IMFS

IMFS Interdisciplinary Studies in Monetary and Financial Stability

2012 / 1

The ESRB *at 1*

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1. The ESRB at 1 – an Introduction

Ernest Gnan, Stefan Gerlach and Jens Ulbrich[1]

Among the many lessons drawn from the current financial and economic crisis there is a consensus view that policy makers need to pay much closer attention to macro-financial developments, i.e. to stability of the financial system as a whole, in addition to stability of individual financial firms. In 2009, the de Larosière report recommended, among other things, that a Union level body be established with a mandate to oversee risk in the financial system as a whole. This led to the creation of the European Systemic Risk Board (ESRB), which is part of the European System of Financial Supervision (EFSF), on 16 December 2010; with the inaugural meeting of the General Board of the ESRB being held on 20 January 2011. The seat of the ESRB is in Frankfurt am Main and its Secretariat is ensured by the European Central Bank (ECB), and the ESRB's President is the ECB President. The ESRB shall contribute to the prevention or mitigation of systemic risks to financial stability in the Union.

SUERF – The European Money and Finance Forum, the Deutsche Bundesbank and the Institute for Monetary and Financial Stability (IMFS) took the opportunity of the first anniversary of this new institution to organise a joint conference in Berlin on 8-9 November 2011. The purpose of this event was to take stock of first experiences with the ESRB; to discuss current issues in the field of macroprudential supervision, including the integration of macro-financial elements into macroeconomic models, the measurement and indicators of systemic risk, macroprudential tools and their effectiveness; and to identify forthcoming challenges for the ESRB and macroprudential supervision at large.

Hermann Remsperger, Chairman, Stiftung Geld und Währung, in his opening welcome address, which appears in Chapter 2, raised several pressing questions regarding macrofinancial stability: first, is the ESRB's organisational structure conducive to its effectiveness, and will its recommendations be effective in the absence of strong mandates for financial stability at the individual member state level? Second, how good is our ability to detect macro-financial risks? Third, how much do we know about the transmission of, and the interaction between, various macroprudential instruments? How will policy makers overcome their bias towards inaction, e.g. when it comes to activating countercyclical buffers? And,

[1] The views expressed are those of the authors only and not necessarily those of the institutions they are affiliated with.

finally, how should the line be drawn between central banks' price stability and financial stability objectives? Can they be separated any longer?

Catherine Lubochinsky, President of SUERF, thanked the co-organisers for their excellent cooperation and generous support in making the conference possible. The conference topic serves as an excellent example of how SUERF can provide useful contributions by bringing together the major constituencies involved in the design of macroprudential supervision: from central banks and supervisors, financial practitioners and academic economists.

Helmut Siekmann, President of the Institute for Monetary and Financial Stability, thanked the organisers for putting together an interesting program. He remarked that systemic financial stability has long been an underrated issue, as has financial instability emanating from unsound public finances. Financial crises and the necessity to deal with them can also place severe threats upon central bank independence.

Stefan Gerlach, Deputy Governor, Central Bank of Ireland, introduced the keynote speaker **Martin Hellwig**, Max-Planck-Institute and ESRB, who spoke about '*Systemic Aspects of Risk Measurement and Risk Management: Lessons from the Financial Crisis*'. In the past, systemic risk was used to justify regulation which could not be justified otherwise. According to Hellwig, it is an illusion to measure systemic risk, and in fact, any risk. With regard to why banks are so exposed to interest rate risk, he pointed out that in the past, banks' asset-liability managers had claimed that interest rate risk, being a market risk, was not relevant for the bank book. This stance neglects the systemic relevance of large-interbank-credits: while individual banks appear may be nearly fully maturity-matched, the system as a whole is not: Funding through money markets has also in the past caused bank failures. That individual banks are nearly fully hedged does not prevent the system as a whole from being exposed to substantial systemic risk. System risk is often not straightforward to detect. It may lie in the correlation of counterparty credit risk and the risk of the underlying assets. Typically this is neglected in risk assessments, and 'market discipline' cannot correct the problem, since the information is not available. Repo borrowing and lending has been used as a mechanism for inflating short positions. Long transaction chains from investors to e.g. real estate credit involve many potential failures and risks. The neglect of systemic aspects resulted in delusion about maturity transformation and delusion about liquidity risks. All in all, therefore, the crisis has several causes: subprime loans as an initiator of the crisis (recently, the sovereign debt crisis acted as a new initial shock); the fragility of financing structures (excessive maturity transformation, liquidity transformation and leverage, shadow banks) as magnifiers; and self-enforcing downward dynamics based on the interplay of asset price declines, fair

value accounting, the inadequacy of bank capital, deleveraging, and asset price declines.

Before and during the crisis, various forms of misbehaviour happened: yield hunger, excessive maturity transformation, market share focus, improper risk modelling, lack of understanding of nonstationarities and correlations, a lack of understanding that there are risks not covered in models, and improper risk control. EU and national capital requirements legislation on purpose attaches zero risk weighting to sovereign debt, while this is not stipulated in Basel regulation, and it was always obvious that this is incorrect. Regulators tolerated loopholes in regulation and reporting. Politicians see banks as a source of funds and rely on central banks to deal with stability problems. Hellwig identified several flaws in the design of the financial system: lack of accountability and liability in mortgage origination and securitization, excessive securitization and intransparency of financial vehicles, governance biases towards return on investment, insufficient capital requirements imposed by regulation, procyclicality of regulation, and a lack conceptual understanding of the dynamic effects of regulation and its implementation. In fact, not much has changed in response to the crisis: There is still a lack of capital, and procyclical dynamics are again at work. An assessment of the effects of regulation on the economy needs to adopt a general equilibrium view. Systemic risk and macro risk are not the same. Systemic risk may be due to common exposures or from systemic interdependence due to information contagion, domino effects through contracts, fire sales and asset prices, and the breakdown of market making functions.

There are several reasons as to why risks are not 'measurable': the model based economizing on equity capital was wrong because many risks were not incorporated in the models. Risk correlations (among mortgage backed securities due to a common dependence on the same underlying factors, such as interest rates, real estate prices etc.; among counterparty credit risk and underlying risks in hedge contracts) are poorly understood. Time series are non-stationary, credit risks are endogenous and change over time. There is a lack of information about system risk exposure. Deleveraging, asset prices and bank balance sheets interact in nonlinear ways. In the absence of counterparties it is not even clear that equilibrium exists at all.

Hellwig concluded that regulatory reform should follow a few principles: risk control of banks and regulators do not pursue the same objectives. Regulation should contain elements which are robust against 'wrong' models. Regulation should reduce or better yet eliminate bubble and crisis enhancing elements of regulation. While for countercyclical macroprudential policy judgement is indispensable, the possibility of judgement mistakes by supervisors must be factored in when designing the supervisory architecture and the governance of supervisors.

The following policy panel, which was moderated by **Mark Schieritz**, Die Zeit, was opened by **Philipp M. Hildebrand**, President, Schweizerische Nationalbank (SNB). He highlighted two fundamental flaws of the financial system before the financial crisis: first, capital and liquidity buffers were far too low. Second, systemic risks had been grossly underestimated. Monetary policy geared towards price stability is an important ingredient for a stable macroeconomic development but it does not avoid excesses in the financial system, it can even, as the Bank for International Settlements (BIS) has pointed out, can even provoke financial system instability. Before the crisis, the received wisdom was that interest rate policy is too blunt an instrument to avoid the build-up of risks in the financial system. After the crisis, a new consensus has emerged that central banks need an appropriate toolkit and more specific formal competence to mitigate the build-up of such risks in the first place. In Switzerland, for example, there is a big gap between the actual role the Swiss National Bank had to play during the crisis, which involved taking on enormous risks on its balance sheet, particularly with regard to the rescue of UBS in October 2008, and on the other hand the absence of any specific and formal competence to prevent financial instability. This gap must be closed by giving macroprudential tools and competences to central banks. This need is all the more compelling given the very low level of interest rates in many countries, which is likely to stay for some time. Past experience has shown that long periods of very low interest rates can ultimately be associated with excessive credit creation and the build-up of financial imbalances. The risk of that happening is particularly acute for countries where the financial system as a whole is functioning reasonably well, such as Canada, Sweden and Switzerland.

We have a lot yet to learn, the challenges are formidable. It is more difficult to detect ex ante, in real time emerging problems and then to decide about appropriate tools, the appropriate timing and the right dosage in their use. There are no easy mechanical rules. We have also to be extremely careful about the interaction between countercyclical macroprudential policy and traditional monetary policy, since these two set of tools are in many ways deeply related. Macroprudential tools can amplify, neutralize or undermine interest rate policy. The starting point for setting up a macroprudential framework is likely to differ from one country to another, depending on history, previous crises experiences, and legal, institutional setups and mandates, so there is no easy one-size-fits-all solution. Yet, similar to central bank's experience with inflation targeting, a consensus will likely have emerged in 10 years' time about the principles of macroprudential surveillance and tools.

In Switzerland, the new central bank law of 1984 gave the SNB a fairly classic legal mandate 'to contribute to financial stability', without and specific competencies, tools, and responsibilities. The formal responsibility for financial supervision and stability lies with FINMA, with a focus, as is the case with most super-

visory agencies, on intrusive and far-reaching micro-prudential regulation. Clearly, the SNB's financial stability arsenal needs to be enhanced, to augment the resilience of the banking system and to moderate its pro-cyclical behaviour. Given its inevitable role of lender of last resort, the SNB will play an active role in financial crisis managing. In light of this reality and the vast potential costs of such a crisis, including risks on the balance sheet of the SNB, the SNB should have a clearer and more developed formal role in preventing crises from emerging in the first place. Work is currently being done in this direction in Switzerland. These enhanced competences should rest on two pillars: First, the SNB needs to have full access to bank data, which is not the case now. Second, the SNB should have a say on regulation with a direct bearing on financial stability. In particular, it should be the SNB's responsibility to mandate a countercyclical capital buffer as set out in Basel III.

Summing up, Hildebrand emphasised that price stability must remain the key objective of central bank mandates. If central banks are to play a role in crisis prevention, they need additional, separate macroprudential instruments. By design, experience, and by trial and error, central banks are best equipped to be in charge of macroprudential supervision. But if they are to fulfil this role properly, they must be equipped with the necessary mandate and instruments. The worst combination would be an implicit or explicit expectation that the central bank will fulfil that role, without the appropriate mandate and the necessary instruments.

Stephen G. Cecchetti, Bank for International Settlements, addressed the challenges involved in '*Measuring systemic risk*', which appears in Chapter 3. To examine systemic risk, four phenomena require measuring: first, common exposures, e.g. aggregate exposure to USD mortgage-backed securities or European sovereign debt; second, leverage, which implies that small price movements can induce insolvency; third, maturity transformation, which can, e.g. if refinancing is concentrated in short-term markets, in the event of liquidity runs amplify shocks; and finally, cross-border linkages, which can amplify and propagate shocks, e.g. if cross-border capital flows suddenly come to a halt or are reversed, or in case of cross-border spill-overs of a drying up of wholesale funding. In the run-up to the crisis, e.g. non-US banks' funding of long-maturity assets through short-term USD liabilities obtained in interbank and foreign exchange swap markets made them vulnerable. In the crisis, funding liquidity and market liquidity dried up simultaneously, implicitly lengthening the effective maturity of assets and shortening the effective maturity of liabilities. Another consequence of this development was that long-USD-banks, being unable to roll over their foreign exchange swap funding, were forced into the spot foreign exchange market to close these positions. The resulting increase of the demand for USD drove the

strong appreciation of the USD in the months following the collapse of Lehman Brothers.

The fact that most financial markets are opaque in the sense that investors are unable to identify concentrated positions at the system level implies that they cannot appreciate the possible impact of a large and rapid unwinding in the event of a shock. This, in turn, hinders correct market pricing. Better data are crucial both for crisis prevention and crisis management. Joint analysis of data covering many institutions' balance sheet positions, including breakdowns by instrument, counterparty country and type, currency and maturity, can uncover common exposures, concentrated funding patterns and system-level leverage and maturity transformation. By aggregating confidential date in meaningful ways and disseminating them to market participants, market pricing and discipline can be improved. For crisis management, policy makers need to make fast decisions about the systemic relevance of financial institutions: data on bilateral exposures between financial institutions is thus crucial (and was lacking e.g. in the days preceding the Lehman crisis).

