-0.42
1996	0.01	-0.13	0.19	-0.42	-0.48	-0.05	-0.25	0.06	0.64	0.05	-0.38
1997	0.02	-0.17	0.26	-0.36	-0.55	-0.11	-0.20	0.13	0.58	0.10	-0.34
1998	-0.01	-0.24	0.31	-0.33	-0.52	-0.01	-0.22	0.01	0.48	0.20	-0.36
1999	0.02	-0.21	0.33	-0.27	-0.46	0.04	-0.20	0.06	0.48	0.27	-0.32
2000	0.02	-0.19	0.38	-0.21	-0.47	0.15	-0.15	0.17	0.54	0.31	-0.38
2001	-0.06	-0.17	0.37	-0.16	-0.46	0.15	-0.08	0.19	0.58	0.31	-0.34
2002	-0.08	-0.18	0.41	-0.07	-0.40	0.16	-0.09	0.24	0.63	0.29	-0.32
2003	-0.05	-0.12	0.43	0.03	-0.35	0.19	-0.09	0.22	0.66	0.33	-0.30
2004	-0.03	-0.05	0.43	0.07	-0.33	0.24	-0.06	0.23	0.72	0.34	-0.24

Note: Based on dataset developed by Lane and Shambaugh (2008).

The impact of the global financial crisis

Although the epicenter of the global financial crisis has clearly been in the financial systems of the advanced economies, the emerging markets have been substantially affected by the crisis. The most timely evidence is in terms of asset prices. Figure 8 shows that most of the major emerging market economies have experienced substantial currency depreciation against the US dollar, albeit with the major exception of China. The decline in demand for emerging market bonds is evident in the sharp decline in the JP Morgan emerging market bond index during 2008, even if it has rallied to some extent in the most recent period (see Figure 9). Similarly, equity returns in emerging markets have been very negative, as is shown in Figure 10. In addition to the asset market data, activity indicators are now emerging that show severe declines in exports and deceleration in output growth in the last quarter of 2008.

Figure 8. Currency Depreciation. 30/6/2007 to 31/12/2008

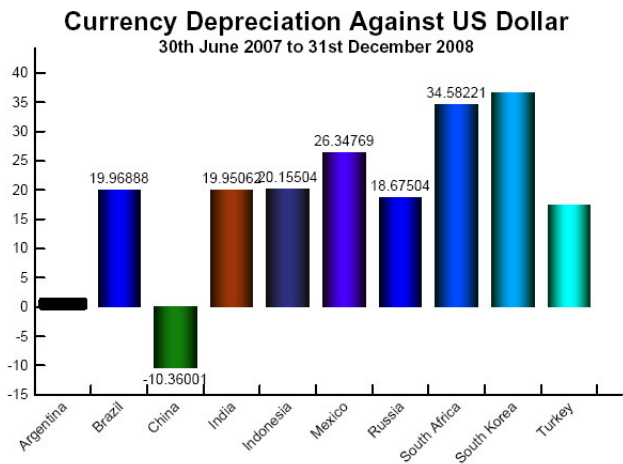
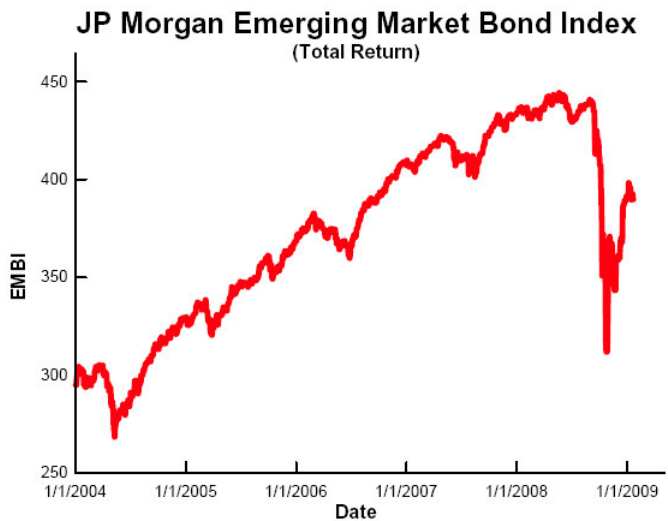


Figure 9. EMBI Total Return Index



It should be acknowledged that full impact of these asset value declines has been mitigated by several factors. For those emerging market economies that are long in foreign-currency assets, currency depreciation per se confers a valuation gain. Moreover, the short position of emerging markets in equity instruments means that the global decline in equity values further improves the net foreign asset position of these countries.

For instance, Milesi-Ferretti (2009) estimates that each of the BRIC economies made on the order of \$200 billion in external capital gains during 2008. Accordingly, the expansion in the equity share of liabilities has indeed provided some useful risk transfer during the current crisis.

Figure 10. Stock Market Indices for Emerging Market Economies

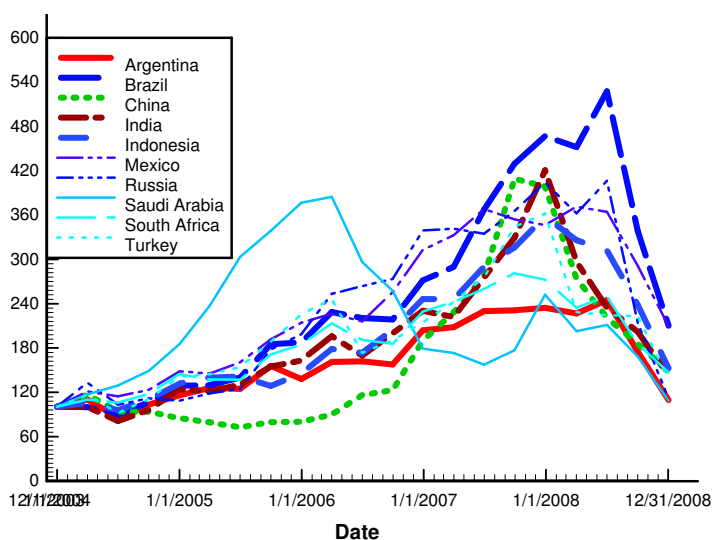
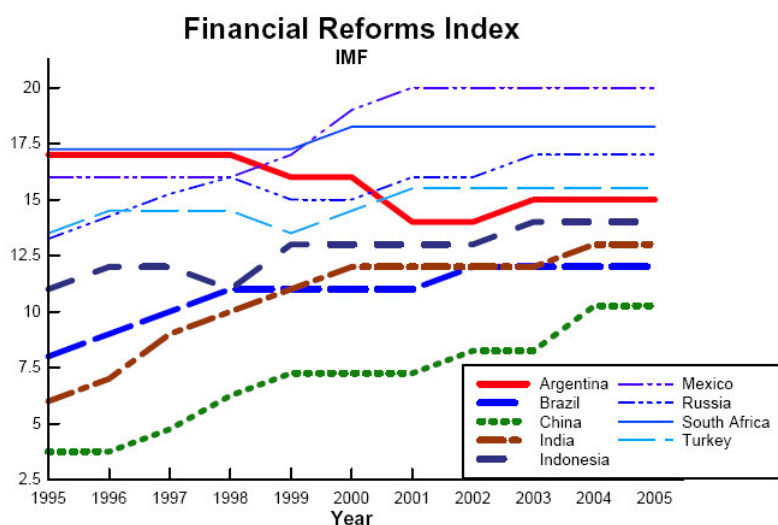


Figure 11. Financial Reforms Index



Note: Index range is (0;21). Source: Abiad et al (2008).

The fact that currency depreciation exerts a positive balance sheet effect (or at least a less negative balance sheet effect for those countries that still maintain negative foreign-currency exposure) means that currency depreciation can have a stabilising impact on the emerging market economies, by helping to support net exports in the face of a decline in external demand. This stands in contrast to the experience during the 1990s, when sharp depreciations were associated with major contractions due to the fact that adverse balance sheet effects overwhelmed the positive trade channel impact.

Moreover, the high levels of foreign-currency reserves has helped to limit free-falling currency depreciation, since national authorities can more credibly resist speculators that seek to engineer self-fulfilling currency attacks. Indeed, Obstfeld et al (2009) find that the extent of currency depreciation has been smaller for those countries that maintained excess levels of reserves (relative to the levels predicted by their empirical model).

In relation to the banking channel, the evidence is that banking claims on emerging market economies initially held up quite well. McGuire and Tarashev (2008) show that the level of claims between mid-2007 and mid-2008 exceeded that predicted by their empirical model that was estimated on data over 1992-2007. However, it is plausible that banking claims may have declined in late 2008. In particular, there is anecdotal evidence that foreign banks active in Central and Eastern Europe have withdrawn funds in order to replenish the balance sheets of parent banks.

It is also important to appreciate that there is variation across emerging markets in terms of exposure to individual banking systems and in terms of the maturity of claims, with those countries more heavily reliant on short-term funding from those countries with the weakest banking systems and/or the greatest exposure to emerging market economies facing the greatest risk of an adverse shift in funding conditions. There is little by way of publicly-available high-frequency data on the behaviour of international portfolio investors. However, market reports indicate that foreign equity flows to emerging markets have been negative in recent months, while the volume of bond issuance by emerging markets has undergone a dramatic decline.

Policy issues

The increase in global risk aversion and the contraction in the balance sheets of major international investment institutions means that the scale of gross capital flows to emerging market economies is set to shrink in the near term, with the cost of capital remaining above pre-crisis levels. This poses a host of near-term and medium-term policy challenges for this group of countries.

In relation to near-term policy challenges, the governments in several emerging market economies must manage deterioration in the balance sheets of key actors. This problem is most intense for entities that relied on short-term external funding to acquire longer-term illiquid domestic or foreign assets. To this end, the high level of reserves that were accumulated in recent years improves the capacity to manage balance sheet problems, both by enabling effective monetary expansion and through direct deployment of reserves. However, the challenges in utilising foreign-currency

reserves to stabilise the domestic economy in an environment in which domestic-currency and foreign-currency asset values are also falling are severe (Caballero and Krishnamurthy 2001).

More generally, there is scope for domestic fiscal and monetary expansion in a number of emerging market economies in order to support the domestic economy in the face of adverse external shocks. Indeed, the planned scale of fiscal expansions is quite large in some regions (most prominently, emerging Asia). However, the effectiveness of fiscal interventions depends on the sustainability of a country's fiscal position. This is fully recognised in the recent IMF study on the role of fiscal policy in the current crisis (Spilimbergo et al 2008). While this study generally advocates the deployment of fiscal policy, it recognises that it will not be effective in all countries. In particular, the authors state.

However, it is also essential that fiscal stimulus not be seen by markets as seriously calling into question medium-term fiscal sustainability. This is key, not only for the medium run, but also for the short run, as questions about debt sustainability would undercut the near-term effectiveness of policy through adverse effects on financial markets, interest rates, and consumer spending
(paragraph 27 on page 8).

Accordingly, fiscal accommodation is only desirable for those emerging market economies that can credibly demonstrate that the fiscal position is sustainable over the medium term. To this end, further progress in developing fiscal processes that can protect sustainability is highly desirable (Lane 2003).

In addition to the domestic policy response, the international community has also responded to the incipient funding crisis in some emerging market economies.¹⁰ Two major innovations stand out. First, there has been the establishment of currency swap arrangements among the world's major central banks and also vis-a-vis selected emerging market economies. As is discussed by Obstfeld et al (2009), the currency swaps with emerging market economies have typically been with countries that have already very high levels of reserves. Accordingly, the main function of the swaps has been to signal the commitment of the participating central banks to ensure adequate foreign-currency liquidity for the countries in question.

Second, the IMF created the new Short-Term Liquidity Facility (SLF) that is available to those member countries that have previously demonstrated strong fundamentals in terms of sound policies, access to capital markets and sustainable debt burdens. Since it relies on the track record of the applicant, the funds can be disbursed quickly and without conditionality, such that the SLF has the potential to be helpful in tackling short-term liquidity difficulties. Accordingly, the SLF represents a potentially useful expansion in the range of instruments available to the IMF in dealing with liquidity problems.

In relation to the medium-term goal of improving the structural foundations of the international financial system, the over-riding principle is to reduce the risks faced by emerging market economies in engaging with the international financial system (Wolf 2009). In addition, in managing the residual risk, the goal is to develop mech-

¹⁰ See McGuire (2009) for an illuminating analysis of the global dollar shortage that was created by international banks seeking to obtain dollar funding for the very large dollar asset positions that expanded rapidly in recent years.

anisms that reduce the cost of insuring against such risks. We documented above that significant progress has been made in shifting the external risk profile of emerging market economies since the late 1990s. In general, the funding model for these countries has changed through a greater reliance on equity-type liabilities, the accumulation of substantial liquid reserves and the running of current account surpluses. While these steps have reduced the vulnerability to financial crises, each involves significant inefficiencies. In particular, this strategy has been costly in terms of foregone domestic absorption opportunities and in the potential for superior international risk sharing arrangements. Moreover, it exerts substantial spillover effects on the reserve-issuing countries, through the impact of persistent trade surpluses and the official-sector demand for liquid securities.

In general, the appropriate framework for thinking about medium-term reform is to recognise that the emerging market economies suffer from an incomplete level of international financial integration. Unlike very low income countries, these economies are sufficiently integrated into the global financial system to be exposed to severe financial shocks. However, at the same time, these countries are treated differently by the global system in comparison to the financial environment that faces the most advanced economies. Empirically, Calvo et al (2008) and Kose et al (2008) find that there is a threshold effect in terms of the relation between international financial integration and financial stability. The goal for the emerging market economies is to pass this threshold and thereby attain a more robust form of financial integration. Importantly, as is emphasised by Kose et al (2008), the financial integration threshold is affected by key features of the domestic economy, including the level of domestic financial development, the quality of institutions and governance, macroeconomic policy discipline and trade integration. Accordingly, reaping the gains from financial globalisation involves the same types of reforms that are also generally beneficial for domestic economic performance.

In relation to the domestic reform efforts of the emerging market economies, the recent increase in the cost of external capital should induce an intensification of efforts to develop the domestic financial system. Domestic financial development is important for two reasons. First, the improved domestic mobilisation of domestic savings reduces the importance of external capital as a funding source. Second, a deeper financial system increases the span of investable opportunities that are available to foreign investors. Financial development should be broadly interpreted to encompass improvements in corporate governance and the quality of the regulatory system. In particular, the current crisis has highlighted that volume-based indices of financial development (such as the stock of outstanding securities) are not good measures if the financial system is distorted by a poor regulatory environment.

It is also important to take into account that the empirical evidence indicates that financial reform policies only promote financial development in environments in which private property rights are secure from arbitrary political interference (Tresselt and Detragiache 2008). Moreover, while the full impact of domestic financial reform only unfolds over the medium term, the credible announcement of a programme of financial reforms should be helpful even in the short term. While Figure 11 shows that the major emerging market economies have made major progress in financial reform, a considerable gap remains for several countries relative to a fully-liberalised domestic financial system (the maximum score is 21 in the IMF index).

It should also be understood that domestic risk management extends beyond the financial system to include social insurance programmes. In advanced economies, risk management is provided by a combination of public and private systems. However, the degree of social insurance for major personal risks (illness, unemployment) is much less adequate in a number of emerging market economies, leading to a high degree of precautionary saving by households. Accordingly, part of the reform agenda is to improve the adequacy of social insurance, via welfare systems and the public funding of relevant goods and services. In similar fashion, institutional reform extends beyond the regulation of the financial system. A striking illustration is provided by Naughton (2006), who shows how the ambiguous ownership status of many enterprises in China generates an extraordinarily high level of corporate savings, due to lack of clarity over the appropriate distribution of dividend payments.

In relation to domestic reforms that directly affect the nature of international capital flows, one key element is the development of local-currency debt markets. Burger and Warnock (2006) investigate the determinants of success in promoting local-currency debt markets and find that key drivers include the attainment of macroeconomic stability (low inflation) and strong creditor protection. Indeed, these authors note that the requirements for a thriving local-currency bond market are very similar to those for the development of the domestic-currency banking system. Accordingly, reform efforts that are targeted at improving the operation of debt financing in general can serve the dual purpose of promoting both the bond market and the banking system.¹¹

So far, local-currency debt markets have been dominated by locally-resident investors, with relatively little participation by foreign investors. While participation by domestic residents is a major achievement in itself, it is also desirable to enable effective cross-border capital flows in local currency. To this end, it is important that the development of local-currency debt markets is complemented by the development of the currency derivatives market, in order to allow investors to separately trade currency risk and credit risk.

The role of derivatives markets in cross-border risk transfer is not well understood at the empirical level, with many derivative trades simply redistributing risk across domestic residents. However, the evidence from a recent national survey in Australia is quite striking. The analysis of this survey by Becker and Fabbro (2006) shows that currency hedging allowed Australian residents to transform the risk profile of the external balance sheet. In particular, foreign-currency debt of AUS\$428 billion at the end of March 2005 was greatly reduced to AUS\$90 billion through derivatives contracts with overseas counterparties. These international hedges meant that the aggregate foreign-currency exposure of Australia turned from negative to positive. Accordingly, the Australian example illustrates how foreign-currency debt can be transformed via currency derivatives into domestic-currency debt from the perspective of domestic residents.¹²

11 Schmitz (2009) finds that domestic financial reforms stimulates capital inflows for a sample of emerging European economies. A striking feature of his work is that it is banking-sector reform that is especially important in attracting inflows.

12 This is not to under-estimate the regulatory and market design challenges in establishing a well-functioning derivatives market. Again, the current crisis teaches us that poorly-functioning derivatives markets can lead to non-fundamental volatility in the prices of the underlying assets.

In addition to the promotion of local-currency debt markets, there is also considerable scope to improve risk sharing via other types of state-contingent instruments. For instance, the idea of GDP-indexed bonds has received considerable attention (see Borensztein and Mauro 2004 for a recent and comprehensive review). In a series of contributions, Caballero and a set of collaborators have advocated other types of state-contingent instruments (see Caballero and Cowan 2007 for an overview of this line of work). On the liabilities side, a commodities exporter might issue debt with a coupon that is indexed to global commodity prices. More broadly, emerging markets might tie yields to the high-risk spread in the US corporate debt market. The virtue of these types of instruments is that the contingent element in the return is a function of external conditions, such that it cannot be manipulated by the issuer. This feature eliminates the moral hazard problem that generically affects state-contingent contracts. There is also scope for greater use of state-contingent instruments on the asset side of the international balance sheet, since many of the risk sharing benefits of state-contingent liabilities can be replicated by an appropriate portfolio of assets. However, the limitation of an asset-based approach is that, all else equal, it involves the leveraging of the international balance sheet.

A second key element is to further promote international equity financing. As indicated earlier, the share of equity in the foreign liabilities of emerging markets has grown strongly over the last decade. However, corporate governance and regulatory problems limit the attractiveness of emerging-market stockmarkets for many investors (see, for example, the evidence provided by Kho et al 2008). However, the evidence is that financial reform is associated with an increase in the equity share in liabilities, such that investors do respond to shifts in the institutional environment (Faria et al 2007). Similar factors also apply in relation to foreign direct investment. In addition, there are restrictions in some countries that limit the capacity of foreign investors to acquire controlling stakes in certain sectors that are deemed to be strategically important. However, in the other direction, it is possible that the level of subsidies and tax breaks offered to foreign direct investors is arguably excessive in a number of host countries, such that some shift away from foreign direct investment could be desirable in some cases.

The importance of domestic institutional development extends beyond the financial sector. In particular, a fundamental goal for emerging market economies is to counteract instability in macroeconomic policies. In relation to fiscal procyclicality, institutional reforms can do much to improve the cyclical behaviour of fiscal policy (Lane 2003). While there remains considerable variation across countries, the capacity of countries such as Chile to develop fiscal processes that help to insulate the budget from the curse of procyclicality has been impressive.

So far, we have discussed domestic reforms. An extension of this is to further promote regional financial integration. The empirical evidence is that gravity factors such as distance and cultural linkages are influential in international asset trade (Portes and Rey 2005, Lane and Milesi-Ferretti 2008b). In addition, there is a strongly positive correlation between trade in goods and services and trade in assets. Accordingly, there is much scope for regional levels of financial integration. In particular, regional capital flows may be more stable in character, in view of the underlying linkages between neighbouring economies and the lower level of bilateral exchange rate volatility. Accordingly, it is desirable that regional groups intensify

efforts to cooperate in the design of common institutional standards for financial market development and work to lift barriers to cross-border asset trade.

Turning to the international dimension of reform, there is considerable scope for the international community to support a more stable system of international finance for emerging market economies. The international financial institutions have a clear role to play in terms of the provision of technical advice in the development of domestic financial systems. For instance, in relation to local-currency debt markets, the World Bank's GEMLOC program seeks to build a common knowledge base concerning the operation of these markets.¹³

The IFIs could possibly do more in terms of issuing securities in the currencies of the emerging market economies. Such issues have the potential to help to expand the depth and liquidity of the domestic-currency bond markets, as well as allowing the international financial institutions to make local-currency loans to clients in those markets. Such issuance could be in specific currencies, such as the RMB-denominated bond issues by the Asian Development Bank and the International Finance Corporation (the so-called Panda Bonds). In addition, securities could be issued that are indexed to a basket of emerging market currencies (see also the discussion in Wolf 2009). More generally, in view of the free riding problem and other externalities that inhibit the creation of new securities markets, the IFIs potentially have a central role in helping to develop the types of state-contingent securities that may improve the risk profile of the external liabilities of emerging markets.

In terms of the broader G20 agenda, it is in the interests of the emerging market economies to support international reforms that improve stability in the major financial centres and at the global level. The strength of two-way international transmission mechanisms between advanced and developing countries means that this reform debate has to involve representatives of the emerging economies in a central role. In terms of governance arrangements, a major shift in the distribution of voting power at the IMF would be clearly beneficial and it is up to the advanced economies to voluntarily agree to a new agreement, with the obvious potential for the consolidation of representation by member countries of the European Union.

The current crisis has vividly illustrated how public sources of funding must be available in the event of the breakdown of financial trade among private-sector counterparties. At the international level, this reinforces the need for an expansion of the funding base for the IMF. In tandem with a redistribution of quotas, it is appropriate that the largest emerging market economies join the advanced economies in becoming substantial underwriters of the IMF's balance sheet. A better-financed IMF that stood ready to provide liquidity support would enable these economies to shed some of their excess foreign-currency reserves and would be collectively more efficient. Accordingly, the principle of major IMF renewal should be a key G20 target.

That said, it is unlikely that major IMF reform can be achieved in the short term. The recent agreement to reallocate quotas in a limited fashion took a considerable period to be negotiated and has not yet been ratified by all member countries. Accordingly, the prospect of a more radical quota reform seems unlikely in the near term. However, the expansion of IMF resources need not wait for the completion of governance reform. Already, Japan has offered \$100 billion in financing for the IMF,

13 GEMLOC stands for Global Emerging Market Local Currency Bond Fund Program.

while other major surplus economies may also be prepared to offer extra funding.

In addition to reform of the global financial institutions, there is also room for a greater level of regional initiatives. The limits to the potential resources of the IMF and the heterogeneity of IMF membership means that there is scope for additional resource pooling at the regional level.¹⁴ Most obviously, the bilateral swap arrangements among ASEAN+3 countries under the Chiang Mai Initiative demonstrate the viability of securing liquidity insurance that is additional to IMF resources.¹⁵ Moreover, the current crisis has also shown a regional capability to quickly respond to the shift in international financial conditions. For example, major increases in the scale of the agreed bilateral swaps between China and Korea and between Japan and Korea were announced in December 2008.

Regional groupings may also be better placed in terms of continuous surveillance of member country policies and in designing multi-dimensional forms of policy coordination, by which regional integration in trade and factor mobility reinforces the incentives to cooperate in terms of financial support.¹⁶ The European experience also suggests that there may be scope for regional cooperation in the development of processes that help in ensuring the sustainability of the public finances (Lane 2008). While the scope for political integration clearly varies across regions and limits the transferability of institutional models across regions, the general principle is to obtain those benefits from regional integration that are feasible in each particular setting.

The analysis of international capital flows to emerging markets would be greatly facilitated by renewed efforts to improve the collection of publicly-available high-quality data on international capital flows and international investment positions. While data availability has greatly improved with initiatives such as the Coordinated Portfolio Investment Survey (CPIS), major data holes remain. Indeed, measurement problems are growing in absolute scale, due to the rapid growth in the volume of cross-border transactions and the pace of financial innovation. While these are severe even for the most advanced economies, measurement problems are especially acute for emerging markets and developing economies.¹⁷ Most obviously, offshore financial centres play a central role in the intermediation of international capital flows, with the information deficit particularly large for lightly-regulated entities such as hedge funds. Better quality data would also do much to facilitate improved surveillance and analysis by the IMF and other policy organisations, contributing to the development of early-warning systems and other desiderata.

14 See Irwin et al (2008) for a model of how diversity across countries limits the capacity of the IMF to function as a credit union.

15 See Kohlscheen and Taylor (2008) for an analysis of the Chiang Mai bilateral swap arrangements. In line with a risk pooling model, these authors find that bilateral swaps among participants are larger, the weaker the correlation in reserves between the pair of countries. However, these authors also highlight the limitations of a regional approach to risk pooling: the correlation in reserves growth is much higher within regions than across regions.

16 The Chiang Mai agreement among the ASEAN+3 (China, Japan, Korea) provides for short-term currency swap facilities. This agreement demonstrates the ability of governments to agree on forms of policy coordination even when the level of political integration is quite low. See Lane (2008) on the lessons to be drawn from the European approach to economic integration.

17 See Lane and Milesi-Ferretti (2009) in relation to problems in the measurement of the US international investment position.

Finally, it is important to appreciate that a broad reform programme at the domestic and international levels could lead to a major re-configuration of the distribution of global imbalances. In particular, the growing share of global GDP that is generated by emerging market economies in combination with successful domestic financial development and appropriate international financial reforms may lead to this group of countries seeking to be a major net absorber of global capital flows.¹⁸ If this scenario plays out, other potential borrowers will receive smaller net capital inflows and/or the level of global interest rates will climb. For advanced economies seeking to save due to population ageing, this should be a welcome development.

Conclusions

At one level, the international financial position of emerging market economies has undergone radical change since the late 1990s. Net foreign liabilities are much lower, the role of equity financing has greatly expanded and very large foreign-currency reserve positions have been accumulated. These steps have increased the capacity of emerging market economies to withstand international financial shocks. However, the limited role of domestic-currency debt in the funding of external liabilities means that the nature of international financial integration for the emerging market economies remains quite different relative to the experience of the advanced economies. The self-insurance approach adopted by individual emerging market economies is also highly inefficient in terms of the collective allocation of resources within the emerging market economies and between the emerging markets and the advanced economies. Moreover, the expansion in the gross scale of international balance sheets means that the linkages between the emerging market economies and the advanced economies have grown tighter, in terms of the exposure to breakdowns in the normal operation of financial markets.

Accordingly, there is a busy reform agenda at the domestic, regional and global levels in order to develop a financial system that improves the stability of external financing for emerging market economies. The reforms that are good for emerging markets are also the reforms that should improve global economic performance and global financial stability. Accordingly, the emerging market reform agenda should be an integral part of the wider G20 reform agenda.

References

- Abiad, Abdul, Enrica Detragiache, and Thierry Tresselt (2008), A New Database of Financial Reforms, IMF Working Paper No 08/266.
- Aguiar, Mark and Gita Gopinath (2007), Emerging Market Business Cycles: The Cycle

¹⁸ Dollar and Kraay (2006) calibrate a model that projects current account deficits for China on the order of 5 percent of its GDP for a sustained 10-15 year period. While not approaching the size of the current US deficit relative to world GDP, it would still be a substantial call on global savings. See also the discussion in Lane and Schmukler (2007).

- is the Trend, *Journal of Political Economy* 115(1), 69-102.
- Becker, Chris and Daniel Fabbro (2006), Limiting Foreign Exchange Exposure through Hedging: The Australian Experience, Reserve Bank of Australia Research Discussion Paper No. 2006-09.
- Bernanke, Ben (2009), The Crisis and the Policy Response, Stamp Lecture, London School of Economics.
- Borensztein, Eduardo and Paolo Mauro (2004), The Case for GDP-Indexed Bonds, *Economic Policy*, 38, 165--216.
- Burger, John and Frank Warnock (2006), Local Currency Bond Markets, *IMF Staff Papers* 53, 115-132.
- Caballero, Ricardo and Arvind Krishnamurthy (2001), International and Domestic Collateral Constraints in a Model of Emerging Market Crises, *Journal of Monetary Economics* 48, 513-548.
- Caballero, Ricardo and Kevin Cowan (2007), Financial Integration Without the Volatility, mimeo, MIT and Inter-American Development Bank.
- Caballero, Ricardo, Emmanuel Farhi and Pierre-Olivier Gourinchas (2008), An Equilibrium Model of 'Global Imbalances' and Low Interest Rates, *American Economic Review* 98(1), 358-393.
- Calvo, Guillermo A., Leonardo Leiderman and Carmen Reinhart (1996), Capital Flows to Developing Countries in the 1990s: Causes and Effects, *Journal of Economic Perspectives* 10, 123-139.
- Calvo, Guillermo A., Alejandro Izquierdo and Luis-Fernando Mejía (2008), Systemic Sudden Stops: The Relevance Of Balance-Sheet Effects And Financial Integration, NBER Working Paper No. 14026.
- Devereux, Michael B., Philip R. Lane and Juanyi Xu (2006), Exchange Rates and Monetary Policy for Emerging Market Economies, *The Economic Journal* 116, 478-506.
- Dollar, David and Aart Kraay (2006), Neither a Borrower Nor a Lender: Does China's Zero Net Foreign Asset Position Make Economic Sense?, *Journal of Monetary Economics* 53(5), 943-971.
- Eichengreen, Barry and Ricardo Hausmann (2005), *Other People's Money: Debt Denomination and Financial Instability in Emerging Market Economies*, University of Chicago Press.
- European Central Bank (2009), Foreign Asset Accumulation by Authorities in Emerging Markets, *Monthly Bulletin* (January), 73-85.
- Faria, Andre, Philip R. Lane, Paulo Mauro and Gian Maria Milesi-Ferretti (2007), The Shifting Composition of External Liabilities, *Journal of European Economic Association* 5 (2-3), 480-490.
- Felices, Guillermo and Bjorn-Erik Orskaug (2008), Estimating the Determinants of Capital Flows to Emerging Market Economies: A Maximum Likelihood Disequilibrium Approach, Bank of England Working Paper No. 354.
- Irwin, Gregor, Adrian Penalver, Chris Salmon and Ashley Taylor (2008), Dealing with Country Diversity: Challenges for the IMF Credit Union Model, Bank of England Working Paper No. 349.
- Kaminsky, Graciela, Carmen Reinhart and Carlos Végh (2003), The Unholy Trinity of Financial Contagion, *Journal of Economic Perspectives* 17(4), 51-74.
- Kho, Bong-Chan, Rene Stulz and Frank Warnock (2008), Financial Globalization,

- Governance, and the Evolution of the Home Bias, *Journal of Accounting Research*, forthcoming.
- Kohlscheen, Emanuel and Mark P. Taylor (2008), International Liquidity Swaps: Is the Chiang Mai Initiative Pooling Reserves Efficiently? *International Journal of Finance & Economics* 13(4), 323 – 332.
- Kose, M. Ayhan, Eswar Prasad, Kenneth Rogoff and Shang-Jin Wei (2008), Financial Globalization: A Reappraisal, IMF Staff Papers, forthcoming.
- Krugman, Paul (2008), The International Finance Multiplier, mimeo, Princeton University.
- Lane, Philip R. (2003), Business Cycles and Macroeconomic Policy in Emerging Market Economies, *International Finance* 6(1), 89-108, Spring 2003.
- Lane, Philip R. (2008), The Macroeconomics of Financial Integration: A European Perspective, IIS Discussion Paper No. 265.
- Lane, Philip R. and Gian Maria Milesi-Ferretti (2007a), The External Wealth of Nations Mark II, *Journal of International Economics* 73, 223-250
- Lane, Philip R. and Gian Maria Milesi-Ferretti (2007b), Europe and Global Imbalances, *Economic Policy* 22(51), 519-573.
- Lane, Philip R. and Gian Maria Milesi-Ferretti (2008a), The Drivers of Financial Globalization, *American Economic Review* (Papers and Proceedings) 98(2), 327-332.
- Lane, Philip R. and Gian Maria Milesi-Ferretti (2008b), International Investment Patterns, *Review of Economics and Statistics* 90(3), 538-549.
- Lane, Philip R. and Gian Maria Milesi-Ferretti (2009), Where Did All the Borrowing Go? A Forensic Analysis of the U.S. External Position, *Journal of Japanese and International Economies*, forthcoming.
- Lane, Philip R. and Sergio Schmukler (2007), The Evolving Role of China and India in the International Financial System, *Open Economies Review* 18(4), 499-520.
- Lane, Philip R. and Jay Shambaugh (2008), Financial Exchange Rates and International Currency Exposures, *American Economic Review*, forthcoming.
- McGuire, Patrick and Nikola Tarashev (2008), Bank Health and Lending to Emerging Markets, *BIS Quarterly Review* (December), 67-80.
- McGuire, Patrick (2009), The US Dollar Shortage in International Banking, *BIS Quarterly Review*, forthcoming.
- Milesi-Ferretti, Gian Maria (2008), Fundamentals at Odds? The US Current Account Deficit and the Dollar, *Economic Notes* 37(3), 259-281.
- Milesi-Ferretti, Gian Maria (2009), A \$2 Trillion Dollars Question, *VoxEU*.
- Mendoza, Enrique, Vincenzo Quadrini and Jose-Victor Rios-Rull (2008), Financial Integration, Financial Development and Global Imbalances, *Journal of Political Economy*, forthcoming.
- Naughton, Barry (2006), Top-Down Control: SASAC and the Persistence of State Ownership in China, mimeo, University of California at San Diego.
- Obstfeld, Maurice, Jay Shambaugh and Alan Taylor (2008), Financial Stability, the Trilemma, and International Reserves, NBER Working Paper No. 14217.
- Obstfeld, Maurice, Jay Shambaugh and Alan Taylor (2009), Financial Instability, Reserves, and Central Bank Swap Lines in the Panic of 2008, *American Economic Review* (Papers and Proceedings), forthcoming.
- Portes, Richard and Helene Rey (2005), The Determinants of Cross-Border Equity

- Flows, *Journal of International Economics* 65, 269-296.
- Prasad, Eswar (2009), India's Approach to Capital Account Liberalization, IZA Discussion Paper No. 3927.
- Reinhart, Carmen and Kenneth Rogoff (2004), Serial Default And The Paradox Of Rich To Poor Capital Flows, *American Economic Review* (Papers and Proceedings) 94(2), 52-58.
- Reinhart, Carmen and Vincent Reinhart (2008), Capital Flow Bonanzas: An Encompassing View of the Past and Present, NBER Working Paper No. 14321.
- Schmitz, Martin (2009), Financial Reforms and Capital Flows to Emerging Europe, IIS Discussion Paper No. XXX.
- Spilimbergo, Antonio, Steven Symansky, Olivier Blanchard and Carlo Cottarelli (2008), Fiscal Policy for the Crisis, IMF Staff Position Note No. 08/01.
- Tressel, Thierry and Enrica Detragiache (2008), Do Financial Sector Reforms Lead to Financial Development? Evidence from a New Dataset, IMF Working Paper No 08/265.
- Wolf, Martin (2009), *Fixing Global Finance*, Yale University Press.

The Risk of Deflation

Stefan Gerlach

University of Frankfurt and CEPR

1. Introduction

The onset of financial instability in August 2007, which quickly spread across the world, raises a number of questions for policy makers. First, what are the roots of the crisis? Many factors have been emphasized in the debate, including the opacity of complex financial products; the excessive confidence in ratings; weak risk management by financial institutions; massive reliance on wholesale funding; and the presumption that markets would always be liquid.¹ Furthermore, poorly understood incentive effects – arising from the originate-to-distribute-model, remuneration policies and the period of low interest rates – are also widely seen as having played a role.

Second, how can a repetition of the crisis be avoided? Much attention is being focused on regulation and supervision of financial intermediaries. The G-20, at its summit in November 2008, noted that measures need to be taken in five areas: (i) financial market transparency and disclosure by firms need to be strengthened; (ii) regulation needs to be enhanced to ensure that all financial markets, products and participants are regulated or subject to oversight, as appropriate; (iii) the integrity of financial markets should be improved by bolstering investor and consumer protection, avoiding conflicts of interest, and by promoting information sharing; (iv) international cooperation among regulators must be enhanced; and (v) international financial institutions must be reformed to reflect changing economic weights in the world economy better in order to increase the legitimacy and effectiveness of these institutions.

Third, how can the consequences for economic activity be minimized? Many of the adverse developments in financial markets – in particular the collapse of term interbank markets – reflect deeply entrenched perceptions of counterparty risk. Prompt and far-reaching action to support the financial system, in particular the infusion of equity capital in financial institutions to reduce counter-party risk and get credit to flow again, is essential in order to restore market functioning.

A particular risk at present is that the rapid decline in inflation in many countries in recent months will turn into deflation with highly adverse real economic developments.² This background paper considers how large the risk of deflation may be

Author's note: I am grateful to Katrin Assenmacher-Wesche, Petra Gerlach-Kristen and Madhu Mohanty for helpful comments and to Eva Koscher for research assistance.

1 See Bean (2008) and G-20 (2008).

2 Some countries experienced deflation in 19th century because of favorable supply shocks that also led to rapid output growth. See also the Appendix.

and discusses what policy can do to reduce it. It is organized as follows. Section 2 defines deflation and discusses downward nominal wage rigidities and the zero lower bound on interest rates. While these factors are frequently seen as two reasons why deflation can be associated with very poor economic outcomes, they should not be overemphasized. Section 3 looks at the current situation. Inflation expectations and forecasts in the subset of economies we look at (the euro area, the UK and the US) are positive, indicating that deflation is not expected. This does not imply that the current concerns of deflation are unwarranted, only that the public expects the central bank to be successful in avoiding deflation. The section also looks at the evolution of headline and "core" inflation, focusing on data from the US and the euro area. Section 4 reviews how monetary and fiscal policy can be conducted to ensure that deflation is avoided. Section 5 briefly discusses special issues arising in emerging market economies. Finally, Section 6 offers some conclusions. An Appendix discusses deflation episodes in the period 1882-1939.

2. Preliminaries

As a start, it is useful to emphasize that deflation is a fall of the economy-wide price level that is sufficiently persistent to trigger expectations that prices will continue to decline for some non-negligible period of time. Because of changes in productivity and production costs more broadly, or because of changes in demand patterns, prices for some goods may always or frequently be declining. For instance, prices of traded goods are typically rising at a much slower rate than services, implying that if the central bank's inflation target is sufficiently low, traded goods prices may be falling continuously. However, while price falls in a specific sector may be associated with economic weakness in the sector in question, the broader economy is likely to be unaffected. Thus, declines in individual or sectoral prices do not constitute deflation.

Similarly, purely temporary falls in the aggregate price level may not have any lasting effects on consumers' and firms' behaviour, and on the broader economy, and therefore do not constitute deflation. By contrast, if the aggregate price level declines for some time, expectations may form that prices will continue to fall. Much in the same way as expectations of future inflation may lead firms to raise prices already now, expectations of deflation exacerbate the downward pressure on current prices and make it more difficult to design policies to return to a low, positive rate of inflation. As discussed below, this suggests that policy measures that seek to shield inflation expectations from current price developments are likely to help mitigate the macroeconomic effects of falls in the economy-wide price level.

While there are historical episodes in which deflation arose from positive supply-side developments and that tended to raise economic growth, cases of deflation are likely to be associated with pronounced macroeconomic weakness for several reasons.³

3 Unexpected falls in the price level - which by my definition do not constitute deflation - that redistribute wealth from debtors to creditors are more likely to depress spending and lead to defaults and financial distress than unexpected increases in the price level. See Buiter (2003) or IMF (2003).

First, deflation may reflect particularly large and persistent declines in the demand for goods and services, triggered for instance by financial instability. If so, deflation is merely an indicator, and not a cause, of slowing aggregate demand. Monetary and fiscal policy measures that raise demand will in this case expand economy activity in much the same way as they would at a low, positive rate of inflation.

Second, deflation can induce non-linearities in the functioning of the economy. Thus, there is a risk that a contractionary shock of a given size will be more difficult to handle if it pushes the economy into deflation than if the rate of inflation remains positive. There are two reasons for why that may be the case: nominal wages may be rigid downward and there is a risk that policy-controlled interest rates reach zero, which reduces the effectiveness of the interest rate channel of monetary policy. We discuss each in turn.

2.1 Downward nominal wage rigidity

Downward nominal wage rigidity is an important reason why deflation is likely to be associated with poor real outcomes. In situations in which nominal wage growth and inflation have historically been positive, it seems unlikely that a fall in the nominal price level will trigger a decline in nominal wages. Thus, real wages will rise, reducing employment and economic activity. Since price increases vary across firms, one would expect that the fraction of firms that experience falling prices increases when the economy-wide inflation rate falls towards zero. The importance of downward nominal wage rigidity is consequently likely to rise with falling inflation.

Indeed, Fehr and Götte (2005, Fig. 3, p. 788) show that as inflation in Switzerland declined from 4.7% in 1991 to 0% in 1997, the distribution of wage changes of workers shifted towards the left and growing number of workers reported zero wage increases.⁴ Though some reported wage falls, the distribution of wage changes became increasingly asymmetric over time. This evidence demonstrates that downward nominal wage rigidity does impact on the labour market's ability to adjust to shocks, in particular when inflation is very low.

However, there are reasons not to overestimate the importance of downward nominal wage rigidities. Most importantly, if productivity growth is positive, real unit labour costs can still decline even if real wages are rising, although less so than in the absence of downward nominal wage rigidity. Moreover, unit labour costs depend also on indirect taxes and social charges, which can be changed in a counter-cyclical manner to support employment.

Furthermore, downward nominal wage rigidity is not a structural feature of the economy but rather a consequence of having experienced a long period of positive inflation.⁵ Indeed, the importance of downward nominal wage stickiness may decline if the economy enters deflation, as the experiences of Hong Kong suggest. The CPI in Hong Kong fell a cumulative 16.3% between May 1998 and August 2003, with the peak rate of deflation being 6.3% (Gerlach and Kugler 2007). Measured by the change

4 Buiter (2003) argues that this spike at the zero of the distribution of relative wage changes only indicates that wages are sticky, not that they are downwardly sticky. The findings of Fehr and Götte (2005) contradict this conclusion.