Cecchetti concluded that currently, no national supervisor has a global perspective, there is a lack of infrastructure for sharing confidential data, so as a result there is no adequate system-level view and analysis. At the BIS, two statistical initiatives currently under way hope to improve the situation. First, the Committee on the Global Financial System has been working on enhancing the BIS' international banking statistics, e.g. to capture most international linkages, albeit at the level of national banking systems rather than individual bank offices; this will help in assessing the stability of cross-border capital flows. Second, the G-20 Financial Stability Board data gaps process creates several bank-level datasets to be stored and analysed in a central data hub.

Stefan Ingves, Governor, Sveriges Riksbank, Chairman of the Basel Committee on Banking Supervision and of the Advisory Technical committee of the ESRB, offered reflections on the ESRB after 10 months of existence, in his speech on '*Experiences with the ESRB – The view from within and relation to other policy areas*' in Chapter 4. The institutional framework is in place, and the new institution is fully operational and has issued its first public recommendations. The ESRB's Secretariat is provided by the ECB. Its General Board has 65 members, of which 37 may vote. The Steering Committee has 14 members, and is assisted by an Advisory Technical Committee with 62 members and an Advisory Scientific Committee with 16 members. The ESRB is embedded in a network of globally active institutions in charge of systemic stability. The Financial Stability Board works, inter alia, on globally active systemically important financial institutions, on shadow banking and OTC derivatives. The Bank for International Settlements provides inter alia inputs on capital adequacy, liquidity rules, and countercyclical

buffers. Macroprudential, micro-prudential and monetary policies may mutually reinforce each other but may also enter into conflict, thus calling for co-ordination and a clear division of responsibilities.

The ESRB's strategy for the current crisis includes four main components: a proactive adoption and implementation of credible, sustainability-oriented fiscal programmes and policies; coordinated action by EU supervisors to strengthen bank capital, including backstops, and a need for transparent and consistent valuations of sovereign exposures; a full and speedy implementation of measures to counter contagion risks; and coordinated and consistent communication by all policy-makers. The ESRB is currently dealing with foreign exchange lending, EU banks' funding in foreign currencies, especially USD, and the use of macroprudential instruments at the national level. The ESRB started at an extremely turbulent period. To be successful, it needs to provide high-quality and timely risk assessments and to communicate effectively. The addresses in turn need willingly accept warnings and follow recommendations by the ESRB.

Alberto Giovannini, Unifortune Asset Management, raised the question about progress in our understanding of the financial system and of solving problems in the financial system, and a summary of his remarks appears in Chapter 5 '*Is there progress in Financial Reform?*' Quick and fast information about major financial institutions' balance sheet positions and exposures is crucial in a financial crisis. To the extent that the global financial system has become more complicated, crisis resolution has become more difficult. We are currently trying to learn the lessons from the crisis but are only half way through. Supervisory institutions have insufficient information to truly address problems. The fact that the various Financial Stability Reports in their data and analysis usually focus on prices rather than quantities, is a good indicator of the persisting lack of information and understanding. The BIS was the first institutions putting more emphasis on quantities with its international banking statistics. Monetary authorities are stuck in a low interest-rate trap: persistently negative real interest rates are a symptom of the malaise of our financial system. The 2007/2008 crisis has reminded us that market failure is very important in financial markets, rather than efficient and self-stabilizing. Past bank-runs could be treated by well-known instruments. Also securities markets are subject to runs. These are multiple-equilibria market failures. No single actor in current complex and interlinked financial markets follows simple linear behavioural patterns. Therefore also financial market prices behave by their nature in a non-linear manner.

The multitude of transactions in securities and derivatives markets implies huge counterparty exposures. If markets dry up, the system fails. The role of collateral, and more generally the means of payment in financial markets, is not sufficiently understood; we should monitor this more closely. The CCP initiative is crucial in

controlling the transmission of stress across markets more efficiently in the future. Current measures are useful insofar as they improve incentive structures of financial firms, and provide additional information for decision-makers active in financial markets. Trade repositories, by collecting key information on over-the-counter derivatives trades, provide an important function in mitigating the opacity of OTC derivatives markets but they may raise important legal issues such as ownership of information and conflicts of interest, not only in the private sector but also among authorities. The issue of liquidity dry ups is not sufficiently covered in recent initiatives; money market mutual funds should be regulated more tightly and be transformed into 'narrow savings banks', ABS should be set up by 'narrow-funding banks' also subject to strict rules. The proposal for a securities transaction tax may be justified on fiscal grounds; but the objective to create disincentives for transactions that do not enhance the efficiency of financial markets fails to see that the liquidity of securities markets is there to save capital; if markets become more costly to trade in banks require more capital. These proposals suffer under fundamentals flaws in basic economic thinking.

The second keynote address by **Jens Weidmann**, President, Deutsche Bundesbank, on '*Managing macroprudential and monetary policy – a challenge for central banks*', appears as Chapter 6. The crisis was, among other things, also caused by a long period of very low interest rates. In the future, therefore, monetary policy has to monitor more closely the build-up of financial imbalances, because the latter may ultimately have a bearing on price stability. Monetary analysis, with its medium to long-term perspective, will gain in importance in the future, and enable monetary policy to extend its horizon and behave more symmetrically over the cycle. However, monetary policy needs to be supplemented with macroprudential policy, which, in order to fulfil the expectations, needs to have an individual set of effective instruments: it needs to have to tools to detect early on risks, be able to issue warnings and recommendations, and the latter need to be translated into actual policy action. Macroprudential authorities need a clear mandate. Central banks are ideally suited to fulfil this task, given their expertise and the necessary coordination between monetary and macroprudential policies. However, central banks' primary objective to safeguard price stability must not be jeopardized. Countercyclical capital buffers will make it possible to 'lean against the wind' of emerging financial imbalances, which is particularly important in EMU, given the asymmetry of many shocks across EMU countries. While final decisions on macroprudential policies should be taken at the national level, a purely national perspective would be misleading, given externalities, spillovers etc. The ESRB has a central and important role to play in this respect.

The Euro Area sovereign debt crisis shows that stability-oriented monetary and financial stability policies alone cannot ensure monetary, financial and macroeco-

nomic stability. Sound public finances and a sound and competitive real macroeconomic is paramount. Monetary policy must not be overburdened in solving the crisis; if it takes on too many tasks, price stability may be endangered and incentives for the necessary structural reforms will be watered down. The prohibition of monetary financing is one of the most important achievements in central banking of the last decades: it reflects many governments' short-sighted incentives to monetize debt, weakens central bank credibility, undermines the incentives for sound public finances, and ultimately risks destabilizing the currency. In EMU, it furthermore collectivises sovereign risks among euro area countries' taxpayers, and is equivalent to issuing Eurobonds. It circumvents democratic decisions: Only national parliaments have the democratic legitimacy to make such decisions. Also proposals to involve the Eurosystem in leveraging the ESFS would violate the monetary financing prohibition. Germany's most important contribution to crisis resolution is that it remains an anchor of stability in EMU. Problem countries need to take the necessary steps to stabilize their public finances, and international help needs to be conditioned by progress in this regard. In the longer term policy makers need to decide which direction EMU should take: one option would be to return to the founding principles of the system but with enhanced mechanisms and incentives to ensure solid public finances; the alternative is to centralise fiscal responsibilities towards the EU.

Session 1, chaired by **Jens Ulbrich**, Deutsche Bundesbank and SUERF, dealt with theoretical and empirical models linking financial stability and the performance of the economy. The first paper, presented by **Alexandros Vardoulakis**, Banque de France, with the title '*Financial Regulation and General Equilibrium*', explores how different types of financial regulation could combat many of the crisis developments observed in 2007 to 2009. A shortened policy-oriented version of this paper appears as Chapter 7. The general equilibrium model they use for this purpose includes both a banking system and a shadow banking system. Shadow banks are less risk averse and face lower default costs than conventional banks: therefore, they use bigger leverage and less portfolio diversification. When households default, this triggers forced selling by shadow banks. Five different policies for countering defaults, credit crunches and fires sales are assessed: limits on loan to value ratios, bank capital requirements, bank liquidity coverage ratios, bank dynamic loan loss provisioning, and margin requirements on repo agreements used by shadow banks. They find that leaning against the wind to reduce credit expansions and house price booms via regulation is not easy: large asset price increases during the boom yield capital gains to owners, which improves their equity and lowers the loan to value ratio on their mortgages. High home prices improve bank capital ratios as mortgages become less risky and bank equity is raised. Thus, during a boom imposing higher loan to value requirements, raising capital standards, and raising margin requirements on repo loans enough to slow

down credit expansion and house price increases is difficult. By contrast, dynamic provisioning and liquidity requirements are found to effectively support 'leaning against the wind'. Given many complex interactions between agents, no single regulatory tool is sufficient to offset the many distortions arising from a default. Multiple sources of inefficiency require multiple tools to correct for them. Capital alone is unlikely to be sufficient.

Philipp Hartmann, European Central Bank and SUERF, gave a presentation on '*Macrofinancial models linking financial stability and the performance of the economy*'. We have seen a number of failures recently: first, inadequate risk management – correction is under way. Second, financial regulation failed to lean against bubbles and prevent crisis – again, reforms are under way. Third, fiscal governance proved to be insufficient – here, some correction is under way. Also the economics profession needs to reform substantially. Economic theory ultimately shapes policy, as could be seen in the area of monetary policy. We need to reach a similar state in financial stability. The question now is how to integrate widespread financial instability into macroeconomic policies. There are three important elements causing widespread financial instability: big shocks, contagion, and the build-up of substantial imbalances leading to abrupt unravelling. We need to look at these issues in an integrated encompassing way. Why did economics fail to avoid the crisis? Financial frictions are missing from macro models. Work to remedy this is now on going – financial sectors are now being included. However, other important phenomena are so far still largely neglected: defaults and break downs, non-linearities, a distinction between stable and unstable financial intermediaries rather than just one agent per sector, and non-rational expectations. Against this background, Hartmann called for a 'new finance macro synthesis'. He then outlined the objectives, main lines of work and working method and organisation of the Eurosystem Macroprudential Research (MaRs) Network. One example of the work achieved so far is a composite coincident indicator of systemic stress, covering several markets.

The third paper of the session, presented by **Stefano Neri**, Banca d'Italia, addressed '*Financial intermediation and the real economy: implications for monetary and financial stability prices*'. The pre-crisis New-Keynesian models were suitable for developed economies during normal times with a stable steady state. The crisis showed many of the underlying assumptions were wrong. The main missing elements were: financial intermediation, insolvency, default, liquidity. The crisis is an opportunity to modify the current framework. Intensive research has been on-going since 2009. But to include non-linearity, there is need to simplify strongly in other areas. All existing models fall short of modelling systemic risk. New models require a lot of time, while policy makers need timely answers. Until new models become available, the most promising intermediate solution is

to modify existing DSGE models and use them for policy analysis. The authors use such a model to answer what was the impact of the crisis on activity, whether monetary and macroprudential policies should cooperate, and whether macroprudential policies could be used to lean against financial cycles. They find that the 2009 recession was almost entirely caused by adverse shocks to the banking sector. The sharp reduction in policy rates attenuated the strong and negative effect of the crisis on the euro area economy. In normal times, macroprudential policy yields small benefits. If the monetary and macroprudential authorities do not cooperate, policy tools are extremely volatile. Benefits are sizeable when the economy is hit by financial shocks and when the two authorities cooperate. As regards leaning against the financial cycle by the macroprudential authority, they find that tighter capital requirements can be effective in containing the expansion of lending.

In his dinner speech, **Jürgen Stark**, European Central Bank, addressed the link between '*Macroprudential policies and financial integration*', which appears in Chapter 9. The growing integration of financial markets has raised issue of contagion and regulation. Without such far-reaching integration, the costs of the crisis might have been considerably lower. The recent crisis had several causes: high credit growth, an under-pricing of risk, wrong incentives triggered by securitisation and the resulting complexity and opaqueness. The ESRB was established to ensure the necessary macroprudential dimension to supervision. While the ESRB is closely linked to the ECB, it is nevertheless distinct and separate. It does not change the ECB's statutory mandate. Fiscal policies are still a national competence. As distressed fiscal policy spills over, national fiscal policies need to be embedded in a firm rules-based framework. Recent reforms go in the right direction but are insufficient. These caused the crisis to escalate further and hinders effective crisis management. Ultimately, there further fiscal integration will be needed. There may also be a case for a single financial supervisor across EU countries. The banking system is a vital part of economic infrastructure. Disruptions can inflict big costs. The financial sector's nature as a public good justifies strict regulation. The new regulatory framework is a major achievement. But more interaction between macro and microprudential supervision is needed. Further steps are necessary towards integration in the area of supervision are therefore necessary, as will be the creation of a fiscal union and a 'financial union'.

Session 2, chaired by **Ernest Gnan**, Oesterreichische Nationalbank and SUERF, was devoted to '*Empirical models on the causes, transmission channels and the real impact of the financial crisis*'. The session was opened by **Elod Takats**, Bank for International Settlements, who presented his work – together with Christian Upper from the BIS – on '*Deleveraging and Recovery*', which appears in Chapter 10. The question their paper tries to address is the impact of private sector delev-

eraging in the aftermath of a crisis. Given that the build-up of the crisis involves excessive credit growth and increasing leverage of the private sector accompanying private consumption and real estate booms one should expect that the correction of the crisis involving deleveraging goes along with a more muted recovery of the real economy. Investigating that hypothesis in a cross-country panel analysis the authors do not find any robust correlation between private sector deleveraging and the strength of the economic recovery. This lack of correlation itself is robust over different specifications. Their explanation for this somewhat surprising result – given the prominent fears of the impact of necessary deleveraging for economic prospects – is that a focus on aggregate debt figures is misleading. Leveraging before a crisis involves capital misallocations, correcting these developments frees resources to be used in areas supportive to growth. Thus, it would be necessary to distinguish between 'good' and 'bad' deleveraging, a distinction that certainly deserves merit in qualifying currently flourishing fears of the ongoing correction of highly leveraged positions. In addition, the authors find that growth-enhancing structural reforms play an important role for recovery processes after financial crises.

Claudia Buch, University of Tübingen, gave a paper on '*Macroeconomic factors and microeconomic bank risks*', co-authored by Sandra Eickmeier (Deutsche Bundesbank) and Esteban Prieto (University of Tübingen), the principle findings of which appear in Chapter 10. The authors try to identify how macroeconomic shocks are transmitted to bank risks and other banking variables. In that regard, the heterogeneity of banks plays an important and not-well understood role in the responses of individual banks to macroeconomic shocks. Using a factor augmented VAR the study finds that bank ending increases on average after expansionary macroeconomic shocks and average bank risk declines. While this is true on average there is also important heterogeneity among banks. Their findings have implications for banking regulation: regulators should focus on macroeconomic factors and regulative efforts in the form of capital and liquidity requirements directed towards macro influences deserve more prominence. Moreover, their methodological approach might entail some fruitful applications in regulatory stress tests aiming at identifying macro-micro linkages.

The third paper of the session, presented by **Bin Li,** International Monetary Fund, was devoted to '*Creditless Recoveries*'[2]. The authors tackle the issue of recovery processes that are characterized by the absence of usual patterns of credit growth. They can be expected to play a role after financial crises when the private sector needs to deleverage and/or banks have to reduce excessive leverage positions.

[2] An earlier version of this paper was published as: A. G. ABIAD, L. (Grace) BIN and G. DELL'ARICCIA, "Creditless Recoveries (March 2011)", *IMF Working Paper* 11/58, 2011.

Thus, in a sense their paper poses a very similar question to the first paper of this session. Their answer, however, stands in some contrast to the findings presented by Takats: Creditless recoveries occur after banking crises and the recovery of the real economy is usually more protracted than in these cases. Driving factors for these developments are bank-supply related factors. Taken together, the empirical analyses of the dependencies between financial crises, deleveraging processes and recovery strength deserves more detailed research. Central in that respect would be to identify beneficial deleveraging compared to harmful deleveraging and to gain further insights into the supportive role of structural reforms in the recovery process.

Session 3, chaired by **Thilo Liebig**, Deutsche Bundesbank, was devoted to '*Measuring Systemic Risk*'. **Laurent Clerc**, Banque de France, opened the session with a paper on '*Measuring aggregate risk: can we robustly identify asset boom-bust cycles? Implications for macroprudential policies*'[3]. As a response to the financial crisis, several initiatives have taken place to develop macroprudential regulation to prevent systemic risk and the built-up of financial imbalances. Crucial to the success of such policy is the ability of the macroprudential authority to identify in due time the development of these imbalances, which are generally associated to asset-price boom-bust cycles. In his paper, we investigate the extent to which it is possible to detect asset-price booms according to alternative identification strategies and we assess their robustness. Based on these different strategies, the authors infer the probability that an asset-price boom turns into an asset-price bust. In addition, they try to disentangle costless or low-cost from costly asset-price booms. Clerc presented some evidence that house price booms are more likely to turn into costly recession than stock price booms. Resorting both to a nonparametric approach and a discrete-choice (logit) model, he analyzed the ability of a set of indicators to robustly explain costly asset-price booms. According to the results, real long-term interest rates, total investment, real credit and real stock prices tend to increase the probability of a costly housing-price boom, whereas real GDP and house prices tend to increase the probability of a costly stock-price boom. Regarding the latter, credit variables tend to play a less convincing role. Interestingly, the credit-to-GDP gap indicator sometimes put forward in the literature does not seem to be a robust leading indicator of asset price booms.

Ester Faia, University of Frankfurt, presented a paper on '*Attributing Systemic Risk to Individual Institutions*'. She took as a starting point the pervasiveness of interlinkages in current financial systems. Understanding the nature and driving

[3] V. BORGY, L. CLERC and J.-P. RENNE (2011): *Measuring Aggregate Risk: can we robustly identify Asset-price boom-bust cycles?*, mimeo Banque de France, November.

forces of these crossdependencies is crucial to gain insights in systemic aspects of risks and to set the right regulatory incentives to tackle the accompanying problems. In her model she analyses these issues within a network context focussing on balance sheet exposures that form the links between nodes in a network of interconnected banks. Systemic effects in such a model context have their roots in network externalities and network models are well-suited to analyse those interlinkages. Regulatory implications to internalise externalities in network structures are well-known to economists in the form of Pigouvian taxes. However, concrete regulatory implications in the form of a mechanism design still have to be developed.

The session was concluded by **Jon Danielsson**, London School of Economics, with a presentation on '*Dealing with systemic risk when we measure systemic risk badly*'[4]. Danielsson, thus, provided a thorough analysis of the criticism raised by Hellwig in his keynote about our (in)ability to identify and measure systemic risk properly. He confirmed the pessimism raised by Hellwig with regard to some of the currently most prominent measures used by financial market participants. In his conclusion remarks he remarked that current measures of systemic risk are quite bad, and are barely distinguishable from random noise. The interesting question from a policy point of view then arises of how to deal with such a sober conclusion. As potential costs to society are large when regulators focus on a wrong model he concludes that – besides other factors – the focus on point forecasts are plainly wrong. Dealing with estimation and model risk requires confidence intervals. We should not fall into the illusive trap of numbers that gives a pretend precision to current measures of systemic risk that does not in actual fact exist.

Session 4, chaired by **Jürgen Pfister**, BayernLB and SUERF, discussed '*Macroprudential instruments to contain system risk*'. The session was opened by **Francesco Mazzaferro**, ESRB Secretariat, with a paper on '*Macroprudential instruments for containing systemic risk: the ESRB view*', which appear in Chapter 12. Mazzaferro took as a starting point the deficiencies that had emerged in the financial crisis in the macroprudential frameworks in the EU and elsewhere in the world. He described in detail the process of setting up the ESRB at the European level as part of a broader framework for macro and microprudential supervision on a European level. The scope of the ESRB is extensive: its macroprudential oversight covers not only banks, but all financial intermediaries, markets, products and infrastructures that may cause systemic risks to financial stability. The ESRB's focus in that regard is one of systemic risks.

[4] J. DANIELSSON, K. R. JAMES, M. VALENZUELA and I. ZER (2012), *Dealing with systematic risk when we measure it badly*, European Center for Advanced Research in Economics and Statistics.

The ESRB, however, has only limited tools at hand to address these issues. Of particular importance to note, it has no binding powers for macroprudential policy, but is instead endowed with the instruments of warnings and recommendations. These warnings and recommendations can be addressed to the EU as a whole or to specific member states. As such, they are not legally binding but follow the philosophy of 'Act or Explain'.

Right from the beginning, the ESRB has been thrown into a crisis-driven financial environment. Thus, while not being a typical crisis management institution, the first steps of the ESRB nevertheless have had to take into account the difficult state of the European financial system. It should then come as no surprise that the ESRB in its first year has been very active in issuing warnings and recommendations on a broad range of topics (forex loans, USD funding of European banks, implementation of decisions agreed upon at different European summits). The ESRB can also support member states in developing a toolkit of macroprudential instruments, not least as such a toolkit is somewhat underdeveloped in Europe. All in all, the first year of the ESRB has been an active and fruitful one. But important work remains to be done before a robust and effective macroprudential framework in the EU can emerge.

The euro area view was juxtaposed by **Simon Hall**, Bank of England, who gave an overview of the '*Development of macroprudential policy in the UK*'. In the light of the crisis the UK regulatory framework also underwent significant change. With regard to macroprudential supervision, the Bank of England has gained importance similar to other central banks as far as a macroprudential mandate is concerned. The newly established Financial Policy Committee (FPC) under the roof of the Bank of England is one of the central elements in a reformed regulatory framework. The FPC's tasks are to identify and monitor systemic risks, but also to take actions to reduce them. The FPC clearly resembles the same kind of challenges all macroprudential watchdogs face, namely to gain a proper understanding of the nature, measurement and development of systemic risks. This means that '*terra incognita*' has to be conquered and macroprudential functions have to be reconciled with the traditional goals of a central bank in safeguarding price stability. In that respect an effective toolkit will have to be implemented, but also a communication strategy will have to be designed for the general public and the parliamentary legitimized institutions by which accountability will be guaranteed and a common understanding about macroprudential issues is built. Simon Hall made clear that these issues do not differ from the ones identified by Francesco Mazzaferro for the ESRB. However, designing and implementing a macroprudential mandate at the national level is certainly less complex than at the European level, where initiatives have to respect the ultimate sovereignty of member states.

Volker Wieland, Institute for Monetary and Financial Stability, concluded the conference by asking whether we will have made progress in terms of predicting and/or warning of financial crises by the time that further 'anniversary conferences' are held, and whether we will be able to do better in terms of maintaining financial stability and moderating booms and busts in the real economy. He acknowledged that for the current crisis professional forecasters erred by a wide margin. While our understanding of the interlinkages between real and financial sectors of the economy will certainly improve and while also our understanding of the nature of systemic risk will progress we should not rely on automatic improvements on theses fields. Wieland argued that similar to the progress made in designing robust monetary policy frameworks the new strand of macroprudential analysis should also focus on a pluralistic modeling approach. But pluralism should by no means imply losing scientific rigor. In the end, it is all about fitting empirical benchmarks and identifying policy recommendations that are robust to model uncertainty. In that regard, the macroprudential approach could and should learn from the research agendas of monetary policy frameworks over the past decades. The latter have increasingly focused on comparability and robustness. And given the large uncertainty of models in the macroprudential realm interlinking the real, monetary and financial sectors such an approach would be even more appropriate for policy advice in macroprudential issues.

2. Opening Remarks

Hermann Remsperger

Ladies and Gentlemen, also on behalf of my colleagues from the 'Foundation for Monetary and Financial Stability' I would like to warmly welcome you to the conference on 'The ESRB at 1'. First of all, let me extend a special welcome to the distinguished speakers who certainly will make this conference a stimulating event. At the same time many thanks go to the organisers who managed to compile an excellent program. Regarding the Foundation I would like to mention that it was set up as a Federal institution by Act of Parliament in 2002 to promote public awareness of the importance of price and financial stability. To meet this objective, we support economic and legal research in financial and monetary matters.

The flagship of our Foundation is the Institute for Monetary and Financial Stability in Frankfurt. I only would like to emphasize that the name or the title of the Institute represents at the same time its research activity, which is monetary and financial stability. In addition to the IMFS, the Foundation funds two PhD programs, one in Frankfurt and another one as a joint venture at the universities of Jena and Halle. Last but not least we support academic conferences like this here in Berlin on '*The ESRB at 1*' which certainly cannot be confused with a birthday party.

As the fast growing literature on systemic risks and macroprudential policy clearly shows there are difficult questions all around. Let me mention only a few of them with four areas in mind, to some extent shadowing the topics of our conference.

1. On the ESRB itself: Is it – as some critics say – too big to act or even an empty shell without direct power or power to direct? Will recommendations by the ESRB work without strong mandates for financial stability on the national level? And as a follow-up: Do you think that Germany is behind the international curve when it comes to an official financial stability mandate for the central bank? Or is it better for a central bank not to have a mandate for financial stability?

2. On measuring systemic risks: Do you agree with the ECB and many others that empirical research on systemic risk is still in its early development stage? And in particular: Do you side with Professor Hellwig who argues that there are illusions about our ability to measure systemic risk?