5 In some countries, labor market legislation may bar wage cuts in some circumstances.

in prices over twelve months, Hong Kong experienced 68 months of deflation. The deflation rate soon became fully expected by firms and workers and wage cuts were common. The distribution of wage changes in 2002-2004 involved a large number of wage cuts and appears symmetric (HKMA, 2008, Box 3, pp. 35-36). This suggests that any downward nominal wage rigidity disappeared as the economy experienced an extended period of deflation.⁶ Nevertheless, unemployment increased in Hong Kong during this period, suggesting that the fall in nominal wages was not sufficiently large to prevent real wages from rising.

Overall, downward nominal wage rigidity is likely to worsen labour market outcomes if inflation falls towards, and below, zero.

2.2 The zero lower bound on nominal interest rates

A further reason why economic outcomes are likely to be adverse in a situation of deflation stems from the fact that central banks can not reduce nominal interest rates below zero. The nominal interest rate equals the sum of the real interest rate and the expected inflation rate. If the nominal interest rate is zero, the real interest is equal to minus the rate of inflation. As deflation takes hold and turns increasingly severe, real interest rates rise, reducing aggregate demand and exacerbating the downward pressure on prices.⁷

While the zero lower bound does impose a constraint on the interest rate channel of monetary policy, its importance for the overall transmission mechanism – which operates also through yields in longer-term securities, private securities, exchange rates and asset prices – is frequently exaggerated, as is discussed in Section 4.

3. Is deflation likely?

There is much evidence that the expected rate of inflation plays a key role in determining the current rate of inflation. This naturally leads to the question what rates of inflation the public expects at the current juncture. Before addressing this question, suppose that expected inflation is positive. Does this imply that policy makers need not worry about deflation and that there is no need for unusual policy measures to offset this risk?

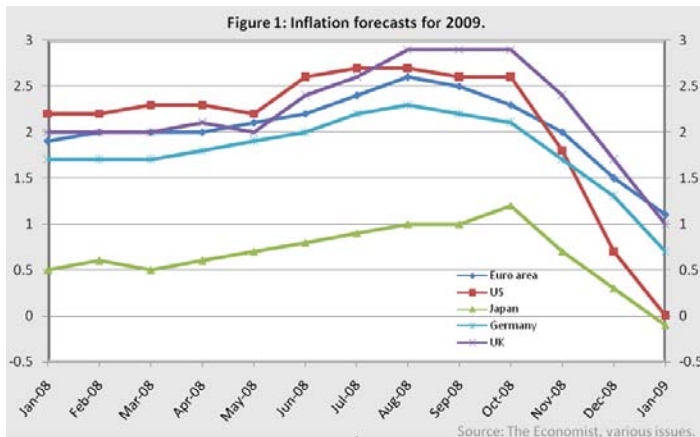
A moment's reflection indicates that the answer to this question must be "no." Inflation expectations depend on (i) the shocks impacting on the economy and (ii) the public's beliefs about how the authorities will respond if deflation threatens and how effective these responses are likely to be. Thus, positive inflation expectations may thus result even if there is strong downward pressures on inflation rates if the public expect that the authorities will adopt aggressive policy measures to offset

6 More anecdotally, when the present author extended his employment contract with the Hong Kong Monetary Authority in 2004 after six years of deflation, he was offered a wage cut of 2.5%.

7 There is also a risk of a deflation trap developing. Suppose that interest rates and inflation are both zero and that for some reason the public starts to expect deflation. The expected real interest rate then rises, reducing aggregate demand and triggering deflation.

them. In sum, expectations that inflation will remain positive say nothing about whether there is a need for the authorities to adjust policy to avoid deflation.⁸

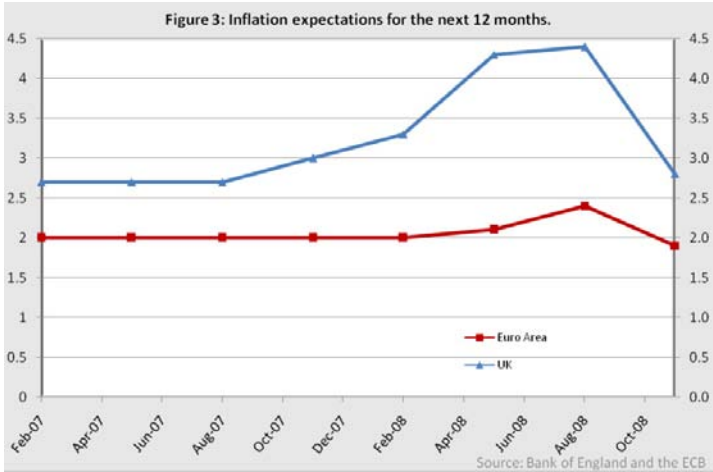
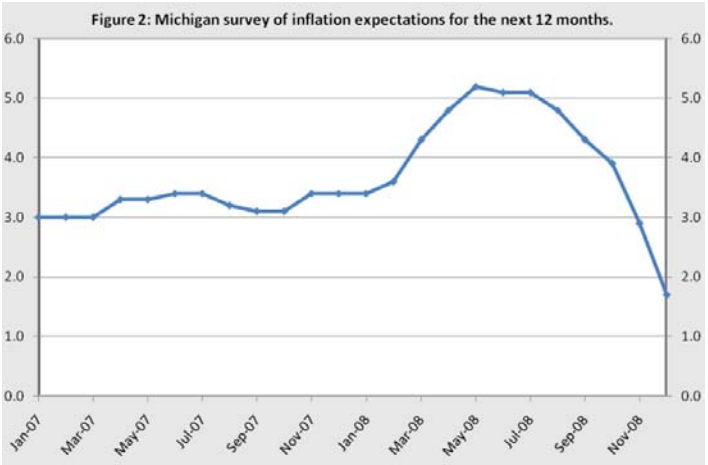
However, it can be useful to look at short-run measures of expected inflation which, since economic policies impact on inflation only with a lag, are less likely to be contaminated by expectations of future economic policy. Figure 1 shows average forecasts of inflation in 2009, made at various times in 2008 and in 2009, from the Economist poll of forecasters.⁹ Inflation forecasts for 2009 were raised as headline inflation picked up in 2008 in response to shocks impacting on the prices of oil, food and other commodities. Following the collapse of Lehman Brothers in September 2008 and the sea-change it caused in financial markets, forecasts of inflation in 2009 were rapidly reduced from October onwards. By January 2009, on average, forecasters expected consumer prices to fall over the course of the year by 0.1 percent in Japan, stay constant in the US, rise by 1 percent in the UK and 1.1 percent in the euro area, that is, quite a bit below the Bank of England's inflation target of 2% and the ECB's objective of inflation "below, but close to, two percent."



Other indicators of price expectations display a similar story. For instance, Figure 2 shows the Michigan survey of US inflation expectations for the next 12 months; these fell by from 4.3% in September to 1.7% in December. Figure 3 shows the expected rate of inflation over the next 12 months taken from the Bank of England's *Inflation Attitude Survey* and the ECB *Survey of Professional Forecasters*. These data are quarterly, and the most recent data point is for November. Since inflation and expected inflation declined towards the end of the year, it seems likely that the expected inflation rates have fallen below the rates tabulated here. But overall, the lesson we draw from these graphs is that inflation is generally expected to be positive for 2009 in these countries, with the possible exception of the US and Japan.

⁸ By contrast, inflation expectations that are negative provide firm reasons for central banks to relax monetary policy.

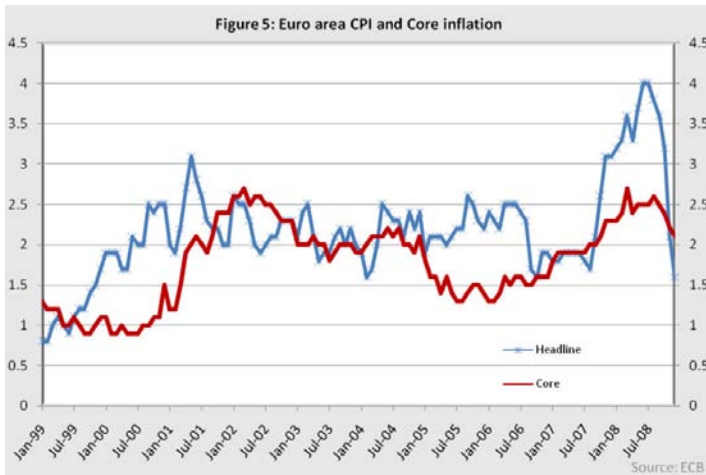
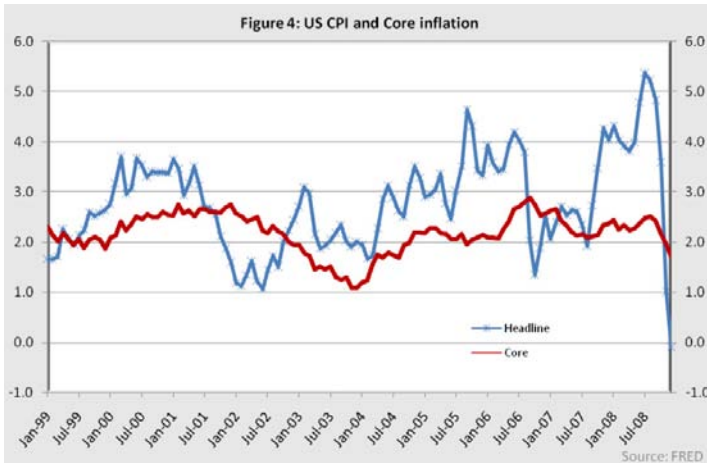
⁹ An obvious weakness of this survey is that it is based on a very small sample of 13 financial institutions; the main advantages are that it is freely available and monthly.



3.1 Headline and core inflation in the US and the Euro Area

Another way to assess the likely path of inflation is to look at measures of "core" and headline inflation. Figures 4 and 5 show that headline CPI inflation in the US and the euro area (as in many other economies) rose sharply in the fall of 2007, reached a peak in July 2008, and declined rapidly thereafter.¹⁰ Core inflation (defined using the CPI less the food and energy components) was more stable, implying that these movements in headline inflation reflected largely oil and food price shocks, not shocks to the underlying rate of inflation. Since movements in oil prices are best thought of as price level shocks, they are likely to have only a temporary impact on the rate of inflation. The recent fall in oil prices, which constitutes an expansionary supply shock, is thus unlikely to lead to deflation, although it may lead to a brief peri-

¹⁰ The graph for the US would look similar if instead the deflator for personal consumption expenditure was used.

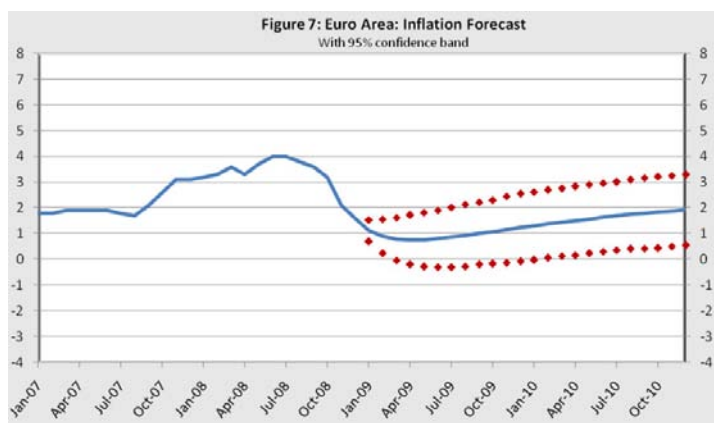
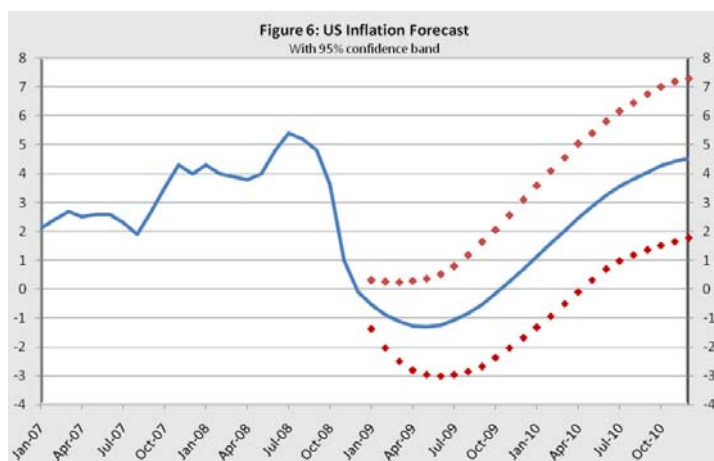


od of falling prices.

To explore this issue somewhat more formally, I next estimate a forecasting model for inflation in the US and the euro area on data spanning January 1999 – December 2008, and compute dynamic out-of-sample forecasts of headline inflation for the period January 2009 – December 2010.¹¹

The results for the US are displayed in Figure 6 and those for the euro area in Figure 7, together with 95% confidence bands. The point forecast for inflation in the US is that it will continue to fall, reach a trough at -1.3% in May 2009, remain negative

¹¹ In both cases I estimated a VAR model for CPI inflation, core inflation, the rate of growth of oil prices and a business cycle indicator. While there are no financial variables in the model, the financial crisis is captured indirectly by the last two variables, both of which have collapsed in recent months. As business cycle indicator I used the NAPM survey for the US and the Economic Sentiment Indicator of Eurostat for the euro area. Gerlach (2007) shows that the latter displays strong correlation with future values of estimates of the euro area output gap. On the basis of the Schwarz information criterion, I selected a VAR(1) model for the US and a VAR(2) model for the euro area.



until October, and recover rapidly thereafter. These findings are broadly compatible with the inflation forecasts for 2009 presented above. However, the wide confidence bands indicate a great deal of uncertainty around those forecasts.

Turning to the results for the euro area, these suggest that inflation will continue to decline in the months ahead, reach a trough of 0.8% in April 2009, and gradually rise to 1.9% in December 2010. Also in this case are the forecasts highly uncertain and, in particular, there is some probability that inflation will turn negative for a while.

Overall, these results indicate that the decline in inflation is expected to be temporary. However, they should not be overinterpreted. They come from a very simple model and disregard a number of factors that impact on inflation, such as monetary and fiscal policy measures. Moreover, by construction, they assume that the inflation will return to its sample mean over time.

4. Policy measures to reduce deflation risks

The analysis in the previous section suggests that while inflation is declining rapidly and prices may be falling for a while in 2009, inflation will soon return. But suppose that that prediction turns out to be wrong. Can policy then be used to ensure that declining prices do not become a permanent feature of the economic landscape?

It is useful to remember that the historical record clearly shows that episodes of deflation are best seen as evidence of serious policy failures, rather than as episodes in which policy makers were overwhelmed by a collapse in aggregate demand that was too large and too sudden for them to offset. Thus, the deflation experienced by Japan in the 1990s was largely due to a lack of consensus about what policy measures were necessary to support the financial sector and the economy more broadly. Similarly, the deflation experienced by many countries in the interwar period is also typically seen as evidence of massive policy mistakes, such as the failure of the Federal Reserve to prevent widespread bank insolvencies and the fact that many countries maintained their gold parities despite the collapse of demand following the onset of the Great Depression.¹²

But if episodes of deflation are due to policy failures, what tools can policy makers use to avoid them?

4.1 Monetary policy

Since inflation – and therefore deflation – is a monetary phenomenon, it is avoidable by appropriate monetary policy actions. It is useful to distinguish between monetary policy in the "standard" case in which policy-controlled interest rates are positive, and the "non-standard" case when they have reached zero and cannot be reduced further.

4.1.1 Monetary policy when interest rates are positive

Given the costs of deflation, the best policy strategy is to prevent it from arising rather than to deal with it when it has become a fact.¹³ When interest rates are positive, the central bank can reduce the risk of deflation by cutting interest rates further. In this case there is no analytical difference between preventing inflation from falling too low and preventing deflation from taking hold. Yet two points deserve being mentioned.

First, since modern macroeconomic theory holds that inflation is forward-looking and depends on expected future inflation, it becomes important for central banks facing falling prices to engender expectations that inflation will over time return to a low positive number.¹⁴ To do so, it is helpful to adopt a formal numerical objective for inflation. Precisely how that is done – whether by announcing a target for inflation or by adopting price stability as the overriding objective for monetary policy and buttress this with numerical definition thereof – appears to be less important. The ration-

12 For a discussion of the role of the gold standard in the transmission of the Great Depression, see Eichengreen (1992).

13 See Bernanke (2002) and IMF (2003).

14 Woodford (2003) is the by now classic reference. See also Galí (2008).

ale for such an objective is that, if it is credible, the public will expect inflation in the future even if prices are falling today, which depresses the expected real interest rate and supports demand.¹⁵

However, to be effective, such an objective should be adopted before the inflation rate reaches zero. If economic conditions then worsen, the central bank can demonstrate its commitment to the objective by cutting interest rates aggressively. If, by contrast, the objective is adopted when prices are already falling and policy-controlled interest rates are at zero, the public may doubt whether the central bank has sufficiently powerful tools to deliver on any announced inflation objective. The objective will thus lack credibility and the public may simply disregard it, which risks damaging the central bank's credibility.

Second, since monetary policy is likely to be less effective when policy rates have reached zero, it makes sense for the central bank to cut interest rates increasingly aggressively as the policy rate approaches zero. The argument that central banks should avoid cutting interest rates to zero since they then have no policy lever left to use if inflation falls further seems incorrect, since the likelihood that additional policy easing is needed will decline if rates are cut aggressively at an early stage of the easing process.¹⁶ This is consistent with theoretical models that predict a stronger decline in long interest rates and therefore a greater reaction of the economy, the longer the interest rate is maintained at a low level.

4.2.2 Monetary policy when interest rates are zero

While the fact that policy controlled interest rates cannot be cut below zero complicates the management of monetary policy, the importance of this constraint has frequently been exaggerated. As a preliminary, note that if the rate of deflation is moderate, the zero lower bound need not imply unreasonably high real short-term interest rates. As an illustration, the average overnight interest rate in the euro area between January 1999 and October 2008 was 3.2%. In the same period, HICP inflation averaged 2.2%, resulting in an average real short-term interest rate of 1%.¹⁷ Thus, if policy rates reached the zero lower bound, deflation rates of 1% could be accommodated without pushing real interest rates above their historical mean.¹⁸ Of course, while it would be desirable to have even lower real interest rates during a recession, it seems that the zero lower bound does not necessarily imply very high real short-term interest rates.

More importantly, the zero lower bound does not render monetary policy ineffective. First, monetary policy impacts on the economy through a range of interest rates

15 To further strengthen this effect, the central bank could announce a price level target above the current price level. This has the added effect of requiring the central bank not only to raise the rate of inflation if it falls too low, but also to compensate for the fact that prices may previously have fallen below the targeted rate. A price level target is a key ingredient of the *foolproof* way of escaping deflation suggested by Svensson (2001).

16 However, pegging the overnight rate at zero makes it difficult to revive the interbank market since in that situation a bank has no financial incentive to incur the credit risk associated with interbank lending.

17 Inflation is defined as the realized change of prices over the past 12 months.

18 For comparison, in Japan the CPI (excluding fresh food) fell by 4.9% between September 1997 and February 2005, with a peak rate of deflation of 1.5%.

and not only through the overnight rates that central banks control. Many observers have noted that even if overnight interest rates reach zero, longer-term interest rates are likely to remain positive. For instance, at the present stage with the policy rate in Japan being 0.1%, 10-year yields are around 1.25%. In the US, where it currently is the Federal Reserve's intention to keep the federal funds rate in the interval 0 to 0.25%, 10-year yields are around 2.5%. By purchasing long-term government bonds, central banks can reduce their yields, leading to valuation gains for bond holders and an improvement of their balance sheets, and depress other interest rates that use them as reference rates. The valuation gains may be particularly important if the bonds are held by the banking system, in which case the balance sheet effects could reduce perceptions of credit risk in the interbank market and help spur additional bank lending when the economic outlook improves.¹⁹

Furthermore, even in a situation in which all government bond yields have declined to zero, yields on private debt instruments will typically be positive. As emphasized by Buiter (2003), as long as some nominal yields are positive, central banks can stimulate the economy by purchasing these securities and driving yields down to zero.

Second, monetary policy also impacts through credit availability effects. Bernanke (2009) notes that concerns about credit risk may limit the willingness of banks to extend credit even in the hypothetical case in which all interest rates have reached zero. If so, the central bank can provide credit directly to borrowers. The Federal Reserve's recent purchases of commercial paper provide an illustration of how this can be done.

Of course, central bank purchases of long bonds and private assets raise a number of questions. For instance, the central bank can experience capital losses on its long bond portfolio if economic prospects improve and yields rise. Similarly, purchases of private assets raise questions about credit risk.²⁰ However, these issues can be overcome by the financial authorities assuming any capital losses the central bank becomes exposed to as a consequence of such operations. This indicates how important close co-operation between the central bank and the financial authorities is in the present situation.

Third, monetary policy also impacts on the economy through the exchange rate channel, which remains effective even if the interest rate channel has become dysfunctional. For instance, by depreciating the exchange rate a central bank can stimulate the economy and raise the rate of inflation. While this is a "beggar-thy-neighbour" policy, it may be seen by other countries as appropriate if the shock triggering deflation is idiosyncratic. At the current juncture, where a number of countries are exposed to rapidly slowing demand, this strategy is of course not available. Moreover, efforts to provide macroeconomic stimulus by depreciating the exchange rate may in this case well turn out to be counterproductive if policy makers in other economies seek to undo the resulting appreciation of their currencies.

19 These valuation gains are greater for longer maturity bonds, and greater the lower the level of interest rates is. To see this, note that the price, p , of an n -period pure discount security and the yield, r , are related as follows $p = (1+r)^{-n}$ (e.g. Wickens 2008, p. 267).

20 They also raise the issue what criteria the central bank should use when determining what private asset to buy.

Overall, even if policy-controlled interest rates were to reach zero, monetary policy retains considerable potency.²¹ Indeed, some observers worry that there is a risk that the vigorous easing of monetary policy across the world in recent months risks leading to a burst of inflation. How concerned should we be about that possibility? It is difficult to see why central bank could not withdraw the policy stimulus at the same rate as it was introduced: interest rates can be increased as rapidly as they were cut and assets purchased by central banks can be liquidated rapidly if economic conditions improve. (Moreover, to the extent that the central banks' operations have been in short-dated instruments or repos, they will naturally mature within a short time span.)

However, given the lags between changes in monetary policy and their impact on the economy, the risk remains that the measures already taken will only impact on the economy as it starts to recover on its own. Central banks must thus remain alert and ready to respond, potentially, rapidly when the economy starts to recover.

4.3 Fiscal policy

Monetary policy in most countries is geared towards maintaining low and stable inflation, although that is not always the overriding target of policy. As inflation falls towards zero, interest rates are therefore adjusted to limit the risk of deflation. Moreover, since the stance of monetary policy can be changed rapidly in response to changing economic circumstances, it is natural for it to be the first line of defence against deflation. But monetary policy cannot on its own ensure that deflation is avoided. For that, fiscal policy measures are likely to be needed. These can come in at least two forms.

First, episodes of deflation associated with instability in the banking system are likely to have particularly serious effects on output and employment. Banks that have sustained large losses and have seen their capital evaporate are likely to want to scale back their balance sheets. Perceptions of credit risk may impair their ability to participate in interbank markets, triggering liquidity problems in these markets and, in severe cases, leading to runs on the banks. Furthermore, to improve their balance sheets, banks are likely to reduce leverage by contracting lending, which can depress aggregate demand sharply. To restore banks' creditworthiness, the infusion of public funds may become necessary. The measures taken in recent months by many countries to support banks' balance sheets will help reduce the risk of deflation.

Second, changes in government purchases or taxes that boost spending can also play an important role in staving off deflation. While it is possible to think of cases in which fiscal policy has no impact on aggregate demand – for instance, a permanent increase in government spending may be offset by one-for-one fall in permanent income and consumption; a debt financed tax cut may have no impact if there is debt neutrality – those seem unrealistic and of limited practical relevance.²²

Overall, if deflation materializes, fiscal policy measures have a role to play in supporting the financial system and in boosting aggregate demand.

21 This is the main message in Bernanke (2002) and Buiter (2003).

22 See the discussion in Buiter (2003).

5. Emerging markets issues

The repercussions of the financial crisis are increasingly felt globally, raising the question of how exposed emerging markets economies are to the risk of deflation. While it is difficult to draw any firm conclusions, some special considerations that arise for these countries are readily apparent.

First, many emerging market economies have a high commodity concentration in their exports. Since commodity prices have fallen sharply, these countries have been exposed to a highly contractionary shock, raising the likelihood of deflation. On the other hand, their initial inflation rates were relatively high (partially on account of the Balassa-Samuelson effect), allowing inflation to fall further than in the industrialized world before turning negative. Moreover, commodity prices rose sharply before falling. Thus, the decline partially offsets an expansionary shock.

Second, fixed exchange rate regimes are more common in emerging markets economies than in advanced economies. If the exchange rate is fixed, the entire burden of adjustment to a shock will fall on the nominal price level.²³ This suggests that the risk of deflation is greater in economies with fixed exchange rates. Interestingly, China, Hong Kong SAR and Argentina (before the abandonment of the currency board regime), which all managed or fixed the exchange rate against the US dollar, have all experienced periods of deflation in the last two decades.

Third, while considerable progress has been made in the last decade or two, the credibility of monetary policy is generally lower in emerging markets economies than in advanced economies. As a consequence, expectations of future inflation may be relatively sensitive to the current rate of inflation. If headline inflation turns negative, this could engender expectations of further price falls and raise the likelihood that deflation will take hold. This suggests that it may be beneficial to clarify the objectives for monetary policy by adopting an inflation target or a numerical definition of price stability.

Fourth, while financial institutions in emerging markets countries had less direct exposure to structured financial products than banks in advanced economies, they are directly exposed to the rapid downturn in the industrial economies and to the process of global deleveraging. Furthermore, in some transition economies foreign banks play a dominant role in the domestic banking system. This provides a direct channel of transmission, and exposes emerging markets economies to the risk that if the foreign banks were to experience difficulties, they could withdraw from the market leaving the host country with a much reduced banking system at a time of great economic stress.

Fifth, the degree of downward nominal wage rigidity is likely to be lower in emerging markets economies (although there may be large variations between countries), many of which have a large informal sector. If so, the onset of deflation may tend to raise real wages by less than otherwise, which in turn may support employment and economic activity.

23 Gerlach and Gerlach-Kristen (2006) demonstrate that the rate of inflation in Hong Kong SAR, which has maintained a peg to the US dollar for more than a quarter century, has been higher and more volatile than inflation in Singapore, which has used a managed float.

6. Conclusions

The main policy conclusions to draw from this paper are four.

First, past episodes of deflation are best seen as reflecting policy mistakes or an inability to forge a political consensus about how policy should be conducted.²⁴ The economics of stopping a deflation is straightforward and calls for aggressive easing of monetary and fiscal policy, and, when it is associated with financial instability, measures to support the financial system.

Second, the rise of inflation between mid-2007 and mid-2008 and its subsequent decline appear to have been largely due to fluctuations in food and oil prices, and not to changes in the underlying rate of inflation. While it seems highly unlikely that the world economy will slip into generalized deflation in the coming year, some economies may experience a few months or quarters of falling prices, to a large extent because of the collapse of oil and food prices. That said, it makes good sense for policy makers to review their contingency plans in this area and to consider the potential benefits of adopting an inflation target or a numerical definition of price stability well before the economy risks slipping into deflation.

Third, the interest rate channel of the monetary transmission mechanism does not become ineffective simply because short-term policy-controlled interest rates reach zero. It remains operational as long as some interest rates – including those on long-term government debt and private securities – are positive. Furthermore, monetary policy also remains effective if some market participants are unable to borrow at the prevailing level of interest rates because of perceptions of credit risk. The central bank can then, in theory, purchase debt issued by these borrowers and expand aggregate demand.

Fourth, monetary policy may be unable to stop deflation if it takes hold, and fiscal policy measures to shore up the banking system and to expand aggregate demand may become necessary. While it is possible to think of situations in which fiscal policy is ineffective, those are not likely to be of much practical relevance.

Appendix: Deflation and output growth, 1882 – 1939

It is difficult to assess the risk and the consequences of deflation because very few economies, with the notable exceptions of Japan and Hong Kong SAR, have experienced a prolonged period of falling prices since the end of the Second World War.²⁵ Any broad analysis must therefore be based on data from before 1939. Table I shows the mean inflation rate and output growth rate for ten countries using data in the period 1882 to 1939. Deflation is defined as a decline of the CPI lasting at least two years. Moreover, given that the deflation episodes in the interwar period may have been different from those before the First World War, the table presents results for the two subperiods 1882-1913 and 1923-39. In interpreting the results it should be kept

²⁴ Historically, many cases of deflation reflect beneficial supply shocks.

²⁵ This Appendix draws on material prepared by the author and published in BIS (1999, pp. 77-80).

Table 1 Average annual growth rates in percent

	Deflation periods		Non-deflation periods	
	Inflation	Output growth	Inflation	Output growth
1882-1913				
Belgium	-4.2	1.6	1.5	2.1
Canada	-4.7	1.1	1.1	4.6
Denmark	-3.5	2.8	1.8	3.0
France	-1.1	2.1	0.2	1.6
Germany	-2.0	4.0	1.8	2.6
Italy	-1.2	1.3	1.4	2.2
Japan	-3.7	1.8	4.4	2.7
Sweden	-2.8	2.0	2.2	3.3
United Kingdom	-3.0	1.4	1.0	1.9
United States	-3.7	-1.2	1.4	4.4
<i>Average</i>	-3.0	1.7	1.7	2.8
1923-1939				
Belgium	-5.6	-1.1	8.7	2.6
Canada	-6.2	-8.6	0.6	6.6
Denmark	-5.0	2.3	3.0	3.5
France	-5.8	-1.9	10.2	3.7
Germany	-6.4	-2.2	1.6	7.1
Italy	-5.4	1.1	6.1	3.4
Japan	-6.7	0.9	5.7	6.6
Sweden	-3.0	2.7	1.5	4.2
United Kingdom	-3.1	0.6	1.9	4.1
United States	-4.2	-3.8	1.8	7.3
<i>Average</i>	-5.1	-1.0	4.1	4.9
1923-1939, excluding 1930-1933				
Belgium	-3.8	1.3	9.6	2.7
Canada			0.6	6.6
Denmark	-5.8	3.0	2.9	3.5
France	-6.1	-1.8	11.1	4.4
Germany			1.6	7.1
Italy	-5.5	3.1	6.1	3.4
Japan	-4.2	0.5	6.3	7.9
Sweden	-3.3	5.9	1.5	4.2
United Kingdom	-2.3	1.8	1.9	4.1
United States	-1.6	1.1	1.8	7.3
<i>Average</i>	-4.1	1.9	4.4	5.1

in mind that historical data were of lower quality than modern data and that the structure of the economy has evolved fundamentally over the last century. In particular, services, which are cyclically more stable and less likely to experience falling prices, are much more important in modern economies.

Evidently, periods of declining price levels were quite common before the First World War. More strikingly, output growth was positive in these periods, although not as high as in periods of rising prices. By contrast, in the 1923 – 1939 period, deflation episodes were associated with falls in real output. However, this finding appears

to be entirely due to the occurrence of the Great Depression, which was characterized severe financial turmoil, exacerbated by insufficiently aggressive monetary policy. Income growth rates were also positive in the second subsample if the years 1930-33 are disregarded. Overall, this suggests that episodes of deflation are particularly worrisome if they coincide with periods of financial instability.

It is interesting to hypothesize why periods of declining prices were generally not associated with severe recessions. One possibility is that deflation episodes have historically occurred at times of relatively favourable aggregate supply movements. Another explanation is that prices did not fall long or far enough to engender extrapolative expectations of further price decreases and thus to raise expected real interest rates.

References

- Bean, Charles (2008), "Some Lessons for Monetary Policy from the Recent Financial Turmoil." Remarks at Conference on Globalisation, Inflation and Monetary Policy. Istanbul, 22 November 2008.
- Bernanke, Ben S. (2002), "Deflation: Making Sure "It" Doesn't Happen Here," Remarks before the National Economists Club, Washington D.C.
- Bernanke, Ben S. (2009), "The Crisis and the Policy Response," Stamp Lecture, London School of Economics.
- BIS (1999), 69th Annual Report, Basel.
- Buiter, Willem H. (2003), "Should We Worry about Deflation? Prevention and Cure," 2003 McKenna Lecture on International Trade and Economics; Perspective on the Economy.
- Buiter, Willem H. (2009), "Fiscal Strategy and Sustainability." See this volume.
- Eichengreen, Barry (1992), *Golden Fetters: The Gold Standard and the Great Depression 1919-1939*, Oxford University Press.
- Fehr and Götte (2005), "Robustness and Real Consequences of Nominal Wage Rigidity," *Journal of Monetary Economics*, 52, 779 – 804.
- G-20 (2008), "Declaration of the Summit on Financial Markets and the World Economy." Available at <http://www.whitehouse.gov/news/releases/2008/11/20081115-1.html>.
- Galí, Jordi (2008), *Monetary Policy, Inflation and the Business Cycle: An Introduction to the New Keynesian Framework*, Princeton University Press.
- Gerlach, Stefan (2007), "Interest rate setting by the ECB, 1999-2006: Words and deeds." *International Journal of Central Banking*, 3, 1-45.
- Gerlach, Stefan and Petra Gerlach-Kristen (2006), "Monetary policy regimes and macroeconomic outcomes: Hong Kong and Singapore." In: *Monetary Policy in Asia: Approaches and Implementation*, BIS Papers No. 31. (Also published as BIS Working Paper 204).
- Gerlach, Stefan and Peter Kugler (2007), "Deflation and price dispersion: Evidence from Japan and Hong Kong." Unpublished working paper.
- IMF (2003), "Deflation: Determinants, Risks, and Policy Options – Findings of an Interdepartmental Task Force." Mimeo. Available at www.imf.org.

- Ito, Takatoshi (2009), "Zero interest rate policies and quantitative easing." See this volume.
- HKMA (2008), *Half-Yearly Monetary and Financial Stability Report*, December.
- Mishkin, Fredric S. (2009), "Is Monetary Policy Effective During Financial Crisis?"
- Svensson, Lars E.O (2001), "The Zero Bound in an Open Economy: A Foolproof Way of Escaping from a Liquidity Trap," *Monetary and Economic Studies* (Special edition), Bank of Japan, 19, 277 – 312.
- Wickens, Michael (2008), *Macroeconomic Theory: A Dynamic General Equilibrium Approach*, Princeton University Press.
- Woodford, Michael (1994), "Non-Standard Indicators for Monetary Policy: Can Their Usefulness be Judged from Forecasting Regressions?" in N.G. Mankiw, *Monetary Policy*, Chicago University Press.
- Woodford, Michael (2003), *Interest and Prices: Foundations of a Theory of Monetary Policy*, Princeton University Press.

Zero Interest Rate Policy (ZIRP) and Quantitative Easing (QE)

Takatoshi Ito

University of Tokyo and CEPR

Executive summary

Deflation is bad, because even with the nominal interest rate being lowered to zero, that is the lower bound, the real interest rate stays positive. If deflation does not last long, the inflation expectation may stay positive, so that the forward-looking real interest rate could be negative. It is most important to end deflation quickly, and keep inflation expectation positive.

What could the central bank do beyond ZIRP to stimulate the economy? Many researchers have suggested variants of unconventional monetary policies. Most of them fall into a category of the broadly-defined quantitative easing (QE)-that is, an expansion of the central bank balance sheet by purchasing risk assets that the central bank normally would not buy. QE variants differ with respect to (1) what is its primary purpose; (2) what would be the target instrument and communication strategy; (3) what assets to buy; and (4) how to influence inflation expectation.

The Bank of Japan tried one version of QE from 2001 to 2006 and, right now, the Federal Reserve, followed by several European central banks, is trying another version, which it says is "credit easing" (CE), rather than (a Japanese-type) QE. Will ECB soon follow suit? Will BOJ again go into ZIRP/QE again? If all of them do simultaneously, we will enter an environment of global ZIRP and QE-clearly uncharted territory of international macro/finance.

With adoption of ZIRP by several major central banks, the effectiveness of QE in one country would be diminished, since one channel of stimulus from ZIRP, namely, the exchange rate depreciation, would not be available. Coordination among central banks may become important for this reason. All countries, if possible, want to depreciate to help encourage exports and discourage imports under a deflationary environment, but not all of them can do so simultaneously. Thus, some currencies have to appreciate vis-à-vis others. Who should that be? Countries with large trade surpluses are obvious candidates.

Under a *global ZIRP* environment, a country with large trade surpluses with positive GDP growth should refrain from large scale intervention since intervention to prevent appreciation would be equivalent to a beggar-thy-neighbor policy.

The ZIRP/QE experiences of the Bank of Japan from 1999 to 2006 offers important lessons, some to follow and some not to follow. Based on Japan's experience from 2001-2006 and on-going experience of FRB, and with anticipation of what is coming to Europe, the following policy recommendations seem to emerge.

Effective policy to fight deflation requires that the central bank (a) communicate

the intention, objective, and target of ZIRP/QE policies; (b) prevent the inflation rate from falling into the negative territory for an extended period with extensive purchase of risky assets; (c) keep various securities markets functional by direct purchase of those securities, if the markets become dysfunctional; (d) find tools and strategies to keep inflation expectations in the positive territory; and (e) at the time of exit, err on the side of later than earlier.

1. Introduction

In postwar history, we have only a few episodes of the zero interest rate policy (ZIRP) combined with quantitative easing (QE): The Bank of Japan (BOJ) from 1999 to 2006, and the Federal Reserve Board (FRB) in recent months are prominent examples.¹ However, several other major central banks will have to introduce ZIRP/QE in 2009 if gloomy economic predictions are realized.

The purpose of this note is to review facts of the BOJ ZIRP/QE policy, to draw lessons learnt from the BOJ ZIRP/QE, to show the difference between BOJ QE and FRB QE, and to point out some issues associated with global ZIRP/QE if BOE, ECB, and some other G20 countries adopt ZIRP/QE.

2. The Bank of Japan experience of ZIRP/QE

2.1. ZIRP, the first episode, February 1999 – August 2000

The Bank of Japan adopted the zero interest rate policy (ZIRP) in February 1999 in response to extremely weak economic conditions combined with lingering banking sector weakness. The growth rate in 1998 was negative and major banks were suffering from shortage in their capital in the process of writing off bad loans. Major banks were scheduled to receive the second capital injection in March 1999, as the first capital injection in March 1998 was apparently not enough.

The February decision was to lower the policy rate to 0.15% immediately, and to induce the rate lower as soon as possible. By mid-March, the rate was near zero, and in April, the Governor mentioned that ZIRP would continue until "the deflation concern would be dispelled".² The inflation rate measured by CPI excluding fresh food had become zero and had been declining since mid-1998. With that crisis mode, the decision of ZIRP came too late. *The first lesson is that ZIRP should not be delayed when*

1 The ZIRP does not necessarily mean literal 0.00% policy rate, although that was the case in the BOJ experience, 2001-2006, when the excess reserve as well as required reserve was not remunerated. In 2008, the Bank of Japan has lowered the policy rate to 0.1%, and excess reserves are subject to remunerated deposit rate at the Bank of Japan. This is effectively ZIRP. The FRB lowered the policy rate to the range 0.00 - 0.25%, with the remunerated deposit rate at 0.1%. This is another case of ZIRP.

2 Some may argue that the ZIRP had not been adopted firmly until April 1999. But for simplicity, I date the Japanese first ZIRP started in February 1999. See Okina and Shiratsuka (2004), Ito (2004a) and Ito and Mishkin (2006) for details of developments and statements of policy decisions.

the economy is sharply declining, and the inflation rate is also fast declining toward zero. The Bank of Japan should have adopted ZIRP soon after the banking crisis of November 1997 broke out and credit crunch became evident. ZIRP of 1999 came one year too late.

The exit from ZIRP in August 2000 by the Bank of Japan turned out to be too early. The Bank had to return to ZIRP, although it was combined with QE, in March 2001, only seven months later. At the time of exit in August 2000, the inflation rate was still negative, although the degree of deflation had been moderating. However, the prospect of economic growth should have been weak, as the IT stock bubble was bursting in the United States and other major stock markets, including Tokyo. The decision of lifting the ZIRP in August 2000 was opposed by the government, as the government representative tabled a motion to delay voting by one monetary policy meeting (about one month later). The government representatives, who do not have voting power, have a right to table such a motion, according to the Bank of Japan Law. The motion of "delay" was voted down by 8 to 1, and the motion by the Governor to raise the interest rate from zero to 0.25% was approved by a 7 to 2 majority.

The economy deteriorated in the fall of 2000, and it became clear that economic stimulus was needed by spring of 2001. The fact of back pedaling to ZIRP, although presented as QE, in March 2001 showed that the prediction and judgment by the government (Ministry of Finance and Cabinet Office), objecting to the end of ZIRP in August 2000, was more prudent than the Bank of Japan's. Also, a suspicion that the Bank of Japan would err on the side of too early exit rather than too late exit was proven. This was a substantial damage to the reputation and credibility of the Bank of Japan. *The second lesson from this episode was that a commitment to err on the side of "late" would be important in getting out of deflation.*³

The Bank of Japan may have proved itself in standing tall and "independent" by rejecting a transparent objection by the government, but it eventually lost credibility. The renewed fight against deflation with QE starting March 2001 was much tougher due to this lost credibility. Accountability was lacking, as Governor Hayami after reintroduction of ZIRP with QE in March 2001 did not explain what went wrong: whether the objective was wrong; whether a forecasting model was wrong; or whether judgment was wrong.

In the literature of central banking, an "inflation bias" caused by the government preferring a higher output, is always cited as a reason for central bank independence, but the incident of August 2000 shows that the Bank of Japan had a "deflation bias."⁴

In October 2000, the Bank of Japan initiated a semi-annual "Outlook" paper, in

3 Theoretical underpinning of this lesson can be given by modeling inflation expectations depending on the future policy commitment (Krugman (1998)) and by modified Taylor rule argument, taking into account the zero bound of the nominal interest rate (Oda and Ueda (2005)).

4 This was almost expected as Governor Hayami was quite negative on calls for additional measures, including quantitative easing in his speech in March 2000. He cautions against the danger of inflation and is against the policy to call for aiming at inflation rate of 2 to 3 percent since inflation once occurred would be difficult to control. He sounded like fighting inflation in the midst of deflation. See Hayami (2000).

which Monetary Policy Board members' forecasts were shown in a range, much like the FRB's FOMC participants' forecast in semiannual Humphrey Hawkins testimony documents. In the first Outlook, the forecast horizon was just the current fiscal year (April 2000 to March 2001). Members' forecasts for CPI (excluding fresh food) ranged from -0.5 to -0.1, while the trimmed range (excluding one max and one min each-similar to "central tendency" in FRB) was from -0.4 to -0.2. This is remarkable, since just two months earlier, they had voted to raise the interest rate (with no major events in between). The MPC members were not afraid to raise the interest rate in the midst of deflation. Many observers saw contradiction to the commitment of April 1999, in that ZIRP would continue until the "deflationary concern would be dispelled."

Also in October 2000, the Bank issued a document called "On Price Stability." Such a document had been promised since the spring of that year.⁵ That was expected to be an attempt to define price stability in a transparent manner, possibly with a quantitative definition. It turned out to be a disappointment. The October document defined price stability as a state that is neither inflationary nor deflationary – a tautology.⁶ (Much later in March 2006, the Bank of Japan published a document that says the "understanding" of price stability in quantitative points of all members ranging from 0.0 to 2.0.)

In sum, the too-early exit, from ZIRP, not only in hindsight but in real time, revealed that the Bank was too eager to raise the interest rate at the earliest opportunity. When ZIRP was restored with an additional feature of excess reserve target (QE), the market was still skeptical on how long the Bank would continue ZIRP/QE.

Against this criticism, the Bank of Japan came up with a new commitment: The QE/ZIRP would continue until the CPI (ex fresh food) inflation rate becomes "stably above zero." This was an indirect way of admitting the mistake of August 2000-without saying so. (Later, in 2003, "stably" was further defined as zero or above zero "for a few months" and no prospect to falling back to deflation) The definition of inflation (CPI ex fresh food) and the floor condition for an exit was finally defined. At this point, a desirable (target) rate of inflation was still not defined.

2.2. Quantitative Easing (QE)-excess reserve targeting

The current account balance, essentially the sum of required reserve and excess reserves, at the Bank of Japan became a new target, and maintaining the target balance above required reserve meant that the interbank interest rate would be automatically zero (ZIRP), given that excess reserves were not remunerated back then, and that more than enough liquidity would be provided to the interbank market. In order to induce the commercial banks to deposit to the non-remunerated current account at the BOJ, ample liquidity had to be injected by purchasing qualified securities.

This policy can be called QE-reserve targeting. The level of current account target was initially set at 5 trillion yen while the required reserve was about 4 trillion yen.

5 See Hayami (2000) for mentioning the initiation of the study in March 2000 as a part of enhancing transparency.

6 See Ito (2004a) for in-depth analysis on why the Bank of Japan was reluctant to define price stability in the quantitative manner.

Shortly after this policy was introduced, required reserves went up to 5 trillion yen, when the postal bank became a part of commercial banking system, and the QE target was raised to 6 trillion.

The current account balance target was increased from December 2001 to January 2004 in several steps. From January 2004 to March 2006, the target level was maintained at 30-35 trillion yen, while the required reserve was at around 6 trillion yen.

The QE- reserve targeting was ended in March 2006 and the policy target became ZIRP. It took several months to mop up excess liquidity and the interest rate was raised by 0.25% in July 2006, citing that the CPI (ex fresh food) inflation rate had been above zero for several months. This was the end of the second ZIRP period.

As one of the measures to increase overall liquidity, possibly influencing the slope of the yield curve, the Bank of Japan increased the amount of monthly (gross) purchase of long-term bonds. The purchase of long bonds had been done practiced on the assumption that monetary base had to increase with the nominal GDP growth and the long-term growth of monetary base can be provided with long-term assets on the liability side. However, the increase of monthly purchase of long-term bonds during the period between August 2001 and October 2002 was for helping increase the liquidity provision and, possibly, lowering the long-term interest rate. The monthly purchase was increased from 400 billion yen to 600 billion yen in August 2001; 600 billion yen to 800 billion yen in December 2001; 800 billion yen to 1 trillion yen in February 2002; and 1 trillion yen to 1.2 trillion yen in October 2002. The rapid increase reflects implies that the Bank was less reluctant in purchasing long-term bonds-no risk if held to maturity-than other kinds of risk assets.

It is also important to note that the increase in long-term bond purchases was done under Governor Hayami, while large jumps in the target amount of QE were done under Mr. Fukui, who became Governor in March 2003. Governor Fukui's communication was clearer in carrying out large increase in QE.

When the QE-reserve targeting was wound up in 2006, the amount of monthly purchase of long-bonds did not change.

These changes in long-bonds purchase and QE were shown in Figure 1.

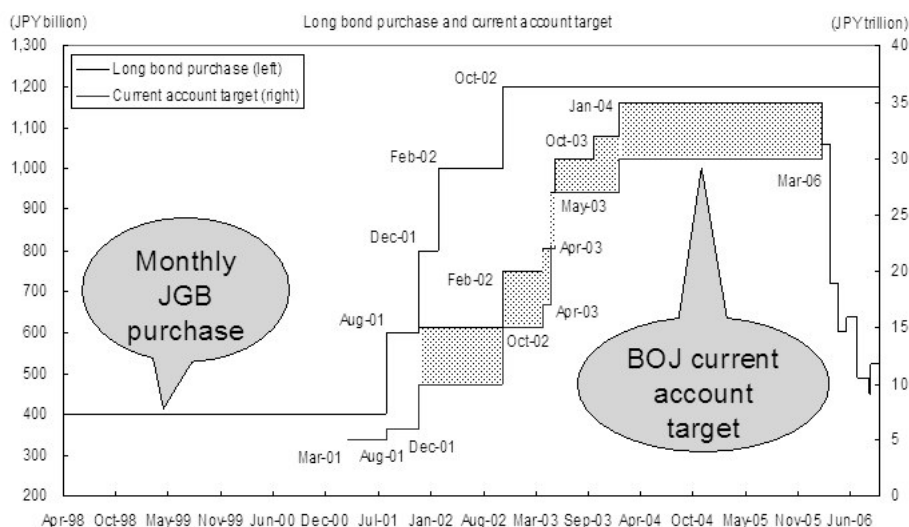
2.3. Assessment of QE-reserve targeting

It is not immediately clear from the traditional theoretical monetary policy models how QE- reserve targeting would help the economy recover from stagnation and deflation. Even if money supply increases, as monetarists would recommend in fighting deflation, if most of increases of M2 is in the central bank reserve-that is, smaller money multiplier-then the real side of economy (investment and consumption) would hardly be stimulated.

There are *four different channels* that QE-excess reserves contributed to restoring financial stability, helping economic recovery and fighting deflation.

First, it was expected to, and it did, have had strong effects on financial systemic stability. Since there was ample liquidity, a sudden death of a commercial bank due to liquidity shortage became extremely unlikely. So, *counterparty risk in the interbank market was lessened*.

Second, it was also *expected, but did not happen, that credit crunch would not happen for the reason of liquidity shortage*. However, bank loans were not dramatically increas-

Figure 1 BOJ increased the purchase of JGBs and current account balances (excess reserves)

ing at all during the QE period, because banks were concerned with their capital adequacy ratios and deteriorating credit worthiness of corporations. When the economy was stagnant and stock prices were falling, it would be very difficult to encourage Japanese banks (or any other banks) to lend more, even with expanding QE. The task should be taken up by financial supervision policy and fiscal operations in terms of capital injection to commercial banks.

Third, QE-reserve targeting had sent a message to market participants that ZIRP would continue for some time, and there would not be an abrupt end like August 2000. This has been called the "*policy duration effect*" (see Oda and Ueda (2005)). As extra liquidity provided to the market, and it would take time to take out liquidity from the market, ZIRP would be guaranteed for some time. At the time of introducing QE in March 2001, there was also a commitment, in that the exit would not come until the inflation rate would be stably above zero. With high target of QE and the commitment of a clear exit condition, the medium- and long-term interest rates came down. Therefore, the yield curve would become flatter: the zero interest rate up to approximately one year, and flatter slope up to ten years. Then borrowers with investment project and potential house buyers may be encouraged to borrow and invest, provided that the expected inflation rate for a longer term stays stable (that is, not dragged down with the nominal interest rate). That would raise aggregate demand.

Fourth, with ZIRP in place with policy duration effects, commercial banks may find it safe and profitable to invest in interest bearing securities like long-term bonds, high-grade corporate bonds, equities, and low-grade corporate bonds. This is called "*portfolio rebalance effects*."

Ugai (2007) provides a comprehensive survey of empirical work related to the policy duration effect and the portfolio rebalance effects. For policy duration effects, Baba et al. (2005), Oda and Ueda (2005) and Okina and Shiratsuka (2004) confirmed that the effect was strong in lowering the 3-year to 5-year JGB interest rate. The effect became even stronger in late 2002.

As for portfolio rebalance effects, Kimura and Small (2006) found some effects on high-grade corporate bonds (a 10 trillion excess reserve increase depressed the spread of Aa bonds by 1 to 4 basis points), but not on equities and low-grade corporate bonds.

Long bond purchases by BOJ were increased from gross purchase of 400 billion yen per month before QE to 1.2 trillion yen per month in October 2002. Oda and Ueda (2005) actually did not find the measurable impact of this policy on the JGB yield. Kimura and Small (2006) found some effects from BOJ's increased JGB purchases on high grade corporate bond yield, but not in the low-grade corporate bonds.

The Bank of Japan also purchased equities directly from commercial banks from 2002 to 2004 for the reason of financial stability, and, as the Bank of Japan emphasizes, not for monetary policy.⁷ More than 2 trillion yen worth of equities were purchased. Japanese commercial banks' holding of equities contributed to significant uncertainty over the prospect of their Basle Capital Adequacy Ratio, as 45% of valuation gains can be counted toward tier II capital, but evaluation losses had to be deducted from tier I capital. What was once a cushion in CAR became a liability by 2002. The Bank of Japan decided to avoid self-fulfilling prophecy of banks' selling equities in loss cut that would actually cause the equity price to decline, that would induce more loss cut selling.

3. Variants of QE

3.1. BOJ

What the Bank of Japan did not do as QE, despite many economists were the following.⁸ (1) Purchase of foreign currency denominated government securities; (2) Outright purchase of corporate debts (except Asset Back securities); (3) Purchase of REITs; (4) Purchase of equities as monetary policy; and (5) Guarantee of interbank liabilities. Svensson (2001) recommended that BOJ would purchase foreign bonds that would amount to unsterilized intervention. This would have two benefits via probably depreciation of the yen, preventing deflation through imported inflation and stimulating exports. Svensson called this a foolproof way out of deflation.

In Japan, foreign exchange intervention is under the Ministry of Finance jurisdiction, as foreign reserves are held in the fiscal special account. (See Ito (2007) for this mechanism.) The Ministry of Finance conducted massive yen-selling intervention from January 2003 and March 2004, coincided with BOJ expansion of its balance sheet. This may be viewed as unsterilized intervention, but it was explained as a "coincidence" by then Deputy Governor of Bank of Japan. (See Ito (2004b))

Important lessons of ZIRP and QE from the experiences of the Bank of Japan are that it is important (a) to communicate the intention, objective, and target of those policies; (b) to prevent the inflation rate from falling into the negative territory for an

7 See Ito (2004a) for political economy over the debate of purchasing equities by the Bank of Japan. The purchase was decided in the "regular" meeting of monetary policy board, and not in the "monetary policy" meeting of the same board.

8 See Meltzer (1999, 2001), Svensson (2001), and others summarized in Ito and Mishkin (2006).

extended period; and (c) to find ways to influence inflation expectation. BOJ failed in some of these criteria and succeeded in some.

3.2. FED, credit easing

The Federal Reserve has expanded its balance sheet in 2008, much faster than BOJ did from 2001 to 2003. Bernanke (2009) explained the action as "credit easing" to make it differentiated from BOJ experiences. The difference is best explained by his own words:

"The Federal Reserve's approach to supporting credit markets is conceptually distinct from quantitative easing (QE), the policy approach used by the Bank of Japan from 2001 to 2006. Our approach--which could be described as "credit easing"--resembles quantitative easing in one respect: It involves an expansion of the central bank's balance sheet. However, in a pure QE regime, the focus of policy is the quantity of bank reserves, which are liabilities of the central bank; the composition of loans and securities on the asset side of the central bank's balance sheet is incidental. Indeed, although the Bank of Japan's policy approach during the QE period was quite multifaceted, the overall stance of its policy was gauged primarily in terms of its target for bank reserves. In contrast, the Federal Reserve's credit easing approach focuses on the mix of loans and securities that it holds and on how this composition of assets affects credit conditions for households and businesses. This difference does not reflect any doctrinal disagreement with the Japanese approach, but rather the differences in financial and economic conditions between the two episodes. In particular, credit spreads are much wider and credit markets more dysfunctional in the United States today than was the case during the Japanese experiment with quantitative easing."

From these explanations, we arrive at the conclusion that QE has many forms. QE has several variations regarding (1) what is the primary purpose; (2) what would be the target instrument and communication strategy; (3) what assets to buy; and (4) how to influence inflation expectation. Therefore we need to make it clear which QE we are talking about. The Bank of Japan, in 2001-2006, went for QE-reserve targeting, hoping that providing ample liquidity to banks would change their behavior to lend more and that the yield curve would be flattened to stimulate aggregate demand. The yield curve did become less steep, but bank lending did not pick up the pace. The Federal Reserve in 2008 directly intervened in the credit and capital markets and purchased the securities and provided guarantees. This CE (credit easing) action seems to be based on a recognition that the BOJ QE-reserve targeting was rather ineffective.

3.3. Balance sheet concern

A common concern in expanding central bank balance sheet, either by BOJ style or FRB style, is the possible losses from holding risky assets, like corporate bonds. In fact, the concern was one of the reasons that the Bank of Japan did not take bolder actions. Here it becomes crucial that the central bank and the fiscal authority must cooperate. The central bank has to put the health of the economy ahead of the health of its balance sheet, and the fiscal authority has to find an implicit or explicit mechanism to fill losses from the central bank action of holding risk assets for the sake of economic recovery. The fiscal authority can take reduced payment of seigniorage from the central bank over the years, directly inject capital (if losses wipes out capital), or reim-

burse the losses in risky securities holding in joint facilities, such as Maiden Lane that would assume possible liabilities of Bear Stearns assets.

The trust between the central bank and the fiscal authority is a key. The Bank of Japan in 2001-2006 did not have such a trust, possibly due to a crash over lifting the first ZIRP in August 2000. The FRB and the Treasury seem to enjoy such a trust. It would be a challenge for ECB to build such trust with 16 different fiscal authorities of the euro area.

4. Implications of *global* ZIRP

When several major economies simultaneously fall into ZIRP, the effectiveness of QE is diminished as a stimulus via exchange rate depreciation may be limited.

When Japan was suffering from stagnation while other major economies were booming like the late 1990s, the correct policy prescriptions for Japan included currency depreciation. Currency depreciation is a potent weapon for getting out of deflation because it works directly via imported inflation and indirectly through stimulation of output among the export sectors. Japan needed this help in 2001-2006, and other major countries that were growing at healthy pace did have room to absorb exports from Japan. Japan did maintain the zero interest rate, and as other countries raised interest rates, the widening interest rate gap induced the yen to depreciate in 2004 to 2006.

Moreover, Svensson (2001) recommended non-sterilized intervention as a fool-proof way of getting out of deflation. Whether it is a result of natural consequences of monetary base expansion or a result of outright non-sterilized intervention, the currency depreciation should be considered as a part of the prescription. However, currency depreciation becomes difficult when ZIRP is practiced by many countries simultaneously. Some currency has to appreciate to help others. The burden of appreciation should be shouldered by a country with large trade surpluses with relatively sound financial system and growth prospects.

5. Inflation targeting

Flexible inflation targeting has been popular among many OECD and emerging market central banks. It has been argued that successful inflation targeting has effects of stabilizing inflation targeting. In the current context, anchoring inflation expectation, say, at around 1-2 % has the following benefits. Even if actual inflation rate becomes negative, the public continues to believe that the inflation rate would return to 1-2% in the medium term (say, two to three years). The investment and consumption decision would be based on *negative real* interest rate (ZIRP minus positive nominal expected inflation) that is stimulative, rather than a positive interest rate, that is contractionary. Thus, credible, flexible inflation targeting would be beneficial to managing the economy during a deflationary period.

QE-reserve targeting by the BOJ in 2001-2006 had "policy duration effects" that

flatten the yield curve by lowering the long-term interest rate. The lower long-term interest rate can be a result of low inflation rate expectation, or low real interest rate expectation, or both. The credible inflation targeting may lower expected real interest rate, but not the nominal rate. An introduction of credible inflation targeting amidst deflation may be counterproductive by raising the inflation expectation and in turn raising the nominal long-term interest rate. This logic was also used as one of the objections to inflation targeting proposal to the Bank of Japan. Thus, it is important to have credible inflation targeting regime during a normal period with positive inflation rate, and to use it to prevent the inflation expectation falling into deflation territory in the beginning phase of deflation. As the central bank shows resolve to get out of deflation in a short period, inflation targeting may be a useful tool.

The Federal Reserve of the United States, the ECB (Eurosystem) of the Euro Area and the Bank of Japan have not adopted inflation targeting. Would it be better for them to adopt inflation targeting at this juncture? Although the Group of Big Three (G3) central banks have not declared inflation targeting, some of them have improved on many of the pre-conditions for inflation targeting, such as independence, transparency, communication strategy, and history of inflation rates, with some deficiency remaining.

The Bank of Japan has been quite negative on adopting inflation targeting during the ZIRP period and even after the exit from ZIRP. Ito (2004) discussed the political economy of the inflation targeting debate in Japan during ZIRP period. He summarized the Bank of Japan's opposition as follows.

"In fact, inflation targeting became somewhat a symbol of additional steps that the Bank of Japan should or should not take, since in order to achieve a positive inflation rate target, some of the unconventional measures have to be taken. Most of the Board members and staff economists of the Bank spoke out negatively about inflation targeting. Several reasons were mentioned. First, inflation targeting was characterized as a simple-minded reflation policy and rejected. Second, no country had adopted inflation targeting to increase an inflation rate from the state of deflation. Third, there was no policy measures, given that the interest rate was zero, are available to lift the inflation rate to the positive territory so that announcement of inflation targeting, without tools to achieve, would damage the credibility of the Bank. Fourth, a mere announcement of an inflation target would not change expectation. Fifth, if the public happens to believe in the inflation targeting, the long-term interest rate would increase and it would damage the economy."

6. Conclusion: Policy Recommendations

Based on Japan's experiences of ZIRP from February 1999 to August 2000, and ZIRP and QE from March 2001 to March 2006, and FRB's experience of credit easing from mid-2008 to now, with some forecasts on what will be coming in Europe, the following policy recommendation seems to emerge.

- (1) Determination and communication of a do-everything attitude to avoid a prolonged deflation is critically important. Arriving at ZIRP should not be delayed until the inflation rate reaches zero. Inflation targeting-such as aiming at returning to 1-2 percent inflation rate in three years-may be helpful as a clear, transparent message.

- (2) The authorities should not hesitate to expand the central bank's balance sheet by buying risk assets that would most effectively restore financial stability. Many variations of QE should be considered and attempted. In this respect, the FRB actions to purchase wide range of securities are remarkable and commendable. It is firmly believed at the FRB that restoring the economic health is more important than keeping the central bank's balance sheet clean and riskfree.
- (3) It is important for ensuring the end of deflation to have a commitment to err on the side of late than early for the timing of exit and an implementation of easier-than-usual monetary policy after the exit of ZIRP.
- (4) Global ZIRP would shut down one channel of recovery, that is, stimulus via currency depreciation. Under a global ZIRP environment, a country with large trade surpluses with positive GDP growth should refrain from large scale intervention since intervention to prevent appreciation would be equivalent to a beggar-thy-neighbor policy. The currency of a relatively strong economy should appreciate (at least in the *real effective* exchange rate) in the globally deflationary environment.
- (5) The trust between the central bank and the fiscal authority is important to induce the central bank to take bold actions in QE and/or CE.
- (6) Globally-coordinated fiscal stimulus is desirable, but room for sustainable fiscal deficits is quite different from a country to another. The higher the debt ratio is, the more constrained is the country in implementing fiscal stimulus. Even in these countries, current fiscal spending associated with structural reform removing inefficiency and with subsidies to green innovations, with a promise to raise a less-distortionary tax in the medium run may be prudent fiscal policy under the circumstance.

References

- Baba, Naohiko, (2006), "Financial Market Functioning and Monetary Policy: Japan's Experience," *Monetary and Economic Studies*, vol. 21, Special Edition, December: 39-71.
- Baba, Naohiko; S. Nishioka; N. Oda, M. Shirakawa, K. Ueda, and H. Ugai, (2005), "Japan's Deflation, Problems in the Financial System and Monetary Policy," *Monetary and Economic Studies*, vol. 23, no. 1: 47-111.
- Bernanke, Ben S. (2009). "The Crisis and the Policy Response," At the Stamp Lecture, London School of Economics, London, England, January 13, 2009.
- Bernanke, Ben S. (2003). "Some Thoughts on Monetary Policy in Japan," Before the Japan Society of Monetary Economics, Tokyo, Japan, May 31, 2003.
- Hayami, Masaru, (2000). "Price Stability and Monetary Policy" Speech given to the Research Institute of Japan, Tokyo, March 21.
- Ito, Takatoshi, (2007). "Myths and reality of foreign exchange interventions: An application to Japan", *International Journal of Finance & Economics*, Volume 12, Issue 2, April 2007: 133-154.
- Ito, Takatoshi (2004a). "Inflation Targeting and Japan: Why has the Bank of Japan not

- adopted Inflation Targeting?, " in Christopher Kent and Simon Guttman (eds.) *The Future of Inflation Targeting*, August 2004: 220-267, available at <http://www.rba.gov.au/PublicationsAndResearch/Conferences/2004/Ito.pdf>.
- Ito, Takatoshi (2004b). "The Yen and the Japanese Economy, 2004." C. F. Bergsten and J. Williamson, (eds.) *Dollar Adjustment: How Far? Against What?*, ch.8, Washington, D.C.: Institute for International Economics: 171-196
- Ito, Takatoshi (2009). "How Close Are They to Inflation Targeting: BOJ, FRB, and ECB?" Presented at the AEA meeting January 3, 2009
- Ito, Takatoshi and Frederic S. Mishkin. (2006). "Two Decades of Japanese Monetary Policy and the Deflation Problem," in T. Ito and A. Rose, (eds.) *Monetary Policy with Very Low Inflation in the Pacific Rim*, NBER-University of Chicago Press: 131-193.
- Kimura T. and D. Small, (2006). "Quantitative Monetary Easing and Risk in Financial Asset Markets," *The B.E. Journal of Macroeconomics*, vol. 6, no. 1,
- Krugman, Paul (1998), "It's Baack! Japan's Slump and the Return of the Liquidity Trap," *Brookings Papers on Economic Activity* 1998, vol. 2, pp. 137-187
- Meltzer, Allan H. (1999). "Comments: What More Can the Bank of Japan Do?" *Monetary and Economic Studies*, vol 17, December: 189-191.
- Meltzer, Allan H. (2001), "Monetary Transmission at Low Inflation: Some Clues from Japan," *Monetary and Economic Studies* 19, no. S-1, Bank of Japan, February: 13-34
- Oda, Nobuyuki and Kazuo Ueda (2005). "The Effects of the Bank of Japan's Zero Interest Rate Commitment and Quantitative Monetary Easing on the Yield Curve: A Macro-Finance Approach," CARF Discussion Paper, No. F-013, University of Tokyo, 2005.
- Okina, Kunio and Shigenori Shiratsuka (2004). "Policy Commitment and Expectation Formation: Japan's Experience under Zero Interest Rates," *North American Journal of Economics and Finance*, vol. 15: 75-100.
- Svensson, L.O. (2001), "The Zero Bound in an Open Economy: A Foolproof Way of Escaping from a Liquidity Trap," Bank of Japan, *Monetary and Economic Studies*, vol. 19, no. S-1, February: 277-312
- Ugai, Hiroshi (2007), "Effects of the Quantitative Easing Policy: A Survey of Empirical Analyses," *Monetary and Economic Studies*, vol. 25, March: 1-47:

Fiscal Sustainability

Willem Buiter

*European Institute, London School of Economics and
Political Science and CEPR*

Introduction

In this short paper I shall discuss the following issues. Section 1 reviews the usefulness of debt and deficits for smoothing consumption over time and the limits on this usefulness due to aggregation constraints in a closed global system. Section 2 discusses fiscal sustainability. Section 3 considers the conditions under which different fiscal stimuli will boost aggregate demand, output and employment, nationally and globally. Section 4 considers the effect of sovereign default risk on the expansionary effect of fiscal policy. Section 5 considers the effect of a credit squeeze on effective supply and Section 6 reviews neoclassical fiscal measures, that emphasis intertemporal substitution effects over income effects.

1. Debt and deficits

Debt is a wonderful and dangerous social invention. It permits individuals and groups of individuals to smooth consumption over time. Another way to put this is that it permits saving to be decoupled from investment. When I borrow, I can absorb more resources for consumption and investment than are provided by my current income. Such borrowing creates a legal obligation to repay the debt with interest at some future date. Because the net financial benefit from adhering to the terms of a debt contract sooner or later become negative for the borrower, and because the anticipation of future access to borrowing facilities and a concern for one's reputation are often imperfect contract enforcement mechanisms, self-enforcing debt contracts are rare in the private sphere and third-party or external contract enforcement tend to be the rule.

This is less true for sovereign borrowing. External or third-party enforcement of sovereign debt contracts is unusual, although countries can at times be forced or bullied by other nations to meet some of their external obligations – the deposit insurance obligations of the foreign branches of Icelandic banks assigned to/imposed on the Icelandic sovereign by the British, Dutch and German authorities, are an example. Self-enforcement is, however, the rule for sovereign debt contracts. Repetition and reputation can sustain debt service that would not be individually rational in a one-shot or single-stage game. That is why it is essential that governments honour the sovereign debt bequeathed to them by their predecessors, even if the new gov-

ernment disapproves of the spending programmes or tax cuts that generated that debt.

The scope for consumption smoothing created by borrowing is often much less impressive in equilibrium, when the interaction of all participants in the economic game are fully taken into account, than they appear to be when we consider the options open to an individual would-be borrower (individual, government or country) facing a much larger national or global economy. In equilibrium, I can only borrow if someone else is willing to lend. In a closed economy, the government can only borrow more if the private sector borrows less. In an open economy, a nation can only reduce its external borrowing if the rest of the world is willing to increase its external borrowing or to reduce its net external lending.

Proposition 1: *The current global economic slowdown makes it desirable for every country to seek to increase its external trade balance. This is logically impossible and represents an invitation for conflict. Countries with unsustainable external deficits (e.g. the USA) should seek to boost their trade balances and de-emphasize domestic demand relative to countries with unsustainable external surpluses (e.g. China), which should seek to boost domestic demand and reduce their trade balance surpluses.*

2. Fiscal sustainability

Fiscal sustainability is a useful conceptual tool, but not an operational concept. Technically, a fiscal-financial-monetary programme is sustainable if the authorities have not taken a leaf from Bernie Madoff's handbook and are not engaged in an open-ended pyramid scheme or Ponzi finance scheme, in which existing debt – both interest and principal repayments due – is serviced forever by issuing additional debt.

Formally, this means that the present discounted value of the sovereign's terminal debt goes to zero as the terminal period recedes into the infinitely distant future. It can be restated as the prima-facie operational requirement that the outstanding value of the non-monetary debt of the sovereign or the state (the consolidated general government and central bank) be no larger than the present discounted value of current and future primary budget surpluses of the state. The primary surplus of the state is the financial budget surplus of the state – the consolidated general government and central bank – minus net interest income plus the monetary issuance of the sovereign (the change in the stock of base money issued by the central bank). This can be written as the simple requirement that the permanent share of the state's primary surplus in GDP, \bar{s} , be no less than the outstanding stock of sovereign non-interest-bearing debt as a share of GDP, d , times the difference between the long-term real interest rate on the sovereign debt, \bar{r} and the long-run growth rate of real GDP, \bar{n} . So the smallest permanent share of the state's permanent surplus in GDP that is consistent with solvency of the sovereign is given by:

$$\bar{s} = (\bar{r} - \bar{n})d \quad (1)$$

This is very similar to the expression for the current-period state primary surplus (as a share of GDP), s , that just stabilised the debt-to-GDP ratio. This is given by

$$s = (r - n)d \quad (2)$$

where r is the current real rate of interest on the public debt and n is the current rate of growth of real GDP. The difference between the sustainability condition (1) and the debt-to-GDP ratio stabilising primary surplus of the state given in (2) is that \bar{s} , the permanent primary surplus as a share of GDP, is the *long-run average* ratio of the primary surplus of the state and that \bar{r} and \bar{n} are likewise future long run average values of the real interest rate on the public debt and the growth rate of real GDP respectively.

Unfortunately, three of the four key parameters in (1) are unobservable. First, the long-run real interest rate on the public debt and the long-run real growth rate of GDP are uncertain and have to be estimated and predicted. The net debt-to-GDP ratio is, in principle, measurable and verifiable. Unfortunately, governments have developed the habit of hiding significant liabilities and contingent exposures in off-budget and off-balance sheet constructs, so measuring d accurately is no trivial matter.

Given d and estimates of the long-run real interest rate and growth rate, the minimal required permanent surplus as share of GDP to achieve solvency can simply be calculated from (1). Whether the permanent primary surplus (as a share of GDP) of the state that is predicted, expected or planned is indeed at least as large as \bar{s} depends on a host of economic, social and political factors, including the determination and credibility of present and future governments, the willingness of the citizens to pay higher taxes or accept lower public spending programmes and the ability and willingness of the central bank to extract real resources through the issuance of base money – seigniorage.

It is in principle possible for a policy maker to announce a thousand years of primary deficits followed by an eternity of sufficiently large primary surpluses that (1) is satisfied. No government has the credibility to commit itself and its successors to such a strategy. The markets have therefore become doubting Thomases: they want to see before they believe. The best guide to future primary surpluses is the government's capacity for generating primary surpluses in the past, when doing so was not easy. Only costly signals are credible. Governments with a history of procyclical behaviour during the upswing will met with market scepticism (in the form of higher CDS rates and higher spreads of their sovereign debt rates over that of best-of-breed benchmarks, like Bunds or US Treasury bonds) when they announce counter-cyclical behaviour in the downswing while promising higher taxes and/or lower spending in the next upswing.

Both (1) and (2) show that the minimum required primary surpluses (for long-run solvency or for stabilising the debt-to-GDP ratio at its current level) will increase whenever the real interest rate on the public debt increases. A higher sovereign debt default risk premium will be one possible cause of such an increase. Sovereign default risk spreads have increased sharply in the current crisis, even in the Eurozone, reaching 300 basis points for 10-years sovereign debt instruments. A vicious 'positive feedback' mechanism from a higher debt burden to a higher default risk premium to a higher deficit and a further increase in the debt burden becomes a possibility, since, letting Δ denote 'change in':

$$\Delta d = -s + (r - n)d \quad (3)$$

If the default risk premium cannot be addressed directly, say through guarantees from other, more solvent governments or from international organisations with deep pockets, the only way to stabilise the potentially explosive debt-deficit spiral is through larger primary surpluses, that is, higher taxes, t , as a share of GDP, lower public spending, g , as a share of GDP, or increases seigniorage – issuance of base money by the central bank, or σ , as a share of GDP:

$$s = t - g + \sigma \quad (4)$$

Proposition 2: *Even operationally independent central banks must recognise that their profits or (equivalently) their monetary issuance are an important source of revenue/means of financing for the state. This is true regardless of whether the official monetary policy rate is at its zero floor or above it. Quantitative easing (expansion of the monetary base through purchases of government securities) is an especially important source of revenue for the sovereign whenever short-term interest rates are well below long-term interest rates. Close cooperation between the monetary and fiscal authorities is necessary to achieve the right timing and magnitude of monetization of public debt and deficits, and the reversal of this monetization when the economy recovers. When done competently, these co-operative and coordinated actions will not threaten the price stability mandate of the central bank.*

The financial crisis threatens government solvency through what amounts to an increase in the stock of net debt, d . This can take the form of guarantees for and insurance of bank assets or liabilities, injections of capital financed through government debt issues etc. Much of the exposure is contingent and technically off-balance sheet. From the perspective of the fiscal sustainability, however, all these contingent liabilities should be priced (e.g. using real option pricing methods) and added to d and the marked-to-market value or marked-to-model value of any (contingent) assets the government may have acquired as part of its banking sector or financial sector bail-out operations should be subtracted from d .

Proposition 3: *From the point of view of (1) getting the maximum bang per buck as regards stimulating aggregate demand, and (2) minimizing moral hazard (creating bad incentives for future reckless lending and investment by rewarding past reckless lending and investment, the fiscal authorities should guarantee or insure flows of new lending and credit, including securitisation, but not outstanding stocks of loans, credit, or securities.*

3. When does a fiscal stimulus boost aggregate demand?

A fiscal stimulus is a key weapon in the policy arsenal used to address an undesirable weakening of aggregate demand. For the policy to make sense, either an increase in public spending on goods and services (public consumption or investment) or a tax cut (which includes an increase in transfer payments) must raise aggregate demand at a given price level, wage, interest rates, exchange rates and other asset prices. In the textbook IS-LM model this means that the fiscal measure shifts the IS curve to the

right. We may still not get any effect on output and employment, even if the IS curve shifts to the right, because there is 'financial crowding out' through higher interest rates, lower asset prices or a stronger exchange rate or because there is 'real crowding out' through scarce real resources on the supply side; real crowding out or 'factor market crowding out' occurs through rising real wages and other real factor costs, and through rising inflationary pressures.

But unless the fiscal stimulus shifts the IS curve to the right, it achieves nothing at all – we don't even have to investigate whether there is financial or real crowding out.

Ricardian equivalence

Tax cuts

Even if financial markets were perfect, life-cycle theories of consumption would imply that postponing taxes by government borrowing (that is cutting taxes today and raising them by the same amount in present discounted value at some later date) boosts aggregate consumption demand because it redistributes resources from people with longer expected remaining life-spans (the young and the unborn (future generations) to people with shorter expected remaining life-spans (the old and those currently alive). Strictly speaking, this requires that the tax cuts (transfer payments) be labour income tax cuts or lump-sum tax cuts or transfer payments accruing to persons (owners of human wealth -the non-traded present discounted value of future after-tax labour income), rather than tax cuts on the returns to or on the value of non-human, financial and real assets that are traded and owned by those currently alive. Life-cycle principles imply that, because people try to smooth consumption over the life-cycle, the old will have a higher marginal propensity to consume out of current income than the young. The unborn of course don't consume at all (at any rate prior to conception).

To negate these life-cycle arguments for an expansionary demand effect from tax cuts, the Ricardian equivalence or debt neutrality school assumes (1) that the government always satisfies its intertemporal budget constraint (there is no default risk on public debt) and (2) that aggregate consumption can be viewed as the consumption of a single, representative infinite-lived consumer. The awkward fact that people are born, live and die is finessed by assuming that everyone is linked to all past and future generations through an unbroken chain of operative intergenerational bequest motives.

Stating the assumptions required for Ricardian equivalence to hold is to deny its relevance. Postponing taxes through borrowing, without changing the present discounted value, will boost aggregate demand because it redistributes resources from the young to the old, from the unborn to those currently alive and from permanent-income or life-cycle households to households constrained by liquidity and current disposable income (Keynesian households).

A key point to note is that these aggregate-demand-boosting redistributions can also be achieved without the need for public deficits. If we can identify the young and the old and the life-cycle and Keynesian consumers, and if we have sufficiently rich arsenal of taxes and transfers, we can do balanced-budget redistributions that will boost aggregate consumption.

Proposition 4: *Balanced-budget redistribution between households with different marginal propensities to spend out of current income can boost demand as effectively as deficit financed tax cuts. Examples include the following:*

1. *An increase in social security retirement pensions financed fully by higher social security contributions by workers and employers (pensioners have a higher mpc than workers).*
2. *An increase in student grants financed fully through a levy on financial wealth (students are likely to be liquidity-constrained, unlike owners of financial assets).*
3. *An increase in short-term unemployment benefit financed by a reduction in long-term unemployment benefit (short-term and temporarily unemployed workers are more likely to be liquidity-constrained.)*

The consumer-oriented tax cuts and transfer payment increases recommended in the IMF Staff Position Note, 'Fiscal Policy for the Crisis' (Spilimergo et. al. (2008)) overlap mostly with what I recommend here (increased unemployment benefits, increases in earned income tax credits and the expansion of safety nets in countries where such nets are limited (e.g. China).

Support for homeowners facing foreclosures, including a write-down of mortgages using public resources, only makes sense if it does not amount to an involuntary mortgage write-down imposed on the banks and other mortgage lenders. Unless fiscal resources are actually made available to make the lenders no worse off than they would have been under voluntary restructuring and write-downs of mortgages, support for homeowners facing foreclosures would worsen conditions in the financial sector, and would also reduce the availability of private mortgage financing for future borrowers. It would be a classic example of populist politics, looking after the insiders (existing distressed mortgage borrowers) at the expense of the outsiders (future mortgage borrowers).

Increased public spending on goods and services

Even if there is Ricardian equivalence for tax cuts or increases in transfer payments, a temporary increase in public spending on goods and services (exhaustive public spending) will stimulate demand. The reason is that a one-year (say) increase in public consumption or investment of \$1 bn will, reduce permanent income by much less than \$1bn – to a reasonable approximation, private consumption would only fall by an amount given by the product of the long-term real interest rate and \$1 bn – maybe by \$30 mn or so. In the Ricardian view, a permanent increase in exhaustive public spending would not boost aggregate demand, as it would lower permanent income and thus private consumption by the same amount as the permanent increase in public spending.

If the Keynesian consumption function with its liquidity-constrained consumers describes reality, a balanced-budget increase in public consumption or investment spending (funded with higher taxes or lower transfer payments) would boost aggregate demand.

Proposition 5: *A temporary increase in public consumption or investment will always boost public spending, even if the budget is kept balanced. If there are liquidity-constrained households, even a permanent balanced-budget increase in public spending on goods and*

services will boost aggregate demand.

Different types of 'crowding out'

The conditions for Ricardian equivalence are unrealistic and don't hold in practice. Just because expansionary fiscal policy can stimulate aggregate demand at a given value of current and future prices, wages, interest rates, exchange rates and other asset prices does not mean that it will boost demand when the response of prices, wages, interest rates, exchange rates and other asset prices to the fiscal stimulus is allowed for. Three of crowding out can be distinguished: financial crowding out, real resource crowding out and direct crowding out.

Financial crowding out

Financial crowding out occurs through the response of interest rates, the exchange rate and other asset prices to past, current and anticipated future fiscal actions. The textbook examples in the IS-LM framework are interest rate crowding out when the path of the nominal stock is kept constant and exchange rate crowding out under a floating exchange rate. Interest rate crowding out will be full or 100% when the nominal money stock is kept constant and velocity is constant. Even when the monetary authorities peg the short nominal interest rate, there will be full crowding out of an (unanticipated, immediate, permanent) fiscal expansion under perfect international capital mobility when the exchange rate floats and there are no doubts about the fiscal sustainability of the government's fiscal-financial-monetary programme. A smaller trade surplus (larger trade deficit) undoes the effect of the fiscal stimulus on output through an appreciation of the nominal and real exchange rate.

A large country or region (like the USA or the Eurozone) could use domestic expansionary fiscal policy to raise domestic demand to the extent that its actions raise the world real and nominal interest rate, but even for large countries or region, a significant part of a domestic fiscal stimulus may end up raising output abroad through larger imports and reduced exports.

This discussion has three obvious implications:

Proposition 6: *international coordination of cooperatively designed fiscal stimuli is likely to be necessary to allow the internalisation of the effective demand externalities of a fiscal stimulus through the trade balance and the real exchange rate.*

Proposition 7: *Cooperatively designed international fiscal stimuli must be modulated according to the 'fiscal spare capacity' of each country, that is, according to its ability to generate (and to commit itself credibly to generate) larger future primary government surpluses.*

Proposition 8: *Very large fiscal deficits and public debt issuance by rich countries will risk crowding out sovereign and private sector borrowers from emerging markets and developing countries. Longer-term risk-free global real interest rates are likely to rise.*

Real resource crowding out

Real resource crowding out occurs when, regardless of the degree of financial crowding out, real resource constraints (capital and labour bottlenecks) limit the expansion

of output in response to a fiscal impulse. It will tend to be accompanied by rising prices and wages, often by rising real wages and by rising inflationary pressures. In an open economy, the domestic supply constraint on real final demand can be relaxed through the trade balance. For the world as a whole this is not possible. Fiscal policy cannot relax physical supply-side constraints in the short run, if one ignores the relevance of changes in labour income taxes and other taxes on labour supply in a world where the problem is growing involuntary unemployment. However, I shall argue in Section 5 that credit policy may reduce working capital constraints on production and employment, so credit easing policies may relax effective (financial) supply constraints on output, that could permit a fiscal stimulus to have a stronger expansionary effect.

Direct crowding out

The effect on aggregate demand of an increase in public spending on real goods and services depends not only on the way it is financed and on the marginal propensities to consume of current and future tax payers. It also depends on whether the real resources consumed or invested by the state are direct substitutes for or complements with private consumption and investment. Public spending on free public education and healthcare may be a substitute for private spending on education and healthcare. Public spending on policing is a substitute for private spending on security guards and other means of enhancing personal security and keeping private property safe. Public infrastructure spending (roads, railroads) may boost private investment in tourism or residential construction. There is hardly any hard evidence on the presence and importance of such direct crowding out or crowding in. The issue is not considered in Spilimbergo et. al. (2008). But it is something that could usefully be taken into account when setting priorities for the detailed composition of public spending programmes.

4. Sovereign default risk and the expansionary effect of fiscal policy

If a tax cut or an increase in public spending is deficit-financed, and if markets do not believe it to be certain that the government or its successors will raise future taxes (including monetary issuance) or cut future public spending by the same amount in present discounted value terms as the up-front tax cut or public spending increase, perceived default risk will increase and the government's cost of borrowing will rise. Government borrowing rates tend to set a floor for private sector borrowing rates. Although it is possible that the private sector could borrow on better terms than its sovereign, such situations are few and far between.

A sufficiently large increase in the government deficit (or an increase in the effective net public debt through any other mechanism) could therefore increase the default risk premium on the public debt to such an extent that the net effect of the tax, spending and financing decisions on aggregate demand could be negative. Note that this has nothing to do with Ricardian Equivalence, which assumes that the government never defaults but instead always meets its intertemporal budget constraint.

So far, in most of the industrial world and in the emerging markets, the increases

in sovereign default risk premia have not been of sufficient magnitude to create worries about the effectiveness of expansionary, debt-financed policy through this default-risk driven financial crowding out mechanisms. In a number of countries, including the US, the UK and Germany, the decline in the risk-free rate for a while was larger than the increase in the default risk premium on the sovereign debt and the total cost of government borrowing actually declined. This situation began to reverse itself at the end of 2008, and both government default risk premia and long-term interest rates on sovereign debt have been rising. In a number of European countries (Greece, Ireland, Spain, Portugal, and some of the Central and Eastern European countries) sovereign default risk premia have now risen to the point that financial crowding out of debt-financed fiscal stimuli seems quite likely.