3. On instruments, rules and tools: Is macroprudential policy to be conceived as policy without measurement? And what do we actually know about the

transmission process and the interaction between different macroprudential instruments? Furthermore and with a view on crucial governance issues: Can we really expect that politicians will overcome their bias not to act if and when the countercyclical buffer should be increased or lowered?

4. On the role of monetary policy in the macroprudential framework: Is the Bundesbank right to draw a clear line between the objective of price stability on the one side and financial stability on the other so as to ensure a clear assignment of tools and measures? Or should we agree with Barry Eichengreen and a couple of his colleagues who are convinced that the traditional separation principle, in which monetary policy targets price stability and regulatory policy targets financial stability, is no longer tenable and deserves nothing else but an early retirement?

I should better stop here to avoid the well-known systemic risk of welcome remarks – that of being 'too long to stimulate'. So let me conclude by expressing my hope that this conference will find convincing answers to demanding questions so that 'ESRB at 1' will not only help to improve our understanding of the current financial crisis but will also give some advice how to prevent further potential crises.

3. Measuring Systemic Risk

Stephen G. Cecchetti[1]

Among the many responsibilities of the European Systemic Risk Board (ESRB), two stand out: *crisis prevention* and *crisis management*. Both of these involve measuring and monitoring systemic financial risks. Since modern finance really is global, this means measuring what is happening both within and between countries. And, doing that requires internationally comparable *data*. This is an area in which the BIS has a long history, so I thought I would use the brief time I have this afternoon to discuss a few of the challenges that arise in systemic risk measurement.

In addition, I want to draw your attention to two ongoing international initiatives aimed at closing data gaps. The first is the enhancements to the BIS international banking statistics by the Committee on the Global Financial System (CGFS). And the second is the G20–Financial Stability Board (FSB) initiative that is based on a set of 20 recommendations covering multiple data sources[2]. A subset of these recommendations calls for greater sharing of bank-level data, and the creation of a 'data hub' for their storage and analysis. I will return to this at the end of my comments.

Turning to the primary topic at hand, systemic risk can mean almost anything (or nothing), depending on whom you ask. So, to make any progress, I need some sort of definition. Mine starts with an engineer's formalisation of the world as consisting of a set of shocks or forcing variables, an economic structure or propagation mechanism for the shocks, and a set of outcomes or state variables. In this construction, systemic risk is related to the probability or likelihood that a given size shock will generate a particularly severe and undesirable outcome.

So, in trying to measure systemic risk, we need to ask why it is that in some instances shocks will cause great harm, while in others the same shocks will not. I will mention four sorts of phenomena that we need to measure to examine systemic risk. In my formalisation, these could be either state variables or propagation mechanisms, or both:

First, there are *common exposures*. These are problems in a particular market or asset class that show up on the balance sheets of those entities exposed to these assets. Here, I am thinking of things like the *aggregate* exposure to US dollar

[1] I would like to thank Patrick McGuire for his help in preparing these remarks. The views expressed here are those of the author and do not necessarily reflect those of the BIS.

[2] See IMF-FSB (2009, 2010) for discussion of this initiative.

mortgage-backed securities or European sovereign debt. We need to find a way to locate and track these common exposures.

The second source of systemic risk arises from problems that develop in one market segment but are exacerbated by *leverage*. Here, since small price corrections can quickly induce insolvency, it is essential that we chase down leverage wherever it goes!

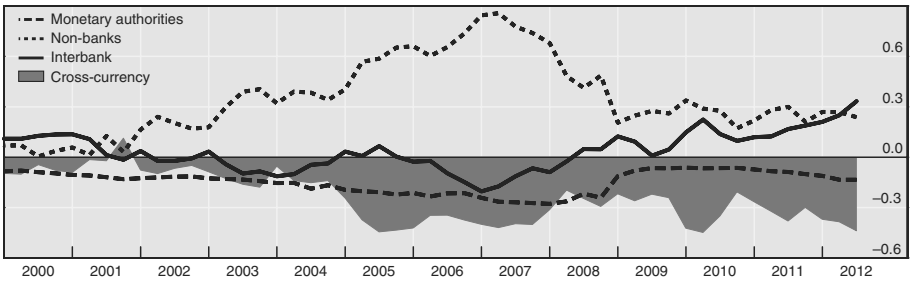
Third, shocks are amplified when institutions engage in excessive *maturity transformation*. This is a particularly serious issue when institutions' funding patterns are highly concentrated in short-term markets that are susceptible to liquidity runs. Indeed, this was a key problem during the recent crisis. Banks and non-banks alike found it difficult to roll short-term liabilities when levels of trust in the market were low. I'll return to this in a moment.

Finally, we need to develop a better understanding of how the structure of financial markets, in particular how *cross-border linkages*, amplify and propagate shocks. A few questions that immediately come to mind are: If cross-border capital flows were to suddenly come to a halt and even reverse, what would it mean? If wholesale funding were to dry up in one market, what would it mean for others?

With that as a brief introduction, let me turn to a few pieces of information – a few measurements – that we might have liked to have had five or even ten years ago. The first concerns US dollar funding. As everyone now knows, European banks' USD funding problems were at the heart of the crisis in 2008 and 2009. And, they continue to be a problem because of their sovereign exposures at home[3].

European banks' net US dollar exposure [1]

Net, by counterparty sector, in trillions of US dollars



[1] Estimates are constructed by aggregating the worldwide on-balance sheet cross-border and local positions reported by internationally active banks headquartered in Germany, the Netherlands, Switzerland and the United Kingdom.

Sources: BIS consolidated banking statistics (immediate borrower basis); BIS locational statistics by nationality. Graph 1

[3] This part of the discussion is based on McGuire and von Peter (2009).

Graph 1 shows a system-level picture of rollover risk for European banks in dollars, based on BIS data. This picture is based on *net positions* (assets minus liabilities). I just mention that a full set of funding risk measures should consider both gross and net positions.

Looking at the graph, the dotted line shows European banks' net investment in non-banks – this includes their holdings of US dollar collateralised debt obligations, as well as US Treasuries and any dollar-denominated corporate loans. We take these amounts as a measure of European banks' *desired* US dollar investment portfolio. Positive net positions reflect the excess of such assets over the US dollar funding obtained from non-banks.

These net positions are financed in three ways. First, by net interbank borrowing – this is the solid line in the graph. Second, they are financed by net borrowing from central banks – the dashed line. (These are primarily deposits of foreign exchange reserves.) And third, the banks can obtain dollars through cross-currency positions. A primary example of this is FX swaps, shown by the shaded area in the graph[4].

The fact that non-US banks funded long-maturity dollar assets using short-term liabilities obtained in interbank and FX swap markets made them vulnerable. That is, implicit in Graph 1 is a rising degree of rollover risk in the run-up to the crisis. Of course, when funding becomes unavailable, it is always possible to liquidate assets. But, it is precisely during periods of stress that problems arise: funding liquidity and market liquidity dry up at the same time. The result is an implicit lengthening of the effective maturity of assets, and an implicit shortening of the maturity of liabilities.[5]

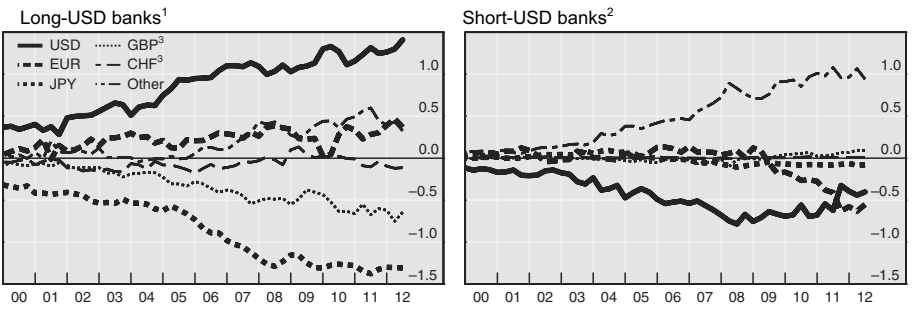
Now let me expand on this analysis a bit. Graph 2 plots information on cross-currency funding positions similar to that in Graph 1, but for a broader universe of banking systems. The solid line in the left-hand panel is the long dollar position of the European banks from Graph 1, together with that of Canadian and Japanese banks. These banks have more dollar assets than dollar liabilities, so they are *net borrowers* of dollars in the FX swap market. The other lines in this panel correspond to these banks' net positions in other currencies. Note how yen and pounds are being swapped into dollars. The right-hand panel of the graph reports analogous information for banks that are short US dollars – that is, for those banks that have more dollar liabilities than dollar assets, so they are (on net) supplying dollars in the swap market (the solid line in the right-hand panel).

[4] As described in Cecchetti *et al.* (2010) and BIS (2011), we do not have data on FX swaps. Instead, I plot the net position consistent with a hedged balance sheet. That is, one with no open dollar position.

[5] A careful reader will note that since the solid line rises above zero, it appears as if European banks are currently net dollar providers in the interbank market. This is almost surely the consequence of errors in measurement. An alternative set of estimates puts net interbank borrowing around zero, and thus determines a correspondingly smaller value for 'cross-currency' FX swap positions (shaded area).

Long- and short-USD banks' net FX swap positions, by currency

In trillions of US dollars



[1] Banking systems with more on-balance sheet US dollar assets than US dollar liabilities at end-Q2 2007: Canadian, Dutch, German, Indian, Japanese, Swiss and UK banks. [2] Banking systems with fewer on-balance sheet US dollar assets than US dollar liabilities at end-Q2 2007: Australian, Belgian, Chinese Taipei, Danish, Finnish, French, Greek, Hong Kong, Italian, Luxembourg, Norwegian, Portuguese, Spanish, Swedish and Turkish banks. [3] Positions booked by offices located in Switzerland (for CHF) and in the United Kingdom (for GBP). CHF and GBP positions reported by offices located elsewhere are included in "Other".

This information leads to a very intriguing conclusion. During the crisis, the long dollar banks were unable to roll their FX swap funding. This forced many of them into the spot market to close these positions. That is, in order to repay the FX swaps that could not be rolled over, banks that had more dollar assets than liabilities sold euros, Swiss francs and British pounds in the spot market to obtain US dollars. Many European banks, pension funds and insurance companies had similar long-US dollar balance sheets. Their overall demand for dollars when they could no longer roll funding – more than safe haven flows into dollar assets – is arguably what drove the unprecedented appreciation of the US dollar in the five months following the collapse of Lehman Brothers.

Most financial markets are opaque in the sense that investors are unable to identify *concentrated positions* at the system level, so they cannot gauge the possible impact of a large and rapid unwind in the event of a shock. But how can market participants *price* systemic risks that they cannot see? At the BIS, we believe that more data on the aggregate net positioning in the FX swap market would provide information on the possible *size* of the future spot market demand for a currency (and hence spot rates) in the event of a shock. That is, we are led to ask whether the euro-dollar swap spreads would have been, say, 20 basis points wider in 2006 if the global scale of cross-currency positioning had been known.

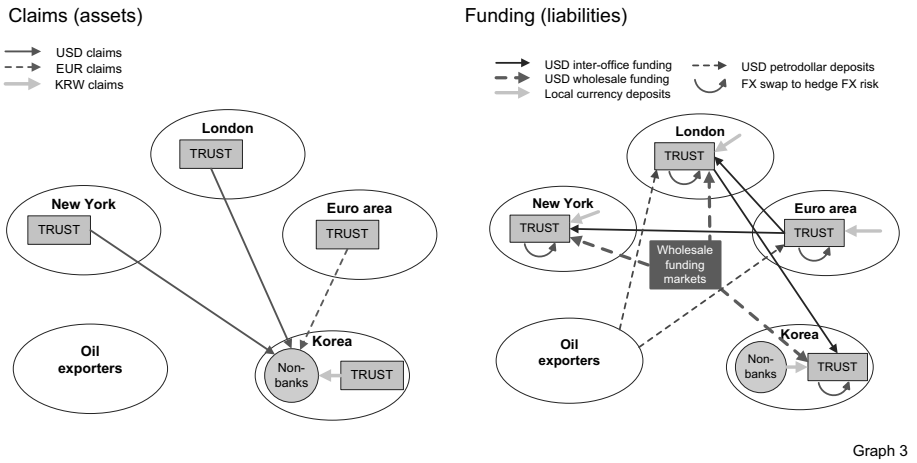
Finally, put yourself in the shoes of a borrower country and consider some of the systemic risks faced in a world of open borders and capital markets. In the wake of the crisis, cross-border credit to many emerging economies contracted sharply as banks struggled with the problems on their balance sheets in Europe and the United States. Many policymakers were caught by surprise, in part because they

lacked adequate measures of the *stability* of cross-border capital flows into their economy.