In other large countries, including the US, the UK, Germany and France, we may not yet have reached that position. The accumulation of public debt and of other hard or contingent exposure to the banking sector, other financial institutions and instruments (AIG, Fannie Mae, Freddie Mac), and non-financial enterprises deemed too large, too interconnected or too politically connected to fail (GM, Chrysler, Opel, Renault, Airbus), is such, however, that financial crowding out through rising sovereign default risk premia could become a real issue soon. In that case, only balanced-budget measures or central bank money-financed support measures would have any expansionary effect.

Deficit-financed fiscal stimuli should be modulated across countries according to the 'fiscal spare capacity' in that country. This is the difference between the current permanent primary surplus and the maximum value of the permanent primary surplus that is economically, administratively and politically sustainable. We must not be fooled by the contemplation of the very high public debt to GDP ratios found in the US and the UK immediately after WWI and WWII. The willingness of the public to make great sacrifices, including fiscal sacrifices in order to pay down a debt incurred in a noble, national cause – a war against an evil aggressor – is not present today. The increases in public debt we have seen in recent years and are likely to see in the next few years, were incurred as a result of a war on ourselves. The political constraints on spending cuts and tax increases are much tighter than they were immediately following WWII, when the US had public debt around 120% of GDP and the UK around 220% of GDP. Don't take that as a guide to what the fiscal authorities will be able to get away with today.

Another way of putting this is that nations like the US and the UK have much less *social capital* today than they had in 1945. Citizen's *trust* in government, both as regards its competence, but more importantly as regards its veracity – its capacity to live up to its commitments and promises is at an all-time low. Both in the US and in the UK, the polity is much more *polarised* today than it was in 1945. This increased polarisation is not the same as the increased inequality in income and wealth that characterises both countries, although the two may well be driven by common third factors.

The increased political polarisation and is reflected, especially in the US, in the existence of a large number of de-facto veto groups, that can prevent the imposition of higher taxes or cuts in public spending. In the US Congress, Democrats are likely to veto any future cuts in public spending, and Republicans any future increase in future taxes. In such a deadlocked society, current tax cuts and public spending

increases are likely to be ineffective in boosting demand, because the market anticipates corrective that future fiscal restraint is unlikely to be forthcoming. Longer term nominal and real interest rates will rise, both through higher risk-free rates and through higher inflation and exchange rate depreciation risk premia (if the unsustainable government deficits are eventually monetised) and higher sovereign default risk premia (if the unsustainable government deficits eventually lead to sovereign default).

In the UK, the stronger position of the executive branch of government and a docile parliament make a US -style deadlock unlikely, so a determined executive could, in all likelihood, cut taxes and raise public spending today and reverse the stimulus at some cyclically appropriate future time. The key question in the UK is how likely it is that a future executive will have both the insight and the courage to inflict the necessary fiscal pain.

5. Will a fiscal stimulus work as effectively when the economy has been hit by a credit crunch?

The credit crunch is now hitting the non-financial enterprise sector hard. How does a fiscal boost affect demand when the enterprise sector is credit-constrained? If the constraints are tight enough, they will weaken and may even completely neutralise the effect of a fiscal stimulus on output and employment. This is most easily seen if production is subject to a lag (inputs go in before saleable output comes out). This means that firms need working capital to get production going. Increased demand can be met from inventories, and that may provide some working capital, but once inventories have been worked off, the credit constraint on production and employment becomes binding.

The notion that a credit crunch could lead to effective supply constraints being binding in the market for goods and services, even if demand is depressed, was first developed by the South-American structuralist school of Raul Prebisch and Celso Furtado, and its neo-Structuralist successors (e.g. Lance Taylor and Domingo Cavallo (1977)), although its antecedents go back much further to the Austrian school of Hayek, Mises and to Marx.

The "Austrian" or working capital supply side model of the supply side was introduced into mainstream macroeconomic analysis by Alan Blinder (1987), but it has not become part of the standard professional tool set (for a non-technical description, see Buiter (2008)). I believe that the Great Credit Crunch of the Noughties will demonstrate its usefulness, because of its key assumption that production cannot take place without credit. A severe contraction in economic activity induced by a credit crunch could, if effective supply contracts even faster than effective demand, lead to greater upward pressure on prices or inflation than would be inferred by considering the output gap defined not as the gap between effective demand and effective supply, but instead between effective demand and notional supply. Notional supply or potential output, which is determined by the available physical resources of capital, land and labour and is independent, in the short run, of the cost and availability of

credit.¹

Proposition 9: *Because production takes time, working capital is essential. Policies to provide credit to the non-financial enterprise sector may therefore be a precondition for expansionary fiscal policy to have any material demand on production and employment. Qualitative easing or credit easing is therefore likely to be complementary to fiscal policy in economies badly affected by a credit squeeze.*

Neoclassical fiscal measures

Keynesians believe in the power of (current) income effects on spending. Neoclassical economists believe in the power of the intertemporal substitution effect. Why not use both when there is no additional price tag attached to the Neoclassical effect?

A temporary VAT cut

I believe the temporary VAT cut introduced in the UK by Chancellor Darling last year (2.5% down now to 15%, up 20% after 13 months), and which was given such a hard time by many observers, made sense. In principle, twisting the intertemporal terms of trade like that causes consumers to switch their expenditures (especially on durables) to the temporary low tax period. It so happened that the fierce price wars that were going on at the time may have drowned out these relative minor cuts, but apart from that (and apart from the menu costs inflicted on restaurants and shopkeepers), this was not a stupid idea. Perhaps a cut to 10 % for a shorter period would have made more impact on the cognitively challenged, but the principle of using the substitution effect where it reinforces the income effect is surely correct.

A temporary investment tax credit/subsidy

Provided there is no binding external finance constraint on investment, a temporary investment tax credit or investment subsidy could be an effective means of shifting investment towards the present. The budgetary cost of such measures (which target just the flow of new investment) is much lower, for a given effect on investment demand, compared to that of measures that both target the flow and give a boost to owners of existing capital, as a cut in corporation tax or in the capital gains tax would.

Conclusion

Fiscal sustainability imposes strict limits on the amount of additional government debt that can be incurred as part of a fiscal stimulus plan. A globally coordinated fiscal stimulus, modulated according to national fiscal spare capacity is desirable. Initially, much of the resulting deficits can be monetised by the central banks (quan-

¹ In the long run, the physical capital stock is endogenous and is therefore affected by the cost and availability of finance. Working capital can affect effective supply at much shorter horizons, of months or quarters.

titative easing) without risking an undesirable increase in inflation. But when the global and national economies recover, the earlier appropriate increase in global liquidity will become inflationary, unless it is reversed promptly. Unless the markets are convinced that future tax increases or public spending cuts commensurate with the massive additional public debt that will be issued during the next two or three years will indeed be implemented, the spending stimulus may well be crowded out through increases in sovereign default risk premia. Even if sustainability and solvency are not deemed to be at risk, the enormous forthcoming public debt issues by rich countries are likely to crowd out foreign currency borrowing by governments and private parties in developing countries and emerging markets and put upward pressure on real risk-free interest rates.

References

- Blinder, Alan S (1987), "Credit Rationing and Effective Supply Failures," *Economic Journal*, Royal Economic Society, vol. 97(386), pages 327-52, June, obtainable with a subscription from JSTOR).
- Buiter, Willem H. (2008), "Credit crunch, effective supply failure and stagflation", *Financial Times* Maverecon blog, <http://blogs.ft.com/maverecon>, October 19.
- Cavallo, Domingo F. (1977), "Stagflationary Effects of Monetarist Stabilization Policies," unpublished Ph.D. dissertation, Harvard University.
- Spilimbergo, Antonio, Steve Symansky, Olivier Blanchard and Carlo Cottarelli (2008), "Fiscal Policy for the Crisis", IMF Staff Position Note, December 29, SPN/08/01.

Financial Crises: Mechanisms, Prevention and Management¹

Markus K. Brunnermeier

Princeton University

The recent financial turmoil has led to disruptions in credit flow second only to the one during the Great Depression in the 1930s. Building on my earlier work in Brunnermeier (2009), this article first outlines the underlying amplification mechanisms that turned several hundred billion dollars of losses in the subprime mortgage market into a multi-trillion dollar destruction of wealth. The understanding of these mechanisms is an important prerequisite for setting up a new financial architecture whose objective is to minimize the risk and impact of a recurrence of a similar crisis. In the second part, I discuss specific proposals for crisis *prevention* that are described in more detail in Brunnermeier et al. (2009). The final part of this report discusses elements of crisis *management* useful in handling and minimizing the impact of such crises.

1) Underlying mechanisms

Trends leading up to the crisis

Several trends in the last decades have made the financial system vulnerable to a sharp financial downturn with detrimental implications for the real economy. First, the U.S. economy was experiencing a low interest-rate environment, both because of large capital inflows from abroad, especially from Asian countries, and because the U.S. Federal Reserve had adopted a lax interest rate policy. Asian countries bought U.S. securities both to peg the exchange rates on an export-friendly level and to hedge against a depreciation of their own currency against the dollar, a lesson learned from the South-East Asia crisis in the late 1990s. The Federal Reserve Bank feared deflation risks after the bursting of the Internet bubble and thus did not counteract the buildup of the housing bubble. Second, the banking system underwent a deep structural transformation. The traditional banking model, in which the issuing banks hold loans until they are repaid, was replaced by the "originate and distribute" banking model, in which loans are pooled, tranced, and then resold via securitization. The creation of new securities facilitated the large capital inflows from abroad. A large fraction of funding was arranged through the so-called "shadow banking system," which turned out to be very fragile, since it relied primarily on short-term financing.

Both trends led to a housing and credit bubble. Lending standards eroded, and

¹ I am grateful to Martin Schmalz and Stephen Yeo for feedback.

inflated house prices served as collateral to finance unsustainable high consumption levels in the U.S., which outpaced domestic production. The savings rate for U.S. households shrank close to zero percent. Most of the U.S. consumption increase was financed by a growing current account deficit.

Leverage, maturity mismatch, and two liquidity concepts

The problem with the increased lending was not only the high leverage ratio, but also the maturity mismatch -most of the long-term lending through the shadow banking system was funded by (very) short-term borrowing that relied on the repo and Asset Backed Commercial Paper market. In short, as will be explained below, it was high leverage ratio combined with increased maturity mismatch that led to a fragile situation.

To be more specific, leverage can cause a risk-shifting problem resulting in excessive risk-taking. Hence lenders, who anticipate excessive risk taking, and cut back their funding. The lack of new funding is however no problem if existing funds are secured with long-term debt contracts, since no new funds need to be raised in the interim. New funds are needed only when debt matures earlier than the assets pay off, i.e., if there is a maturity mismatch.. A funding shortage arises when it is prohibitively expensive both to (i) borrow more funds (low funding liquidity) and (ii) sell off assets (low market liquidity). In short, problems arise if both funding liquidity dries up (high margins/haircuts, restrained lending) and market liquidity evaporates (fire-sale discounts).

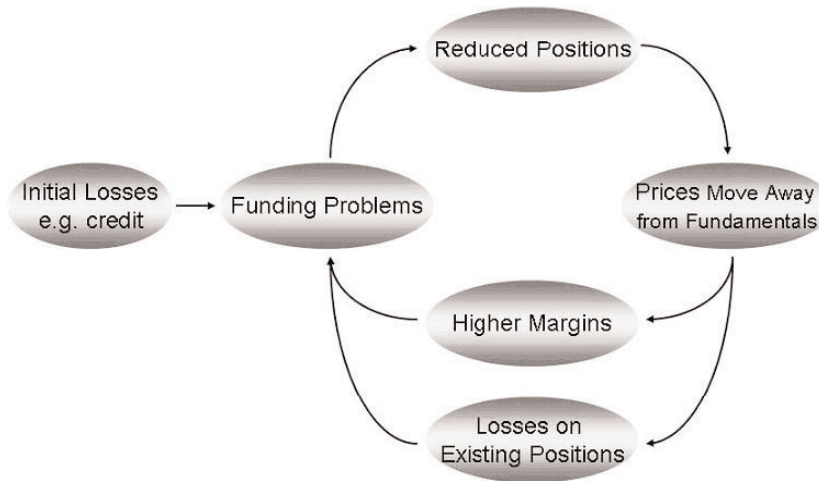
Funding liquidity describes the ease with which investors and arbitrageurs can obtain funding. Funding liquidity is high-and markets are "awash with liquidity"-when it is easy to raise money because collateral values are high (and/or rising), and haircuts and margins are low. *Market liquidity* is high when it is easy to raise money by selling one's assets at reasonable prices. Conversely, market liquidity is low when selling the asset depresses the sale price considerably. When market liquidity is low, it is very costly to shrink a firm's balance sheet.

From the point of view of a bank, both forms of liquidity are influenced by the financial soundness of other financial institutions. Furthermore, they can mutually reinforcing through (i) liquidity spirals, (ii) hoarding of funds, (iii) runs on financial institutions and (iv) network effects via counterparty credit risk.

Liquidity spirals

A funding shock can trigger two distinct liquidity spirals: the loss spiral and the margin spiral. The loss spiral is due to asset price effects. If many financial institutions suffer a similar funding shock, all of them have to cut back on their positions. This depresses the price level of the assets, leading to a further erosion of wealth, which forces financial institutions to cut back on their positions even further. Overall, a leveraged institution that suffered a mark-to-market loss of \$x has to reduce its position by \$x times its leverage ratio. Note that if financial institutions can defer losses and do not have to mark-to-market, the loss spiral is much less powerful.

The *margin/haircut spiral* reinforces the loss spiral as it forces the financial institution to reduce its leverage ratio on top of the effect of the loss spiral, the latter of

Figure 1: Loss and margin/haircut spiral that arise due to leverage and maturity mismatch

Source: Brunnermeier and Pedersen (2009)

which arises even if leverage is to be held constant. Margins and haircuts implicitly determine the maximum leverage a financial institution can adopt. Margins/haircuts spike in times of large price drops and thereby lead to a general tightening of lending. Brunnermeier and Pedersen (2009) – see Figure 1 – show that a vicious cycle emerges, where higher margins and haircuts force de-leveraging and more sales, which increase margins further and force more sales, leading to the possibility of multiple equilibria. As asset prices drop, risk measures like Value-at-Risk increase, not only lead to higher margins and higher external funding costs, but also reduce risk appetite within banks. Risk managers step on the brakes and force traders to de-lever their positions.

The spirals are most pronounced in a financial system in which banks obtain their funding through markets instead of deposits. But even for traditional deposit-taking banks, their marginal source of funding has been the capital markets, for example through repurchase agreements or commercial paper.

Allowing financial institutions to hide losses by not forcing them to mark-to-market is not necessarily a solution: it introduces more information asymmetries and makes the margin/haircut spiral worse. Hence, while mark-to-market exacerbates the loss spiral, it leads to more transparency and hence reduces the adverse impact of the margin spiral.

Margin/haircut spiral and procyclicality. These liquidity spirals are the underlying cause of procyclicality. As asset prices drop, losses mount and margins/haircuts increase.

So far I have not explained why a drop in asset prices leads to higher margins and haircuts, as well as a more cautious attitude towards lending. There are at least three reasons: (i) backward-looking risk measures, (ii) time-varying volatility, and (iii) adverse selection.

Margins, haircuts and banks' internal risk tolerance are typically based on risk measures such as Value-at-Risk (VaR). Typically these risk measures are estimated

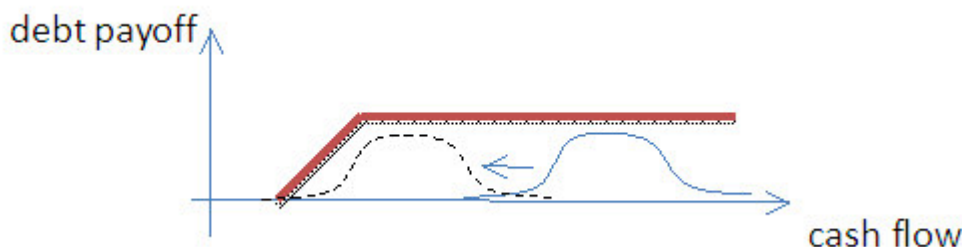
using historical data. Hence, a sharp temporary price drop leads to a sharp increase in the estimates of these risk measures. This leads to an increase in margins/haircuts, constrains investors, and may force them to sell off their assets. Paradoxically, the forced fire sale might justify the sharp increase in the risk-measure ex-post. In a boom phase volatility and default estimates are low. As a consequence, margins will be low, which allows higher leverage and supports the expansionary phase. When the first adverse shocks hit, the volatility estimates shoot up, leading to a deleveraging process described by the margin spiral. In short, if the objective of individual institutions is to maintain return on equity, or value at risk, leverage will be procyclical.

Second, the volatility of a price process can vary over time. A sharp price decline may signal that we are about to enter more volatile times. Consequently, margins and haircuts should be larger and lending should be reduced after such a price decline. An extreme example was the situation in August 2007, when the asset-backed commercial paper market dried up completely within a few hours. Prior to the crisis, asset-backed commercial paper was almost risk-free because of overcollateralization – i.e. the initial losses would be borne by the lower tranches. However, in August 2007, the overcollateralization cushion evaporated, making such assets much more risky. Consequently, investors were unwilling to let structured investment vehicles roll over their debt.

The third reason why margins increase when prices drop is the emergence of frictions due to asymmetric-information. As losses mount, debt becomes more risky and hence more "information sensitive" (a point first stressed in Gorton and Pennacchi (1990)).² Figure 2 illustrates this point. The hockey stick depicts the payoff of a debt contract as a function of firm's cash flow. If the cash flow is sufficiently high, the face value of the debt is paid off in full. The bell-shaped curves depict two different probability distributions of the cash flow. For example, if the cash flow is distributed as depicted by the solid blue curve, the debt holder does not care much about the exact cash flow of the firm. However, after the firm faces a negative shock, the cash flow shifts towards the left (as depicted by the dashed black curve), each debt holder is eager to collect information. Suddenly asymmetric information problems emerge which can lead to market break-downs.

On top of it, financiers become more careful about whether to accept a pool of assets as collateral since they fear receiving a particularly bad selection of assets. They

Figure 2: As the cash flow distribution shifts towards the left, debt payoff becomes more sensitive to information



2 Beng Holmström drew the connection to the current crisis.

might, for example, be worried that structured investment vehicles have already sold the good, "sellable" assets and left as collateral only the bad, less valuable, "lemons."

Fire-sale externality. Why do financial institutions overexpose themselves to the risk of getting caught in a liquidity spiral by holding highly levered positions with excessive maturity-mismatches? The reason is a fire-sale externality, i.e. a situation in which the institution does not bear the full cost of its own actions. It arises since each individual financial institution does not have an incentive to take into account the price impact its own fire-sales will have on asset prices in a possible future liquidity crunch. Hence, fire sales by some institution spill over, and adversely affect the balance sheets of others, which constitutes a negative externality. This was first pointed out in Stiglitz (1982) and Geanakoplos and Polemarchakis (1986). The fire-sale externality is arguably the main rationale for bank regulation.

Hoarding and maturity rat race

The second amplification mechanism is due to precautionary hoarding. It arises if potential lenders are afraid that they might suffer from shocks in the near future, when they will need funds for their own projects and trading strategies. Precautionary hoarding therefore increases when a) the likelihood of such shocks increases, and b) outside funds are expected to be difficult to obtain (see e.g. Holmström and Tirole, 1997, 1998). Financial institutions either refuse to lend at all or lend only at very short maturity. Since lending at a shorter maturity grants one de-facto seniority over other lenders, a maturity rat race can emerge where all lenders only lend very short-term (see Brunnermeier and Oehmke, 2009).

The troubles in the interbank lending market in 2007-8 are a textbook example of precautionary hoarding by individual banks. As it became apparent that conduits, structured investment vehicles, and other off-balance-sheet vehicles would likely draw on credit lines extended by their sponsoring bank, each bank's uncertainty about its own funding needs skyrocketed. At the same time, it became more uncertain whether banks could tap into the interbank market after a potential interim shock, since it was not known to what extent other banks faced similar problems. These effects led to sharp spikes in the (3 months) interbank market interest rate, LIBOR, relative to the Treasury bill interest rate.

Runs

Runs on financial institutions constitute another mechanism that amplifies an initial shock. In a classic bank every investor has an incentive to preempt others and run to the bank. A first-mover advantage triggers a dynamic preemption motive.

Deposit insurance has made classic bank runs almost obsolete, but runs can occur on other financial institutions and especially to the shadow banking system. Not rolling over commercial paper is, in effect, a run on the issuer of asset-backed commercial paper. Bear Stearns essentially experienced a bank run in March 2008 when hedge funds, which typically park a sizable amount of liquid wealth with their prime brokers, pulled out those funds. In September 2008, AIG faced a "margin run" as explained in Gorton (2008). Several counterparties requested additional collateral from AIG for its credit default swap positions. These requests would have brought the

firm down if the Fed had not injected additional funds.

Such runs can lead to socially inefficient outcomes, since the agent withdrawing his funds does not take into account that this causes negative externalities on others who withdraw with a delay.

Network effects: counterparty credit risk – interconnectedness externality

Most financial institutions are lenders and borrowers at the same time. Modern financial architecture consists of an interwoven network of financial obligations. For example, new credit derivatives like credit default swaps made financial institutions very interconnected. One main problem with these instruments is that each financial institution knows its own financial, but has only a vague idea what financial obligations its counterparties have. The obligations of its counterparties' counterparties are even more difficult to estimate. Consequently, nobody has a good idea what effects the default of a particular institution would have as it ripples through the financial system. This lack of information significantly increases uncertainty and counterparty credit risk.

The problem is exacerbated because most of these credit derivatives are traded over-the-counter. If all credit derivatives were traded via a clearing house, exposures could be netted out and the clearing house would know the exposure of each financial player.

When signing a bilateral credit derivative contract, each individual institution does not take into account that it introduces additional risk to its counterparties. Indeed, the more interconnected a financial institution is, the more difficult it is for a regulator to predict the repercussions of the bank's default on the financial system. This makes it more likely that this institution will be bailed out by the government, which involves a wealth transfer from tax payers to bank's debt and equity holders. Hence, each institution has the perverse incentive to become as interconnected as possible in the most opaque way.

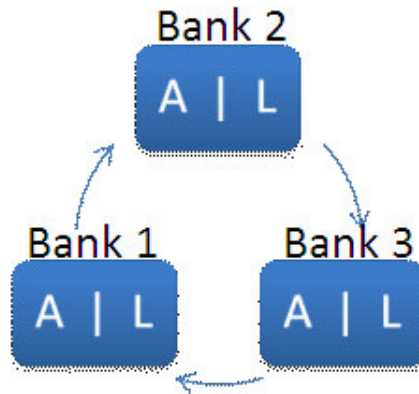
Endogeneity of liquidity – micro-prudent versus macro-prudent behavior

Finally, it is very important to note that liquidity is endogenous and that one bank's micro-prudent behavior to cut back its funding to others hurts other banks and hence might not be macro-prudent. This can most easily be seen in the following example, depicted in Figure 2: if bank 1 sheds assets and cuts back on its lending to bank 2, it shrinks its leverage ratio but worsens the balance sheet of bank 2. Consequently, bank 2 is forced to shed assets and cut back its lending to bank 3 and similarly bank 3 has to cut its lending to bank 1.

The argument resembles Keynes' paradox of thrift. Formally, many of the above-described mechanisms can lead to multiple equilibria: one with low funding liquidity levels and one with high funding liquidity (e.g. in Brunnermeier and Pedersen, 2009). Once the economy falls into the low funding liquidity equilibrium, it is not easy to return to the "good" equilibrium since it is difficult to coordinate all investors' beliefs and ensure that trust and confidence return to the credit markets.³

³ While most economists favor models with a unique equilibrium in order to make clear predictions, I think that models with multiple equilibria provide important insights for studying financial crises.

Figure3 Three interconnected banks



2) Crisis prevention

The mechanisms outlined above help to design a financial architecture that is less prone to periodic financial crisis. Any regulatory intervention built on sound economic principals is justified, if it (i) constrains distortionary effects due to monopoly power, (ii) protects the essential needs of ordinary people when information is costly to acquire (e.g. prevent fraud), or (iii) internalizes significant externalities. In this section I outline some specific measures that internalize externalities and hence should be reflected in a new financial architecture. This is in sharp contrast to the current regulatory framework which does not focus on externalities and, ironically, even provides an incentive for financial institutions to become "too big to fail" and "too interconnected to fail," since the larger an institution, and the more interconnected it is, the higher the probability that a financial institution will be bailed out in times of crisis. For a more detailed discussion about policy measures I refer again to Brunnermeier et al (2009).

Macro-prudential regulation – focus on systemic risk contribution

During times of financial crisis, losses tend to spread across financial institutions, threatening the financial system as a whole. Future regulation should provide incentives for financial institutions to reduce risk concentrations that lead to contagion. It is therefore imperative to focus on the risk spillovers (externalities) an institution creates or is correlated with, rather than the risk of an individual bank in isolation. A financial institution's contribution to systemic risk can be large either if it (i) causes financial difficulties at other institutions or if it is (ii) correlated with financial difficulties among other financial institutions. New measures of systemic financial risk need to be developed that ideally encompass both channels.

This is in sharp contrast to existing regulation that focuses primarily on the risk of an individual financial institution in isolation. The Basel II regulation is based on Value at Risk (VaR), the most commonly used risk measure, which only captures an individual's bank risk in isolation. Regulation based on VaR reduces likelihood of the failure of an individual bank, irrespective of whether this bank causes, or is correlat-

ed with, distress in other financial institutions. VaR may be useful for micro-prudential regulation whose main objective is investor protection (against fraud). However, such measures are not effective measures against systemic risk.

One risk measure that focuses on the contribution of a financial institution to systemic risk is CoVaR (as suggested in Adrian and Brunnermeier (2009)). The CoVaR of an institution is defined as the Value-at-Risk (VaR) of the financial sector conditional on this institution being in distress. The percentage difference between the usual VaR and the CoVaR captures the degree to which a particular institution contributes (or is correlated with) to the overall systemic risk. Such a systemic "co-risk measure" should

- a) determine financial institutions that should be subject to macro-prudential regulation, and
- b) affect the degree to which regulatory constraints bite.

In Brunnermeier et al. (2009) we propose to assign all financial institutions to one of four categories:

Table 1 Classification of financial institutions based on their systemic risk contribution

Institution	Examples	macro-prudential	micro-prudential
"individually systemic"	Large and interconnected banks and insurance companies that cause risk spillovers	yes	yes
"systemic as part of a herd"	Leveraged hedge funds, whose correlated may concern systemic risk	yes	no
non-systemic large	Pension funds and insurance companies that are not highly levered	no	yes
"tinies"	unlevered	no	no

Regulatory charges: capital charges, Pigovian taxes, compulsory insurance

Financial institutions that are subject to macro-prudential regulation have to be constrained in their activities. Ideally, one would like to provide an incentive structure that internalizes all externalities outlined in Section 1. The larger a financial institution's contribution to financial risk is the larger should be the capital charge, Pigovian tax, or compulsory insurance premium. Each incentive scheme has its advantages and disadvantages:

Caps: Current regulation focuses to a large extent on capital charges and hence limits (caps) the extent to which banks can leverage up and extend their business activities. Absolute caps limit the total amount of leverage, but they might stifle competition among the banking sector.

Pigovian taxes: Pigovian taxes increase with a bank's CoVaR and other systemic co-risk measures. The advantage of such a tax system is that it generates a revenue stream for the government. This revenue stream compensates the tax payer for bailing out

the financial sector whenever a crisis occurs. Note that the government is the natural insurance provider against systemic risk, since investors' flight to quality makes it cheap for the government to issue debt in times of crisis. Also, unlike a capital charge system, a Pigovian tax system does not hinder competition among banks, but might be less effective in achieving a total maximum leverage ratio than capital requirements.

Compulsory private insurance scheme: A well-designed private insurance scheme whose insurance premium is based on a financial institution's contribution systemic risk (as e.g. measured by its CoVaR and other inputs) would work similar to a Pigovian tax. However, the regulators have to ensure that the insurance scheme is properly administrated and a sufficiently large amount of capital is set aside and invested in safe government bonds.

Liquidity regulation

The reliance on short-term funding of long-term assets with potentially very low market liquidity has been the main source of financial fragility. While current regulation focuses primarily on the assets' quality, systemic risk has as much to do with how assets are funded. If two institutions have the same asset, but one funds them with long-term debt and the other by borrowing overnight from the money market, the implications for systemic risk are substantially different. Consequently, any future regulation, be it a capital charge, Pigovian tax, or private insurance scheme, should provide an incentive for long-term funding in order to minimize the asset-liability maturity mismatch. The rationale for this regulatory element is the fire-sale externality outlined in Section 1: each individual institution chooses a socially excessive maturity mismatch because it does not take into account the fact that it will be forced to sell its assets at fire-sale prices if it is unable to roll over its short-term debt during a crisis, and thus imposes a negative externality on others.

On top of a regulatory incentive, our Geneva report (Brunnermeier et al., 2009) proposes a new accounting rule, mark-to-funding. It gives financial institutions an additional incentive to reduce their asset-liability maturity mismatch. The idea of mark-to-funding is that an investor who has secured the funding of say, a two-year asset with six months debt, he should be allowed to value the assets with the expected price of the asset in six months time. An investor with funding secured for another six months should not need to worry about price volatility within the next six months. In contrast, an investor who holds the same asset, but relies on overnight borrowing, should be forced to mark-to-market his position on a daily basis. We propose that banks be forced to publish two balance sheets: one mark-to-funding balance sheet on which the regulatory charges are based on and one mark-to-market balance sheet. The latter ensures that all positions are valued in a transparent way. We would eliminate hold-to-maturity accounts and the vagaries associated with it, as assets are shifted from the trading book to the loan book.

Countercyclical

All regulation restrictions should be countercyclical, i.e. they should be most stringent in times of credit booms. They have to counteract the margin/haircut spiral

which causes higher leverage in times of booms and deleveraging in times of crisis.

Furthermore, most financial crises are preceded by asset price and credit bubbles. Financial regulation should be particularly vigilant for bubbles whose bursting might adversely affect the financial intermediation sector. While the bursting of the technology bubble in the early 2000s caused a lot of localized disruptions, it bears no comparison to the turmoil that the bursting of the credit and housing bubble has caused. The big difference between them was that the technology bubble did not severely damage the lending sector. It is important to determine whether a funding and credit expansion at a time is sustainable or may be subject to sudden reversal, with detrimental consequences for the economy. Variables regulators should be vigilant about are credit growth, credit spreads, haircuts, margins, and loan-to-value ratios. It is important that regulation leans against credit bubbles early.

In Brunnermeier et al. (2009) we also propose a laddered response structure to ensure a prompt and early intervention before things get out of hand. One of the first steps is to freeze dividend payments for institutions that are in trouble. Furthermore, an incentive structure has to be put in place that ensures that regulators are forceful in implementing these policies and withstand lobbying efforts from banking industry and politicians.

3) Crisis management

History suggests that financial crises can be abated but never fully prevented. Once in a crisis, crisis management comes to the forefront. The primary objective should be to minimize the adverse impact on the real economy, i.e. secure efficient lending. In a financial crisis, banks often do not have sufficient equity to engage in lending activities. In addition, it is often impossible for banks to raise additional private capital without government support since

- a) troubled financial institutions typically suffer from *debt overhang problems*, Myers (1977). That is, investors refuse to inject additional equity, since it primarily benefits existing debt holders rather than the new investors. This is especially acute if the face value of debt exceeds the bank's asset value.
- b) low equity levels make new debt funding very *informationally sensitive* (as illustrated in Figure 2 above). Emerging asymmetric information problems hinder an injection of new funds.

As a consequence, crisis management typically necessitates some form of recapitalization or restructuring of the banking sector by the government. The recapitalization of a leveraged sector such as banks can be done at the expense of (i) debt holders and/or (ii) tax payers. This distinction is important as it involves large wealth transfers. The goal is to eliminate financing frictions by reducing asymmetric information problems. Any recapitalization at the expense of debt holders is limited by the fact that one cannot wipe out short-term funding from the money market or demand deposits since this would induce a run on the banks. Favoring short-term debt, however, might lead to long-run adverse effects, where banks fund themselves on a more short-term basis, increasing their maturity mismatch.

In addition, successful policy should bring confidence and trust back to the market place. Translated to economists' language, in a setting with multiple equilibria, policy intervention should coordinate investors' beliefs such that the "good" equilibrium with an active lending market is reinstalled.

Debt-equity swap provision

Swapping long-term debt for equity has the advantage that it recapitalizes the bank at the expense of the debt holder and hence does not involve a large wealth transfer from tax payers. Ideally in the future, law should contain a provision that allows forced conversions in pre-specified circumstances, e.g. when it is in public interest. More specifically, a debt-equity swap should only be invoked if the financial sector is in a systemic crisis. Otherwise, there is the danger that this provision be abused and inefficient banks, which should be liquidated, are rescued. Debt-equity swap provisions for particular debt classes have the disadvantage that in the long-run investors steer away from these types of debt funding and opt for more short-term debt funding, exacerbating the maturity mismatch problem.

Nationalization via prompt corrective action

An alternative way to let the debt holders participate in the recapitalization is to induce a controlled bankruptcy through prompt corrective action that ultimately leads to a forced merger of the troubled banks with a government entity. This is essentially a nationalization of the bank, which ensures that (junior) debt holders pay their part. Any nationalization should be followed by re-privatization of the good bank, while "toxic" assets are held in a bad bank for a while.

Partial nationalization via public equity injection

This approach requires large sums of funds, and debt holders of banks with a debt-overhang problem are the primary beneficiaries. As the government injects equity, the value of the debt increases. Overall, this approach involves large wealth transfers from tax payers to banks' debt and equity holders. Also, since the government takes on a majority stake in banks, banks are subject to political pressure in their lending decisions. It is questionable whether public equity injections necessarily reignites lending, since remaining private equity holders will try to delever banks in order to pay out the government as quickly as possible.

Tender offer by government to buy debt at current market price

To avoid the tax payers subsidizing current debt holders, the government could try to buy up the debt at the current market price. Importantly, to induce current debt holders to sell their bonds, the government has to commit to let the bank go bankrupt, if it fails to buy the debt at the current price. If legally possible, this combined with a subsequent equity infusion would be an efficient way to resolve the undercapitalization problem.

Purchase of toxic asset bundles

The purchase of toxic assets leads to recapitalization of banks only if the government pays an artificially high price. Like an equity injection, it involves a wealth transfer from tax payers to bank's debt and equity holders. However, it provides less "bang for the buck" than a \$ x equity injection, since the banks receive \$ x dollars in exchange for toxic assets, which presumably still have some value.

If the purchase involves public and private capital, then price discovery might help to value these assets at reasonable prices. Importantly, these assets should only be sold in big bundles (the whole portfolio of a bank) since otherwise banks have an incentive to cherry pick and to sell off bad assets and keep good assets. Banks' cherry picking would lead to a lemons' problem and hence would rule out a private co-investment scheme. No private investors would participate. Compared to equity injections such a scheme terminates automatically when the underlying assets mature.

Guaranteeing a floor for asset bundles

To stimulate trading of assets, the government can guarantee a minimum price for assets (for a limited amount of time). The hope is that by putting a floor on asset values, many of these assets would change hands and price discovery for toxic assets would start. To avoid cherry picking and lemons problems, only portfolio of assets should be guaranteed.

Non-recourse loans are one way to offer a floor on asset values. If the price of the asset falls below its collateral value, the borrower of funds can simply give up its collateral without being forced to repay his loan. Using non-recourse finances for newly issued securities that are backed by new mortgages and loans can help to stimulate lending to end users and seems to be an attractive option.

Propping up house prices via mortgage subsidies

In addition to introducing refinancing schemes to minimize the number of home foreclosures, the government can try to lower mortgage rates and thereby push up house prices. This can be done by allowing the central bank to directly buy long-dated securitized mortgage products or accept them as collateral for non-recourse loans. However, there is the danger that artificially high house prices lead to other distorting effects, especially in areas in which higher demand is met with additional construction activity.

There are numerous other schemes that are debated. It is ingenuity of our imagination combined with careful economic analysis that will help us overcome the current financial crisis.

References

- Adrian, T. and Brunnermeier, M. K. (2009), 'CoVaR', working paper. At <http://www.princeton.edu/~markus/research/papers/CoVaR>.
- Allen, F. and Gale, D. (2007), *Understanding Financial Crises*, Oxford University Press,

- Oxford, U.K. (Clarendon Lectures in Economics).
- Bernanke, B. and Gertler, M. (1989), 'Agency Costs, Net Worth, and Business Fluctuations', *American Economic Review* 79(1), 14-31.
- Brunnermeier, M. K., (2009) 'Deciphering the Liquidity and Credit Crunch 2007-08', *Journal of Economic Perspectives*, forthcoming .
- Brunnermeier, M. K., Crocket, A., Goodhart C., Persaud Avi and Shin Hyun, (2009), *Fundamental Principles of Financial Regulation*, 11th *Geneva Report on the World Economy*.
- Brunnermeier, M. K. and Pedersen, L. H. (2009), 'Market liquidity and funding liquidity', *Review of Financial Studies* (forthcoming).
- Diamond, D. and Dybvig, P. (1983), 'Bank runs, deposit insurance, and liquidity', *Journal of Political Economy* 91(3), 401-419.
- Fisher, I. (1933), 'The debt-deflation theory of great depression', *Econometrica*, 1(4), 337-357.
- Geanakoplos, J. (2003), Liquidity, default and crashes: Endogenous contracts in general equilibrium, in M. Dewatripont, L. P. Hansen & S. J. Turnovsky, eds, *Advances in Economics and Econometrics: Theory and Applications II, Econometric Society Monographs: Eighth World Congress*, Vol. 2, Cambridge University Press, Cambridge, UK, pp. 170-205.
- Gorton, G. (2008), 'The Panic of 2007', Federal Reserve Bank of Kansas City Symposium 2008, at <http://www.kc.frb.org/publicat/sympos/2008/Gorton.10.04.08.pdf>.
- Gorton, G. and Pennachi, G. (1990), Financial Intermediaries and Liquidity Creation," with George Pennacchi, *Journal of Finance*, 45(1), 49-72
- Holmström, B. and Tirole, J. (1997), 'Financial intermediation, loanable funds, and the real sector', *Quarterly Journal of Economics* 112(1), 35-52.
- Holmström, B. and Tirole, J. (1998), 'Private and public supply of liquidity', *Journal of Political Economy* 106(1), 1-39.
- Myers S. (1977), 'Determinants of Corporate Borrowing', *Journal of Financial Economics*, 5, 147-75.
- Shleifer, A. and Vishny, R. W. (1997), 'The limits of arbitrage', *Journal of Finance* 52(1), 35-55.

Mitigating the Procyclicality of Basel II

Rafael Repullo, Jesús Saurina and Carlos Trucharte

CEMFI and CEPR; Banco de España; Banco de España

Introduction

The Basel Committee on Banking Supervision (BCBS) approved in 2004 a reform, known as Basel II, whose primary goal is "to arrive at significantly more risk-sensitive capital requirements" (BCBS, 2006, paragraph 5). As a result of the increased risk-sensitivity, a widespread concern about Basel II is that it might amplify business cycle fluctuations, forcing banks to restrict their lending when the economy goes into recession. Even in the old Basel I regime of essentially flat capital requirements, bank capital regulation had the potential to be procyclical because bank profits may turn negative during recessions, impairing banks' lending capacity.¹ Under the internal ratings-based (IRB) approach of Basel II, capital requirements are an increasing function of the probability of default (PD) and the loss given default (LGD) estimated for each borrower, and these parameters are likely to rise in downturns. So the concern about Basel II is that the worsening of borrowers' creditworthiness in recessions will increase the requirement of capital for banks and lead to a severe contraction in the supply of credit.

Repullo and Suarez (2008) show that forward-looking banks have an incentive to hold precautionary capital buffers (defined as capital in excess of the minimum required by regulation), but that the buffers maintained in expansions are typically insufficient to prevent a significant contraction in the supply of credit at the arrival of a recession. They also show that Basel II leads to a substantial increase in the procyclicality induced by bank capital regulation, and that some simple cyclical adjustments in the 99.9% confidence level (used to derive the Basel II capital requirements) may significantly reduce its procyclical effects.

The purpose of this paper is to analyze the leading alternative procedures that have been proposed to mitigate the procyclical effects of the Basel II capital requirements. 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 1986-2007 using data from the Credit Register of the Bank of Spain.

The empirical model provides an estimate of the point-in-time (PIT) PDs of the

Authors' note: 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 thank the comments of Patricia Jackson as well as those of the participants at the CEPR/RWBC Conference on "Financial Regulation and Macroeconomic Stability. Key Issues for the G 20".

1 See Borio, Furfine and Lowe (2001).

loans in the portfolio of commercial and industrial loans of the Spanish banks, so we can compute the corresponding Basel II capital requirements per unit of loans (assuming an exogenous LGD). Thus we can estimate the credit risk profile of the Spanish banks over the sample period using the metric of Basel II.

We then consider the effect of different procedures to mitigate the cyclical behavior of these requirements. According to Gordy and Howells (2006) there are two basic alternatives: One can smooth the inputs of the Basel II formula, by using some sort of through-the-cycle (TTC) adjustment in the PDs, or smooth the output by using some adjustment of the Basel II final capital requirements computed from the PIT PDs. Following the work of Saurina and Trucharte (2007) on mortgage portfolios, we first construct TTC estimates of the PDs by setting the value of the macroeconomic controls in the logit equation at their average level over the sample period, and then compute the corresponding series of Basel II capital requirements per unit of loans. Second, we analyze different adjustments to the PIT-based capital requirements using macroeconomic variables, such as the rate of growth of the GDP, the rate of growth of aggregate lending, or the return of the stock market.

The comparison of the different procedures is based on the criterion of minimizing the root mean square deviations of each smooth series with respect to the trend of the original series computed by applying the Hodrick-Prescott filter.

The results show that the best procedure is to use a simple multiplier of the Basel II requirements that depends on the deviation of the rate of growth of the GDP with respect to its long-run average. Specifically, the requirements would be increased in expansions (or decreased in recessions) by 7.2% for each standard deviation in GDP growth.

Model of probabilities of default

Empirical model

In order to compute the cyclical profile of the Basel II capital requirements with real data (if Basel II had been in place), we estimate a model of firms' defaults using the information contained in the Spanish Credit Register. The dependent variable, y_{it+1} , is a dichotomous (zero-one) variable which takes value 1 if the firm i defaults in year $t+1$, and 0 otherwise:²

$$\Pr(y_{it+1} = 1) = F(\beta_1 RISKPROFILE_{it} + \beta_2 LOANTYPE_{it} + \beta_3 MACROVAR_t)$$

where $F(x)$ is the cumulative standard logistic function.

The explanatory variables (all dated in year t) include previous delinquencies and defaults, utilization of credit lines, total borrowing (proxy for size), fraction that is collateralized, maturity of exposures, age, number of banking relationships, and

2 A firm is considered to have defaulted if it is 90 days overdue, failing to meet its financial obligations on a certain loan or if, with a high probability, it is considered unable to meet its debts. If a borrower has several loans, failure to meet payments on any of them means that this borrower is in default. This definition is similar to that established in Basel II (see BCBS, 2006, paragraph 452).

changes in the firms' main lender. Additionally, macroeconomic controls, such as the rate of growth of the GDP, the rate of growth of the commercial and industrial loans in the Credit Register, and the return of the Spanish stock market index, and two sets of industry and regional dummies are also included.

Database and sample data

The database used in the estimation of the model of PDs is the Credit Register of the Bank of Spain (CIR). This Register records monthly information on all credit operations granted by all credit institutions operating in Spain for a value higher than €6,000.

Our paper focuses on commercial and industrial loans. The period covered goes from 1984 to 2007, although for regression purposes it spans from 1986 to 2007. To facilitate the estimation we have randomly selected a 10% sample of the population.

Empirical results

Point-in-time PDs derived from the logit model are increasing in previous delinquencies and defaults, utilization of credit lines, collateralization, number of banking relationships, and changes of main lender. On the other hand, PDs are decreasing in total borrowing (proxy for size), and firm' age. The macroeconomic controls included in the regression have negative signs, indicating that they proxy for the level of economic activity which reduces PDs. All the variables are significant at the 99% confidence level. An indication of the goodness of fit may be found in the signs (expected ones) with which all variables enter the equation, and in the predictive power of the regression model.

Smoothing the Basel II capital requirements

Point-in-time (PIT) capital requirements

We first compute the PIT capital requirements for each firm using the Basel II formula for corporate exposures (BCBS, 2006, paragraph 272) and the estimated PD for each firm, and assuming an LGD of 45% (as in the foundation IRB) and a 1 year maturity. Then we compute the aggregate PIT capital requirements per unit of loans for the period 1986-2006.

Figure 1 shows how PIT capital requirements would have evolved in Spain during this period had Basel II been in place, together with the Spanish GDP growth rate. Both series are highly negatively correlated, which suggests that GDP growth rates may be useful to correct the cyclicity of bank capital requirements.

The Hodrick-Prescott benchmark

To identify a trend of the Basel II capital requirements series we apply a Hodrick-Prescott (HP) filter with a smoothing parameter $\lambda = 100$ (annual data). Figure 2 shows the HP trend in dashed lines. The purpose of computing this trend is to provide a

Figure 1. Basel II capital requirements and the business cycle

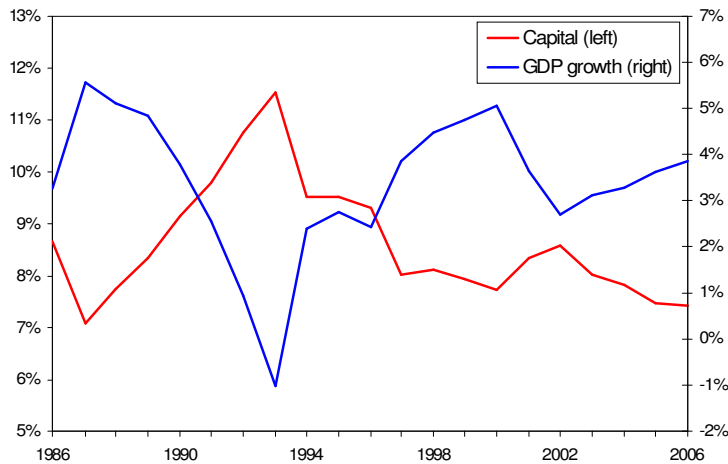
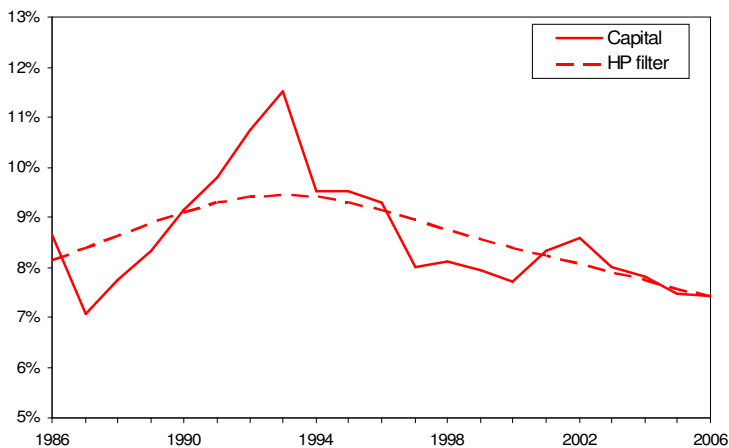


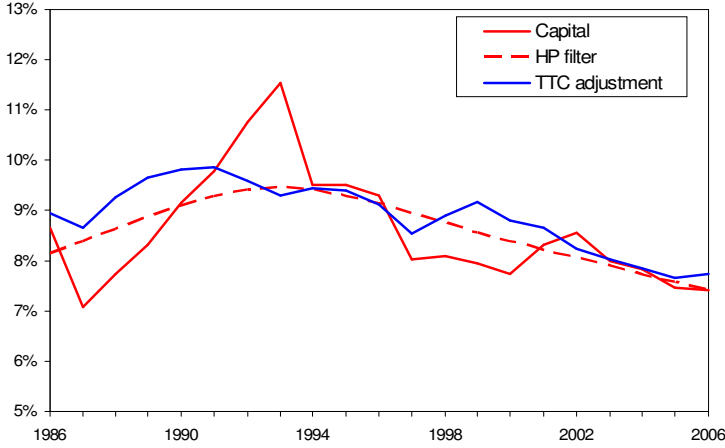
Figure 2. Basel II capital requirements and the Hodrick-Prescott trend



benchmark for the comparison of the alternatives procedures suggested in the literature to mitigate the cyclicalities of the Basel II requirements.

Adjusting the inputs of the Basel II formula: TTC ratings

The first procedure that we analyze is to smooth the PD input of the Basel II formula by using through-the-cycle (TTC) PDs. In practical terms this is equivalent to use TTC ratings (and its associated PDs) in the computation of the capital requirements. Following the work of Saurina and Trucharte (2006) on mortgage portfolios, to obtain these PDs we replace the current values of the macroeconomic controls (GDP growth, credit growth, and stock market index growth) by their average over the sample period. Figure 3 shows the results.

Figure 3. Point-in-time and through-the-cycle Basel II capital requirements

Adjustment of the output of the Basel II formula

The second procedure to smooth the Basel II capital requirements is to use a business cycle multiplier of the form:

$$\hat{k}_t = \mu_t k_t$$

where k_t is the original series and \hat{k}_t is the smoothed series. A possible functional form for the multiplier is:

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

where $N(\cdot)$ is the cumulative distribution function of a normal random variable, g_t is the growth rate of some indicator variable of the business cycle, \bar{g} is its average and its standard deviation over the sample period. Note that with this functional form for $g_t - \bar{g}$ we have a unit multiplier $\mu_t = 2N(0) = 1$. Also note that the multiplier ranges between a maximum of 2 and a minimum of 0.

Two issues related to the proposed adjustment have to be addressed. First, what is the variable that should be chosen to proxy for the business cycle? Second, how do we choose parameter α ?

Consistent with the proposed HP benchmark, the criterion for the choice of α (for each proxy for the business cycle) is to minimize the root mean square deviations (RMSD) of the smoothed series with respect to the HP trend.

Following this criterion the results are as follows: When the variable selected to proxy for the business cycle is the GDP growth rate, $\alpha(\text{GDP growth}) = 0.086$; if we use the credit growth rate $\alpha(\text{credit growth}) = 0.066$; and if we proxy the business cycle by the rate of change of the stock market index, $\alpha(\text{stock market}) = 0.017$.

Figures 4, 5, and 6 show the adjustment of the capital requirements series for the three selected proxies, together with the original series and its HP trend. The adjust-

Figure 4. Smoothing the Basel II capital requirements with GDP growth

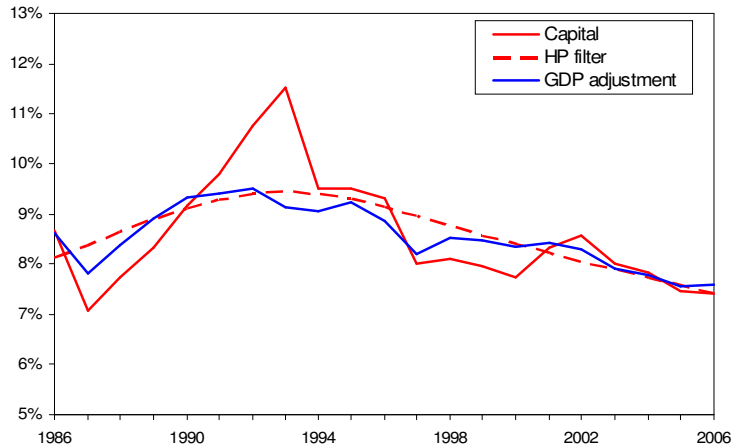


Figure 5. Smoothing the Basel II capital requirements with credit growth

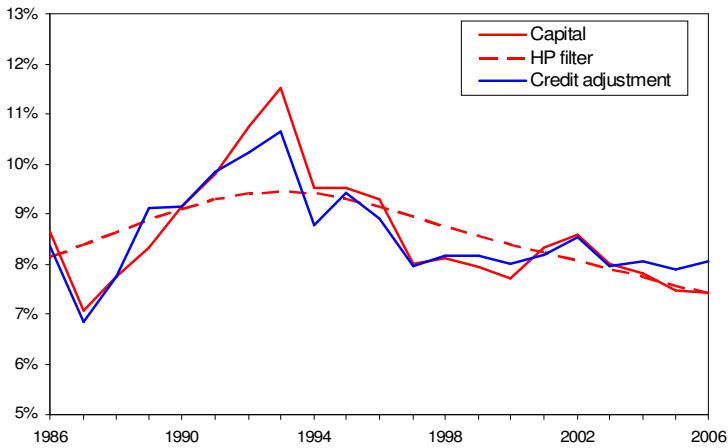
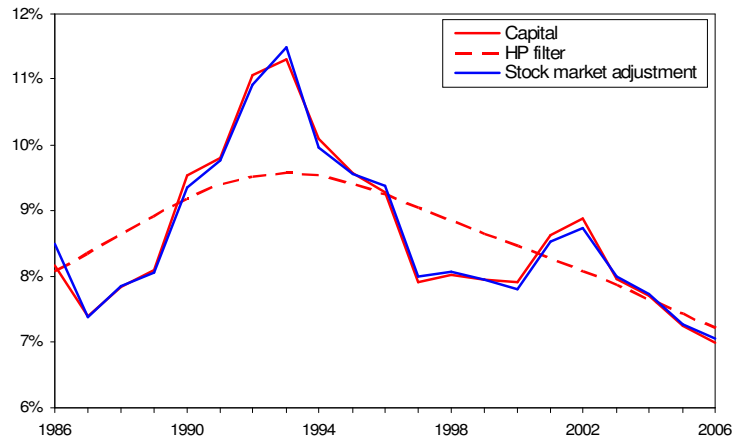


Figure 6. Smoothing the Basel II capital requirements with stock market returns



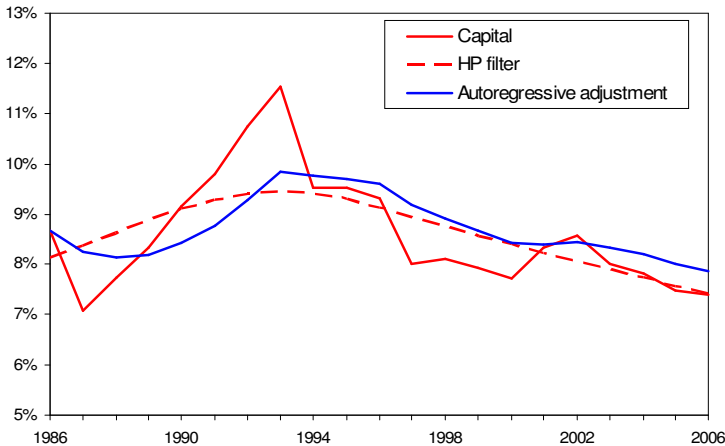
ment using the GDP multiplier is the best in terms of approaching the proposed benchmark, whereas the stock market multiplier seems rather useless in smoothing capital requirements.

Alternatively, we could follow Gordy and Howells (2006) and use an autoregressive filter to smooth the PIT capital requirements:

$$\hat{k}_t = \hat{k}_{t-1} + \delta(k_t - \hat{k}_{t-1})$$

where k_t is the original series and \hat{k}_t is the smoothed series. Again, the criterion for choosing δ is to minimize the RMSD of the smoothed series with respect to the HP trend. Using this criterion we get $\delta = 0.30$. Figure 7 shows the autoregressive adjustment of the capital requirements series, together with the original series and its HP trend.

Figure 7. Autoregressive adjustment the Basel II capital requirements



What is the best procedure? Smooth the inputs of the Basel II formula using TTC ratings? Or smooth the outputs through either a business cycle multiplier or an autoregressive adjustment? In line with our previous discussion, the criterion that we propose is to choose the procedure that minimizes the RMSD of each smooth series with respect to the Hodrick-Prescott trend.

The results are summarized in Table 1. The best approach is to smooth the output using the GDP growth multiplier. TTC-based capital requirements and autoregressive

Table 1. Root mean square deviations (RMSD) from HP trend

	RMSD (%)
TTC ratings	0.45
GDP growth multiplier ($\alpha = 0.086$)	0.36
Credit growth multiplier ($\alpha = 0.066$)	0.60
Stock market returns multiplier ($\alpha = 0.017$)	0.75
Autoregressive adjustment ($\delta = 0.30$)	0.48

adjustments of the capital requirements are second best alternatives, while the credit growth multiplier and the stock market multiplier perform much worse.

Conclusion

This paper aims to contribute to the growing policy debate, initiated by Kashyap and Stein (2004), on how risk-sensitive bank capital regulation may be adjusted to smooth lending and business cycles. We propose a benchmark for comparing different procedures suggested in the literature to mitigate the cyclicity of Basel II, and apply it to the smoothing of the estimated capital requirements for commercial and industrial loans in Spain over the period 1986-2006.

The results show that the best procedure is to use a simple multiplier of the Basel II requirements that depends on the deviation of the rate of growth of the GDP with respect to its long-run average. Specifically, for $g_t = \bar{g} + \sigma_g$ we have $\mu_t = 2N(0.086) \cong 0.072$. Hence, according to our results for the portfolio of Spanish commercial and industrial loans, the multiplier should be increased in expansions (or decreased in recessions) by 7.2% for each standard deviation in GDP growth.

The procedure presented in the paper could also be applied to expected losses, which provides a rationale for a dynamic provisioning mechanism. Whether the adjustment to cyclicity should be confined to capital requirements or could be extended to loan loss provisions is a very interesting policy issue that is beyond the scope of this paper.³

References

- Basel Committee on Banking Supervision (2006): *International Convergence of Capital Measurement and Capital Standards. A Revised Framework*, Basel: Bank for International Settlements.
- Borio, C., C. Furfine, and P. Lowe (2001): "Procyclicality of the financial system and financial stability: issues and policy options," *BIS papers*, 1, 1-57.
- Gordy, M., and B. Howells (2006): "Procyclicality in Basel II: Can We Treat the Disease Without Killing the Patient?," *Journal of Financial Intermediation*, 15, 395-417.
- Jiménez, G. and J. Saurina (2006): "Credit cycles, credit risk, and prudential regulation," *International Journal of Central Banking*, 2, 65-98.
- Kashyap, A., and J. Stein (2004) "Cyclical Implications of Basel II Capital Standards," *Federal Reserve Bank of Chicago Economic Perspectives*, 1st Quarter, 18-31.
- Repullo, R., and J. Suarez (2008): "The Procyclical Effects of Basel II," CEPR Discussion Paper No. 6862.
- Saurina, J., and C. Trucharte (2007): "An Assessment of Basel II Procyclicality in Mortgage Portfolios," *Journal of Financial Services Research*, 32, 81-101.

3 Jiménez and Saurina (2006) explain the rationale for such dynamic or countercyclical provisions, which have been applied in Spain since 2000 and further adjusted when IFRS came into effect in 2005.

The Regulation of Credit Derivative Markets¹

Hendrik Hakenes and Isabel Schnabel

*University of Hannover and MPI Bonn; University of Mainz,
MPI Bonn and CEPR*

1. Introduction

Credit derivatives have been made out as one of the main culprits of the current crisis. This has led to calls for regulation of credit derivatives, and specifically of CDS (credit default swaps). Currently, CDS are more or less unregulated. In the United States, for example, they are neither considered an insurance contract (because the protection buyer does not necessarily hold the underlying asset of the reference entity), nor a future (as was stipulated by the Commodity Futures Modernization Act of 2000), nor a security. This is now called into question. Regulatory suggestions range from a complete ban of credit derivatives to doing nothing. Before one can decide on what appropriate measures would look like, one has to understand what specific role credit derivatives played in the recent crisis.

We see three important aspects:

- (1) The credit derivative market has allowed market participants to build up enormous risk positions, which could be hidden from the eyes of regulators, counterparties and even equity holders of the respective financial firms.
- (2) The great uncertainty about banks' positions in the credit derivative market contributed to the disturbances in interbank markets.
- (3) The CDS market contributed to the increase in "connectivity" of global financial markets. The collapse of a major dealer could potentially lead to severe domino effects, and – in an extreme scenario – to a complete unwinding of the CDS market.

The default of Lehman Brothers is a case in point. The CDS market has taken center stage in that episode, for two reasons. First, the outstanding volume of CDS contracts with Lehman as reference entity was huge; at the time it was estimated to be around \$ 400 billion. Second, and more importantly, Lehman had issued large volumes of CDS, which now became more or less worthless. The demise of Lehman triggered the breakdown of the insurance giant AIG, who surmounted to the large margin calls after the Lehman debacle and who had an exposure of \$ 441 billion in credit derivatives (out of which \$ 58 billion referred to subprime securities).

What conclusions should policy makers draw from these events? In this paper, we

¹ We thank Guy America, Vittorio Grilli, Martin Hellwig, and the participants of the conference on "Financial Regulation and Macroeconomic Stability - Key Issues for the G20" for useful comments.

will give a tentative answer to this question, trying to balance the benefits and dangers of credit derivatives. We will discuss current policy proposals regarding the regulation of credit derivative markets. One important question will be where regulatory action is necessary, and what should be left to the markets.

Our study will proceed as follows: In the following section, we briefly describe the functioning of credit derivatives, in particular of CDS, to set the stage for the following analysis. In Section 3, we summarize the major arguments why credit derivatives may be desirable from a welfare perspective. Section 4 presents some arguments why regulation may be needed in credit derivative markets. In Section 5, we discuss several regulatory responses: a ban on credit default swaps, transparency, standardization, the use of collateral, the creation of a central counterparty, and capital adequacy. Section 6 summarizes our major conclusions.

2. Credit derivatives

Credit derivatives are used to separate the credit risk of an asset, such as a bond or a loan, from its ownership. In this paper, we focus on credit derivatives in the narrow sense of the word, i. e., excluding securitization. According to BBA (British Bankers' Association, 2006), the two dominant forms of credit derivatives are single-name credit default swaps (where the reference entity is one specific debtor) and index trades (where the underlying is a CDS index). The largest share of single-name CDS is based on reference entities from the corporate sector; CDS on other assets, such as mortgage-backed securities, constitute only a small share of the market.²

In their simplest form, CDS are bilateral contracts where the protection seller insures the protection buyer against the credit risk of the reference entity. For this service, he receives a periodical payment. In case of a pre-specified credit event, the buyer delivers the underlying to the seller in exchange for the notional value (physical settlement), or the seller pays the buyer the difference between the notional value and the market value of the underlying (cash settlement). In this sense, credit derivatives are similar to an insurance contract, the difference being that the protection buyer does not necessarily own the underlying. According to BBA, only one third of transactions are used for the purpose of managing credit risks. In line with this observation, the outstanding notional value of CDS is typically much larger than the notional value of the underlying debt. Besides banks and insurance companies, hedge funds are playing an increasing role in the credit derivative market.

Most credit derivatives are *unfunded* transactions, meaning that the protection seller does not provide any upfront funding in a transaction (an exception are credit-linked notes). However, there are often margin requirements attached to a CDS contract, which depend on the credit standing of the protection seller. However, since the protection can never be perfect, a significant *counterparty risk* remains in any CDS transaction.

Single-name CDS are highly customized and are traded *over-the-counter* (OTC).

2 Credit default swaps also play an important role in a number of complex structured instruments. These structured products are not the focus of this paper.

Therefore, transparency and liquidity are relatively low.³ In practice, exposures from CDS are often hedged by entering offsetting transactions with another party, which in turn hedges its exposure with yet another party. Moreover, the counterparty risk from CDS is frequently hedged by another CDS. This leads to complicated chains of linked exposures, where any party knows the direct counterparties, but not the parties farther away in the chain. Hence, the actual location of risk is unknown to market participants and regulators.⁴ Index products are more standardized and hence more liquid. In 2006, the notional amount of outstanding index trades caught up with single-name CDS (Bank for International Settlements, 2008b, p. 33).

However, the aggregate numbers on the credit derivative market are highly uncertain (not to mention the exposures of single market participants). The ISDA (International Swaps and Derivatives Association) reports the notional amount of outstanding credit default swaps to be \$ 54.6 trillion as of June 2008 (down from 62.2 in December 2007).⁵ These numbers do not, however, yield a correct picture of the risks stemming from the CDS market. First, many market participants are holding off-setting positions.⁶ Second, many contracts are subject to margin requirements. Exact numbers on the extent of margin requirements are, however, not available. The importance of both considerations became clear in the settlement of claims after the Lehman default. Out of the total notional value of \$ 72 billion in Lehman CDS (which was much lower than the expected volume of \$ 400 billion), only \$ 5.2 billion are said to have actually changed hands in the settlement. Finally, the BIS has argued that notional values are not informative about the actual risks. They propose the use of gross market values, i. e., replacement values of CDS contracts, instead of notional values (Bank for International Settlements, 2008c).

3. Why are credit derivatives desirable?

In the years before the subprime crisis, credit derivatives were welcomed by many academics and policy makers. The major argument was that credit derivatives can be used to *efficiently allocate risks* in an economy. For example, a bank can buy credit protection in the form of a CDS to transfer credit risk to another party that can bear that risk at a lower cost (for example, an insurance company). In effect, credit derivatives complete markets, allowing agents to achieve an efficient allocation of risk that – in the absence of state-contingent claims – could not be obtained otherwise (see Allen and Gale, 2006).

In addition to being used to insure the credit risk of a large loan directly, credit

3 However, the CDS market has become more liquid in recent years. For some reference entities, the CDS market has become more liquid than the corporate bond market, showing up in lower bid-offer spreads and more rapid reactions to corporate news (Bank for International Settlements, 2008b, p. 31).

4 According to Gorton (2008), the uncertainty about the location of risk was one of the driving forces of the "Panic of 2007."

5 See <http://www.isda.org/press/press092508.html>. While these numbers are huge, they are still much smaller than the notional amount of interest rate derivatives (\$464.7 trillion as of June 2008).

6 Whether such exposures can actually be netted, depends, however, on the exact legal arrangements.

derivatives can also be used to insure any kind of counterparty risk. If, for example, a firm enters a contract with a third party, it can insure the default risk of this third party using a CDS. The CDS would then be traded by a bank on behalf of the original firm. Consequently, CDS can help to improve the efficiency in any market where counterparty risk is an issue.

Such risk transfers may *increase systemic stability*. Hellwig (1994) has argued that banks may not be well suited to hold non-diversifiable (systematic) risk and that it may be efficient to shift such risks to third parties (e. g., to their depositors). This would make the bank invulnerable to macroeconomic shocks. If bank failures are associated with large social costs, a situation where banks shed systematic risk may be preferable.

Another benefit of credit risk transfer is its potential to *improve the access to finance* for households and firms (Hakenes and Schnabel, 2008).⁷ If banks have limited risk-bearing capacities, for example due to bankers' risk aversion (as in Morrison, 2005) or high bankruptcy costs (as in Wagner and Marsh, 2006), a transfer of credit risk to a third party allows banks to take on new risk, for example by granting additional loans. Consequently, households and firms will benefit from a better availability of credit, and possibly even lower loan rates.

In addition to hedging, credit derivatives may be used for *speculation* purposes. For example, market participants can sell or buy CDS to express their views on the credit standing of a firm. The information on a firm's credit standing can be aggregated in the market for credit derivatives. Consequently, the market for credit derivatives may yield information on firms that complements (and is potentially even superior to) the information provided by rating agencies.⁸ However, the aggregation of information requires some degree of transparency in credit derivative markets.

4. Why is regulation necessary?

The current crisis has changed the view of many observers about the benefits of credit risk transfer. Credit derivatives do not seem to have stabilized the financial system; rather, they seem to have led to a propagation of the crisis from the United States to the rest of the world. Instead of reducing systemic risk, they seem to have increased it. While credit derivatives contributed to a larger availability of credit, many of the additional loans maybe should not have been granted. And instead of providing useful information, the opacity of CDS markets seems to have contributed to disruptions in interbank markets. Therefore, let us now turn to the potential downsides of credit derivatives. These downsides may then yield a rationale for the regulation of credit derivatives.

In identifying reasons for regulation, it is necessary to differentiate between an *ex-ante* and an *ex-post* perspective. From an *ex-post* perspective, after the CDS has

⁷ According to Goderis et al. (2006), the use of collateralized loan obligations (CLOs) has enabled banks to expand their loan volumes by 50 percent.

⁸ Hull, Predescu, and White (2004) show that CDS markets anticipate rating announcements.

expired, either the buyer or the seller has lost money. If the underlying has defaulted, the seller has lost and the buyer has won; if the underlying has not defaulted, the opposite is true. Regulation cannot be justified by the fact that someone has been losing money. From an ex-ante perspective, none of the parties was forced into the contract. Hence, the CDS must have been considered beneficial by both parties at the time of the conclusion of the contract (at least if both parties understood what they were selling or buying). Consequently, the reason for regulation must always be some *externality problem*, i.e., some negative impact of CDS on a third party.

4.1. Systemic risk

Instead of reducing systemic risk, credit risk transfer seems to have contributed to a rise in systemic risk. One problem is that risks were not shifted outside of the banking sector (as suggested by Hellwig, 1994), but a large share of it remained in the banking sector. When several banks share their risks using CDS, each single bank becomes safer. However, the banks also become more similar (Wagner, 2009). This implies that the probability of the default of a single bank drops, but the joint probability of the default of several banks increases. The contemporaneous default of several banks may entail large costs for the economy. Banks may even have an incentive to deliberately increase systemic risk. By becoming part of a chain of credit derivatives (like AIG), they may choose to become "too interconnected to fail" (Brunnermeier, 2008).

Another problem was that risk was not always shifted to the parties that were best able to bear it, but to parties that were subject to laxer regulatory constraints. For example, banks appear to have used credit derivatives in order to transfer credit risks to (unregulated) hedge funds simply to avoid the regulatory capital requirement.⁹ This bypassing of prudential regulation is often referred to as *regulatory arbitrage*, and is interpreted as shirking the legal framework. However, such arbitrage would not be a problem if regulation were efficient. As was argued above, the transfer of risk to other sectors may be desirable and regulators can design regulatory policies to instigate desirable risk transfers. For example, the banking sector is typically considered to be more fragile than the insurance sector. Hence, a regulator may want the insurance sector to hold part of the risks originated within the banking sector (Wagner and Marsh, 2006). In such a situation, the policy maker should encourage insurance companies to sell CDS to banks. This can be achieved by smaller capital requirements for insurance companies. Hence, the regulation of different financial sectors should take into account that different institutions are exposed to different types of risk (Hellwig, 2008). However, if regulation is inefficient, regulatory arbitrage may induce risk transfers that increase the fragility of the financial system (Allen and Gale, 2006). A case in point is the observed risk-shifting to structured investment vehicles (SIVs). Given that these SIVs were largely financed by short-term commercial paper, they were not at all able to bear the risks from maturity transformation that they were facing (Hellwig, 2008).

If risks are shifted to parties that are not able to bear them, the transferred risks

9 Pennacchi (1988) was the first to motivate credit risk transfer by regulation. Other examples are Gorton and Pennacchi (1995) and Hakenes and Schnabel (2008).

may come back to the protection buyers in the form of *counterparty risk*. As has been argued forcefully by Hellwig (1995, 1998, 2008), the risk to be insured tends to be highly correlated with counterparty risk, making the insurance worthless when it is needed most. This is exactly what we have seen in the current crisis. One important question is how regulation can deal with this in a sensible way.

4.2. Moral hazard

Granting a loan is an implicit commitment to *monitor* the borrower. However, if credit risk is easily transferable to a third party by buying a CDS, this commitment breaks down (see Morrison, 2005). Given the opaqueness of CDS markets, the buying and selling of credit risk is not observable. Credit risk is spread in the economy, and monitoring incentives disappear.¹⁰ Potentially, a chain structure can emerge. Credit risk is passed on from institution to institution, with no-one having any monitoring incentives as long as credit risk can again be resold. Although banks will benefit from reselling credit risk, there is a negative externality on the underlying firm and on other creditors of the firm.

Credit risk transfer may also lead to a moral hazard problem in the *origination of loans*. If credit risk can be transferred to other parties, banks may knowingly grant loans with negative net present values. However, as was shown by Hakenes and Schnabel (2008), this does not necessarily mean that the overall welfare effects of credit risk transfer are negative. If the positive welfare effects, such as the increase in profitable loans, are large enough, overall welfare effects may also be positive.

In the current crisis, moral hazard in the origination of loans, especially in subprime mortgages, seems to have played an important role (Hellwig, 2008). However, only a relatively small part of the securities underlying CDS refers to subprime mortgages. Therefore, these types of arguments seem to have less relevance for the CDS market than, e.g., for the question of securitization.

4.3. Excessive risk-taking

Credit derivatives lend themselves particularly well to excessive risk-taking due to their specific return structure. They earn a small positive return with a high probability, and entail huge losses with a low probability. Given limited liability, such a return structure is attractive because it generates reliable income streams most of the time. In fact, banks and other financial institutions have generated huge incomes by writing CDS. The highly unlikely event of huge losses is not taken into account because the losses can be shifted to other parties (such as creditors, the deposit insurance, or the tax payer). Problems in the governance structure of financial institutions (for example, due to compensation schemes that lead to "short-termism" of traders and bank managers) may exacerbate the problem of excessive risk-taking. For example, traders may excessively sell CDS to raise their bonuses. Given the opacity of cred-

¹⁰ Parlour and Winton (2008) have argued that the costs from lacking monitoring incentives may over-compensate the benefits of credit risk transfer for risky borrowers. This is in line with the empirical study by Ashcraft and Santos (2008) who find that CDS trading has increased the cost of corporate debt for high-risk borrowers.

it derivative markets, such risk-taking was controlled neither by "market discipline," nor by the regulator. We are now experiencing the tail event that was deemed to be highly unlikely. The question is how future regulation can best contain risk-taking in credit derivatives.

5. Regulatory measures

We will now discuss the regulatory measures that have been discussed most prominently in the recent past concerning the regulation of credit derivative markets: a ban on credit default swaps, transparency, standardization, the use of collateral, the creation of a central counterparty, and capital adequacy.

5.1. Ban on credit default swaps

The most drastic regulatory measure would be a complete ban on credit default swaps. Given the arguments in favor of credit derivatives presented in Section 3 of this paper, a complete ban of credit derivatives is in our view undesirable. A somewhat milder proposal is a ban on "naked" CDS trading, i.e., on the buying of a CDS when one does not own the underlying asset.¹¹ The risk position of a (naked) CDS buyer is the same as that of a short seller of the underlying bond. Therefore, the CDS buyer benefits from the bond going into default. This may lead to undesirable incentive effects. In fact, CDS allow investors to short a company's debt without any restriction.¹² As a consequence, CDS may be prohibited for the same reasons as the short sales of stocks, which have been banned in a number of countries since fall 2008.

In fact, such a prohibition would be almost tantamount to a complete ban on CDS because the current volume of CDS outstanding largely exceeds the volume of the underlying bonds. It would limit the purpose of CDS to hedging and would prohibit speculation. However, as argued above, speculation may yield useful information on the underlying reference entities. Furthermore, the CDS market appears to have functioned more smoothly than other markets during the crisis. In any case, it is hard to argue for a permanent ban on CDS on these grounds, just as the permanent prohibition on short sales of stocks is generally not considered to be desirable.

Nevertheless, the market seems to have produced some instruments with unclear benefits. In particular, these are instruments that involve several layers of securitization, such as CDS on asset-backed securities. Since the usefulness of such instruments is doubtful, their prohibition may well be justified.¹³ Apart from this, it seems that an improvement of the infrastructure of CDS markets is preferable to a complete (or de-facto) ban on credit derivatives.

¹¹ Such a proposal has, for example, been made by Collin Peterson, a U.S. democrat, in January 2009.

¹² Cf. the testimony of Christopher Cox, Chairman of the Securities and Exchange Commission, before the U.S. Senate on September 23, 2008.

¹³ See Hellwig (2008, p. 23-25) on this point.

5.2. Transparency

The enhancement of transparency is at the core of many proposals regarding the improvement of the infrastructure of credit derivative markets. Indeed, a lack of transparency over exposures in CDS markets contributed to the crisis in several ways: First, it made it difficult for market participants to judge the risk of other market players. This means that risk-taking could not be controlled by market discipline. Second, it was one of the reasons for the drying-up of liquidity in interbank markets, which played an important role in the propagation of the crisis.¹⁴ Third, it made it impossible for regulators to discover and hence prevent the build-up of risk concentrations.

In discussing transparency, it is important to distinguish between the disclosure of information to the regulator and the disclosure of information to market participants. Regarding the first point, it seems obvious that the regulators need more detailed information about the individual risk positions of banks in order to be able to recognize and control risk concentrations. In order to judge the true risks from CDS, regulators have to be regularly informed about financial institutions' exposures split up by counterparties and maturities, including information about margin requirements. However, it has to be recognized that such reporting requirements capture only the risks from instruments that are already known to be a threat to systemic stability. Typically, reporting requirements (such as any other regulation) will lag behind the process of financial innovation. Also, reporting requirements will never be able to fully uncover the chain of linked exposures in credit derivative markets.

Another question is to what extent information should be disclosed to other market participants. Market discipline can only work when "the market" can observe the risk-taking of market participants. In fact, the moral hazard problems described in Section 4.2 are due to the opacity of credit derivative markets, which prevents banks from committing to the monitoring of loans (Morrison, 2005) or to the granting of profitable loans (Hakenes and Schnabel, 2008). Increased transparency would help to solve moral hazard problems. Voluntary transparency initiatives by the industry, such as that by the Depository Trust & Clearing Corporation (DTCC) to publish more information about CDS cleared through their platform are to be welcomed.¹⁵ However, they are insufficient because they do not contain any information about individual exposures. The regulators may consider requiring market participants to disclose "large" exposures in the CDS market to the public (where "large" would have to be defined). Of course, this would still give an incomplete picture of the actual risks because, again, it does not take into account the interconnectedness of different market players.

Another way to increase transparency would be the forced *compression* (or tear-up) of outstanding CDS contracts. This refers to the bilateral or multilateral termination of CDS contracts by discovering and removing offsetting positions. While the com-

14 See, for example, the speech by Lorenzo Bini Smaghi, ECB, 1 Dec 2008, <http://www.ecb.int/press/key/date/2008/html/sp081201.en.html#>.

15 In November 2008, the Depository Trust & Clearing Corporation (DTCC), one of the world's largest settlement and clearing houses, began publishing the outstanding gross and net notional values of credit default swap contracts for the 1,000 largest underlying reference entities and all indices as well as aggregate data on the gross notional values of these instruments on a weekly basis. See <http://www.dtcc.com/products/derivserv/data/>.

pression leaves the net exposures unchanged, it reduces gross exposures, and therefore increases the information content of aggregate notional amounts outstanding.

There is another dimension of transparency that should be taken into account. Transparency requires not only that more information is provided, but it also requires that the provided information is understood. This concerns especially the conditions and terms of CDS contracts, which can be highly complicated. This leads us directly to the next regulatory measure, namely the standardization of contracts.

5.3. Standardization

Current OTC markets are attractive because they allow market participants to tailor CDS contracts to their specific needs. For example, a CDS contract can be arranged such that it allows a bank to perfectly hedge the risk from a loan in its books. Any standardization entails a loss of flexibility and a lower correspondence between risks to be insured and the insurance contracts. Nevertheless, there are a number of arguments in favor of more standardization.

One is related to the previous point – it increases transparency. In order to judge the risk from a CDS contract, the contract's conditions, such as the level of margin requirements, have to be known and understood. This could be facilitated by standardization. Another argument is higher liquidity. A functioning secondary market would improve the efficiency of price formation, reduce the possibilities of price manipulation, and make the practice of offsetting trades, which adds to the low transparency of the market, unnecessary. Finally, standardization reduces legal disputes. This concerns, for example, the definition of credit events triggering payments.

The benefits of standardization have already been recognized by the industry. In particular, many contracts are now concluded under an ISDA master agreement, which contains general terms and conditions for OTC derivative contracts. This master agreement is typically complemented by a confirmation, which contains the details specific to a given contract. The confirmation again draws on a number of definitions pre-specified by ISDA.

Given the movement towards the creation of a central counterparty (which will be the topic of a later section), the trend towards a standardization of contracts is likely to continue in future years. Whether at least part of the CDS market is going to end up being traded in organized exchanges is an open question. Given the industry's interest in promoting a further standardization, regulatory action seems unnecessary in this area.

5.4. Use of collateral

The use of collateral is one way to mitigate counterparty risk. In fact, *margin requirements* seem to play an important role in CDS markets (even though information is sparse). According to the ISDA Margin Survey of 2007, 63 percent of all over-the-counter derivatives transactions are subject to collateral agreements. The according number for credit derivatives is unknown. Margin adjustments have become much more frequent than in earlier years. Today, margin requirements are typically calculated on a daily basis.

Margin requirements are generally useful in reducing counterparty risk. With large

parts of the collateral consisting of cash, the volatility of the value of collateral has become a minor issue.

However, margin requirements give rise to new risks, the most important being *funding liquidity risk*.¹⁶ When counterparties are required to post additional collateral at short notice, this can lead to severe liquidity problems. The problem is even reinforced when margin requirements are linked to credit ratings, implying huge margin calls in the case of a credit rating downgrade. The case of AIG is the best example for the destructive effect that such margin calls can have, especially in times of market distress.¹⁷ Brunnermeier and Pederson (2009) have shown that in times of crisis, market liquidity and funding liquidity are mutually reinforcing and may lead to a "liquidity spiral."¹⁸ This spiral forces traders to de-lever during crises, exerting a procyclical effect. In this sense, margins can be destabilizing and may precipitate the crisis that they are supposed to prevent.

The underlying mechanism is, however, by no means specific to modern financial instruments. Schnabel and Shin (2004) have documented very similar effects in a crisis in Northern Europe as early as 1763. At that time, banks were merchant bankers and traded in grain and sugar. The banks in different countries were connected through chains of bills of exchange. When one prominent banker failed and could not pay his bills, the whole chain of bills unraveled and bankers were forced to sell their assets (such as grain and sugar). Asset prices dropped sharply, exerting pressure on other bankers. This example makes clear that such liquidity spirals are not at all specific to modern credit derivative markets.

The close relationship between funding and market liquidity risk, on the one hand, and between liquidity risk and credit risk, on the other, point to the important role of liquidity for systemic stability. The strong focus on capital requirements in today's banking regulation may have to be given up in favor of a broader approach that encompasses liquidity as a major determinant of the soundness of financial systems. The proposals of the Working Group of Liquidity, established by the Basel Committee on Banking Supervision, are a first step in this direction (Bank for International Settlements, 2008a).

5.5. Creation of a central counterparty

The threat of counterparty risk in the CDS market can also be tackled by the establishment of a *central counterparty* (CCP) in the form of a clearing house.¹⁹ The basic idea is that the counterparty in any transaction cleared by the CCP would not be another market participant, but the CCP itself. The key advantage of such a CCP is the possibility of *multilateral netting* of credit exposures, which reduces counterparty risk by reducing members' credit exposure. Also, the members would have to deal with only one counterparty that would enjoy a large degree of creditworthiness due

16 See Bank for International Settlements (2007), p. 23-24.

17 Similar mechanisms were at work during the LTCM crisis of 1998.

18 See also Adrian and Shin (2008).

19 See Bank for International Settlements (2007) for an overview of current arrangements and regulatory issues regarding the clearing and settlement of OTC derivatives.

to the backing from all of its members. The creation of a CCP would at the same time reduce the degree of *connectivity* in the system. The danger of domino effects vanishes as long as the CCP remains solvent and liquid. At the same time, this would increase transparency because it would break the chain of exposures in favor of direct exposures to the CCP. Moreover, all procedures and legal provisions could be standardized, which would reduce legal risk. Finally, the CCP could develop efficient procedures, for example in case of a member's default, reducing operational risk.

However, the creation of a CCP means that counterparty risk is now *concentrated* in a single agent, the clearing house. Therefore, the CCP needs a strong risk management, a solid financial backing, and close supervision by regulatory authorities. Strict membership criteria and margin requirements play an important role in ensuring the credibility of the CCP. A sufficient capitalization by its members is needed to be able to absorb the losses deriving from a member's default. In addition, the participation in other members' losses helps to maintain the members' interest in enforcing tight risk controls. However, the CCP may need an additional *public backing*, such as a government guarantee, in order to be considered fully creditworthy. The costs in terms of increased moral hazard would be moderate because the CCP would in any case be subject to an *implicit government guarantee*: Given its size and systemic importance, it would clearly be considered to be "too important to fail." As a consequence, strict regulation is needed to ensure that market participants do not shift risks to the clearing house and from there to the tax payer.

In CDS markets, there are some additional obstacles in the establishment of a CCP related to the OTC nature of many CDS. Given the lower liquidity of these instruments, their valuation is much more difficult. This affects the determination of margin requirements, but especially the handling of a default of a member. This problem can best be solved by requiring a minimum degree of standardization and by excluding highly complex products from the CCP. Moreover, default procedures have to be adjusted to take into account the instruments' illiquidity.

The creation of a CCP is already well under way and should be left to the markets.²⁰ The government should intervene only in the regulation and supervision of CCPs. Given that members will probably need less capital to back up the CCP than they would need individually as a safeguard against potential losses, there should be sufficient incentives for banks and other financial institutions to become members of the clearing house. If not, one may consider regulatory incentives. For example, credit risk mitigation using instruments cleared by the CCP may receive a favorable treatment in the capital regulation framework.