A hypothetical example may help here[6]. Consider a disruption to a major funding source for banks: for example, wholesale funding markets freeze up, or the placing of deposits of petrodollars and Asian surpluses slows significantly (or migrates to another currency). Which *borrowers* – that is, which sector in which country or countries – are likely to be hit the hardest?

Addressing this question requires knowledge about the banks that extend credit and the types of liabilities supporting this credit. In Graph 3, I have created a fictitious global bank called TRUST Ltd. The left-hand panel maps TRUST Ltd's credit to non-banks in Korea. Note that this credit is booked in four different office locations – London, New York, euro area and Korea – and in three different currencies – US dollar, euro and Korean won.

The structure of the global operations of the hypothetical firm TRUST Ltd



Graph 3

The right-hand panel maps the structure of TRUST Ltd's liabilities supporting the credit in the left-hand panel. Here, different offices rely to varying degrees on *local deposits* (short thick solid arrows), *inter-office transfers* (thin arrows), *wholesale funding* (thick dashed arrows) and *petrodollar deposits* (thin dashed arrows). On top of these are currency swaps, which hedge the exchange rate risk at the office level (curved arrows).

The key point I want to make is that each office of TRUST Ltd has its *own* liability structure with its *own* mix of instruments and maturities. This means that the

[6] This example is taken from Fender and McGuire (2010) and BIS (2011).

stability of the international bank credit to non-banks in Korea depends on the ***mix*** (across banks and office locations) of credit positions and funding sources – that is, on the underlying global structure of the creditor banks.

Keep in mind that such a view is *not* captured in consolidated data for TRUST Ltd, no matter how detailed the breakdowns are. Currently, existing data provide no way for us to simultaneously assess all the dimensions presented in this graph. Yet it is precisely data of this sort which are needed to size up the likely effects on borrower countries when banks are hit with funding (and other) shocks elsewhere on their global balance sheets.

In general, better data will help both in *crisis prevention* and in *crisis management*. Starting with prevention, better data can help us to identify the build-up of the sorts of system-level vulnerabilities I have described – *common exposures*, concentrated funding patterns, leverage and maturity transformation. But, success will require the *joint analysis* of data covering many financial institutions' balance sheet positions, complete with breakdowns by instrument, counterparty country and type, currency and maturity. And, confidential data can be aggregated in meaningful ways and disseminated to market participants, thus improving market discipline.

To manage crises, policymakers need to make quick decisions about the failure (or not) of distressed financial institutions. Data tracking *bilateral* exposures to other financial institutions – that is, Citibank's exposure to Deutsche Bank and vice versa – will provide a rough picture of potential spillovers, and thus lead to more informed decisions. Information of this sort was sorely lacking in the days preceding the Lehman bankruptcy.

To conclude, let's look at where we stand. Supervisors have quite a bit of detailed information about banks already. But no one national supervisor has a global perspective.

Moreover, there is no real infrastructure for the sharing of confidential data, particularly outside the regulatory community. Institutions charged with systemic risk assessment either globally or in particular countries often sit outside the supervisory community, and thus lack the data to do their job. In other words, nobody has a system-level view or anything close to it at the moment.

As I said at the outset, two statistical initiatives currently under way hope to change this. First, the CGFS has been working on a series of enhancements to the BIS international banking statistics. Of the many enhancements, one worth highlighting here is that the statistics will soon capture most of the international linkages (the arrows) I discussed above for TRUST Ltd, albeit at the level of national banking systems rather than individual bank offices. This will help in assessing the stability of cross-border credit flows.

And second, a key goal of the G20-FSB Data Gaps initiative is to create (several) *bank-level* datasets that are to be stored and analysed in a central data hub.

These two initiatives address systemic risk measurement from different angles. The detailed but consolidated balance sheet data envisioned in the G20-FSB initiative will be essential for identifying common exposures and funding risks. This will not only help with crisis prevision, but will inform crisis management decisions.

In contrast, the enhanced BIS statistics will cover a much wider universe of banks at the level of national banking systems. This will provide a complementary view of banks' consolidated balance sheets that are disaggregated across host jurisdictions. That is, it will supply information on banks' operations in particular jurisdictions (ie German banks in France, German banks in the United Kingdom, etc) which the bank-level consolidated data described above will not.

These projects are very complex – conceptually, technologically and legally – but I am confident the difficulties can be overcome. Importantly, if they are not, we will be back to relying on banks' annual reports, which are clearly not up to the task.

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4. Experiences with the ESRB – The View from within and Relation to Other Policy Areas

Stefan Ingves

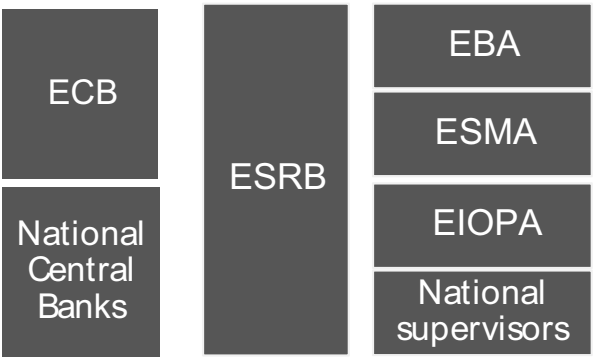
The European Systemic Risk Board (ESRB) has now been in operation for nearly a year. I hardly need to point out that the ESRB started in a very difficult period when systemic risks in Europe seemed to be greater than ever and when political and economic issues were tightly interconnected. Obviously, the work of the ESRB has to a large extent focused on the immediate challenges of the current situation. But important progress has also been made on several macro-prudential issues including bank funding in foreign currencies, macro-prudential implications of the EU legislation and the adoption of public recommendations on lending in foreign currencies. I will in my presentation focus on the ESRB's unique macro-prudential role in the EU, the important work of the ESRB so far, the global perspective of the ESRB and finally on how to ensure a successful ESRB going forward.

4.1. The Macro-prudential Framework

The global financial crisis revealed serious weaknesses of the EU regulatory framework. It was obvious that the traditional institution-specific (micro-prudential) supervision needed to be complemented with supervision focused on the stability of the financial system as a whole (macro-prudential). The new European supervisory structure rests on two major pillars. The *first* pillar includes a strengthened framework for the micro-prudential supervision in the EU. Out of this came the three European Supervisory Authorities (ESAs), namely the European Banking Authority (EBA) in London, the European Insurance and Occupational Pensions Authority (EIOPA) in Frankfurt and the European Securities and Markets Authority (ESMA) in Paris. The *second* pillar was to establish a new macro-prudential authority at EU level, namely the European Systemic Risk (ESRB).

As a result, the ESRB is closely linked to the new supervisory authorities – EBA, ESMA and EIOPA. The ESRB is also closely related to the European Central Bank (ECB). The ECB President is Chair of the ESRB. The ESRB secretariat also shares the same premises in Frankfurt and the ECB provides analytical support to the ESRB. National central banks and supervisors are also members of the ESRB.

Figure 1. The Macro-prudential Framework



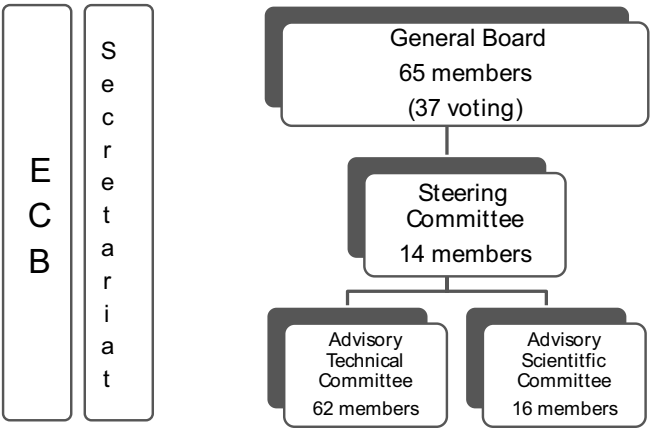
The ESRB has no binding powers. Instead, it can issue warnings and recommendations to national authorities and to EU institutions. These warnings and recommendations can be either public or private. The effectiveness of its recommendations will depend on the attitude of the addressees to the 'comply or explain' principle. This principle simply says that either you do as recommended or you explain why you have chosen not to comply. To work, it requires respect for the institution issuing the recommendations.

The ESRB is unique in that it brings together representatives from central banks and financial supervisory authorities from all 27 Member States, as well as representatives from the three European supervisory authorities and from the European Commission. However, this also makes the General Board a large body consisting of 65 members – 37 voting and 28 non-voting. Decisions are taken by simple majority, but a majority of two thirds is needed to adopt recommendations or to make a warning or recommendation public. The fact that ESRB decides by voting rather than by consensus is important, since blocking minorities can be avoided. The majority of voting rights are held by the national central banks (27 voting rights) while the national financial supervisory authorities have one non-voting representative per Member State in the General Board. This gives the central banks a strong role in the ESRB.

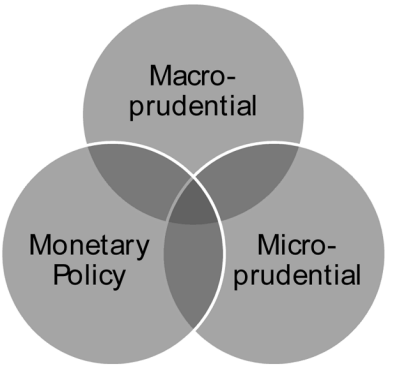
Obviously, this requires efficient preparations of meetings. A Steering Committee with 14 members has therefore been established with the purpose of guiding the work to be presented to the General Board. The majority of the Steering Committee members represent the EU institutions and in addition there are four elected members from the national central banks. Two advisory committees have also been set up – the Advisory Technical Committee which I chair and the Advisory Scientific Committee chaired by Professor Martin Hellwig of the Max Planck Institute. The Advisory Technical Committee (ATC) mirrors the composition of

the General Board with 62 members. The Advisory Scientific Committee (ASC) is smaller, consisting of only 15 academics and the chair of the ATC.

Figure 2. The Institutional Set-up of the ESRB



4.2. Macro-prudential Objectives



Generally speaking, the targets for macro-prudential, monetary and micro-prudential policies mutually complement and enhance each other. All three policy areas have a common goal in promoting financial stability. However, situations may arise where the targets of the different policy areas can be conflicting. Macro-prudential regulation concerns itself with the stability of the financial system as a whole. Micro-prudential regulation, on the other hand, concerns itself with the stability of individual institutions and the appropriateness of individual instruments. In practice, there can be a trade-off between micro-prudence and macro-prudence. For example, different ways to act that seem to be rational and appropriate for an individual institution may undermine the stability of the financial system as a whole.

In the short- to medium-term, a trade-off may also arise between macro-prudential policy and monetary policy. Stable prices and sustainably low interest rates may pose a threat to financial stability by affecting risk-taking incentives. For instance, such an environment can result in underpricing of risk, excessive indebtedness and asset price bubbles.

Given these synergies and conflicting targets, effective macro-prudential frameworks will require some form of co-ordination and a clear division of responsibility.

4.3. The ESRB's Strategy to Tackle the Current Crisis

The deepening of the sovereign debt crisis since this summer has triggered a dangerous feedback loop. We now face a dangerous interplay between fragile public finances, weak banking sectors and low economic activity both at global and EU levels. In September, the ESRB issued a statement highlighting that the crisis had reached a systemic level and called for immediate actions to put the EU financial system on a sustainable recovery path. The ESRB's strategy to tackle the current crisis includes four pillars:

- a pro-active adoption and implementation of credible sustainability-oriented fiscal programmes and policies;
- coordinated action by EU supervisors to strengthen bank capital, including by having recourse to backstop facilities, recognising the need for transparent and consistent valuation of sovereign exposures;
- a full and speedy implementation of the 21 July measures to address the risks of contagion including their standing ready to cope with unexpected events, associated with the acceleration of the unfolding of the crisis; and
- coordinated and consistent communication by all policy-makers.

4.4. Important ESRB Work on Macro-prudential Issues

Notwithstanding the deepening of the sovereign debt crisis, the ESRB has made important progress on several macro-prudential issues. This includes the publication of recommendations on lending in foreign currencies. But also EU banks' funding in foreign currencies (especially USD) and the use of macro-prudential instruments at national levels.