The markets will also decide how many clearing houses will be needed. Some arguments such as the centralization of collateral seem to support the convergence towards a low number of clearing houses. It is likely that important economic areas, such as the EU, are going to establish their own clearing houses. One important issue will be the harmonization of regulations across different jurisdictions.

20 See Kroszner (1999, 2000) on the effectiveness of markets in controlling risks through the creation of clearing houses

5.6. Capital adequacy

The final question is what role capital adequacy rules can play in the regulation of credit derivative markets. One aspect that has been discussed at length in recent years is the extent to which *credit risk mitigation* techniques should be taken into account in the calculation of capital requirements. Under the new Basel Accord ("Basel II"), a *substitution approach* is generally applied to credit derivatives, such as CDS, implying that the protected exposure is assigned the risk weight of the protection provider. This means that the capital charge cannot be lower than a direct exposure to the protection provider. However, a bank using the internal ratings-based (IRB) approach has – under a number of restrictions – the option to choose the *double default framework*. This approach allows for a broader consideration of credit mitigation effects because it takes into account that a default occurs only if both the original debtor and the protection seller default. The reliability of this approach, however, crucially hinges on the determination of correlations between the risk to be insured and the counterparty risk. Even if these correlation parameters are set at a high level by the regulators, they may prove to be too low when a severe crisis arrives and correlations suddenly become exceptionally high. One may question whether the double default approach adequately takes into account the high correlation of risks in times of crisis.

This leads to the more general criticism of the current approach to banking regulation. It still largely focuses on the solvency of individual financial institutions and is not able to capture correlations among financial institutions adequately. While there is now a consensus that regulation should follow a *macro-prudential approach*, proposals of how this can be done have appeared only recently. A promising route is the suggestion by Adrian and Brunnermeier (2008) to measure an institution's risk not only by the conventional value at risk (VaR), but also by a measure called *CoVaR*, defined as the VaR of a financial institution conditional on other institutions being in distress. Importantly, this measure is able to quantify the tail-risk dependency among financial institutions. This implies that a financial institution subject to substantial spillovers from other institutions would be required to hold more capital than an institution that is not subject to such spillovers. Importantly, this reduces banks' incentives to choose strategies increasing their CoVaR in the first place. Therefore, such an approach may be able to prevent an accumulation of risks, as the one seen in the CDS market in recent years.

6. Conclusion

Our major conclusions are summarized in the following bullet points:

- In spite of the disruptions observed after the Lehman default, it seems far-fetched to blame credit derivatives for the crisis as a whole. They rather seem to have played an *accelerating* role. Many of the problems, such as the relationship between funding and market liquidity, are much more general and are not specific to credit derivative markets. These problems should not be solved by measures directed to specific instruments.
- Therefore, we would like to stress some *general lessons* for regulation that are not specific to the credit derivative markets:

1. Financial regulation should give up its strong focus on capital adequacy in favor of a broader approach that encompasses *liquidity* as a major determinant of the soundness of financial systems.
 2. Current capital regulation has to be complemented by a *systemic, macro-prudential perspective*. The proposal by Adrian and Brunnermeier (2008) is an important step in this direction.
 3. Sector-specific regulation should take into account that different types of financial institutions are exposed to different types of risks. A homogenization of regulation (as envisaged, for example, by Solvency II in the insurance sector) is not desirable.
- Moreover, there are a number of *specific suggestions* that are directly related to credit derivative markets:
 1. The creation of *central counterparties* has the potential to mitigate the problem of counterparty risk and at the same time increase transparency in credit derivative markets. However, their success will depend crucially on the CCP's creditworthiness, the basis of which is a strong risk management and a solid financial backing. An additional government guarantee may be unavoidable to ensure the creditworthiness of the CCP. This, in turn, requires strict regulation in order to combat moral hazard problems.
 2. Regarding *transparency*, there is little doubt that financial institutions should be subjected to stricter reporting requirements about credit derivatives towards the regulators. Additionally, regulators may consider requiring market participants to disclose large exposures to the public. In any case, reporting requirements are likely to lag behind the process of financial innovation.
 3. Other improvements of the infrastructure of credit derivative markets, such as the further standardization of contracts and the decision to move credit derivatives to organized exchanges, should be left to the market. In particular, some scope for market participants to employ customized contracts and to experiment with novel types of instruments should remain.
 - Finally, any regulation should consider that credit derivatives serve a number of useful purposes in an economy. A complete or de-facto ban on credit derivatives is therefore undesirable. Regulation should interfere only if there is a clear indication of a market failure. Moreover, it is well known that any regulation is bound to produce evasive behavior by market participants and may therefore prove to be ineffective or even counterproductive. Finally, regulation should leave some scope for financial innovation. Although there is always political pressure to respond to crises by enforcing stricter regulation, more regulation does not necessarily lead to higher financial stability.

References

- Allen, F., and D. Gale (2006): "Systemic Risk and Regulation," in *The Risks of Financial Institutions*, ed. by M. Carey and R. M. Stulz, 341-375, University of Chicago Press.
- Adrian, T., and M. K. Brunnermeier (2008): "CoVar," Federal Reserve Bank of New York

Staff Reports No. 348.

Adrian, T., and H. S. Shin (2008): "Financial Intermediary Leverage and Value-at-Risk," *Federal Reserve Bank of New York Staff Reports* No. 338.

Ashcraft, A. B., and J. Santos (2007) "Has the CDS Market Lowered the Cost of Corporate Debt?", Federal Reserve Bank of New York Working Paper.

Bank for International Settlements (2007): "New Developments in Clearing and Settlement Arrangements of OTC Derivatives," Committee on Payment and Settlement Systems, March 2007.

Bank for International Settlements (2008a): "Liquidity Risk: Management and Supervisory Challenges," Basel Committee on Banking Supervision, February 2008.

Bank for International Settlements (2008b): "Credit Risk Transfer – Developments from 2005 to 2007," Basel Committee on Banking Supervision, April 2008.

Bank for International Settlements (2008c): "OTC Derivatives Market Activity in the First Half of 2008," Monetary and Economic Department, November 2008.

British Bankers' Association (2006): BBA Credit Derivatives Report 2006, London.

Brunnermeier, M. K., and L. H. Pederson (2009): "Market Liquidity and Funding Liquidity," *Review of Financial Studies*, forthcoming.

Brunnermeier, M. K. (2008): "Deciphering the Liquidity and Credit Crunch 2007-08," Working Paper.

Goderis, B., I. Marsh, J. Castello, and W. Wagner (2006): "Bank Behavior with Access to Credit Risk Transfer Markets," Working Paper, Cass Business School.

Gorton, G. (2008): "The Panic of 2007," Working Paper.

Gorton, G., and Pennacchi, G. (1995), "Banks and Loan Sales – Marketing Nonmarketable Assets," *Journal of Monetary Economics*, 35(3), 389-411.

Hakenes, H., and I. Schnabel (2008), "Credit Risk Transfer in Banking Markets with Hard and Soft Information," Working Paper.

Heider, F., M. Hoerova and C. Holthausen (2008), "Liquidity Hoarding and Interbank Market Spreads: The Role of Counterparty Risk," Working Paper.

Hellwig, M. (1994), "Liquidity Provision, Banking, and the Allocation of Interest Rate Risk," *European Economic Review*, 38(7), 1363-1389.

Hellwig, M. (1995): "Systemic Aspects of Risk Management in Banking and Finance," *Schweizerische Zeitschrift für Volkswirtschaft und Statistik*, 131(4), 723-737.

Hellwig, M. (1998): "Banks, Markets, and the Allocations of Risks," *Journal of Institutional and Theoretical Economics*, 154(1), 328-351.

Hellwig, M. (2008): "Systemic Risk in the Financial Sector: An Analysis of the Subprime-Mortgage Financial Crisis," Preprints of the Max Planck Institute for Research on Collective Goods Bonn, 2008/43.

Hull, J., M. Predescu, and A. White (2004), "The Relationship between Credit Default Swap Spreads, Bond Yields, and Credit Rating Announcements," *Journal of Banking and Finance*, 28(11), 2789-2811.

Kroszner, R. S. (1999): "Can the Financial Markets Privately Regulate Risk? The Development of Derivatives Clearinghouses and Recent Over-the-Counter Innovations," *Journal of Money, Credit, and Banking*, 31(2), 596-618.

Kroszner, R. S. (2000): "Lessons from Financial Crises: The Role of Clearinghouses," *Journal of Financial Services Research*, 18(2-3), 157-171.

Morrison, A. D. (2005): "Credit Derivatives, Disintermediation, and Investment

- Decisions," *Journal of Business*, 78(2), 621-647.
- Parlour, C., and A. Winton (2008): "Laying Off Credit Risk: Loan Sales versus Credit Default Swaps," Working Paper.
- Pennacchi, G. G. (1988): "Loan Sales and the Cost of Bank Capital," *Journal of Finance*, 43(2), 375-396.
- Schnabel, I., and H. S. Shin (2004): "Liquidity and Contagion: The Crisis of 1763," *Journal of the European Economic Association*, 2(6), 929-968.
- Wagner, W., and I. W. Marsh (2006): "Credit Risk Transfer and Financial Sector Performance," *Journal of Financial Stability*, 2(2), 173-193.
- Wagner, W. (2009): "Diversification at Financial Institutions and Systemic Crises," *Journal of Financial Intermediation*, forthcoming.

Credit Ratings Failures: Causes and Policy Options

Marco Pagano and Paolo Volpin

*Università di Napoli Federico II, CSEF, EIEF and CEPR;
London Business School and CEPR*

1. Introduction

As the ongoing financial turmoil originated in the market for subprime mortgage-backed securities, much attention is currently directed at the flaws of the securitization process and particularly at the failures of the rating agencies (CRAs), which played a key role in this process (see for instance the Financial Stability Forum Report, 2008, and International Monetary Fund, 2008). Two issues fare prominently in this respect.

First, since 2007 even very highly-rated structured debt products have performed very poorly: the value of AAA-rated mortgage-backed securities (as measured by the corresponding credit default swaps prices) has fallen by 70 percent between January 2007 and December 2008. This suggests that their initial ratings greatly understated the risk of structured debt securities. Such "ratings inflation" is central to the understanding of the crisis: insofar as many investors naively based their investment in these securities mainly or solely on inflated credit ratings, these led to a massive mispricing of risk, whose correction later detonated the crisis.¹

Second, in the process of securitization and rating much detailed information about the risk characteristics of the underlying assets has been lost. Given the way they are designed, ratings provide very coarse and limited information about these characteristics. This information loss is particularly serious in view of the heterogeneity of the collateral and the great complexity of the design of structured debt securities. Now that a scenario of widespread default has materialized, this detailed information would have been essential to identify the "toxic assets" in the maze of existing structured debt securities, and to price them correctly. Absent such information, structured debt securities find no buyers, and their market is frozen. So the information loss involved in the process of securitization and rating is largely at the source of the illiquidity that plagues securities markets since the crisis broke out.

Authors' note: We thank Vittorio Grilli, Janet Mitchell, Rafael Repullo, Vikrant Vig, David Watts and Susan Woodward for helpful information and comments.

1 Both rating inflation and naïve investors' excessive reliance on ratings are well captured by Lloyd Blankfein, CEO of Goldman Sachs, when he writes that before the crisis "too many financial institutions and investors simply outsourced their risk management. Rather than undertake their own analysis, they relied on the rating agencies to do the essential work of risk analysis for them. ... This over-dependence on credit ratings coincided with the dilution of the coveted triple A rating. In January 2008, there were 12 triple A-rated companies in the world. At the same time, there were 64,000 structured finance instruments, such as collateralised debt obligations, rated triple A." (Blankfein, 2009, p. 7).

In this paper, we draw on existing research to assess the likely causes for these two failures of rating agencies in the securitization process - ratings inflation and their coarseness - and review the policies that may be adopted to correct or mitigate them in the future.

The most obvious motive for the inflation of credit ratings is an incentive problem: CRAs are paid by issuers, so that their interest is more aligned with that of securities' issuers than with that of investors. In this respect, CRAs are not unique: a similar conflict of interest also exists for other "financial gatekeepers", such as auditing companies, but as we shall see regulation has been much more lenient with credit rating agencies. Moreover, in the case of ratings the problem is exacerbated by the possibility for issuers to engage in "rating shopping", by soliciting only the most favourable rating among those potentially available from a set of competing agencies.

The reason for disseminating only coarse information when issuing structured debt securities is less obvious, since one would expect the provision of detailed public information to reduce the rents of informed traders, and thereby to enhance secondary market liquidity. This should in turn increase the issue price of the securities, leading issuers to ask CRAs to provide the most detailed assessment of the risk characteristics of their issues, or else complement their ratings with any additional data necessary for such assessment. But arguably issuers saw an even larger benefit in providing relatively coarse information: that of expanding the primary market of structured debt securities, by making them palatable also to investors who could not easily process complex information. By providing little information to all, they levelled the playing field so that unsophisticated could buy these securities without losing money to sophisticated ones, and thereby attracted the former into their primary market. Indeed, issuers and rating agencies grasped the counterintuitive principle that, to market very complex securities to a clientele that includes relatively unsophisticated investors, less rather than more disclosure enhances market size and liquidity. However the current crisis shows that the implied information loss can have dire consequences for market liquidity further down the road, if and when the neglected information becomes price relevant.

Moreover, the coarseness of ratings may reinforce the tendency to inflate them, as it expands the room for collusion between issuer and rating agency, and therefore the conflict of interest with investors. As we shall see, if ratings are set on a discrete scale, complacent rating agencies can suggest to issuers how to structure their securities or their tranches so that they can just attain a given rating. Therefore, in each rating class a disproportionate number of issues or tranches will feature a risk corresponding to the low end of that class. This enhances ratings inflation in comparison to a situation where ratings are set on a finer grid.

What can policy makers do to improve things for the future? We argue that the *preferred policy* would require a drastic change in regulation - not just in specific rules but in their guiding principles as well. First, since both of the problems discussed above arise from the conflict of interest between rating agencies and investors, it is of essence to eliminate (or at least reduce) this conflict by addressing the issue of "who pays". If rating agencies are tempted to please issuers by inflating their credit ratings and/or by choosing excessively coarse ratings, then the most appropriate solution is to have investors - not issuers - pay for their services, as indeed was the case before the 1970s. But switching from the "issuer pays" to the "investors pay" model may be

difficult to implement in practice in a situation where delegation by banking and securities regulations has conferred a tremendous power to a select group of rating agencies over issuers. Therefore, it will be essential to prevent indirect payments by issuers to credit rating agencies in the form of the purchase of consulting or pre-rating services. A more direct (and consequential) way to deal with the problem would be to eliminate the many regulations that delegate powers to rating agencies: once the rents that these regulations confer to these agencies are gone, issuers will have less of an incentive to circumvent the "investors pay" principle.

Second, in order to attain greater disclosure the issuers should make publicly available the complete (anonymous) data about the pool of loans (or bonds) underlying their structured finance products, so that buy-side investors may feed them into their own models to assess their risk characteristics. Clearly, few buy-side investors would have the technical skills to do this. Hence, the market for securitized products will be considerably smaller, since less sophisticated investors will tend to stay away from it. However, this problem is likely to be partially and gradually relieved by the entry of specialized information processors, who will supply financial advice to investors and provide healthy competition to CRAs. This highlights an additional reason to revoke the current regulatory delegation to a select group of CRA, as in this setting there is no guarantee that these will be come to be regarded by investors as the most reliable ones, or will survive the competitive challenge mounted by other information processors.

Such sweeping changes will meet not only the opposition of credit rating agencies, but also that of regulators due their considerable transitional costs. Therefore, policy makers may also want to consider a *second-best policy*, which tries to address the above-discussed problems without overhauling the current setup. Specifically, they may retain the "issuer pays" model but constrain the way in which agencies contract with issuers and are paid by them: issuers should pay an upfront fee irrespective of the rating issued (the so-called "Cuomo plan," named after NY Attorney General Andrew Cuomo) and credit shopping should be banned. Similarly, regulators could enhance transparency not by forcing issuers to grant open and free access to all relevant data, but by determining the information that they must disseminate to the investing public, and therefore mandating a more complete format for the information to be disseminated by CRAs.

These more limited reforms may still be consistent with the current regulatory delegation of vast powers to a select group of rating agencies. But their effectiveness in addressing the failures of credit agencies exposed by the current crisis is likely to be quite limited. First, even if issuers must pay an upfront fee and cannot engage in explicit rating shopping, implicit collusion may still be sustainable: issuers may systematically patronize the agency that offers them the best ratings, which they can identify by comparing the models that the agencies use to rate securities.

Second, prescribing which pieces of information and which statistics CRAs should disseminate would shift the burden of identifying such information on the regulator, which can be very costly in the presence of very diverse financial products. It may also expose such detailed regulation to the danger of failing to keep pace with financial innovation, especially in the design of structured debt securities, some of which may even be induced by regulation itself. Finally, it would induce many naïve investors to persist in the bad habits of the past, that is, that of forgoing an inde-

Table 1 Issuance of Mortgage Backed Securities and CDOs over time

	Total Mortgage Origination (\$bn)	Subprime Origination (\$bn)	(% of total mortgages)	Subprime MBS Issuance (\$bn)	(% of subprime mortgages)	CDO (\$bn)
2001	2,215	190	8.6%	95	50.0%	6
2002	2,885	231	8.0%	121	52.4%	36
2003	3,945	335	8.5%	202	60.3%	30
2004	2,920	540	18.5%	401	74.3%	157
2005	3,120	625	20.0%	507	81.1%	272
2006	2,980	600	20.1%	483	80.5%	552
2007Q1	680	93	13.7%	52	55.9%	186
2007Q2	730	56	7.7%	30	53.6%	176
2007Q3	570	28	4.9%	16	57.1%	93

Source: Gorton (2008), Inside Mortgage Finance, Securities Industry and Financial Markets Association, and Creditflux.

pendent evaluation of the risk characteristics of these securities (by turning to additional data sources or other information processors) once a CRA has provided the information required by regulators.

In contrast, an open-access, non-prescriptive approach by regulators would shift on issuers and investors the burden of determining the pieces of information that are most relevant to evaluate the risk of each security, and would not run the risk of obsolescence. It would also reduce, instead of further increasing, the tangle of regulations in this area. This is an instance in which less regulation might also be safer and better regulation, in contrast to what is currently suggested by many.

2. Securitization process and rating agencies

Asset-backed securities have been around for decades. However, since 2001 we have witnessed a spectacular growth in two new types of structured debt products: subprime MBS or Mortgage Backed Securities, and CDOs or Collateralized Debt Obligations. Subprime MBS are backed by pools of mortgage loans that do not conform with the standards set by Fannie Mae and Freddie Mac because of low FICO score, poor credit history or limited documentation. CDOs are backed by pools of corporate bonds and other fixed income assets, or by portfolios of tranches from MBS and other CDOs. As shown in Table 1, between 2001 and 2006 the combined issuance of subprime MBS and CDOs grew ten times, from \$100 billion to more than \$1 trillion.

This remarkable growth in the market for asset-backed securities would have been impossible without the help of CRAs. The reason is simple: for this market to succeed, it needed to attract the large pool of institutional investors that are subject to rating-based constraints. In other words, the market for subprime MBS and CDOs needed be a "rated" market, in which the risk of tranches was assessed by CRAs using the same scale as bonds. In that way, the rating provided access to a pool of potential buyers,

Figure 1 Value of MBS securities as implied by the ABX indexes

Notes: Each ABX index is based on a basket of 20 credit default swaps, which offer protection against the default of asset-backed securities containing subprime mortgages of different ratings. The index is set at 100 on 1 January 2007 for all ratings. Source: Brunnermeier (2008).

who would have otherwise perceived these securities as very complex and would have possibly shied away from them. Interestingly, rating agencies were very explicit in reassuring investors that the rating of structured securities was directly comparable with the rating of bonds. "Our ratings represent a uniform measure of credit quality globally and across all types of debt instruments. In other words, an 'AAA' rated corporate bond should exhibit the same degree of credit quality as an 'AAA' rated securitized issue" (S&P 2007, p. 4).

This led to a massive repackaging of risks into a vast quantity of newly issued AAA-rated securities: according to Fitch (2007), 60 percent of all global structured products were AAA-rated, in contrast to less than 1 percent of the corporate issues. The rating agencies benefited a lot from the growth of structured products. By 2006, 44 percent of Moody's reported revenue came from rating structured finance products, with respect to 32 percent of revenues from the traditional business of rating of corporate bonds (Coval et al., 2008). In this way the issuers of structured products and the rating agencies became very much dependent on each other, until the collapse in the late 2007.

The extent of the crisis in the market for asset-backed securities can be best appreciated by looking at the dynamics of the ABX price indexes reported in Figure 1. ABX indexes provide an indicative measure of the value of MBS, as they are based on the price of credit default swaps offering protection against the default of baskets of subprime MBS of different ratings. In other words, a decline in the ABX index indicates an increase in the cost of insuring a basket of mortgages of a certain rating against default. It is clear from the graph that the crisis was first felt in March 2007 by the BBB-rated MBS. A few months later, in June 2007, all tranches (even the AAA-rated securities) experienced a substantial drop in value, as UBS shut down its internal

Table 2 Example of REMBS: GSAMP-Trust 2006-NC2

Tranche description Class	Notional	Width % of total	Credit Rating		Coupon rate 1-month LIBOR +
			S&P	Moody's	
A-1	\$239,618,000	27.2	AAA	Aaa	0.15%
A-2A	\$214,090,000	24.3	AAA	Aaa	0.07%
A-2B	\$102,864,000	11.7	AAA	Aaa	0.09%
A-2C	\$99,900,000	11.3	AAA	Aaa	0.15%
A-2D	\$42,998,000	4.9	AAA	Aaa	0.24%
M-1	\$35,700,000	4.0	AA+	Aa1	0.30%
M-2	\$28,649,000	3.2	AA	Aa2	0.31%
M-3	\$16,748,000	1.9	AA-	Aa3	0.32%
M-4	\$14,986,000	1.7	A+	A1	0.35%
M-5	\$14,545,000	1.7	A	A2	0.37%
M-6	\$13,663,000	1.6	A-	A3	0.46%
M-7	\$12,341,000	1.4	BBB+	Baa1	0.90%
M-8	\$11,019,000	1.2	BBB	Baa2	1.00%
M-9	\$7,052,000	0.8	BBB-	Baa3	2.05%
B-1	\$6,170,000	0.7	BB+	Ba1	2.50%
B-2	\$8,815,000	1.0	BB	Ba2	2.50%
X	\$12,340,995	1.4	NR	NR	.

Source: Ashcraft and Schuermann (2008), SEC-filed prospectus for GSAMP 2006-NC2

hedge fund, Dillon Read, after suffering about \$125 million of subprime-related losses. As the crisis worsened, the indexes never recovered and kept declining across all ratings.

To understand the way in which securitization works and could be reformed, it is best considering a real example of a subprime MBS. The special-purpose vehicle shown in Table 2 is called GSAMP-Trust 2006-NC2 and owns 3,949 subprime loans for an aggregate principal of \$881 million. The originator of the underlying loans is New Capital Financial, at the time the second largest subprime lender in the US, originating \$51.6 billion in mortgage loans in 2006. It later filed for bankruptcy on 2 April 2007. The arranger of the deal is Goldman Sachs who bought the portfolio from the originator and sold it to a SPV named GSAMP-Trust 2006-NC2. The SPV funded the purchase of this loan through the issue of asset-backed securities (listed in Table 2). It is interesting to notice that the first 5 tranches representing almost 80% of the total were AAA rated. All but tranche X (the riskiest one) were rated and sold to the public. The sale to the public required the publication of a prospectus, which is a document of 555 pages deposited at the Securities and Exchange Commission (SEC) on 31 March 2006.

Prospectuses contain several summary statistics on the underlying pool of loans. From the prospectus of GSAMP-Trust 2006-NC2, we learn that 88.2% of the loans have adjustable rate (the remaining have a fixed rate); 98.7% are first-lien (that is, the first mortgage on the property); 90.7% are for first homes; 73.4% of the mortgaged properties are single-family homes; 38.0% and 10.5% are secured by residences in California and Florida, respectively, the two dominant states in this securitization. The average borrower in the pool has a FICO score of 626: 31.4% have a FICO score below 600, 51.9% between 600 and 660, and 16.7% above 660. The average mortgage

loan in the pool has a LTV of 80.34%: 62.1% have a LTV of 80% or lower, 28.6% between 80% and 90%, and 9.3% between 90% and 100%. The ratio of total debt service of the borrower to gross income is 41.78%. However, this information is not available for all borrowers, as only 52% of the loans have full documentation, that is, the provide information about income and assets of the applicants, while the remaining ones have no information about the income or assets of the applicants.

The above information is contained in 20 pages. The rest of the document describes the originator (New Capital Financial), the arranger (Goldman Sachs), the servicer (Ocweb), the securities administrator (Wells Fargo), the underwriting guidelines, and contains a list of disclaimers, reps and warranties (for instance, the absence of any delinquencies or defaults in the pool; compliance of the mortgages with federal, state, and local laws; the presence of title and hazard insurance; disclosure of fees and points to the borrower; statement that the lender did not encourage or require the borrower to select a higher cost loan product intended for less creditworthy borrowers when they qualified for a more standard loan product).

At this point, it is worth making three observations on the quality of the information available to investors. First, the data provided in the prospectus is not enough to help pricing or detect default. In fact, it is entirely made of summary statistics, which deliver information on the average claim but not on the individual loans in the portfolio, which may be critical to assess the risk of default of the portfolio and its tranches. Valuing these risks was of limited importance when house prices were rising and defaults were few. But as house prices stopped rising and the number of defaults started increasing, the valuation of these securities became very complicated and information about the underlying securities became very important but was not available in the prospectus and in the yearly reports produced by the SVPs.

Second, detailed information on the pool of underlying securities is available through data providers like Loan Performance and McDash Analytics. Loan Performance's securities databases are the industry's largest and most comprehensive: they include loan-level data on more than 90% of the market for MBS securities. As stated on the website of McDash Analytics, these companies "collect loan level data directly from servicers into an anonymous database, distribute the cleansed data, and provide them to clients who want to perform prepayment and default benchmarking analysis on their mortgage asset holdings." The catch is that the subscription to these datasets is very expensive (over \$1 million per year) and a lot of skills are required to analyze this data. Hence, most investors did not bother to use them to assess the risks of their investment decisions (and check the quality of the credit ratings) until the crisis hit them. After all, why should they spend their money to replicate what rating agencies were (supposed to be) doing for free?

Third, no information is available on the stake retained by originators and arrangers and on their subsequent trades. This information might have been very important to help investors to assess to value of MBS securities because securitization of subprime loans generates a clear moral hazard problem. As loans are sold to the market, originators have less incentive to collect the soft information that is needed to screen the applicants. Keys, Mukherjee, Seru and Vig (2008) show that among loans with similar observable characteristics those that are more likely to be securitized (because their FICO score is just above the 620 cutoff) are more likely to default than those that are less likely to be securitized (because their FICO score is just below

620). This effect is there only for loans with low or no documentation, suggesting that securitization reduces the incentives to collect soft information. If so, holdings and trades of originators and arrangers would signal the quality of the underlying pool of loans, and thus provide very valuable information for investors.

3. Conflict of interest and rating inflation

As noted by Partnoy (2006), among all "financial gatekeepers" CRAs are those who face the most serious conflicts of interest. This is due to a combination of factors.

First, differently from analysts (but not from auditors), since the 1970s they are paid by the issuers whose instruments they rate. This change in practice came at the same time as the approval of a body of U.S. regulations that depend exclusively on credit ratings issued by Nationally Recognized Statistical Rating Organizations (NRSROs), a status until recently awarded only to Moody's, Standard & Poor's, and Fitch.² Being paid by the issuers creates an obvious incentive for rating agencies to distort ratings so as to please their clients, and win further business from them.

Second, unlike other gatekeepers, CRAs are allowed to sell ancillary services to the clients whose instruments they rate, in particular pre-rating assessments and corporate consulting. For instance, an issuer can ask a rating agency how it would rate a financial instrument with certain characteristics, and even ask how these should be modified to (just) obtain a certain rating. This type of activity facilitates rating shopping, that is, it allows an issuer to identify the rating agency that would provide the most favourable rating to its financial instruments, a point highlighted by Bolton et al. (2008), Skreta and Veldkamp (2008) and Spatt, Sangiorgi and Sokobin (2008). In particular, Bolton et al. (2008) show that precisely due to credit shopping the conflict of interest is exacerbated under duopoly compared to monopoly.³ That competition has undesirable effects in this situation is also confirmed by the evidence in Becker and Milbourn (2008), who show that the entry by Fitch has been associated with greater ratings inflation.

Of course, for the conflict of interest to result in rating shopping it must be the case that there are some naïve investors who can be gullied by the inflated ratings, an element present both in Bolton et al. (2008) and in Skreta and Veldkamp (2008), or by regulations that induce the issuer to strive for the highest possible rating, as in Spatt et al. (2008). Importantly, regulation does provide such inducement, as pension funds, banks, investment funds and insurance companies are all subject to regulation based on ratings, and the scope of this regulation has greatly expanded over time. For

2 Since 2003, the number of the NSSRO has risen to ten: between 2003 and 2005, the SEC designated two new NSSRO, and pursuant to the passage of the Credit Rating Agency Reform Act in 2006 by the U.S. Congress it designated five more - two Japanese ones and three small U.S. ones.

3 In their model, there are naïve investors who believe the credit rating agencies' stated ratings. The issuers of commercial paper will never buy a bad rating, so credit agencies have an incentive to overstate the quality of any given issuance if the reputation costs (i.e. future lost profits) are low enough or the share of naïve investors large enough. An increase in the number of credit agencies, i.e. more competition, makes investors actually worse off as it gives issuers more opportunity to shop around for a good rating.

instance, since 1989 U.S. pension funds are allowed to invest in highly rated asset-backed and mortgage-backed securities. The minimum capital requirements of banks, insurance companies and brokerage companies are also affected by the credit ratings of the assets that they hold. Therefore, regulation per se has been an increasing source of demand for high ratings by financial institutions.

Thirdly, ratings agencies are largely immune to civil and criminal liability for malfeasance, because according to several U.S. court decisions they are to be considered as "journalists" and therefore their ratings are opinions protected by the First Amendment (freedom of speech). In contrast, after the Sarbanes-Oxley Act auditors and corporate boards face new rules regarding conflicts of interest, and financial analysts at investment banks are subject to restrictions on their activity and compensation. Therefore, for CRAs regulators have made much less of an effort to mitigate the conflict of interest than for other financial gatekeepers.

These considerations suggest that the inflation in credit ratings might have been exacerbated (i) by the regulatory implications of ratings due to the NRSRO status, which confers an intrinsic value to ratings over and above their true ability to measure risk, (ii) by the presence of naïve investors, whose number may have increased with the popularization of finance in recent years, and ironically (iii) by the increase in competition associated with the entry of a third NRSRO (Fitch). But these considerations can still not explain why the spectacular failure of ratings occurred in conjunction to structured debt securities and not (at least not on the same scale) until CRAs confined themselves to evaluating the default risk of corporate bonds, which for a long time was their main activity. To understand this, it is important to realize that the shift from corporate debt to structured debt securities increased tremendously the gap between the complexity of the instrument being rated and the coarseness of ratings.

3.1 Why complex securities and coarse ratings exacerbate rating inflation

The complexity of structured debt securities greatly expands the scope and incentive of rating agencies to collude with issuers, if ratings remain relatively coarse - e.g., if they are based on a few discrete classes such as AAA, AA, A, BBB, etc., rather than on a continuous scale. The complexity of structured debt securities arises from the fact that these are portfolios of assets, often numerous and highly heterogeneous in their risk and return characteristics. The extent to which the risk of these assets is correlated is very important to determine the sensitivity of structured debt securities to aggregate risk, as underlined by Coval, Jurek and Stafford (2008). In addition, for MBS securities the risk of the underlying mortgage loans stems from two quite different sources: prepayment risk, which materializes when borrowers find early repayment worthwhile because of the improved refinancing conditions, and default risk, which instead occurs when interest costs escalate, housing prices decline, or there are adverse shocks to the borrowers' employment or income. The socio-economic and geographic composition of the underlying loan portfolio determines the exposure of the MBS to each of these risks.

Complexity is further increased by "tranching", which implies that the interest and principal paid by the pool of underlying assets are distributed to the holders of the various tranches in a pre-specified way according to a "waterfall" scheme, that is, a

system of seniority. The scheme is such that the "junior" tranche is the first to absorb losses from the underlying collateral loans, and when it becomes worthless the "mezzanine tranche" starts absorbing further losses, with the senior tranche (typically AAA-rated) being the most protected against default risk.

The issuer of a MBS or of a CDO solicits a rating from a CRA - possibly after shopping, as already explained above - for the security as such if it is not tranching, or otherwise separately for each tranche. Since each ratings class corresponds to a range of possible values of credit risk, the CRA may provide a pre-rating assessment to the issuer, explaining which rating the security would obtain depending on different potential structures of the underlying portfolio of assets. This allows the issuer to choose the portfolio structure that just enables the MBS or the CDO to be, for instance, AAA-rated. Therefore, AAA-rated structured debt issues will end up having not the rating corresponding to the *average* AAA-rated corporate bond but rather to the *marginal* one, implying that they are correspondingly riskier. The same "trick" could be applied to the rating of tranches, in which case the issuer can adjust not only the composition of the underlying portfolio but also the details of the "waterfall" scheme of seniority between tranches.

This may go a long way towards understanding the true meaning of the very large "credit enhancement" achieved by structured debt issuers relative to the credit risk of the underlying portfolio. Indeed, Bemmelech and Dlugosz (2008) find, using data on 3,912 tranches of CDOs, that "while the credit rating of the majority of the tranches is AAA, the average credit rating of the collateral is B+" and observe that the CDOs were structured according to a very uniform pattern - not only in their tranche structure but also in the composition of the underlying portfolio. They suggest that this uniformity may be explained by CRAs helping issuers to structure their CDOs so as to just fit their requirements to achieve an AAA rating. In support of this interpretation, they note: "Anecdotal evidence suggests that the S&P rating model was indeed known to CDO issuers and was provided to them by the rating agency". For instance, by making its CDO Evaluator software available via its web site, S&P allowed issuers "to simulate different scenarios of expected default given the characteristics of the collateral they have chosen. The CDO Evaluator is an optimization tool that enables issuers to achieve the highest possible credit rating at the lowest possible cost." This is reflected even in the wording that S&P uses to define excess collateral: "what percentage of assets notional needs to be eliminated (added) in order for the transaction to provide *just enough* support at a given rating level" (p. 22).

Of course, if investors were all sufficiently sophisticated, they should take this behaviour by rating agencies into account, that is, they should recognize that an AAA-rated CDO is riskier than an AAA-rated corporate bond, so that the CDO would be priced at a discount relative to the bond. This, however, will not occur if many investors are so naïve as to blindly use ratings to assess the riskiness of claims, as argued by Brennan et al. (2008). To support this claim, they quote the statement by the SEC that "certain investors assumed the risk characteristics for structured finance products, particularly highly rated instruments, were the same as for other types of similarly rated instruments", and that "some investors may not have performed internal risk analysis on structured finance products before purchasing them" (*Federal Register*, Vol. 73, No. 123 page 36235, June 25, 2008). Indeed, precisely on this basis the SEC later recognized the need for differentiated ratings for structured products

and corporate bonds. Also the Committee on the Global Financial System (2005) indicates that a number of the investors interviewed by their Working Committee "claim to rely almost exclusively on the rating agencies' pre-sale reports and rating opinions for information on deal specifics and performance" (p. 23).⁴

3.2 Why rating coarseness supported the expansion of the structured debt market

The previous section only considered one sense in which ratings can be regarded as coarse, that is, their discreteness (if ratings were continuous, rating agencies could obviously not play on the difference between the marginal and average credit risk within a given rating class). But in reality there are several other dimensions in which existing ratings are coarse.

First, the ratings released by S&P and Fitch reflect their assessments of the default probability of the corresponding security or tranche. Of course, the default probability captures only one dimension of default risk: it does not indicate the magnitude of the "loss given default", which is crucial to assess the security's or tranche's risk. Instead, Moody's ratings reflect its assessment of the expected default loss, that is, the product of the probability of default and the loss given default. Though better as a measure of default risk, even this is not sufficient to assess the risk of a structured debt security. Indeed, Brennan et al. (2008) show that mispricing arises even if the valuation of structured debt securities is based on ratings that assess their expected default loss, rather than simply their probability of default.⁵

A proper assessment of the risk of such a security would in fact require also information regarding the covariance between default losses and the marginal utility of consumption (that is, its "beta"), as pointed out by Coval et al. (2008). These authors study the mispricing that arises if the rating only assesses the probability of default but fails to indicate whether default is likely to occur in high-marginal utility states. They also point out that, in tranching CDOs, the distribution of risk across the various tranches is very sensitive to the assumptions made by the rating agency about the correlation structure of defaults in the underlying portfolio, which happens to be precisely one of the weakest spots of the methodology commonly used by credit agencies: for instance, S&P simply assume two corporate bonds to have a 15 percent correlation if they are in the same sector, and a 5 percent correlation if they are from different sectors (Bemmelech and Dlugosz, 2008), irrespective of the state of the aggregate economy. But default correlations are clearly much higher in economic downturns than in expansions, a fact that may contribute to account for the massive failure of credit ratings of structured debt in the current recession.

At another level, the coarseness of ratings reflects the limited amount of detailed

4 Consistently with this, Firla-Cuchra (2005) documents that ratings explain between 70 and 80 percent of launch spreads on structured bonds in Europe. Indeed he interprets this as evidence that "some investors might base their pricing decisions almost exclusively on ratings"

5 Well before the crisis, the Committee on the Global Financial System (2005) already warned that "the one-dimensional nature of credit ratings based on expected loss or probability of default is not an adequate metric to fully gauge the riskiness of these instruments. This needs to be understood by market participants" (p. 3). Clearly it was not!

loan-level data that CRAs used in their models to evaluate the risk of the underlying portfolio. As late as 2007, Moody's reported that it was about to request more detailed loan-level data from issuers, for the first time since 2002, including even data that itself considered to be "primary", such as a borrower's debt-to-income (DTI) level, the appraisal type, and the identity of the lender that originated the loan. As noted by Mason and Rosner (2007), it is surprising that these data would not have been collected by them before, considering that "traditionally the loan to value ratio (LTV), FICO score and the borrowers' DTI are the three most significant measures of credit risk on a mortgage" (p. 24). At least as surprising is that the models used by CRAs neglected the identity of the lender that originated the loan, considering that this piece of information turns out to be highly significant in predicting the subsequent rating downgrades of the same asset-backed securities, as documented by Johnson, Faltin-Traeger and Mayer (2009) in an empirical study of S&P ratings.

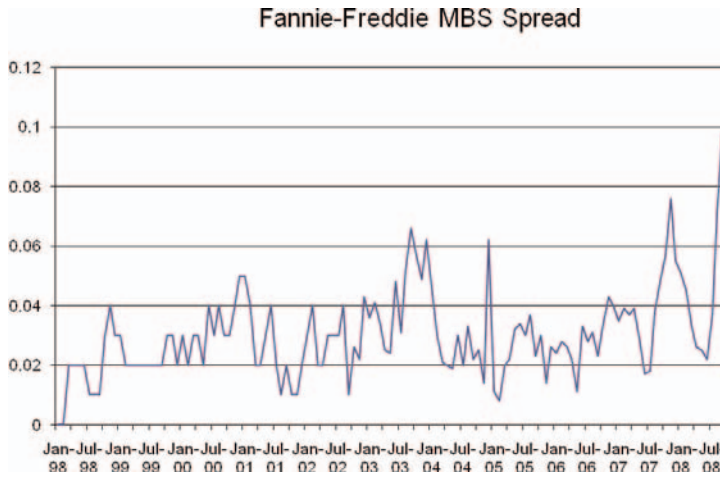
Presumably, to effectively convey all this information about the risk of MBSs, CDOs and their tranches, the rating agencies would have had to produce multidimensional ratings, and also report statistics on the sensitivity of their ratings to the most crucial assumptions of their models, such as those on correlation between the defaults of the assets in the underlying portfolio. This, however, would have probably made their ratings much harder to understand and interpret for many investors, and would have limited the issuance of structured debt, contradicting the role that rating agencies saw for themselves in the development of this market. Indeed, as wittily pointed out by Partnoy (2006), "with respect to these new instruments, the agencies have become more like 'gateopeners' than gatekeepers; in particular, their rating methodologies for collateralized debt obligations (CDOs) have created and sustained that multi-trillion-dollar market" (p. 60).

This drawback of disclosure is captured by the model of Pagano and Volpin (2008), where issuers may not wish to release complex information about their structured bonds, because only few potential buyers are sophisticated enough to understand the pricing implications of such information. Therefore, releasing it would create a winner's curse problem for unsophisticated investors, and would limit the size and liquidity of their primary market. The point that disclosing information about securitized assets may hinder their liquidity is also made intuitively by Woodward (2003) and Holmstrom (2008). The latter draws a parallel with the sale of wholesale diamonds, which de Beers sells in pre-arranged packets at non-negotiable prices, and argues that this selling method is aimed at eliminating the adverse selection costs that would arise if buyers were allowed to negotiate a price contingent on the packets' content.⁶

This prediction is supported by the suppression of mortgage loan location information in the securitizations carried out by the U.S. public agencies. In 1970, when the Government National Mortgage Association (GNMA or Ginnie Mae) pioneered the securitization of loans insured by the Federal Housing Administration (FHA), its management declared that no information other than the coupon rate would be dis-

6 Milgrom and Roberts (1992, pages 75-76), who describe this example in detail, suggest however a somewhat different rationale for de Beer's selling method: they see it as intended to save bargaining costs, that is, the direct costs of haggling over each diamond and the attendant information costs for both the buyers and the seller.