4.4.1. Lending in Foreign Currencies

On October 11 this year, the ESRB published its first recommendations on lending in foreign currencies. Lending in foreign currencies to borrowers that are not protected against exchange risk is a widespread phenomenon in many EU countries, especially in the Central and Eastern European Countries. The ESRB has pointed to three main risks with this lending[1]. First, by exposing borrowers, such as households, to foreign exchange risk, this practice ultimately entails higher

[1] See Introductory Statement by Jean-Claude Trichet, chair of the ESRB, Brussels, 11 October 2011. Hearing on the ESRB before the Committee on Economic and Monetary Affairs of the European Parliament.

levels of credit risk, since a devaluation of the domestic currency would increase the value of the principal to be repaid. Second, foreign currency lending, which carries a lower interest rate than loans in domestic currency, may contribute to excessive levels of overall credit growth. Third, liquidity and funding risks are heightened, for instance due to an over-reliance on short-term foreign currency swap markets. Given the risks to financial stability, the potential for cross-border contagion, and the circumvention of national measures so far, the ESRB decided to adopt policy recommendations. These recommendations focus on policies aimed at addressing risks stemming from *new* loans extended in foreign currencies to *unhedged* borrowers.

4.4.2. Bank Funding in Foreign Currencies

The ESRB has not only addressed the vulnerabilities stemming from lending in foreign currencies but also systemic risks that could originate from banks' funding in foreign currencies. In particular, the ESRB is considering the medium-term need for action to reduce vulnerabilities of large EU banks in US dollar funding markets. The work so far has helped to increase authorities' awareness of potential systemic risks stemming from over-reliance on short-term US dollar funding. Future work will focus on enhanced monitoring of US dollar funding mismatches and to strengthen banks' plans for funding for contingency planning.

4.4.3. Macro-prudential Implications of EU Legislation

The EU is the first to start the process of implementing the Basel III agreement. In this respect, it is very important that the EU deliver a full and consistent implementation of the Basel III agreement. The ESRB plays here an important role to ensure that the macro-prudential aspects are taken into account in the draft EU legislation.

As the former ESRB chair Jean-Claude Trichet pointed out in the European Parliament in late October the extraordinary conditions currently facing the EU highlight the importance of timely and rigorous action to address systemic risk. Accordingly, the ESRB stresses that national macro-prudential authorities of EU Member States must be able to tighten settings of prudential instruments to levels above those provided for in the EU legislation in a timely fashion based on local economic conditions. This is indeed important to enable authorities to address systemic risks in an appropriate and prompt way. Needless to say, this has to be done without jeopardising the integrity of the Single Market. The ESRB, given its mandate, can review decisions taken at the national level by the competent macro-prudential institutions, to signal any violation to the Commission and ensure that national authorities take account of possible cross-border spillovers.

With this in mind, the ESRB has reviewed, and will continue to review, the draft EU regulations for banking (CRD/CRR), market infrastructure (EMIR) and insurance (Solvency II) from a macro-prudential perspective to ensure that policy-makers have the necessary flexibility to act.

4.5. The ESRB – a Global Perspective

The global capital markets are closely integrated and there is a high risk of spill-overs and regulatory arbitrage. Obviously, there is a need to consider the global aspects of macro-prudential policy-making. In the response to the financial crisis, the international community has taken important steps to improve the monitoring of system risk and to develop new macro-prudential tools. At the request of G20 leaders, the Financial Stability Board (FSB) has recently developed recommendations to strengthen the oversight and regulation of the *shadow banking system*. The FSB has also recently developed a policy framework to address the systemic and moral hazard risks associated with *systemically important financial institutions (SIFIs)*. International work is also well underway to strengthen *financial market infrastructures* and improve practices. As an example, FSB assesses regularly OTC Derivatives Market Reforms and whether it is sufficient to improve transparency in the derivatives markets, mitigate systemic risk, and protect against market abuse. The Basel III framework introduces, for example, a new macro-prudential instrument, the so called countercyclical capital buffers.

These high-level international commitments need to be implemented at EU and national level. The ESRB will here play a very important role in co-ordinating this work.

4.6. How to Ensure a Successful ESRB

In my view, the ESRB has had a better start than might have been expected, given its size and composition. It has focused not only on identifying risks, but also on suggesting how to handle them. And the risks discussed have been the relevant ones, in spite of their political sensitivity. Certainly, a lot remains to be done before the ESRB will have established its working procedures. And it remains to be seen what it will be able to produce under normal conditions, out of the present crisis mode. But, properly managed, it should develop into a useful institution, forcing countries and authorities to act in time to avoid difficult and dangerous situations.

I would like to conclude by emphasizing three important aspects on how to ensure a successful ESRB.

4.6.1. High-quality and Timely Risk Assessments

The ESRB's risk assessments and recommendations to act upon them need to be of high quality and to be presented in a timely manner. In doing this, the ESRB should take advantage of its unique composition of representatives from EU institutions, as well as national central banks and financial supervisory authorities. This institutional set-up gives the ESRB a great opportunity to gather relevant information from all key players in the EU financial system. For this to function in practice it is necessary that all actors are willing to share relevant information so that the ESRB can perform its tasks properly. However, sharing information, although simple in theory, often turns out to be difficult in practice.

4.6.2. Efficient Communication

Risk assessments and recommendations need to be well understood and accepted. This will require efficient communication. The issuance of warnings and recommendations is one way to communicate, either in public or in private. So far, there have also been press conferences after the General Board's meetings.

Furthermore, under the ESRB regulations, the ESRB is also required to publish an annual report. This report will be presented by the chair of the ESRB to the European Parliament and the Council in an annual hearing. Developing an effective communication will be key for the ESRB. This is important, not only to legitimize the work of the ESRB but also to increase public awareness of systemic risk and macro-prudential policy. The ESRB could make a substantial contribution to promoting discussions in this field, both nationally and at the international level.

4.6.3. Willingness to Accept Warnings and Recommendations

This may perhaps be the most difficult objective to achieve. Accepting warnings and recommendations from the ESRB may be difficult to agree to when there is a political cost. It is therefore vital that the ESRB proves its independence and that it can express its views even when politically inconvenient.

5. Is there Progress in Financial Reform?

Alberto Giovannini

5.1. Introduction

The purpose of this essay is to assess the current state of financial reform. The 2007-08 crisis brought about awareness of failures in financial markets which justified government interventions. As a result, both within broad international fora like the G20 and within the European Union, as well as national boundaries, a number of initiatives have started to change the rules in financial markets. My task here is to evaluate progress: I will present a framework to describe the fundamental weaknesses of the present financial system, and the market failures that can arise from them. This will naturally point to the solutions that could help correct such market failures. I will discuss the initiatives, mainly those by the G20 and the EU and their consistency with the solutions mentioned above.

5.2. What We Know

An important regularity we have observed in recent months is the central role of banks in the financial crisis. Banks were at the center of the 2007-08 crisis, they are at the center of the current one. My own interpretation of this fact is that banks remain the most important intermediary in the financial system, because they perform a wide array of businesses, which together with traditional deposit-taking and lending include securities brokerage, derivatives sales and trading, proprietary trading and custodian business. Finally, one of the most important reasons why banks are at the center of the current crisis is that banks have retained their primary role in the issuance of means of transactions in financial markets, in the form of deposits as well as repos. These instruments are built to be riskless, but when financial stress develops their riskiness becomes questioned, banks experience large withdrawals and the financial system stops working. Finally, banks are at the center of the financial crisis because they manage a lot of risk, their leverage remains the highest in the financial system.

The current government-debt, bank-debt paradox is just one illustration of the still-unresolved fragility of or financial system. Banks hold a lot of government securities which have a preferential treatment in their balance sheets, and which can be financed at attractive rates. But fears of sovereign credit problems get immediately reflected in concerns about the viability of banks (which hold so much government debt). These in turn feed back into sovereign risk as market

assess the impact of (often) large banks failings into government finances. There is nothing arcane about this mechanism, it is just a multiplier of risk arising from the very high leverage of the banking system.

Thus, it is leverage and liquidity transformation that put banks at the center of the financial crisis. And this is hardly surprising, since every financial crisis is associated with a breakdown of liquidity transformation that gets exacerbated by leverage.

In response to the 2007-08 crisis there has also been a change in perceptions on the robustness of the financial system, along with greater awareness on its nature and functions by authorities and the public. The financial system has evolved in the past decades into a securities-based system, where most transactions are between parties trading rights to certain cash flows, associated with stocks, bonds and derivative contracts. Securities and derivatives markets perform the lion's share of business in the financial system.

But the most important lesson from 2007-08 is that a liquidity collapse does not occur only in the banking business, it happens also in securities markets. What is the equivalent of a bank run in securities markets? Let us recall in what ways securities markets pool liquidity. Any buyer of a security knows that she does not have to hold it until maturity because she always has the option of selling it if need arises. As long as investors operate with reasonable confidence that the market will absorb their own holdings at reasonable prices if they need to sell, they will confidently buy them if they see a convenience in doing so. Therefore, the market becomes a liquidity pool: liquidity needs of the (many) participants are averaged out, and prices end up reflecting exclusively the fundamental drivers of supply and demand (which are normally a reflection of value judgments by investors). However, that confidence may break down, and that will happen whenever investors believe, for whatever reason, that other investors' liquidity demand will become correlated. When liquidity shocks become correlated prices move far away from fundamentals and, with them, transactions in the market collapse.

Now, this is a market failure just like the bank run. And as such it deserves remedies as much as bank runs did. In addition, liquidity collapses in securities markets may have systemic implications through counterparty risk: risk management induces many actors to deploy dynamic hedging techniques, which involve a large number of transactions to adapt portfolios to changing market conditions. With the multiplications of transactions counterparty risk is multiplied. Fears about a market event's impact on the solvency of any large market participant (or class of market participants) produces correlated behavior by investors in all markets where they are present, and this mechanism is then transmitted to many other markets.

Of course, liquidity transformation is a privately and socially desirable business in financial intermediation: it allows banks to fund long-term investments with short-term (but uncorrelated and therefore stable) funding, it allows issuers of long term securities like stocks and bonds to sell them in markets where investors may not be able to fulfill long-term commitments, but whose liquidity needs are uncorrelated. Long-term funding allows the pursuit of long-term projects, which are generally privately and socially more productive than short-term projects.

But what is the optimal amount of liquidity transformation or, in other words, how much liquidity risk can financial markets manage in the aggregate? To me this remains an unanswered question. I only observe that the experience of the 2007-08 crisis, especially the excessive creation of presumably safe assets by the private sector (a phenomenon discussed at length by Jeremy Stein), makes one wonder whether financial markets had some kind of over-reliance on liquidity, that is, that there was too much liquidity transformation and therefore too much liquidity risk.

To complete the list of the lessons from the 2007-08 crisis I add three items. The first is the ignorance of authorities on the state of the financial system: I produce examples of this in Giovannini (2011). This ignorance is still noticeable at the time of this writing. One way to gauge it is to see what the many 'financial stability reports' contain: mostly data on prices in various listed and over the counter markets. They contain little or no data on quantities, which should be the data used by systemic risk managers to measure concentration of risk in financial markets. The second item, connected to the first, is the low-interest-rate trap: central banks that follow markets rather than anticipating it, and they do so because they have insufficient information about what is going on in them, tend to be trapped in long cycles of abnormally low interest rates. With too much risk in the system interest rate normalization increases too much the risk of systemic events, or even produces them, compelling central banks to slash interest rates in response. The current level of real official rates is negative in all of the most important economies, and this is a sign of malaise.

The third remaining item in my list of lessons from the crisis is the fact that different institutions matter in finance. A very extreme interpretation of the functional theory of finance led many to believe that institutions are irrelevant. The experience of banks moving away from their traditional business and taking on too much risk, like some kind of super-leveraged hedge fund, has taught us that institutions matter, because they produce constraints to financial businesses, which may or may not be adequate.

5.3. Responses

The crisis produced tremendous pressure on policymakers to react through whatever means at their disposal. They included direct intervention in the financial system as market makers of last resort as well as lenders and/or shareholders of last resort. And as soon as it became practical, policymakers deployed the other tools at their disposal, that is, the production of rules and norms. The regulatory response has been vast, and is still unfinished. I would highlight the following main features:

1. A keen attention to banks as institutions which are still central in the financial system and perform diverse businesses which expose them to a wide array of risks: for this a number of new requirements emerged, including different and higher capital ratios (with attention on the kinds of capital admissible against risks in the balance sheet) as well as liquidity ratios and stricter provisions for very large institutions or SIFI's (systemically important financial institutions). In some countries, like the UK and the US, there have been also rules against the combination of investment activities and client activities in banks (in the US the Volcker rule, in the UK the adoption of the Vickers Report recommendation that retail business be separated from investment banking).