Figure 2 Current Coupon Yield Differential between Fannie Mae 30 Year MBS and Freddie Mac 30 Year Gold PC



Source: Data kindly provided by Susan Woodward, Sand Hill Econometrics.

closed about the underlying loan pools. The reason that they gave for this decision was that prepayments, though mainly related to coupon, are also to some extent related to the geographical composition of the loan pool. GNMA suppresses the information about geography, and thus reduced investors' ability to evaluate prepayment risk (the only relevant risk in this case, as these loans are insured against default). This policy was inherited by the other two U.S. public agencies that securitize mortgage loans and guarantee them against default risk: the Federal Home Loan Mortgage Corporation (FHLMC, widely known as Freddie Mac) and the Federal National Mortgage Association (FNMA or Fannie Mae). However, in the 1990s Freddie Mac gave in to pressure to reveal more information about its loan pools, and it regularly discloses geographical information about them. Thereafter, as shown in Figure 2, the Freddie Mac pools have traded at consistently higher yields than Fannie Mae's comparable loan pools over the 1998-2008 period, in spite of the fact that Freddie Mac's securities even pay a couple of days earlier (so they should pay lower yields). The differential has been 3.05 basis points over the whole decade, up to 4.8 basis points in the most recent and turbulent period (July 2007-October 2008).⁷ So here we have an example of almost identical securities, which differ mainly in the detail of price relevant information provided by the issuer: the market clearly values more the securities with less information, for which sophisticated investors can extract less trading and arbitrage profits at the expense of less sophisticated ones.⁸

But while suppressing price relevant information enhances liquidity in the primary market, it may reduce liquidity in the secondary market or even cause it to freeze. This is because the information undisclosed at the issue stage may still be uncovered by sophisticated investors later on, especially if it confers them the ability to earn

⁷ Both of these averages are significantly different from zero at the 5 percent confidence level.

⁸ We owe information and data about this example to Susan Woodward (Sand Hill Econometrics).

large rents in secondary market trading.⁹ So limiting transparency at the issue stage shifts the adverse selection problem onto the secondary market. In choosing the degree of rating transparency, issuers effectively face a trade-off between primary and secondary market liquidity.

As shown by Pagano and Volpin (2008), the choice of transparency made by the issuers will depend precisely on the trade-off between primary market and secondary market liquidity: as just argued, coarse information enhances the first but endangers the second. The key parameters in this trade-off are the value that investors place on secondary market liquidity, as well the severity of the adverse selection problem in the primary market. If secondary market liquidity is very valuable and/or adverse selection would not greatly damage primary market liquidity, then issuers will choose ratings to be transparent and informative, even at the cost of reducing primary market liquidity. Conversely, if investors care little about secondary market liquidity and/or adverse selection would greatly impair primary market liquidity, then issuers will go for coarse and uninformative ratings.

But the degree of ratings transparency chosen by issuers falls short of the socially optimal one whenever secondary market illiquidity is more costly for society at large than it is for issuers of securitized assets. This may be the case if, for instance, a secondary market freeze were to trigger a cumulative process of defaults and premature liquidation of assets in the economy, for instance because banks' interlocking debt and credit positions create a gridlock effect. Then the degree of ratings transparency that is optimal for society exceeds that chosen by issuers of structured bonds.

This creates a rationale for regulation imposing a certain degree of transparency on issuers of these securities. Nevertheless, it must be recognized that such regulation will have a cost in terms of reduced liquidity or market size at the issue stage. In other words, imposing greater disclosure on the MBS market will most likely reduce its magnitude compared with the pre-crisis record, and will most likely induce investors to require higher yields even after market conditions will have gone back to normality, as exemplified by the Freddie Mac and Fannie Mae comparative experience.

4. Possible policy interventions

In the discussion above, we have identified rating inflation and coarse ratings as the main targets for policy interventions. The obvious solution to address them is to change the incentives of rating agencies and increase disclosure. But, what are the specific policy reforms to implement? In what follows we outline two possible courses of action.

The first, which we regard as the *preferred policy*, is quite drastic, in that it requires not simply an adjustment of existing rules but a complete reorientation of regulation

9 That sophisticated investors engage in such activity is witnessed by the evidence collected by the Committee on the Global Financial System: "Interviews with large institutional investors in structured finance instruments suggest that they do not rely on ratings as the sole source of information for their investment decisions [...] Indeed, the relatively coarse filter a summary rating provides is seen, by some, as an opportunity to trade finer distinctions of risk within a given rating band" (p. 3, emphasis added).

according to two new guiding principles: (i) ratings should be paid by investors, and (ii) investors and rating agencies should be given free and complete access to all information about the portfolios underlying structured debt securities, as well as about the design of their tranches.

The second policy, which we regard as a *second-best* one, imposes milder changes to the current market model, but is likely to be far less effective in addressing the problems illustrated in this paper. Furthermore, it is expected to require a considerable increase in an already hypertrophic regulation, in contrast with the preferred policy, as also underlined by Richardson and White (2009).

4.1 Preferred policy

(1) Credit rating companies should be paid by investors and not by issuers.

Since both rating inflation and the tendency to issue coarse ratings arise from the conflict of interest between rating agencies and investors, it is crucial to eliminate (or at least reduce as far as possible) this conflict by addressing the issue of "who pays". If rating agencies tend to please issuers by inflating their credit ratings and/or by choosing excessively coarse ratings, then the most appropriate solution is to have investors - not issuers - pay them for their services, as indeed was the case before the 1970s. How would such a system work? Not too differently from the market for other forms of financial information, spanning from the sale of price and transaction data by trading platforms and newspapers to the sale of advice by financial analysts and of economic forecasts by econometric consultancies. Financial analysts are perhaps the most fitting comparison: their analysis and recommendations are either sold to investors on a standalone basis or are packaged together with financial services by large banks or securities companies.¹⁰

It should be recognized that even this arrangement is not completely free from incentive problems, if some investors are large enough (or manage to set up cooperative arrangements to purchase ratings), they may also end up affecting ratings - for instance, they may try to induce CRAs to avoid or delay rating downgrades for securities in which they have invested heavily. But it is hard to imagine that such large investors may wield sufficient power as to distort the ratings of all the competing agencies, and presumably other investors will try to patronize rating agencies that have shown no such tendency to shade their ratings so as to please their large customers.

More importantly, switching from the "issuer pays" to the "investors pay" model may be difficult to implement in practice in a situation where delegation by banking and securities regulations has conferred a tremendous power to a select group of rating agencies over issuers. Therefore, it will be essential to prevent indirect payments by issuers to CRAs in the form of the purchase of consulting or pre-rating services. A

¹⁰ While in most cases analysts are paid by investors ("sell-side analysts"), companies can also hire a fee-based research firm to prepare one or many reports ("paid-for analysts"). Interestingly, Kirk (2008) documents that paid-for analysts issue relatively less accurate forecasts and more optimistic recommendations than sell-side analysts, which is consistent with the idea that the former are more exposed to a conflict of interest than the latter.

more direct (and consequential) way to deal with the problem would be to eliminate the many regulations that delegate powers to rating agencies: once the rents that these regulations confer to these agencies are gone, issuers will have less of an incentive to circumvent the "investors pay" principle.

(2) Arrangers and servicers should disclose the complete data on the individual loans (or bonds) underlying the structured finance products.

We believe that the disclosure of nothing less than the entire set of data available to the arrangers and servicers should be required. It should be clear from the discussion in Section 2 that currently prospectuses do not contain enough information to allow investor to assess the risk of default of a specific product and the change in risk characteristics over time. The information on individual loans currently available (for many but not for all securities) through expensive data providers like Loan Performance should become available for free to all investors. With these data, buy-side investors may be able to form their own assessment of the risk characteristics of the product.

It is important to notice that this form of disclosure reduces both the risk of secondary market freezes (as all available information is given to all investors) and the possibility of collusion between issuer and rating agency. In fact, when the information becomes available on the market, specialized information processors will enter and provide financial advice to investors, thereby providing healthy competition to CRAs. This will weaken the unhealthy bond that now exists between issuers and CRAs.

It is also worth highlighting that imposing disclosure requirements on the issuers is far better than imposing them on the rating agencies themselves, as was proposed by the Securities Exchange Commission, in July. SEC (2008) indicates that CRAs should disclose all information used to determine ratings for structured products. Although this policy would make CRAs more accountable to the public, it would also reduce their incentives to invest in improving their risk models. Moreover, transparency about rating models could lead to greater collusion with issuers: as seen above, S&P was so transparent about its CDO Evaluator Manual that issuers could predict perfectly the rating they would get, and thus structure deals so as to just get an AAA rating!

As already highlighted in the previous section, the policy being proposed here should be expected to reduce the price at which securitized assets can be sold at the issue stage and therefore the size of the market for structured debt securities, in comparison with the pre-crisis period. But at least the market would be placed on safer foundations than it was at that time.

4.2 Second-best policy

This alternative policy retains the current principle that rating agencies are paid by issuers, but tries to restrain the conflict of interest with investors by limiting the way in which agencies contract with issuers and are paid by them, and tries to remedy the coarseness of ratings by prescribing a minimal informational detail to issuers and credit agencies.

(1) Credit rating companies should be paid an upfront fee irrespective of the rating issued and credit shopping (and paid advice by rating agencies to issuers) should be banned.

The requirement of an upfront fee is the so-called "Cuomo plan," named after NY Attorney General Andrew Cuomo. As noted by Bolton et al. (2008), this requirement needs to be supplemented with the ban of rating shopping for it to be effective. SEC (2008) goes some way in the direction of banning the rating shopping. Its plan is to prohibit CRAs to act as both a rater and a paid advisor for a tranching securitization.

Restricting the compensation contracts for rating agencies may instead be less effective. Even if issuers must pay an upfront fee and cannot engage in explicit rating shopping, implicit collusion may still be sustainable: they may systematically patronize the rating agencies that offer them the best ratings, for instance because they know the models that each agency is going to use to evaluate their securities. As a result, the conflict of interest may persist.

(2) Enhance transparency by determining the information that issuers and rating agencies must disseminate to the investing public.

This rule would require mandating a more complete format for the information to be disseminated by rating agencies. This is the policy suggested by the Committee on the Global Financial System (2008), which recommends that CRAs present their ratings so as to facilitate comparison within and across classes of different structured finance products; provide clearer information on the frequency of their updates, and better documentation about their models and the sensitivity of ratings to the assumptions made in their models, and especially reduce the coarseness of their ratings by producing additional measures of the risk properties of the structured finance products. In the same spirit, the Financial Economists Roundtable (2008) suggested that ratings should be complemented by an estimate of their margin of error. One may add yet more indications: for instance, that the agency should provide statistics that measure the systematic risk of the loan pool and of individual tranches, beside estimates of the probability of default and of the loss given default.

However, this prescriptive approach places considerable burdens and risks on the shoulders of regulators. It requires that regulator identifies which pieces of information and which statistics rating agencies should provide, which can be very costly in the presence of very diverse financial products. It also exposes regulation to the danger of failing to keep pace with financial innovation, for instance with new ways of designing structured debt securities, some of which may even be induced by regulation itself. Finally, it may induce investors to forgo once more an independent evaluation of the risk characteristics of these securities (for instance by turning to additional data sources or other information processors), trusting that the rating agency has provided all the information required by regulators.

5. Conclusion

What has been the role of CRAs in the subprime crisis? This paper focus on two aspects that contributed to the boom and bust of the market for asset-backed securities: rating inflation and coarse information disclosure.

Ratings inflation coupled with naïve investment decisions led to a massive mispricing of risk, whose correction has been the trigger of the crisis. The likely motive for the inflation of credit ratings is an incentive problem: CRAs are paid by the issuers of the securities being rated, and therefore their interest is more aligned with the issuers than with the investing public.

The coarseness of ratings is one of the main reasons for the illiquidity that has plagued securities markets since the crisis broke out. After house prices stopped rising and defaults started on subprime mortgages started to increase, market participants realized that the detailed information required to identify "toxic assets" in the maze of structured debt securities had simply been lost in the process of securitization, and that ratings provided an insufficient guidance to identify them. We argue that the reason why coarse (and uninformative) ratings had been produced was to expand the primary market of these securities, by making them palatable also to investors who could not easily process more complex information than coarse ratings.

What can be done to mitigate these problems in the future? Our preferred policy option is to move towards a system where credit ratings are paid by investors, and where arrangers and servicers disclose for free the complete data on the individual loans underlying the structured finance products, so that buy-side investors may feed them into their own models so as to assess their (changing) risk characteristics. Although these reforms will also limit the liquidity and size of the primary market for structured finance securities in comparison with the pre-crisis period, they will restore investors' confidence in the securitization process, which can still prove a valuable tool to enlarge financial markets and transfer risk from lenders to investors. These reforms will also create opportunities for specialized information processors providing healthy competition to CRAs, and sharpen the investors' awareness that they must not place blind faith in ratings alone.

References

- Ashcraft, Adam B., and Til Schuermann, 2008, "Understanding the Securitization of Subprime Mortgage Credit," Federal Reserve Bank of New York Staff Report no. 318.
- Becker, Bo, and Todd Milbourn, 2008, "Reputation and Competition: Evidence from the Credit Rating Industry," unpublished manuscript.
- Benmelech, Efraim, and Jenifer Dlugosz, 2008, "The Alchemy of CDO Ratings," unpublished manuscript.
- Blankfein, Lloyd, 2009, "Do not destroy the essential catalyst of risk," *Financial Times*, 8 February, 7.
- Bolton, Patrick, Xavier Freixas, and Joel Shapiro, 2008, "The Credit Rating Game," unpublished manuscript.
- Brennan, Michael J., Julia Hein and Ser-Huang Poon, 2008, "Tranching and Rating," unpublished manuscript.
- Brunnermeier, Markus K., 2008, "Deciphering the 2007-08 Liquidity and Credit Crunch," *Journal of Economic Perspectives*, forthcoming.
- Committee on the Global Financial System, 2005, "The Role of Ratings in Structured Finance: Issues and Implications," Bank for International Settlements, January.

- Committee on the Global Financial System, 2008, "Ratings in Structured Finance: What Went Wrong and What Can Be Done to Address Shortcomings?" CGFS Paper No. 32, Bank for International Settlements, July.
- Coval, Joshua D., Jakub W. Jurek, and Erik Stafford, 2008, "Re-Examining the Role of Rating Agencies: Lesson from Structured Finance," unpublished manuscript.
- Financial Economists Roundtable, 2008, "Reforming the Role of SROs in the Securitization Process," unpublished manuscript.
- Financial Stability Forum, 2008, "Report on Enhancing Market and Institutional Resilience," 7 April.
- Firla-Cuchra Maciej T., 2005, "Explaining Launch Spreads on Structured Bonds" Discussion Paper, University of Oxford.
- Fitch Ratings, 2007, *Inside the Ratings: What Credit Ratings Mean*.
- Gorton, Gary, 2008, "The Panic of 2007," unpublished manuscript.
- Holmstrom, Bengt, 2008, "Discussion of 'The Panic of 2007' by Gary Gorton," unpublished manuscript.
- International Monetary Fund, 2008, *Global Financial Stability Report*, April, Washington.
- Keys, Benjamin, Tanmoy Mukherjee, Amit Seru, and Vikrant Vig, 2008, "Did Securitization Lead to Lax Screening? Evidence from Subprime Loans," unpublished manuscript.
- Mason, Joseph R., and Joshua Rosner, 2007, "Where Did the Risk Go? How Misapplied Bond Ratings Cause Mortgage Backed Securities and Collateralized Debt Obligation Market Disruptions," unpublished manuscript.
- Johnson, Kathleen, Oliver Faltin-Traeger and Christopher Mayer, 2009, "Securitizers and Bond Performance," work in progress, Columbia Business School, February.
- Kirk, Marcus, 2008, "Can Companies Buy Credible Analyst Research?" working paper available at SSRN: <http://ssrn.com/abstract=1265709>.
- Milgrom Paul, and John Roberts, 1992, *Economics, Organization and Management*, Englewood Cliffs, New Jersey: Prentice Hall.
- Pagano, Marco, and Paolo Volpin, 2008, "Securitization, Transparency, and Liquidity," CEPR Discussion Paper no. 7105, December.
- Partnoy, Frank, 2006, "How and Why Credit Rating Agencies Are Not Like Other Gatekeepers," Chapter 3 in *Financial Gatekeepers: Can they Protect Investors?*, Yasuyuki Fuchita and Robert E. Litan editors, Nomura Institute of Capital Markets Research: Tokyo, and Brooking Institution Press: Washington, D.C.
- Richardson, Matthew, and Lawrence White, 2009, "Rating Agencies: More Regulation or Less?", in *Restoring Financial Stability: How to Repair a Failed System*, Chapter 3 in Viral Acharya and Matthew Richardson editors, New York University Stern School of Business, John Wiley & Sons, forthcoming.
- Security Exchange Commission, 2008, "Summary Report of Issues Identified in the Commission Staff's Examinations of Select Credit Rating Agencies," July.
- Skreta, Vasiliki and Laura Veldkamp, 2008, "Rating Shopping and Asset Complexity: A theory of Ratings Inflation," unpublished manuscript.
- Spatt, Chester, Francesco Sangiorgi and Jonathan Sokobin, 2008, "Credit-Rating Shopping, Selection and the Equilibrium Structure of Ratings," unpublished manuscript.

Standard & Poor's, 2007, "Principles-Based Rating Methodology for Global Structured Finance Securities," Ratings Direct Research.

Woodward, Susan, 2003, "Is More Information Better?," *Wall Street Journal*, 2 January.

The Treatment of Distressed Banks

Mathias Dewatripont and Jean-Charles Rochet

*Solvay Brussels School of Economics and Management,
ECARES, Université Libre de Bruxelles and CEPR; Toulouse
School of Economics and CEPR*

Introduction and recommendations

The current financial crisis is extremely severe. It is also multidimensional, and it has already led to many analyses and policy-oriented documents.¹ This contribution is academic, and therefore stresses principles rather than detailed implementation. Moreover, our focus is on the treatment of distressed banks, a key element of the regulatory architecture which has however attracted insufficient attention so far. The treatment of distressed banks can however not be treated independently of other dimensions of this architecture, which some of our recommendations will therefore indirectly address.

This paper has been prepared ahead of the April 2009 G20 meeting meant to deal with the world financial architecture. As far as the treatment of distressed banks is concerned, we can think of G20 actions as pursuing two potential objectives:

1. The harmonization of the treatment of distressed banks across countries in order to ensure a level-playing field while promoting global financial stability; it is useful in this respect to distinguish individual bank distress and systemic distress.
2. The promotion of cooperation between countries in the treatment of cross-border distressed banks.

This paper discusses these issues in turn. A key idea that underlies the analysis is that the current regulatory system is fragile because it has not dealt in an explicit fashion with the harmonization of the treatment of distressed banks. This stands in contrast with the efforts in terms of harmonization of capital ratios under Basel I and II. Of course, this harmonization has several significant flaws which have to be addressed too. But the idea that we need harmonized capital ratios is a sound one, and it should be extended to the treatment of distressed banks. This is very important because of 'political economy' considerations: whether in good or bad times, supervisors always face pressure from lobbies and from politicians that undermine the proper functioning and stability of the financial system. There is therefore a cost in leaving things vaguely specified or unspecified and therefore at the discretion of supervisors. They

Authors' note: We thank Janet Mitchell and Peter Praet for useful comments

1 See for example Brunnermeier et al. (2009), Tirole (2008) or the Group of Thirty Report (2009) for excellent wide-ranging analyses.

need to be protected *ex ante* through a system of transparent rules. Of course, there is always a potential cost of such rules in terms of loss of flexibility. However, the current system has clearly erred in the other direction. The paper offers a number of recommendations to try and move closer to a rule-based system that maintains enough flexibility.

Specifically, our set of recommendations is as follows:

First, as far as dealing with *individual banks* is concerned:

- A harmonized special bankruptcy regime should be established for banks involving 'prompt corrective action', i.e. giving to the supervisory agency powers to limit the freedom of bank managers (and possibly remove them) and shareholders (and possibly expropriate them) *before* the bank is technically insolvent.
- Supervisors should have the independence, resources and expertise to fulfill their mission properly. If public authorities are unwilling to raise supervisory budgets, this pleads, *ceteris paribus*, for a simplification of the regulatory regime. Basel II did go in the wrong direction here, with big banks being allowed to compute risks themselves through complex internal models, a task where they had a clear conflict of interest and which proved too difficult for proper oversight by supervisors.
- In terms of the structure of regulation, one should not allow banks to 'play one regulator against the other' (as has been the case in the US with OCC and OTS). Beyond this, while consolidated supervision – bundling *ex-ante* monitoring and *ex-post* intervention – allows for cost savings and simpler coordination, it may reduce accountability. Guarding against this can be achieved through reduced discretion in terms of intervention by the supervisors (as in the US FDICIA).
- One should think of the signals triggering intervention as admittedly crude indicators of the risk of potential problems. Therefore, simplicity is crucial, because it reduces manipulability and enhances transparency and credibility.
- A single capital requirement, even when it is very complex, is not enough to limit risk taking by banks. Therefore, a battery of indicators have to be designed by regulators, in order to provide simple signals of the various dimensions of banking risks (including liquidity and transformation risks, risks of large losses, exposure to macroeconomic shocks, ...) and used simultaneously to determine whether supervisory corrective action is needed.
- Other dimensions of regulatory control are to be explored to explicitly curb the incentives of bank managers for excessive risk taking: top managers' remunerations, shareholder representation, and internal risk management systems. This cannot remain as vaguely defined as in pillar 2 of Basel II.

Second, as far as *banking crises* are concerned:

- Public authorities should expect crises to happen. They should put in place a mechanism that allows a crisis to be formally declared (an event which will allow the release of public funds). This means formalizing *ex ante* cooperation between the relevant actors (Central Bank, supervisor, Treasury) with this contingency in mind.
- *Ex-post* crisis management should keep in mind that undercapitalized banks do

not function well. One should go for 'real' recapitalization, even if it is costly. There are several options – temporary nationalization, insuring bank loans or parking toxic assets in bad banks – that are possible. The objective should be to get lending going again without delay by properly capitalized banks, without excessively burdening taxpayers.

- Under current regulation, maintaining adequate capitalization in bad times has procyclical effects. Avoiding this calls for introducing 'automatic stabilizers' into the regulatory system, such as higher capital ratios in good times, dynamic provisioning, capital insurance (privately or publicly provided), or procyclical deposit insurance premia.

Finally, as far as *international cooperation* in crisis management is concerned:

- In economic areas which are meant to be very integrated, like the EU, one should move towards a centralized supervisor and a centralized deposit insurer.
- If one wants to keep integrating the world banking market, one should seriously consider partial centralization of supervision and deposit insurance at the world level.
- Barring such centralization, it is important to foster best practices in establishing credible Memoranda of Understanding for cross-border banking crisis management between authorities that detail in particular the respective rights and obligations with respect to intervention thresholds and deposit insurance.

1. Reforming prudential policy for distressed banks

The regulatory/supervisory systems of most G-20 countries have been strongly influenced by the "Basel process", initiated in the 1980s by the Banking Committee on Banking Supervision (BCBS). The aims of this process were essentially two: promoting the safety and soundness of the international banking system and guaranteeing a "level playing field" by eliminating competitive distortions due to the implicit support provided by some governments to their domestic banks.

Even if the Basel process has clearly contributed to the harmonization both of risk management practices by banks and regulatory requirements across countries², and was still undergoing important reforms (Basel II) when the crisis hit, it was insufficient to contain the crisis. We suggest that Basel II should be reformed in depth, and that the objectives of regulatory/supervisory systems should be significantly reassessed.

1.1 Implementing a special bankruptcy regime for banks

Several episodes of the crisis have revealed that banking authorities of many G-20 countries did not have sufficient legal powers to treat banking distress in a timely and efficient way. Moreover the discretion given to domestic supervisors by Basel II's pil-

² The Basel accords were initially designed for internationally active banks but they have been adopted, after some modifications, by the domestic regulators of many countries.

lar 2 revealed counterproductive in the management of the crisis, since it exposed them to political pressure and threats of judicial recourse by the shareholders of distressed banks. Generally speaking, it is not really useful to harmonize regulatory requirements for banks if enforcement of these requirements is left to the discretion of domestic supervisors, who act under political and legal constraints that differ a lot across countries.

Therefore, a first priority for restoring a level playing field for international banking and avoiding a race to the bottom in terms of enforcement of prudential policy is reforming and harmonizing bankruptcy laws for banks. Banks are not ordinary firms: partly thanks to deposit insurance, even under extreme solvency problems, their shareholders and managers still have considerable scope for "gambling for resurrection".³ In the absence of timely supervisory action, shareholders and managers still have an interest in continuing the bank's activity, typically increasing the ultimate damage to the deposit insurance fund and to the financial system as a whole.

Therefore, as put eloquently by Goodhart (2008, page 353):

"A key feature of any bank insolvency regime must involve some expropriation of shareholder rights, and, whatever the compensation arrangement for shareholders it is bound to generate...a claim that they were robbed of their property...So the key for closure, and the treatment of shareholders, is a central issue."

A good place to start harmonizing bank insolvency procedures would be the US system put in place in 1991 under FDICIA, which is centered around the important notion of PCA, or 'prompt corrective action' (note that Brazil put in place a system with similar features and worth looking at). This system has the advantage of starting to address a crisis gradually, classifying banks in five categories depending on (various measures of) capital ratios: well capitalized (capital ratio > 10%); adequately capitalized (> 8%); undercapitalized (< 8%); significantly capitalized (< 6%); and critically undercapitalized (< 2%). The first two categories face no restrictions, but the bottom three categories face more and more severe restrictions on actions (e.g. 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), and there are also theoretical analyses in its favor (see for example Freixas and Parigi, 2008).

Our first recommendation is therefore that:

- A harmonized special bankruptcy regime should be established for banks involving PCA, i.e. giving to the supervisory agency powers to limit the freedom of bank managers (and possibly remove them) and shareholders (and possibly expropriate them) *before* the bank is technically insolvent.

1.2 Putting in place strong and independent supervisory agencies

A necessary complement to the reform of bankruptcy law for banks is the protection of supervisors from pressure by politicians and lobbies.

³ This has been well-documented for example in the case of the US Savings and Loan crisis of the 1980's; see for example Dewatripont and Tirole (1994) for an overview of this episode.

This is only possible with a strong, independent, well-staffed and well-paid supervisor. And it is likely to be easier with consolidated supervision of all government-insured deposit taking institutions within each country. What is clearly undesirable is for example the US situation, i.e. the ability for financial institutions to choose between two ex-ante supervisors – the OCC for banks and the OTS for savings and loan – an ability which has led, as explained in Box A, to under-regulation by the OTS, mainly due to the fact that its budget depended on the number and size of institutions under its supervision.

Consolidated supervision can however in some cases have drawbacks, even if it may allow for administrative cost savings. Since early detection of bank distress is not always possible, supervisors might be tempted to hide a bank's problems in the hope that they might disappear and therefore not reveal their failure to identify these problems early enough.⁴ This creates a potential conflict of interest between ex-ante supervision and ex-post intervention. In this respect, the US system is attractive, with its distinction between the institution in charge of ex-ante supervision (the OCC for banks and the OTS for savings and loans) and the institution in charge of dealing ex post with distressed banks, i.e. the FDIC. Moreover, endowing supervisors with a clear, focused mission can enhance their accountability. Indeed, as shown by evidence on the behavior of public agencies,⁵ the simpler their task, the easier it is to evaluate how well they have performed, i.e. to keep them accountable.

However, note that there are various means of addressing the issue of political pressure and accountability, namely by using simple, publicly observable (and thus hard to manipulate) mandatory criteria for triggering regulatory intervention. Once again, this is an advantage of the PCA doctrine of the US FDICIA.

Our recommendations for the organization of supervision are that:

- Supervisors should have the independence, resources and expertise to fulfill their mission properly. If public authorities are unwilling to raise supervisory budgets, this pleads, *ceteris paribus*, for a simplification of the regulatory regime. Basel II did go in the wrong direction here, with big banks being allowed to compute risks themselves through complex internal models, a task where they had a clear conflict of interest and which proved too difficult for proper oversight by supervisors.
- In terms of the structure of regulation, one should not allow banks to 'play one regulator against the other' as has been the case in the US with OCC and OTS. Beyond this, while consolidated supervision – bundling ex-ante monitoring and ex-post intervention – allows for cost savings and simpler coordination, it may reduce accountability. Guarding against this can be achieved through reduced discretion in terms of intervention by the supervisors (as in the US FDICIA).

1.3. A set of simple regulatory requirements, rather than a single, complex capital ratio

The Basel Committee on Banking Supervision (BCBS) has put too much emphasis on its Capital Adequacy Requirement. The Northern Rock episodes, and several others,

4 See Dewatripont and Tirole (1994) for a discussion.

5 See Wilson (1989); see also Dewatripont et al. (1999) for an incentive-theoretic perspective.

Box A OTS: weak supervision in the US

The Office of Thrift Supervision in the US has behaved as a comparatively weak and excessively tolerant regulator, with particular emphasis on pushing for deregulation rather than monitoring the institutions under its supervision. In particular, it has:

1. Allowed Washington Mutual to grow fast thanks to very aggressive 'predatory lending' practices, which led them into bankruptcy.⁶
2. Allowed IndyMac Bank to backdate a capital injection in order to avoid sanctions and supervision.⁷
3. Allowed an institution like Countrywide Financial to leave the banking regulator OCC to join its more permissive regulatory oversight.⁸

have shown that a solvent bank can rapidly become distressed for lack of liquidity and that transformation risk cannot be neglected. In the case of Northern Rock for example, Blundell-Wignall et al. (2008) point out that in June 2007 (roughly three months before the depositors run started) its regulatory capital requirement (computed on the basis of Basel II risk weights and approved by the FSA) was slightly above £ 1.5 billion, while British authorities ultimately had to inject around £ 23 billion, i.e. more than 15 times the regulatory requirement, just to maintain the bank afloat.

Similarly, the idea that the capital buffers needed to cover credit risks should be computed by a complex regulatory formula fed by parameters delivered by banks' internal models has revealed disastrous. The Internal Risk Based approach to credit risk uses a regulatory formula based on a theoretical model (the Asymptotic Single Risk Factor model). This formula is simultaneously too simple to be a good predictor of credit losses (it assumes in particular a unique macroeconomic risk factor and normality of loss distributions), and too complicated to be verifiable by a third party (as it requires the calibration of several parameters, such as the probability of default and the loss given default, that are very difficult to estimate).⁹

In any case, it is not the role of supervisors to decide on the level of capital, and more generally of the risk management strategies of all commercial banks. These are business decisions that should normally be left to the assessment of banks' managers and administrators. It is only when supervisors anticipate that a bank is likely to face distress in a near future (and therefore exert negative externalities on its depositors or on the financial system as a whole) that supervisors can and must intrude. As the crisis has shown, indicators for such future distress cannot be summarized by a single capital ratio, even if very complex. Instead, we believe that regulatory intervention should be triggered by a whole set of relatively simple (and publicly verifiable) indicators, including measures of liquidity risk, as well as exposures to macroeconomic shocks, and bilateral exposures to other banks or systemic institutions.

6 See Washington Post (2008a).

7 See Washington Post (2008b).

8 See Washington Post (2008a).

9 See Rochet (2008) for a discussion.

The emphasis on the probability of failure of individual banks (epitomized by the use of the Value at Risk criterion) by the BCBS was obviously misplaced. The Value at Risk is probably a good indicator for banks' shareholders who are protected by limited liability. It is also probably a good indicator for bank managers, who are concerned about the credit ratings of their institution, which are computed on the basis of estimated probabilities of failures. However, the Value at Risk is clearly not a good indicator for public authorities, since this criterion does not take into account the upper tail of losses, which will have to be covered by depositors or more likely by the government.

There is another, more important reason why the focus on the probabilities of failure of individual banks might have been inappropriate, namely systemic considerations. Indeed, a 1% probability of failure does not have the same consequences if it means that 1% of the banks fail every year or alternatively that the whole banking system fails every hundred years. Therefore it is crucial for regulators to find ways to discourage "herding behavior" by banks, or at least to penalize an excessive exposure to the business cycle. This means that new indicators of risks have to be designed, based on correlation with aggregate activity, rather than absolute probability of failure.

Similarly, the main reason for public intervention by Central Banks and Treasuries in the current crisis was the protection of the financial system as a whole, and in particular "core infrastructures" such as large value payment and clearing and settlement systems. Anticipating (rationally) that public authorities are bound to intervene if these infrastructures are in danger, banks have taken insufficient risk prevention activities in relation with these "core infrastructures". To contain moral hazard, it is therefore necessary for regulators to find ways to penalize or at least limit the externalities that large and complex banking organizations exert on these "core infrastructures". A possible alternative (or complement) would be to impose on these "core infrastructures" sufficient risk prevention measures so that closing down or restructuring a large and complex banking organization (previously deemed systemic) could be performed without hindering the activity of the core infrastructure. In the same vein, if central counterparties such as clearing houses are created in order to limit aggregate risk on CDSs and some OTC derivatives, it would be necessary to impose appropriate protection measures for the participants to these central counterparties.

Finally the notion that fine tuned capital requirements could be sufficient to limit the incentives of bank managers to take excessive risk has revealed grossly incorrect. Other instruments, such as some form of control of bank managers' remunerations as well as the implementation of appropriate internal governance measures and adequate risk management systems are certainly much more adapted to curb risk taking incentives by bankers. We find more reasonable to interpret regulatory capital requirements as defining, together with other indicators, thresholds for supervisory intervention rather than recommendations for risk management policies of banks.

Our recommendations in this section are that:

- One should think of the signals triggering intervention as admittedly crude indicators of the risk of potential problems. Therefore, simplicity is crucial, because it reduces manipulability and enhances transparency and credibility.
- A single capital requirement, even when it is very complex, is not enough to

limit risk taking by banks. Therefore, a battery of indicators have to be designed by regulators, in order to provide simple signal of the various dimensions of banking risks (including liquidity and transformation risks, risks of large losses, exposure to macroeconomic shocks, ...) and used simultaneously to determine whether supervisory corrective action is needed.

- Other dimensions of regulatory control are to be explored to explicitly curb the incentives of bank managers for excessive risk taking: top managers' remunerations, shareholder representation, and internal risk management systems. This cannot remain as vaguely defined as in pillar 2 of Basel II.

2. Macroeconomic and systemic considerations

Recent years have witnessed staggering growth of some individual banks, both nationally and internationally. This is in large part a result of regulatory changes, at national level (the elimination of restrictions against out-of-State banking in the US) and also internationally (the elimination of restrictions against activities of foreign banks in many countries, or the Single Market program in the European Union for example, with its many bank mergers, starting often with purely domestic ones). This means that the size of individual banks has grown tremendously, both in large countries like the US and in small countries (Iceland being only the most extreme case), whose banks have become very large indeed relative to GDP.

This development has several consequences for the supervision of banks. The first one concerns political economy considerations. These were discussed already in section 1.2. They are of course magnified by the 'too big to fail' syndrome. Big institutions always have bargaining power in 'normal times', through their lobbying of Governments and supervisors. The aftermath of the Lehman Brothers bankruptcy has moreover clearly indicated that one cannot afford to let big institutions fail, even if the cost of a bailout is significant and therefore politically unattractive. This unavoidably raises big banks' bargaining power with supervisors in times of distress too, reinforcing the need for independence and expertise of supervisors stressed earlier.

Beyond this, it is important for public authorities to face the evidence: banking crises do happen in market economies. Therefore, it is important to have in place explicit crisis-management mechanisms when they come. Given the overreactions that markets often display,¹⁰ market discipline does not work any more in times of systemic crisis, being replaced by destabilizing panics. In such cases, it is important for the Government to step in, and possibly to inject public funds. Three issues have to be discussed in this respect: (i) Who decides when we are 'in a crisis'? (ii) What should be done *ex post*? And (iii) How to reduce the probability and social cost of a crisis?

As far as the first question is concerned, it is important to involve the three main actors in the decision process, the Central Bank, the supervisor and the Treasury. Indeed, each has access to relevant information, and the Treasury brings with it dem-

¹⁰ While somewhat extreme (as discussed for example by Caballero, 2009), the current crisis is a good example of the volatility of markets. It is for this reason for example that, in 'normal times', even the firms which have access to disintermediated finance do rely on banks for credit lines as insurance against the drying up of direct finance.

ocratic legitimacy. Their task would be, by declaring a crisis, to allow for the potential release of public funds, something which should not be possible in normal times. When thinking of the exact decision process by which a crisis can be declared, one has to keep in mind two objectives: (i) It is important on the one hand to avoid excessive use of public funds through excessively frequent crisis declaration; and (ii) It is also important that, when a 'real crisis' hits, it is promptly declared, so as to release needed public funds. Clearly, achieving both objectives can only happen if a crisis-management system has been devised *ex ante*, and if regular consultations take place between the Central Bank, the supervisor and the Treasury at highest level.¹¹

Concerning the second issue, that is, *ex-post* crisis management, a first thing to always keep in mind is that undercapitalized banks do not function well as credit providers to the economy. While there is a natural tendency for public authorities to delay action – which is fiscally costly – in the hope that things will get better, it is typically a very bad idea. The contrast between Scandinavia and Japan in the 1990s is good evidence of that. Quick, real recapitalization has to be preferred to fudging with accounting standards to pretend that capitalization 'is OK after all' or allowing for low capital ratios in hard times. This was tried in the US savings and loan crisis in the 1980s with disastrous consequences.¹²

Ex-post recapitalization of individual banks by public authorities in times of crisis can take several forms (we do not consider here 'universal' intervention mechanisms meant to help all banks; on this, see for example Caballero (2009) and Suarez (2008) among others): partial (or full) nationalization, insurance provision for bank loans, or the purchase of 'toxic' assets to be parked in a 'bad bank'.¹³ Our feeling is that there is no consensus among academics about the best way to proceed here. Some principles seem natural however: (i) at least as far as banks which are performing worse than the average of the sector are concerned, there is clearly no reason to protect shareholders or managers in the process; the goal should be to protect depositors and taxpayers (we assume that workers have access to the same safety net as workers in non-financial companies); (ii) while the first principle pleads for a cost-minimizing recapitalization, a second principle is that speed matters too: this process should not be so slow as to trigger panics or inappropriate (lack of) lending; the goal is to get healthy banks working as soon as possible.

Finally, what about reducing *ex ante* the probability and social cost of a systemic crisis? This is connected to the debate on reducing the procyclicality of regulation. This topic has quite rightly been the subject of various analyses. See for example Brunnermeier et al. (2009), who describe very well the bad externalities banks in trouble exert on other banks when trying to raise their capital ratios, for example by sell-

11 Something which does not seem to happen now (see for example Davies (2008, page 365) for the case of the UK).

12 See for example Dewatripont and Tirole (1994) for an overview of this episode.

13 Interestingly, this issue generated significant research at the time of the 'transition' from central planning to a market economy by former communist countries in the 1990s. See for example Mitchell (2001) and Aghion et al. (1999), who argue that a mixture of recapitalization and the liquidation of non-performing loans can under some conditions be the optimal solutions for a Government trying to serve the interests of taxpayers while being at an informational disadvantage with respect to bank management concerning the quality of the loan portfolio.

ing assets. It is indeed important for prudential regulation to take into account economy-wide indicators and not simply individual bank solvency.

In terms of the subject of this paper, let us here just stress once again the need to avoid the danger of bank undercapitalization in bad times. Reducing procyclicality could then mean aiming at 'adequate' capital ratios in bad times and higher ratios in good times, so as to limit the vicious circle discussed by Brunnermeier et al. (2009). One avenue, which they discuss among others, is Spanish-style dynamic provisioning. Alternatively, in order to limit the overall amount of capital banks need to have (and its associated cost), one could follow Kashyap et al. (2008) and their suggestion of capital insurance. Under this system, banks would pay an insurance premium to institutions against a promise of capital infusion in times of crisis.

The scheme put forward by Kashyap et al. is ingenious. They are confident that private institutions or investors would be willing to provide such capital insurance. This may be too optimistic. However, it could also be provided by Governments. This is in fact what happens anyway when Governments end up recapitalizing banks in times of crisis. The difference with what has happened so far is that the Government could, *ex ante*, charge periodic insurance premia against such 'catastrophe insurance'. Similarly, it is conceivable to require *ex ante* that banks having access to Emergency Liquidity Assistance by the Central Banks pay a periodic fee for this service.

Procyclical capital ratios and capital insurance are two ways to introduce 'automatic stabilizers' in the regulatory system, just like we have automatic stabilizers in fiscal policy, i.e. an anticyclical deficit policy. In this case, the goal is to ensure adequately capitalized banks in times of crisis while limiting the procyclical effect of regulation. Another idea that would go in the same direction would be the introduction of procyclical deposit insurance premia (an idea discussed by Dewatripont and Tirole, 1994).

Our recommendations in this section are that:

- Public authorities should expect crises to happen. They should put in place a mechanism that allows a crisis to be formally declared (an event which will allow the release of public funds). This means formalizing *ex ante* cooperation between the relevant actors (Central Bank, supervisor, Treasury) with this contingency in mind.
- Ex-post crisis management should keep in mind that undercapitalized banks do not function well. One should go for 'real' recapitalization, even if it is costly. There are several options – temporary nationalization, insuring bank loans or parking toxic assets in bad banks – that are possible. The objective should be to get lending going again without delay by properly capitalized banks, without excessively burdening taxpayers.
- Under current regulation, maintaining adequate capitalization in bad times has procyclical effects. Avoiding this calls for introducing 'automatic stabilizers' into the regulatory system, such as higher capital ratios in good times, dynamic provisioning, capital insurance (privately or publicly provided), or procyclical deposit insurance premia.

Section 3: International cooperation

Globalization 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 favor 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 this section, we will analyze this issue in various steps. First, we will start with the case of the European Union, where 'cross-border banks' have been very actively encouraged. We will then take a more global view. This means considering relationships between big economic areas with more limited cross-border banking links, but also the case of emerging economies where foreign banks have become very significant.

3.1. The case of the European Union

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 one has witnessed two competing policy rationales over recent years: the first one saying that the potential of the Single Market, and its associated productivity gains, could only be realized 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 recently to the banking and insurance group Fortis is very instructive (see Box B for details).¹⁴ The 2007 takeover battle over ABN-Amro, which was ultimately 'won' by the trio RBS, 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, crisis which, it is fair to say, 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, due to business mistakes or market reversals. In such circumstances, one can expect nationalistic reactions, especially since national authorities see quite differently the acquisition of national firms by foreign ones than the acquisition of foreign firms by national ones.

Just like 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 starting point the fact that national supervisors can be expected to be pressured to

¹⁴ Also instructive is the case of Icelandic banks and the relation between Iceland (a member of the European Economic Area, even though not of the EU) and UK authorities for example.

pursue national objectives, just like public supervisors can be expected to face lobbying by national industry.

However, the current practices are not 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 is 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 problem is that it is 'a flexible tool that is, however, not enforceable' as stressed by Praet and Nguyen (2008, page 371; this is a view also shared by the CEPS Task Force Report, 2008).

While it is certainly possible to beef up such MoU's and make them more binding, one has to face the facts: If one really wants to promote the Single Market in banking (which makes 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 favor the emergence of a European supervisor and of a European deposit insurer. We understand this is not an obvious goal (see the CEPS Task Force Report (2008) for example on some obstacles on the way to centralization, an objective it subscribes to), but we think it is necessary.

Note that this statement is related to the Single Market, that is, 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 EU-wide supervisor and deposit insurer. The case for Euro-area supervisor and deposit insurer seems therefore 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.