2. Alongside tighter regulation of banks came the supervision and regulation of hitherto unregulated entities like hedge funds (which is in the Dodd-Frank bill in the US and in a EU directive).

3. A big part of all regulatory initiatives on both sides of the Atlantic is the use of central counterparties for more efficient management of 'aggregate' counterparty risk: the experience of the Lehman failure has shown that very large balance sheets and off balance sheets, while not *per se* a source of risk under normal conditions, cause explosion of aggregate counterparty risk in the event of failure, just like what would occur if a central counterparty were to go bankrupt. Large banks and investment banks mix, together with other businesses, also the function of central counterparty, which may be put in jeopardy by problems elsewhere in the institution. Hence the new rules whose objective is to bring to central counterparty clearing the maximum number of financial transactions, starting with derivatives.

4. Finally, the G20 (with the FSB) recognized the importance of the information base to authorities in charge of financial stability – the systemic risk managers. Thus they sponsored trade repositories, databases containing information on individual trades, initially in OTC derivatives, and subsequently on a wide range of instruments including cash instruments.

The discussion above provides us some guidance to start assessing the potential impact of these initiatives vis-à-vis the overall task of building a stronger financial system. Some of the issues highlighted above can be recognized in the initiatives undertaken. In particular, the development of a new set of capital standards for banks appears to stem from the recognition that such constraints can be effective against excessive risk taking, especially in conditions where individual institutions do not internalize risk concentration in the system as a whole. The same observations apply to the initiatives regarding other financial intermediaries. The work on central counterparties appears to be expressly inspired by the objective to limit the risk of contagion in a financial system characterized by a very large number of outstanding debits and credits at each point in time, debits and credits that are being marked to market in real time and can become fast transmitters of financial shocks. The management of centralized pools that specialize exclusively in this kind of service limits the risk that outside shocks may produce system-wide disruptions.

Hence, more capital and liquidity requirements on banks and more specialized management of counterparty risk are both tools that may help decreasing the risk of market failures, by limiting the potential of excessive risk taking and defaults in case of large shocks, and by limiting the potential of contagion of individual actors' failures across the system. Trade repositories are a start towards endowing authorities with the knowledge base the need to perform the role of systemic risk managers.

5.4. Discussion

As already observed in the previous section, I find all the initiatives listed above (still a very partial list) to be going in the right directions, that is, the direction of making the financial system less crisis-prone, less vulnerable to market failures. My discussion in this section concentrates on two sets of issues: implementation and missing parts.

On implementation, I start with the very important project of trade repositories. In today's financial system almost every financial transaction produces an electronic record. In today's computer and communication industries, the handling of very large databases is not a new thing. So, there are the conditions for this project to produces tangible benefits. The factors that will produce success are, first of all, a conscious attempt at collecting the universe of transactions, derivative and cash, across all asset classes. In addition there should be a concerted effort among authorities to stem the creation of multiple – worse, competing! – trade repositories. Finally, the data collection should include all information necessary to compute the sensitivity of debits and credits to changes in underlying

prices. Currently valuation functionalities are not part of the data collection effort. If these problems were correctly addressed, we could afford to build (very large) matrices of debits and credits across all financial market actors, and analyze the effects of exogenous shocks to the distribution of such debits and credits. These exercises are akin to those central banks used to carry out in the 1980s to determine the effects in the payments system of a failure of a single financial institution.

In the absence of a conscious effort of data collection for the purpose of building large scale risk models, researchers offer palliative solutions like the so-called 10x10x10 approach proposed by Darrel Duffie[1]. According to this method, authorities would analyze the exposures of a set of, say 10, systemically important actors to a list of 10 stress scenarios. For each scenario, firms would report their gains or losses, together with the gains and losses vis-à-vis the 10 largest counterparties. The gains or losses with each of those 10 counterparties would also be reported, scenario by scenario. This approach, while in principle valid, has the drawback of relying on potentially unreconcilable information from market actors, and not directly accessible information from trade repositories, as well as the limitations of the sampling approach (thought the sample is likely to capture the main risk balances in the system).

Another significant set of hurdles towards the effective implementation of trade repositories regards the legal framework. Trade repositories developed first in the credit default swap (CDS) markets. The information on the universe of positions in these markets were of interest to authorities also because they could help them identify the biggest holders of sovereign CDS shorts. Such interest could be motivated by the desire to tackle market manipulation or, more broadly, by the objective to exercise moral suasion in order to stem speculative pressures. It seems evident that authorities may have conflicts of interest among their different functions as systemic risk managers as well as guardians of the well functioning of markets, or, more narrowly, debt managers. Such conflicts should need to be carefully regulated to preserve and enhance the fundamental function of trade repositories.

I now turn on the missing parts in the ongoing reforms. Much of the activity of financial intermediation has occurred outside the banking system. In particular, entities like money market mutual funds as well as special purpose vehicles utilized for the distribution of securitized portfolios do perform liquidity transformation and, as such, are subject to liquidity crises. In addition, these entities, together with banks, have been and still are, major suppliers of collateral in the

[1] DUFFIE, Darrell (2011) Systemic Risk Exposures: A 10-by-10-by-10 Approach, Working Paper, National Bureau of Economic Research, Systemic Risk Measurement Initiative, July, 2011. Forthcoming in Systemic Risk and Macro Modeling, Markus K. BRUNNERMEIER and Arvind KRISHNAMURTHY, editors, University of Chicago Press.

financial system, which is the means of payments of financial markets. Doubts about the quality of such means of payments produces liquidity crises. What appears to be missing from the current re-regulatory efforts are ways to manage and prevent unwanted fluctuations of such means of payments.

The first, structural approach, is to minimize liquidity risk in such intermediaries. This is the problem addressed by Gorton and Metrick[2]. They suggest that money market mutual funds providing liquidity services should be organized as narrow banks with prudential regulation and supervision, government insurance, and access to central bank lender-of-last-resort facilities. The same should apply to entities engaged in securitization, which Gorton and Metrick label narrow funding banks. Like banks they should be granted charters, be subject to regulatory oversight, as well as capital requirements and access to discount windows. In exchange, these authors suggest that all securitized products be sellable only to narrow funding banks, thus avoiding the risk of uncontrolled liquidity transformation.

It is apparent that with these rules in place, the task of monitoring and targeting the stock of collateral in the financial system would become manageable. This would represent the missing piece in the overall reform framework. It is well known from monetary theory that fluctuations in means of payments have important effects in the economy. The recent decades have witnessed the emergence of means of payments in the financial system that are still not actively monitored by any authority and certainly have not yet achieved the status of official monetary aggregates. Yet, they are as important as other monetary aggregates since their uncontrolled fluctuation has been associated with the recent, major, financial crises. Therefore, the final missing part in the current reform framework is the proper measurement of transactions aggregates in the financial system, as well as appropriate procedures to prevent and react to unforeseen fluctuations of such aggregates. This will have the very important side-effect of minimizing system-wide liquidity crises, that is, financial crises.

5.5. Concluding Observations

I want to answer the question raised in the title of this paper. Yes, there is progress in financial reform, which will ultimately lead to progress in the efficiency of the financial system. Such progress goes hand in hand with the evolution of financial intermediation. Together with the market, authorities are becoming more familiarized with the new features of financial markets and are thus able to identify regulatory frameworks that better adapt to them. I have identified directions in

[2] GORTON, Gary B. and METRICK, Andrew, Regulating the Shadow Banking System (October 18, 2010). Available at SSRN: http://ssrn.com/abstract=1676947.

reform that seem to be suitable to tackling the market failures that have been apparent to all in the past few years.

Yet, these reforms are not yet finished and, in some cases, they lack some important parts. The fact that such reforms are not being carried out by 'benevolent dictators' can produce outcomes that, through the efforts of special interest groups, which are especially well-organized in the financial industry, are distorted.

In conclusion, we are still in the middle of a transition to a new regulatory system and a new financial industry. I expect this transition to be long and, as a result, somewhat volatile.

6. Managing Macroprudential and Monetary Policy – a Challenge for Central Banks

Jens Weidmann

6.1. Introduction

Ladies and gentlemen,

In the event of an earthquake, the question that decides between life and death is whether the buildings are stable enough to withstand the tremor of the earth. In the event of a financial shock, a crucial factor for the severity of the crisis is to what extent the financial sector is stable, and whether it is possible to contain negative feedback effects within the macroeconomy. The financial system's recent track record in this respect has not been wholly convincing, to put it mildly. Therefore, one central question on the global political agenda is "how to better ensure financial stability?"

Comparing the stability of our financial and monetary system with a building that has to withstand a substantial earthquake, the two columns monetary policy and microprudential supervision – which supported that building and which we believed to be strong enough – turned out to be insufficient. Shocks caused by turbulences on local markets may propagate much more quickly and widely than it had been previously expected. Hence, an explicitly systemic view on financial markets is needed as an additional element in our policy-making building, namely macroprudential policy.

In the following, I would like to elaborate on the question as to how this new column should be designed. First, I will address the more conceptual aspect of the interrelations between financial stability and monetary policy, and point out that, since both policy fields pursue separate objectives, an individual set of instruments for macroprudential policy is needed. Second, I will concentrate on operational aspects of macroprudential policy. In particular, I will highlight that macroprudential policy will rightly gain in importance and that central banks ought to make a substantial contribution without, however, compromising their main objective – price stability – and their independence. Finally, I will outline that, in addition to this, the European sovereign debt crisis poses a much more fundamental question: How can central banks fulfil their mandate if risks to macroeconomic and financial stability emanate from unsound public finances and structural economic weaknesses, yet policymakers do not succeed in putting these deficiencies right?

6.2. Interrelations Between Financial Stability and Monetary Policy

The question as to what extent monetary policy can contribute to financial stability is certainly not new. However, the answer had to be and has been adjusted in the light of experiences throughout the recent crisis. In the decade preceding the financial crisis, central banks kept interest rates at very low levels, partly due to an environment of seemingly exceptional macroeconomic stability. Another important factor was certainly the widespread opinion prevailing at that time, that monetary policy should not lean against a bubble that is building up, but intervene after a bubble has burst. From today's perspective we know that by applying such an asymmetric monetary policy approach two important aspects were underestimated. First, in the low interest environment the search for yield caused market participants to take riskier positions and contributed to the build-up of systemic risk. Second, the turbulences when the bubble burst could not easily be contained by making use of traditional monetary policy instruments but necessitated unconventional measures in several policy areas. In addition, serious repercussions in the financial sector and the real economy could not be prevented.

Against this background, the role of monetary policy has been stated more precisely. There is still no doubt that price stability should be the key goal of a central bank. Fulfilling this mandate forms the basis of our credibility, and we must not lose sight of this goal when becoming involved in crisis management. In addition, we should be aware that monetary policy is not able to fully avoid the build-up of bubbles and the event of crises. Pretending otherwise would lead to expectations in monetary policy that cannot be satisfied, and this would ultimately undermine central banks' credibility with negative consequences for our ability to maintain price stability.

However, as a central lesson from the crisis, monetary policy has to take a closer look at the possible build-up of financial imbalances – because these have implications for price stability. In the case of the Eurosystem, this implies that monetary analysis, which already focuses on longer-term risks for price stability stemming from increasing money supply, will gain in importance. This will allow monetary policy to extend its horizon and to apply monetary policy more symmetrically across the financial cycle, in line with the fact that financial imbalances regularly build up over a longer period of time.

Such a more symmetric approach to monetary policy is based on central banks' primary goal of price stability, and will contribute to financial stability. However, while price stability is a necessary prerequisite for financial stability, it is far from being the only one. In addition, central banks equipped with only one main

instrument, i.e. the interest rate are not able to meet several goals, that is price stability and financial stability at the same time. For monetary policy to be able to concentrate on price stability, it is therefore indispensible that macroprudential policy is equipped with an individual set of instruments.

This notwithstanding, monetary and macroprudential policy cannot be seen completely separately from each other due to potential spillovers. Therefore, some coordination between both policy fields is warranted, although without blurring the individual objectives.

6.3. How to Design Macroprudential Policy

With this in mind, I would like to turn to the more practical issues associated with the question "how to design macroprudential policy?". For efficient macroprudential policy, two things are crucial: a thorough analysis of the build-up of systemic risk to be able to issue warnings and recommendations, and the translation of such warnings into policies and action.