Our recommendation in this section is that:

- In economic areas which are meant to be very integrated, like the EU, one should move towards a centralized supervisor and a centralized deposit insurer.

3.2. International coordination in general

The European Union is in a sense an 'extreme' case of economic integration. Note however that many emerging economies face very significant foreign bank presences. There too the need for coordination in times of crisis – and in particular 'who takes care of depositors' – is crucial, especially since these emerging countries have more 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 grow-

Box B The Fortis case: Limits to international cooperation in rescue efforts¹⁵

In May 2007, together with the Royal Bank of Scotland and Santander, the Belgo-Dutch banking and insurance group Fortis bought ABN-Amro for a record 71 billion Euros. This was the result of a hostile takeover battle, where the trio won against ABN-Amro-top-management-supported Barclays Bank, thanks to a bid which has higher than the equity offer of Barclays and moreover included 80% of cash. This offer involved the splitting of ABN-Amro's activities between the three banks, which 'disappointed' the Dutch public authorities. It is to be noted that, in terms of oversight, Belgium was and remained lead regulator of Fortis, despite the importance of the growth in Dutch activities that the acquisition of the ABN-Amro business implied.

For Fortis, the deal was risky, since it meant buying the Dutch activities of ABN-Amro as well as its private banking and asset management operations more generally, for a price of 24 billion Euros, while the market capitalization of Fortis was around 40 billion Euros at the time. The deal, together with a 13 billion Euro equity issue, was however overwhelmingly approved by Fortis' shareholders in August 2007. Difficulties surfaced openly in June 2008, with the announcement of a new equity issue and the cancellation of dividend payments, both in contradiction with earlier promises. This immediately led to a sharp drop of the stock price, as well as the resignation of the CEO, Jean-Paul Votron, in July 2008.

Fortis' weakness proved fatal after the Lehman Brothers failure and subsequent market meltdown. By September 24, interbank lending to Fortis had collapsed and significant deposit withdrawals were starting to take place. Since Fortis was faced with staggering liquidity needs (dozens of billions of Euros by September 29), the Governments of Belgium, Luxembourg and the Netherlands agreed to a concerted recapitalization (against equity stakes) on September 28, committing respectively 4.7, 2.9 and 4.0 billion Euros in Fortis Belgium, Fortis Luxembourg and Fortis Netherlands.

This agreement failed however to calm the markets, obliging the National Bank of Belgium to keep providing massive Emergency Liquidity Assistance to Fortis in the next days. A second round of negotiations then followed, with the Dutch side buying on October 3 the Dutch activities of Fortis as well as its ABN-Amro activities, for a combined total of 16.8 billion Euros. The Dutch Finance Minister, Wouter Bos, went on Dutch TV boasting that 'they had managed to buy the better part of Fortis, leaving the worse one to the Belgians'. It was also revealed later on that the Dutch side had never paid the 4.0 billion Euros they had promised on September 28. After the departure of the Dutch part of Fortis, the Belgian Government has attempted to sell most of the remainder of Fortis activities to BNP-Paribas. Court opposition by Fortis shareholders (unhappy about the consequences of the deal on the price of Fortis Holding shares) casts a shadow on the future of this operation.

¹⁵ See for example van de Woestyne and van Caloen (2009).

ing over time, especially with the opening up of banking markets and the spread of risks through securitization.

However, let us stress again that, unfortunately, the regulatory and supervisory safeguards have been raised to match these evolutions. Indeed, as Asser (2001, page 3) stresses:

"To protect banks and banking systems against the risk of international financial contagion, bank regulators around the world have embarked on an extensive program of harmonizing prudential banking standards among countries and fostering closer cooperation between national bank regulators. ... It is fair to say that, as a result, the principal licensing and prudential requirements written into national banking laws have reached a high degree of uniformity. One of the reasons for this success is that it has been comparatively easy to identify best practices for these requirements.

In contrast, little international uniformity of law or practice exists in the area of banking regulation governing the treatment of banks in distress."

While of course recent history has shown that the 'success' of harmonized capital ratios should not be exaggerated (see our discussion in Section 1), it remains true that harmonization still has not taken place concerning the treatment of banks in distress. Clearly, this can lead to a host of problems, especially since we have to keep in mind that crisis management has to take place with under great time pressure. Let us simply stress the two most important ones:

First, there is the issue of when public intervention can take place and what are the public intervention powers. We have stressed earlier that the US system established by FDICIA, with PCA, was a good idea; but this system is definitely not generalized, making such prompt action unavailable in other countries.

Second, and most importantly, is the question of depositor protection. Note that banks, when setting up operations in a foreign country, can go for subsidiaries – which then have legal personality in that country and become national firms – or simply branches, which remain an integral part of the bank. However, as stated for example by Krimminger (2008, page 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. 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."

There are therefore clear potential incentive problems facing the home supervisor in terms of consolidated supervision, with the risk of being pressured to 'limit damages' and leaving part of the mess to foreign countries. This can be really dangerous in terms of contagion.

While it is beyond this short paper to analyze in detail the way forward in terms of cooperation in crisis management, we can highlight a couple of general principles:

1. While a global supervisor and deposit insurer may be beyond reach, it has to be considered seriously if one really wants to integrate further the banking market.

What applies to the EU Single Market applies, *mutatis mutandis*, to a Single World Market. Concretely, one could give real powers to a supranational authority like the Basel Committee on Banking Supervision.

2. If one thinks that centralization is either impossible or undesirable, one should at least get serious about joint crisis management. The two goals of avoiding contagion and avoiding regulatory arbitrage by banks should be kept in mind. We have already stressed the need to harmonize intervention thresholds, following and idea like PCA. Moreover, if one keeps the idea of domestic deposit insurance, 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 at which conditions, should in fact be taken jointly by the various authorities. More generally, in the absence of a supranational supervisor, what is required is an ex-ante credible agreement, or MoU, between the various countries about how to share supervisory and deposit-insurance responsibilities. Such a MoU should be as explicit as possible in order to have a chance of functioning in times of crisis. Once again, there should be standardization of such MoU's to spread best practices.

Our recommendations in this section are that:

- If one wants to keep integrating the world banking market, one should seriously consider partial centralization of supervision and deposit insurance at the world level.
- Barring such centralization, it is important to foster best practices in establishing credible Memoranda of Understanding for cross-border banking crisis management between authorities that detail in particular the respective rights and obligations with respect to intervention thresholds and deposit insurance.

References

- Aggarwal, R. and K.T. Jacques (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: 1139-1160.
- Aghion, P., P. Bolton and S. Fries (1999), "Optimal design of Bank Bailouts: The Case of Transition Economies," *Journal of Institutional and Theoretical Economics* 155: 51-70.
- Asser, T.M.C. (2001), *Legal Aspects of Regulatory Treatment of Banks in Distress*, Washington, D.C.: International Monetary Fund.
- Benston, J.G. and G.J. Kaufman (1997), "FDICIA After Five Years," *Journal of Economic Perspectives* 11: 139-158.
- Blundell-Wignall, A., P. Atkinson and S.H. Lee, "The Current Financial Crisis: Causes and Policy Issues," *Financial Market Trends*, OECD. 2008.
- Brunnermeier, M., A. Crockett, C. Goodhart, A. Persaud and H. Shin (2009), *The Fundamental Principles of Financial Regulation*, *The Geneva Report on the World Economy* 11, London: CEPR.
- Caballero, R. (2009), "A Global Perspective on the Great Financial Insurance Run:

- Causes, Consequences, and Solutions (Parts 1 and 2)," *VoxEU.org*, January 23.
- CEPS Task Force Report (2008), Concrete Steps Towards More Integrated Financial Oversight – The EU's Policy Response to the Crisis.
- Davies, H. (2008), "Panel Comments," *Journal of Financial Stability* 4: 364-367.
- Dewatripont, M., I. Jewitt and J. Tirole (1999), "The Economics of Career Concerns, Part II: Application to Missions and Accountability of Government Agencies", *Review of Economic Studies* 66: 199-217.
- Dewatripont, M. and J. Tirole (1994), *The Prudential Regulation of Banks*, Cambridge, MA: MIT Press.
- Freixas, X. and B.M. Parigi (2008), "Banking Regulation and Prompt Corrective Action," mimeo.
- Goodhart, C.A.E. (2008), "The Regulatory Response to the Financial Crisis," *Journal of Financial Stability* 4: 351-358.
- Group of Thirty (2009), *Financial Reform: A Framework for Financial Stability*.
- Kashyap, A., R.G. Rajan and J.C. Stein (2008), "Rethinking Capital Regulation," mimeo.
- Krimminger, M.H. (2008), "The Resolution of Cross-Border Banks: Issues for Deposit Insurers and Proposals for Cooperation," *Journal of Financial Stability* 4: 376-390.
- Mitchell, J. (2001), "Bad Debts and the Cleaning of Banks' Balance Sheets: An Application to Economies in Transition," *Journal of Financial Intermediation*, 10:1-27.
- Praet, P. and G. Nguyen (2008), "Overview of Recent Policy Initiatives in Response to the Crisis," *Journal of Financial Stability* 4: 368-375.
- Rochet, J.-C. (2008), "Le Futur de la Réglementation Bancaire," TSE note number 2.
- Suarez, J. (2008), "The Need for an emergency Bank Debt Insurance Mechanism," CEPR Policy Insight number 19.
- Tirole, J. (2008), "Leçons d'une Crise," TSE note number 1.
- van de Woestyne, F. and A. van Caloen (2009), *Fortis, Dexia ... Le Séisme*, Brussels: Ed. Luc Pire.
- Washington Post* (2008a), "Banking Regulator Played Advocate Over Enforcer: Agency Let Lenders Grow Out of Control, Then Fail", November 23.
- Washington Post* (2008b), "Regulator Let IndyMac Bank Falsify Report: Agency Didn't Enforce Its Rules, Inquiry Finds", December 23.
- Wilson, J.Q. (1989), *Bureaucracy: What Government Agencies Do and Why They Do It*, New York: Basic Books.

Corporate Governance and the Credit Crisis

Marco Becht

*Solvay Brussels School of Economics and Management,
ECARES, Université Libre de Bruxelles, ECGI and CEPR*

Introduction and recommendations

The East Asia/Russia/Brazil crisis of 1998 first highlighted the link between weak corporate governance, weak institutional infrastructure in emerging markets and financial stability. The OECD and the World Bank were entrusted with improving emerging market standards and today the OECD Principles of Corporate Governance are one of the twelve keys standards of the Financial Stability Forum.

The Principles did not prevent the corporate scandals of 2002 in the United States and Europe showing that major corporate governance failures could also occur in developed markets. There were no financial stability problems associated with these scandals. The OECD Principles were revised. The United States adopted the Sarbanes-Oxley Act and other reforms. G20 and other countries adopted their own measures. The international debate focused on the international incompatibility of the reforms, an alleged lack of enforcement outside the United States and shifting capital market competitiveness, with European and Asian markets taking away "market share" from New York.

The current crisis originated in developed markets, it has caused financial instability, it involves contagion and has spilled over into the real economy. It has brought to light classic examples of board failure on strategy and oversight, misaligned or perverse incentives, empire building, conflicts of interest, weaknesses in internal controls, incompetence and fraud.

However, these corporate governance failures have not followed a simple pattern. There have been problems at widely held banks, at banks with a large shareholder and at banks controlled by the state. There are robust banks and distressed banks with similar corporate governance characteristics. Equally there is no simple pattern across countries. Banks have collapsed in countries with weak shareholder rights and in countries with strong shareholder rights. Banks with weak governance have collapsed in one country, but banks with equally weak governance did not collapse in other countries. It is unclear who is a culprit and who is a victim.

To complicate matters further it is likely that even with perfect governance at the level of individual institutions, systemic failure would have occurred. Governance at the firm level did not take into account the financial stability implications of selling

Author's note: I thank Patrick Bolton, Julian Franks and Mathias Dewatripont for discussions. The view expressed here are those of the author and not those of the European Corporate Governance Institute (ECGI) or the CEPR.

or purchasing certain financial services. At the micro-level it appeared that risk could be insured and lending expanded profitably. In many cases there was no agency problem at the firm level. Shareholders and boards encouraged executives to expand and leverage. Corporate governance was never designed to internalize contributions to systemic risk.

Finally, many non-bank institutions on the periphery of prudential regulation have contributed to the leveraging of the world economy. Pension funds and asset managers of all sorts purchased what turned out to be "toxic assets", either directly or by purchasing shares in institutions that did. Private equity firms drove up leverage in the corporate sector, with the consent of the buyout targets' shareholders and of their own investors. Competitive pressure from non-banks drove banks to engage in new riskier activities and to increase total remuneration. Central gatekeepers like credit rating agencies and analysts did not raise the red flag. These developments pose new challenges for prudential regulation, which has traditionally focused on banks.

The most likely explanation of these facts is varying combinations of corporate governance failure with regulatory failure and herding. This would explain why some banks within the same countries failed and others did not. It would also explain why some countries have avoided major bank failures while others could not. Corporate governance was no-fail stop device for regulatory failure. The inability of individual banks to incorporate systemic risk into their corporate governance and incentive contracts amplified these problems.

Independent academic research has not yet caught up with events. It will take many more months before we have conclusive empirical analysis on what so far are casual empiricist observations.

Moving forward the global rescue of financial institutions has amplified moral hazard at all levels. Regulation must become more fault-tolerant and corporate governance has a potential role to play.

The G20 should pursue three basic policy objectives on corporate governance and the prevention of a future credit crisis :

1. Study the governance and regulatory failures associated with the current crisis for each institution and formulate, encourage or force necessary change.
2. Make the system more robust by creating advocates of financial stability and financial stability incentives that can be built into the governance of financial institutions.
3. Ensure the international compatibility of regulation and corporate governance reforms and thus avoid the problems experienced after Enron.

Specific recommendations are:

First, on the corporate governance of individual institutions:

- Encourage or force banks to follow the example of Union Bank of Switzerland (UBS) and conduct a detailed investigation of the sources of their write-downs and propose measure for their future avoidance to shareholders and regulators.
- Recognize that banks need to recruit individuals of outstanding competence and integrity to run them, especially once they are recapitalized, nationalized or re-privatized. Contracts should be modified to take into account the lessons of the

crisis, but this should be based on rigorous analysis of the facts and not on intuition, political or media pressure.

- Recognize that uniform restrictions on bonuses and total remuneration at distressed banks often affect the wrong people and can create perverse incentives. If governments wish to claw back excessive bonuses and salaries paid out during the run-up to the crisis they can attempt to do so through the tax system.

Second, on building financial stability into corporate governance:

- Consider the creation of an international Financial Stability Fund (FSF) that takes common share and preference share equity positions in the financial institutions of participating countries.¹ The FSF would fill a gap in shareholder monitoring of banks. It would hold influential equity positions in all financial institutions and internalize financial stability concerns. The Fund would provide a natural home for bail-out equity stakes in times of crisis. The Fund would be multi-national and thus void of mercantilism and/or protectionism. It would be largely immune to capture by the banks it invests in. The Fund could be given broad guidelines on the governance and lending practices it should promote. The FSF would be broadly autonomous, like the European Central Bank or the Bank of England, and thus protected from political interference. The staff of the Fund would be free to find institution specific solutions to meet its brief, which should be preferable to inflexible, uniform and potentially inappropriate legislation at the national level. The Fund would devote more resources to shareholder monitoring than a private or public sector pension fund. The FSF would also monitor the corporate laws, securities regulation and other corporate governance provisions applicable to the banks it invests in. Private institutional shareholders would monitor the Fund. The FSF would seek a dialogue with these investors. The FSF would be accountable to its sponsoring governments and the general public.

1. Did corporate governance failure at banks cause the current crisis?

Corporate governance can be defined as "concerned with the reconciliation of conflicts of interest between various corporate claimholders and the resolution of collective action problems among dispersed investors." (Becht, Bolton, Roell 2005). In general a corporate governance problem arises whenever an "outside investor wishes to exercise control differently from the manager in charge of the firm."

The corporate governance literature has traditionally focused on the problems associated with dispersed equity holding and the collective action problem among equity investors. BBR survey five alternative mechanisms that may mitigate the conflict between managers and dispersed equity holders: (i) partial concentration of own-

¹ The international fund could also take the form of a group of regional funds tied together in a college of stability funds at the G20 level.

ership and control, (ii) hostile takeovers and shareholder activism, (iii) delegation and concentration of control in the board of directors, (iv) alignment of managerial interests with investors through executive compensation contracts, and (v) fiduciary duties for CEOs together with mechanisms to seek redress for past actions. The survey concludes that there is a fundamental tradeoff between large shareholder intervention and the prevention of large shareholder abuse.

In practice managers and shareholders share control with creditors and potentially with other corporate constituencies, like employees. Provided creditors have liquidation rights sharing control with them can provide an effective incentive scheme for management. In contrast to equity ownership creditor governance is tougher the more dispersed the debt. Dispersed creditors find it more difficult to agree on debt restructuring and hence they are more committed to liquidate, providing stronger managerial incentives (see Hart and Moore, 1995; Dewatripont and Maskin, 1995; and Bolton and Scharfstein, 1996).

The standard corporate governance analysis also applies to banks, except that banks traditionally have depositors. Depositors tend to have no protection from covenants but because they can run and cause a banking crisis they are implicitly or explicitly insured. Prudential regulation can be seen as the governance mechanism for representing depositor interests and as protecting the interest of the taxpayers providing the deposit insurance (Dewatripont and Tirole 1994).²

In the run-up to the credit crisis banks increasingly issued bonds and leveraged using short-term credit. In theory creditor governance became tougher. In practice short term creditors "ran" by not rolling over their loans and ex-post bank creditors were treated like depositors. Creditor governance in the ordinary sense failed. Hence, in what follows I focus on equity governance.

Corporate governance failure at banks?

An intuitive case can be made that the collapse of major financial institutions during the current crisis has its roots in the classic governance conflict of interest between managers and dispersed shareholders. Agency problems in banks are likely to be larger than in other types of corporations (Levine 2004). Banks are complex organizations and the asymmetry of information between executives, the board and shareholders makes monitoring largely ineffective. As discussed already, depositors are not directly involved in the governance of banks and insured.

Bank executives can take wide-reaching decisions with large material consequences that take effect in hours, not in days, months or years. The growth of banks through acquisitions, the increasing complexity of their asset and liabilities sides and international expansion all contributed to tilting the balance of corporate power firmly in favour of bank executives.

Bank executives are said to have used this advantage to grow their institutions in size and to reward themselves richly in cash, shares and options. They lavishly refurbished their offices and ordered corporate jets. They fuelled the financial bubble with reckless lending. They sold complex financial products at inflated prices. They took

² Macey and O'Hara (2003) have suggested that boards should be made liable for the same purpose.

what turned out to be wild gambles. Shareholders, boards and regulators were unable to stop executives from engaging in these dangerous activities.

Bankers supported sports events and the arts. They enjoyed enormous social prestige. They were on best terms with the highest levels of government, which bestowed them with honours. When the music stopped playing bankers had brought the World's financial system to a halt and plunged the real economy into a deep recession that might result in a depression or hyperinflation. Important gatekeepers like auditors, analysts and credit rating agencies were conflicted or incompetent. Regulators were captured or fooled.

This exaggerated account of the standard governance failure analysis leading to the current crisis has motivated numerous policy recommendations to be put forward in recent months. Some have already been implemented or cast into parliamentary proposals. This is worrisome because there is no solid empirical evidence yet that the classic agency problem between dispersed shareholders and managers has caused all the bank failures and problems we have observed.

Does the governance failure view fit the facts?

Executive incentives

Executive contracts provide monetary and non-monetary incentives that are supposed to align the interests of senior management with those of shareholders and potentially with other constituencies. Monetary incentives include base salaries, bonuses, equity ownership plans and option plans. Implicit incentives include dismissal, career prospects and social prestige. Both types of incentive are potentially important.

Most empirical studies of executive compensation have focused on the sensitivity of pay to corporate performance and the likelihood of dismissal following poor performance. Large increases in the level of pay in the 1990s, particularly in the United States, were justified by the large returns to shareholders earned before the 2003 stock market collapse. Executive remuneration became highly controversial when pay remained high after stock prices fell ("reward for failure"). Severance pay arrangements have also attracted severe criticism. The limited downside but apparently unlimited upside in pay-performance sensitivity has raised suspicions of self-dealing by corporate managers.

The self-dealing hypothesis has been put forward most forcefully in the United States because pay levels are much higher on average than elsewhere and boards enjoy much greater autonomy than in most other countries.³ CEOs are alleged to control the nomination process in corporate elections and appoint their own boards. The boards then reward them with excessively generous remuneration packages.⁴ The

3 This case has been argued, for example, by Bebchuk and Fried (2004).

4 In most U.S. states the default rule for corporate elections is "plurality voting". Shareholders are not allowed to vote against candidates but can only abstain. The candidate with the largest number of votes wins. Putting up rival slates of directors requires a full proxy solicitation under SEC rules, which is expensive.

back dating of options scandal provided additional support to this view.⁵

Did bank executives suffer losses as a result of the crisis? To my knowledge there is no systematic answer to this question yet, but press reports suggest that some losses were substantial.⁶ Senior executives did have a large portion of their wealth invested in the shares of the institutions they managed. Some executives even kept these shares after retiring. Proponents of the self-dealing hypothesis will argue that despite the losses the cash remuneration received over the working life of these executives is more than sufficient to retire comfortably. This might well be true, especially if the executives left the firm prior to the credit crisis.

Implicit loss is incurred from dismissal. Again we are still lacking global statistics, but in the most glaring cases the senior executives and/or the Chairman did have to depart. In Europe's smaller countries some chief executives and chairmen of failed banks decided to emigrate, at least temporarily. In the United Kingdom there have been petitions to revoke the "Sir" of the former chief executive of a leading failed bank.

It is important to find out exactly what incentive structures were in place at financial institutions prior to the credit crisis and why they failed. Taxpayers demand an answer and reform should not be based on populist accusations and guesswork. Researchers find it difficult to get access to data on executive contracts and remuneration packages outside the United Kingdom. Even in the United Kingdom it is generally not possible to obtain such data for non-listed companies and below the senior executive level. G20 governments have the power to commission such an investigation.

Pending a systematic answer we do know that there was a failure in executive remuneration. If the executives responsible for bringing about the crisis only suffered mild losses their incentives were not aligned with those of shareholders and they were engaged in self-dealing. If the executives did suffer large losses comparable to those of shareholders their incentives were aligned, but the contract was flawed anyway because it did not prevent the crisis.

In each case the outcome for financial stability is the same, but the corporate governance and regulatory implications are different. If executives engaged in self-dealing active monitoring by shareholders and boards must be strengthened, as many commentators have argued for the United States. If executives and shareholder jointly failed to prevent the crisis the incentive contracts for both groups must be redesigned. Strengthening shareholder rights and boards would not prevent a future crisis.

The current policy response in several G20 countries has been to impose general limits on the total remuneration of executives at institutions that have received capital injections or other financial help from the government. The measures are often justified by a moral hazard argument: bankers who were responsible for bringing

5 Media and scholarly attention usually focuses on the remuneration packages of chief executives and executive directors. In financial institutions the pay structure for employees throughout the organization is important. Moving forward it will be crucial to investigate reward structures in financial institutions below the CEO level.

6 A widely cited example is Jim Cayne, the CEO of Bear Sterns, who sold his shares for \$61,000,000 on a Tuesday when they were worth \$1 billion the week before.

about the current crisis should not be rewarded with taxpayer money after their institutions have failed.

This argument is seductive but has several faults: One, moving forward uniform restrictions are unlikely to cure potential incentive problems at banks. As I argued above a conclusive analysis is still pending but preliminary evidence suggests that the problems are complex and often institution specific. Two, in terms of moral hazard the remuneration restrictions tend to affect the wrong individuals. Many of the executives who led their banks into the crisis have already departed with their bonuses. If governments have the desire to claw back excessive salaries and bonuses paid out during the credit expansion they could use the tax system to this effect. Three, general remuneration restrictions across banks are likely to have perverse effects. New forms of remuneration will be invented that have the sole purpose of avoiding government regulation. Four, as was frequently pointed out in Germany, bank executives might be discouraged from applying for required capital injections because they do not want to become subjected to the associated constraints.

Bebchuk (2009) discusses specific incentive problems arising from TARP II.

Large shareholders

A powerful approach to mitigating the collective action problem of dispersed shareholders is the presence of a large shareholder with a strong economic interest and voting rights. This blockholder has an interest in monitoring the board and through the board the management. Through the board the blockholder also has the ability to appoint or remove the management.

Pending systematic analysis, it is not clear that blockholder controlled banks have been systematically more prudent. It is true that most of the spectacular failures occurred at widely held banks. It is also true that there are examples of blockholder controlled banks that have been particularly resilient. The largest remaining Icelandic bank has a Chairman who owns a controlling block.⁷ On the other hand casual inspection of the New York Times (2009) bailout list shows that two of the banks with the highest reported ratio of nonperforming loans to cash on hand (the "Texas ratio") are run by blockholders owning more than 30% of the equity capital. Blockholder controlled banks in other countries too have incurred substantial losses.

Very recent evidence from Germany on the state as the concentrated owner of banks is not encouraging (Hau and Thum 2008). The research shows that running up to the third quarter of 2008 state controlled banks incurred larger losses than private banks. State control is also negatively correlated to quantitative measures of educational background, finance experience and management experience of board members. Yet it would be incorrect to conclude that state control of banks is always bad. Banks with concentrated state ownership in other G20 countries, and some in Germany itself, have made fewer losses during the crisis than their peers.

More perplexingly in some countries ownerless banks like cooperatives have shown themselves to be extremely robust. The same is true for other "exotic" forms of ownership, like partnerships limited by shares. Again, further investigation is needed.

7 "Iceland's biggest listed bank ponders London switch", *Financial Times*, 27 January 2009.

Shareholder activism

Shareholder activism is a potential alternative to permanently concentrated ownership. Activism takes two different forms. Large institutional investors increasingly monitor their equity portfolios for underperformance. They meet with portfolio companies and regularly vote their shares. Traditionally their influence over boards and management has been limited for legal reasons in the United States and for reasons of tradition in continental Europe and Asia.⁸ Traditional activism is most developed in the United Kingdom where institutional holdings are relatively concentrated, institutional investors are well organized and the legal system grants them great influence over corporate boards through corporate elections.

In practice even the largest institutional investors hold relatively small stakes in large financial institutions. They also find it hard to justify to their beneficiaries or clients why they should spend large amounts of money on monitoring portfolio companies when they only internalize a small portion of the benefits. Even large public pension funds find it hard to justify significant expenditure on active monitoring, beyond the exercising of votes and regular due diligence (Table 1). Traditional activism was unable to prevent bank failures, even in the United Kingdom.

A second source of activism is specialist funds that purchase share blocks in target companies with the intention of bringing about change. These funds have the advantage of internalizing a larger proportion of their activist activity, provided they are successful. Prominent examples of interventions by such funds in banks included ABN Amro, HSBC and UBS. Judging from these and other examples it is not clear either that specialized activist funds are particularly well suited to act as anchors of prudence. Their most common objective is corporate restructuring (Becht, Franks and Grant 2008).

The Board

Most reform efforts in corporate governance have focused on the board and for good reasons. In general it is the mission of the board to select the CEO, to monitor management and to approve important decisions. In practice the role, structure, functioning, composition and size of boards differ substantially across countries and organizations. Boards become crucial in times of crisis, as we have just observed.

There are many reasons why boards can be ineffective. Boards are often not independent from the CEO and even when they are CEOs have superior information. Directors generally prefer to assume an advisory role than to be confrontational. Directors generally have a limited financial interest in the corporation and when they do they are no longer considered independent. In practice the chairman of the board assumes a leading role.

There is extensive empirical research on corporate boards that has been surveyed several times (Romano 1996, Bhagat and Black 1999 and Hermalin and Weisbach 2003). The bulk of this research has focused on the relationship between board independence and corporate performance concluding that there is little or no measurable relationship. There is also consensus that large boards do not function well.

⁸ In the United States there is also significant resistance to giving traditional shareholder activism a bigger role because many of the most active funds are trade union pension funds.

Table 1 Sovereign Pension Funds : By Assets Under Management

Ranking	Country	Pension Fund	AuM (\$bn)
1	Japan	Government Pension Fund	936
2	Norway	Government Pension Fund	286
3	Korea	National Pension	203
4	South Africa	GEPF	178
5	Sweden	AP Fonden 1,2,3,4,7	135
5	Taiwan	Postal Savings	128
7	Canada	Canada Pension	100
8	Malaysia	Employees Provident Fund	82
9	Singapore	Central Provident Fund	70
10	Spain	Fondo de Reserva Seguridad	47
11	France	FFR	41
12	Kuwait	Public Institute / Social Security	40
13	China	National Social Security	36
14	India	Employees' Provident	32
15	Finland	Local Government Pensions	29
16	Ireland	National Pensions Reserve Fund	25
17	Australia	Future Fund	14
18	New Zealand	New Zealand Superannuation	10
19	Thailand	Government Pension Fund	9

Note: Sovereign Pension Funds in the ranking of the 300 largest pension funds in the world by assets under management at the end of 2006.

Source: Watson Wyatt Worldwide (2008)

The research on German banks (Hau and Thum 2008) appears to be the first to relate financial losses at banks to board composition and director qualifications. As discussed already losses are negatively correlated with director qualifications.

Again, the role of boards in the period leading up to the credit crisis and the role of boards during the crisis needs to be investigated thoroughly. Based on all we know one should not hope that boards can prevent the next financial crisis. However, we do know that board failure can result in disaster and continued attention must be paid to ensuring that the boards of financial institutions meet the highest management science standards.

Corporate Acquisitions

The finance literature has documented that corporate acquisitions programmes are extremely hazardous for the shareholders of the acquiring companies. Many of the largest corporate scandals 2002 were related to aggressive acquisitions programs that failed. Mergers and acquisitions also lie at the heart of some of the largest bank failures we have observed during the current crisis. It is tempting to blame poor acquisitions on a lack of shareholder rights. In the United States shareholders in most states have indeed no direct say on corporate acquisitions. However, shareholders did approve the most damaging acquisitions made by banks in the United Kingdom and in Belgium. Again, this is an area that deserves more detailed investigation.

2. Systemic failure

Corporate governance and regulatory failures at individual institutions were amplified by the fact that the parties did not internalize the effects of their actions on the rest of the financial system. This failure also applies to institutions that did not suffer a corporate governance problem in the classic sense.

Mispricing of risk

The UBS (2008a) report on the causes of its sub-prime write-downs states that the risk on mortgage-back securities was mispriced inside the bank, which induced traders to take on too much risk. Even if the incentive schemes for traders applied the correct formula, they could not work with incorrect prices. The same was true at the macro-level. Contributions of individual leveraging to systemic risk were not priced in and as a result many institutions took on too much risk.

For example, there were no obvious corporate governance problems in large leveraged buyouts. Target shareholders received substantial premia and willingly sold their shares. The providers of leveraged finance received extensive documentation and undertook due diligence. The managements negotiating the buyout deals were fully aware of the details and were given high-powered incentives for generating cash-flow. Yet, these buyouts contributed substantially to credit expansion in the corporate sector. This is a new problem that the corporate governance literature has not addressed.

Passing on problems

Shareholder activism increased substantially in the run-up to the crisis and resolved a number of agency problems between widely held bank shareholders and the bank's management. From the perspective of the activist funds and the banks' shareholders these interventions were positive, at least prior to the crisis. From a financial stability perspective the interventions only passed on problems instead of solving them at the root.

Example 1: A well known activist fund engaged with a medium sized mortgage bank in continental Europe. As a result the bank sold off non-performing debt before the credit crisis took hold (Becht, Franks and Grant 2008). The engagement reduced the agency problem between the management and the shareholders of the bank. It did not help financial stability because the bad loans were simply passed on to someone else in the system, in this case a Japanese bank and a U.S. distressed debt-fund specialist.

Example 2: TCI intervened at ABN-Amro. From a corporate governance perspective TCI's intervention shook up an underperforming bank and forced corporate restructuring through a takeover. ABN-Amro shareholders received an advance payment of the expected restructuring gains in the form of a large takeover premium. Ex-post the problems of ABN-Amro were passed on to the United Kingdom and Belgium. The corporate governance problem at ABN-Amro had been solved but a new problem had

been created at the Royal Bank of Scotland and Fortis.⁹ Banco Santander apparently secured the best part in the deal, but it also suffered from the financial instability caused by the subsequent problems at RBS and Fortis. TCI incurred substantial losses from in other financial stocks in its portfolio induced by the financial crisis. All participants clearly failed to internalize the negative financial stability externality emanating from an individually rational deal.

A Financial Stability Monitor

Going forward the current bailout programmes will amplify systemic moral hazard problems. Prudential regulation and supervision was not sufficient to prevent the current crisis. It would be beneficial to have a second line of defense and to build financial stability into corporate governance at the level of individual institutions.

Existing research suggests that the most robust corporate governance device at the micro-level is semi-concentrated ownership, provided the owner has the proper monitoring incentives and no major conflicts of interest. To solve the systemic problem emphasized here the monitor must also internalize global financial stability.

There are no existing institutions one can think of that could play this role. The relevant institution must be large enough to hold significant stakes in all banks. Equally it must be willing to devote significant resources to monitoring the banks and ensuring that they comply with financial stability criteria.

Private institutional investors like company pension funds or insurance companies cannot play the role of a financial stability monitor. They are subject to competitive pressure and would find it hard to find beneficiaries who want to pay for upholding the financial stability public good.

The closest we have to the ideal financial stability monitor are large public pension funds (Table 1). These funds are so large and diversified that they "own the World". Typically they do not serve the interest of national governments but of their pension beneficiaries. They internalize bad debt by one institution sold to another and individual contributions to increases in global risk. However, individually the funds are too small to hold significant stakes in large financial institutions. They can also decide to divest from certain asset classes, regions, sectors or companies.

3. A financial stability fund?

The ideal monitor could be a newly created Financial Stability Fund (FSF) that takes significant equity positions in all financial institutions of participating countries that contribute to systemic risk. In normal times the fund would have the task of monitoring financial institutions as a large shareholder.

In times of crisis the fund could seamlessly provide additional equity capital to a bank. Its influence over the bank would increase with the size of its stake. The fund

⁹ It is debatable whether there was a corporate governance problem associated with the acquisition at RBS and Fortis. Ex-post both banks paid too, but in both cases the acquiring banks' shareholders approved the acquisition.

would complement the role of prudential supervisors. The fund would work with other long-term investors and deal with issues prudential supervisors are badly equipped to deal with, for example the appointment of boards, approval of acquisitions and other important shareholder decisions. In addition to having an active shareholder monitor at the banks looking after their interests, international taxpayers would have a share in the upside of the financial system, instead of insuring it with no residual control or claim.

The German *Finanzmarktstabilisierungsanstalt (SoFFin)* contains elements of the envisaged FSF (see Box 1), but has a different purpose. It is designed to deal with the current crisis and is limited in time. The *SoFFin* does not become involved in the governance of banks on a case-by-case basis. Instead it imposes restrictions, in particular on executive remuneration and payout policy. The Fund only assists German banks. The fund does not invest in all banks but only in distressed banks, upon request. The TARP II programme in the United States is similar to the *SoFFin*.¹⁰

The Financial Stability Fund would provide a long-term response to the financial crisis and resolve many problems of the current response:

1. Beggar-thy-neighbor. National stability funds like the *SoFFin* lend themselves to solving the problems of local banks at the expense of neighboring countries, for example by giving guarantees intended to attract private lenders or equity investment. The FSF would be invested in all banks and have no interest in pursuing such policies.
2. Small countries. The FSF would prevent small countries hosting banks that take excessive risks. The FSF would also allow small countries from hosting large international financial institutions they could not recapitalize on their own.
3. Bail-out stakes. The FSF would offer a coherent approach to administering the bail-out equity stakes governments have acquired during the crisis. It is likely that governments will be holding these stakes for many years.
4. Capture. The FSF would invest in many banks in several countries. It is unlikely that any one bank or group of banks could capture the fund.
5. Principle based. The Fund could be given broad guidelines on the governance and lending practices it should promote. The staff of the Fund would be free to find institution specific solutions to meet its brief, which should be preferable to inflexible, uniform and potentially inappropriate legislation at the national level.
6. Autonomous. The FSF would be broadly autonomous, like the European Central Bank or the Bank of England, and thus protected from political interference. Political interference has been a cause of substantial losses at state controlled banks in some G20 countries.
7. Shareholder monitor. The Fund would devote more resources to shareholder monitoring than a private or public sector pension fund.

10 The *SoFFin* and TARP II have been criticized for imposing restrictions on banks that create perverse incentives. Bank executives have an incentive to avoid getting help from the TARP because of the restrictions it imposes (Bebchuk 2009). The FSF would avoid this problem by taking equity positions in all banks on a permanent basis. Bank executives would be monitored by the FSF at all times.

8. Company law monitor. The FSF would also monitor the corporate laws, securities regulation and other corporate governance provisions applicable to the banks it invests in.
9. Private sector oversight. Private institutional shareholders would monitor the Fund's activities. The FSF would seek a dialogue with these investors.
10. Public sector oversight. The FSF would be accountable to its sponsoring governments and the general public.

Box 1: SoFFin – A national financial stabilization fund limited in time

The *Finanzmarktstabilisierungsfonds* (Financial Market Stabilization Fund) was created as part of the German Financial Market Stabilization Act (*Finanzmarktstabilisierungsgesetz*) on 17 October 2008. It is managed by the *Finanzmarktstabilisierungsanstalt* (Financial Market Stabilization Agency). It was created to deal with an emergency situation and is supposed to be wound down once the crisis has been dealt with. Hence the fund is also referred to as the "Sonderfonds *Finanzmarktstabilisierung* (SoFFin)" (Special Fund Financial Market Stabilization). The fund has the purpose of stabilizing the financial system. Financial institutions can apply to the fund for three types of help : guarantees, capital injections and/or the transfer (sale) of "toxic" assets acquired prior to 13 October 2008. Financial institutions receiving help from the fund become subject to certain conditions. In the case of capital injections and assumption of risk positions these include restrictions on remuneration and the prohibition of severance and dividend payments.

References

- Adams, Renee B. and Mehran, Hamid, Is Corporate Governance Different for Bank Holding Companies? (March 2003). Available at SSRN: <http://ssrn.com/abstract=387561>
- Bebchuk, L.A., Fried, J.M. (2004). *Pay without Performance*. Harvard University Press, Cambridge, MA.
- Bebchuk, L.A. (2009). Congress Gets Punitive on Executive Pay. We want compensation tied to performance. *Wall Street Journal*, 18 February 2009
- Becht, Marco, Patrick Bolton and Ailsa Roell, "Corporate Law and Governance", Chapter 12, *Handbook of Law and Economics*, Volume 2, Elsevier, North-Holland
- Becht, Marco, Julian Franks and Jeremy Grant (2009), "Have a Quiet Word? The Returns to Private and Public Shareholder Activism", mimeo
- Bhagat, S., Black, B.S. (1999). "The uncertain relationship between board composition and firm performance". *Business Lawyer* 54, 921-963.
- Dewatripont, M. and J. Tirole (1994), *The Prudential Regulation of Banks*, Cambridge, MA: MIT Press.
- Dewatripont, M. and E. Maskin (1995), "Credit and Efficiency in Centralized and

- Decentralized Economies", *Review of Economic Studies*, October, 62, pp.541-555.
- Hart, O., Moore, J. (1995). "Debt and seniority: an analysis of the role of hard claims in constraining management". *American Economic Review* 85, 567-585.
- Hau, Harald and Marcel Thum (2008), Subprime-Related Losses and Board (In)Competence: Private vs. Public Banks in Germany, mimeo
- Hermalin, B.E., Weisbach, M.S. (2003). "Boards of directors as an endogenously determined institution: a survey of the economic literature". *Federal Reserve Bank of New York Economic Policy Review* 9, 7-26.
- Levine, Ross, The Corporate Governance of Banks: A Concise Discussion of Concepts and Evidence (September 2004). World Bank Policy Research Working Paper No. 3404. Available at SSRN: <http://ssrn.com/abstract=625281>
- Macey, Jonathan R. and O'Hara, Maureen, The Corporate Governance of Banks. *Economic Policy Review*, Vol. 9, No. 1, April 2003. Available at SSRN: <http://ssrn.com/abstract=795548>
- New York Times*, Tracking the \$700 Billion Bailout, <http://projects.nytimes.com/creditcrisis/recipients/table>
- Romano, R. (1996). "Corporate law and corporate governance". *Industrial and Corporate Change* 5 (2), 277-339.
- Union Bank of Switzerland (2008a), Report on Remediation of Causes of Sub-Prime Losses, Zurich
- Union Bank of Switzerland (2008b), Shareholder Report on UBS's Write-Downs, Zurich
- Volpin, Paolo (2008), The Corporate Governance of Financial Institutions, Presentation at the Transatlantic Corporate Governance Dialogue Conference on "Corporate Governance and Financial Stability", Brussels, 9 September 2008 (<http://www.ecgi.org/tcgd/2008/presentations.php>).

The current crisis is not only systemic, but global: it involves the advanced countries, emerging market countries, and poor countries. There is no decoupling, and solutions must involve reciprocal commitments and actions. The G20 process and the London Summit process offer the prospect of concrete, implementable results that can restore confidence and lead the way to recovery.

The essays in this e-book, first presented at a seminar with the G20 Deputies on 31 January, analyze a range of reform proposals:

- Address global imbalances by creating insurance mechanisms for countries that forego reserve accumulation and stimulate domestic expansion; and by accelerating the development of financial systems in emerging markets, in particular local currency bond markets and foreign currency hedging instruments.
- Use macroeconomic policy to meet any threat of deflation promptly, with a zero interest rate policy and quantitative easing, and an inflation target to avoid expectations of deflation.
- Design fiscal stimuli cooperatively, so that they internalise the effective demand externalities of the stimulus while reflecting each country's 'fiscal spare capacity'.
- Mitigate procyclicality by adjusting the Basel II capital requirements using a multiplier based on macroeconomic conditions.
- Create a centralized clearing counterparty for CDS trades without further delay. Consider requiring that CDS be exchange-traded and prohibiting naked CDS.
- Sever the link between credit rating agencies (CRAs) and issuers, so that a CRA's rating cannot be influenced by the prospect of future business with the issuer. Prohibit indirect payments by issuers to CRAs in the form of the purchase of consulting or pre-rating services.
- Consider eliminating the 'hard wiring' of the CRAs in the regulatory system – less rather than more regulation here.
- Force greater disclosure of information about the underlying pool of securities for structured instruments.
- Establish a harmonized bankruptcy regime for banks, based on US-style 'prompt corrective action', giving the supervisor strong powers over bank managers and shareholders before the bank is technically insolvent.
- Consider the creation of an International Financial Stability Fund that takes equity positions in the financial institutions of participating countries and monitors their activities.