In order to facilitate the transition from analysis to action, a clear mandate for macroprudential supervision is needed. And there are good reasons why central banks should be involved as long as their independence and the hierarchy of their objectives, with price stability as the primary goal, are respected. Their extensive knowledge of financial markets and the macro economy is very valuable for macroprudential purposes, and their participation will facilitate forming a consistent view for both monetary and macroprudential policy. In this regard, I highly welcome that the Bundesbank is to be given an explicit macroprudential mandate.

With the introduction of countercyclical capital buffers, the first truly macroprudential instrument will be at the disposal of national supervisory authorities. By dampening excessive credit growth, countercyclical capital buffers will make it possible to 'lean against the wind' beyond the scope of monetary policy and thereby enable monetary policy to better focus on price stability. This is especially important in a monetary union such as the euro area. As the common monetary policy has to ensure price stability for the euro area as a whole, it is not suitable as a means of preventing excessive credit growth in single countries, which is often aligned with the build-up of systemic risk. For example, it is beyond the reach of monetary policy to counteract regional overheating in housing markets, which often goes along with excessive credit growth. In such a case, nationally calibrated countercyclical capital buffers may prove to be effective.

However, we have to make sure that monetary and macroprudential policy complement rather than counteract each other. For example, it would be inefficient

and detrimental to both objectives if macroprudential policy tightened its stance to dampen credit expansion, while at the same time monetary policy was loosened because there is no medium term inflation risk and an expected economic downturn may contribute to even reduced price pressure. In order to avoid an inconsistent, suboptimal policy mix, a close exchange of assessments in both policy fields is necessary – however, it should not lead to a blurring of the responsibilities of the respective policy areas. It goes without saying that to ensure a comprehensive surveillance of the financial system, such an exchange of information is also necessary between macroprudential policy and microprudential supervision, not just in order to take on board the expertise of microprudential supervision but also to share any relevant information.

While final decisions about the use of macroprudential policy instruments, such as the calibration of countercyclical capital buffers, should be taken on the national level, which has the greatest expertise on the national financial system and has to bear the cost of regulatory failure, a purely national perspective of macroprudential oversight remains too narrow. As became all too clear in the course of the crisis, systemic risk does not respect national borders and the close integration of capital markets and the risks of regulatory arbitrage require international cooperation, for instance in the design of macroprudential instruments.

In this process, the European Systemic Risk Board (ESRB), whose anniversary we celebrate with this conference, is a key player. About one year after it was established, its tasks as central guarantor for financial stability within Europe have increasingly taken shape. Consisting of representatives of national central banks and microprudential surveillance bodies, the ESRB builds on the expertise of national authorities with the task of assessing systemic risk on the European level and issuing recommendations and warnings across Europe. In addition, its scope is about to be broadened to playing a coordinating role for macroprudential policies and guarding against protectionism in the regulatory framework.

6.4. Challenges from the Sovereign Debt Crisis

While the work on a better framework for ensuring global financial stability is in full progress, the European sovereign debt crisis has turned the focus to the foundations on which the stability of our monetary and financial system rest: a sound and competitive macroeconomic base and solid public finances. The specific challenge for monetary and macroprudential policy in the current debt crisis stems from the fact, that while both policy goals are affected the possibilities to contribute to crisis resolution are limited. Specifically with respect to monetary policy, there is the substantial risk that involvement in crisis resolution may entail a burden shifting from fiscal to monetary policy, and the ultimately necessary political

action to address the root cause of the crisis might be delayed, incomplete, or not happening at all.

One of the severest forms of monetary policy being roped in for fiscal purposes is monetary financing, in colloquial terms also known as the financing of public debt via the money printing press. In conjunction with central banks' independence, the prohibition of monetary financing, which is set forth in Article 123 of the EU Treaty, is one of the most important achievements in central banking. Specifically for Germany, it is also a key lesson from the experience of the hyperinflation after World War I. This prohibition takes account of the fact that governments may have a short-sighted incentive to use monetary policy to finance public debt, despite the substantial risk it entails. It undermines the incentives for sound public finances, creates appetite for ever more of that sweet poison and harms the credibility of the central bank in its quest for price stability. A combination of the subsequent expansion in money supply and raised inflation expectations will ultimately translate into higher inflation. In a monetary union of independent countries, one additional aspect that is often missed in the current discussion is particularly relevant. Monetary financing in a monetary union leads to a collectivisation of sovereign risks among the tax payers in the monetary union. It is equivalent to issuing Eurobonds. However, the redistribution of such risks and the related transfers between the members of the monetary union are clearly the task of national fiscal policies, and only the national parliaments have the democratic legitimation to make such decisions. For this reason, the Eurosystem's mandate to ensure price stability rightly involves the prohibition of any kind of monetary financing.

Proposals to involve the Eurosystem in leveraging the EFSF – be it through a refinancing of the EFSF by the central bank or most recently via the use of currency reserves as collateral for an SPV buying government bonds – would be a clear violation of this prohibition. Incidentally a support of this scheme by governments would have also circumvented the parliamentary approval for additional rescue funds provided by Germany. These proposals have met the staunch opposition of the Bundesbank. The current crisis cannot be solved by destroying its stability oriented basis. Hence, I am glad that also the German government echoed our resistance to the use of German currency or gold reserves in funding financial assistance to other EMU members.

It is sometimes requested that Germany should contribute more strongly to international stabilisation. However, in my view the most important contribution at the moment is that Germany remains a stability anchor in EMU with regard to fiscal sustainability and with regard to its stability orientation. For example, the new national fiscal rules in Germany may increase confidence in sound public finances, which I believe is currently more important than any short-lived fiscal

stimulus. Therefore, I would advise the German government not to weaken its fiscal stance by spending any revenue windfalls, but rather to continue the timely consolidation of the budgets at all levels of government.

From a short sighted perspective flirting with monetary financing may be perceived as a seemingly easy way out, but policymakers have to implement a true long-term solution to the crisis. The course of the crisis leaves no doubt about what this requires. First, on the national level the determination of the affected countries to return to a sustainable path of public finance and to undertake the necessary structural reforms is required. Second, as such action will inevitably entail painful and initially contentious adjustments, we need a framework within the monetary union which ensures sufficient incentives for the member states to follow this way nevertheless. So far, the decisions taken for crisis resolution within the monetary union have not addressed these issues sufficiently as the recent aggravation of the crisis has shown.

The October summit dealt with a number of important crisis issues. One definitely positive outcome of the summit was the decision to ensure sufficient capitalisation in the banking sector, given that contagion effects are a major reason for the severity of the crisis.

However, as we currently see, even positive outcomes of the summit fall short of expectation without the necessary consolidation and structural adjustments in the countries which are at the heart of the crisis. More generally, the euro area is currently caught up in the fact that its framework has, in the course of the crisis, increasingly lost consistency. This is harming the credibility of the current rescue packages. While risks stemming from undesirable and self-inflicted developments in individual countries have been increasingly communalised by the assistance packages, the ultimate decision-making power has remained on the national level and the conditionality that was intended to rein in national policymakers has been increasingly relaxed.

As a first step, a consistent strategy requires strict conditionality of the agreed financial help to be enforced in order to prevent the incentives to implement painful reforms and consolidation measures from weakening further. In the case of Greece, this must imply that the financial help, which is bound to strict consolidation and reforms, will be halted if Greece decides against the agreed adjustment process. It is an important and promising signal that policymakers from EMU member countries have stressed this point, too. What is often overlooked, however, is that uncertainty about the future of the adjustment programme can quickly make untenable the situation of central banks which continue to provide liquidity to Greek banks.

Furthermore, however, policymakers have to decide which direction the currency union is to take. As I have discussed in more detail in earlier speeches, there are in principle two conceivable ways to a consistent and economically sustainable framework for the monetary union. While the first would be a return to the founding principles of the system, but with an enhanced framework that really ensures sufficient incentives for sound public finances, the second way would imply a major shift entailing a fundamental change in the federal structure of the EU and involving a transfer of national responsibilities, particularly for borrowing and incurring debt, to the EU. Only a clear decision for either option lays the foundation to preserve the monetary union as a stability union in the long-run. It is up to governments in Europe to make this decision

6.5. Conclusion

Ladies and gentlemen,

Before we had time to implement all the lessons learnt from the financial crisis, the European sovereign debt crisis has posed new and substantial challenges. This is particularly true for central banks, as their primary mandate of ensuring price stability not only has to be internally reconciled with efforts to better ensure financial stability, but is at the same time exposed to a crisis situation in which the line between monetary and fiscal policy is growing increasingly blurred.

In this situation, we are well advised not to overburden central banks. Primarily, they should continue to focus on maintaining price stability, a task at which they have an excellent and proven track record. In addition, central banks will play an important role in macroprudential policy, both at the national and at the international level, for example as members of the ESRB. But, as I said before, the stability of our financial and monetary systems depends on more than these columns and microprudential supervision. A sound macroeconomic and fiscal basis is equally important, and it is not central banks but policymakers that have the means and the legitimacy to ensure this basis.

7. Financial Regulation in General Equilibrium

Alexandros Vardoulakis

7.1. Introduction

Financial instability is a long-standing feature of modern economics. Central banks were founded to deal with financial instability. Nevertheless, even central banks and other regulations and institutions have not succeeded in eliminating financial instability. Financial frictions play an important role in business cycles. The financial crisis of 2007 to 2009 revealed the inadequacy of standard macro models to account for the amplifications of shocks via the financial system. Most importantly, they relied on the assumption that economic agents will always honor their contractual obligations in all cases.

One reason for the 'no default' assumption is the argument that the appropriate design of contracts will include sanctions that diminish the incentives of debtors to default. Indeed, a large literature following Kiyotaki and Moore (1997) presumes borrowers to pledge a level of collateral that fully protects lenders even in the most adverse scenario. However, such exhaustive terms can impede more efficient levels of inter-temporal smoothing and result in lower welfare. As shown in Dubey *et al.* (2005), positive default in equilibrium can be welfare improving when asset markets are incomplete and economic agents cannot write comprehensive contracts.

Default is an assumption that should be included in any satisfactory macro model. Moreover, our analysis goes further to allow for default by financial intermediaries themselves. Thus, we deviate from Bernanke et al. (1999) where financial intermediaries can hedge against (aggregate) default coming from the real sector and not incur any losses. We study an economy that is at risk from an occasional asset price collapse. The primary contribution is the introduction of a model that includes both a banking and a 'shadow banking system' that each help households finance their expenditures and smooth their consumption inter-temporally. But if asset prices collapse, the consumers default and the financial system acts as an amplifier of the primitive shocks.

In our model default can interfere with the supply of credit. Households sometimes choose to default on their loans, and when they do this triggers forced selling by the shadow banks. The banking sector, which faces a maturity mismatch, can choose to liquidate part of its assets to gain liquidity and in the process of doing so they contribute to a fire sale. The latter magnifies the effects of the result-

ing credit crunch on economic performance. Although the presence of both the banking and the 'shadow' banking sector facilitates consumption smoothing, the interaction between default and fire sales results in a market failure due to marginal spirals and a deeper credit crunch.

The proposed framework can contrast five different policy options that officials have advocated for combating defaults, credit crunches and fire sales, namely: limits on loan to value ratios, capital requirements for banks, liquidity coverage ratios for banks, dynamic loan loss provisioning for banks, and margin requirement on repurchase agreements used by shadow banks.

Our analysis suggests that it is helpful to group regulatory tools according to the channels through which they combat market inefficiencies, rather than according to the market or institutions which they directly impinge upon. For example, loan to value restrictions on bank lending and margin requirements on repurchase agreements are substitute tools. The reason is that both regulations limit the amount of ex-ante risk that the financial system can take on by limiting leverage. Conversely, a provision rule that mandates building reserves whenever lending growth is high works to partially slow a lending boom. Interestingly, capital rules are not very effective for this purpose. The problem is that when asset prices are very high then all levered financial institutions are going to look well-capitalize. A third regulatory approach in our economy is a kind of clean up strategy that forces banks to rebuild capital after default. Capital requirement are the most effective tool for this purpose. On the contrary, liquidity requirements in the event of a bust exacerbate the fire-sale externality, as they force the bank to liquidate more of its assets in order to meet the higher requirement for liquid asset holdings.

The following sections describe the building blocks of our model, analyse in more detail the knock-on effects of default and fire-sales externalities on the supply of credit, and provide further intuition about the aforementioned classification of regulatory tools.

7.2. Model Structure

An important feature of our model is its general equilibrium character with fully endogenous prices and interest rates charged on loans. Financial regulation will not only affect the supply of credit, but also the price of loans. Some aspects of default involve choices. This means that default is endogenous. It is true that the easiest way to incorporate financial frictions into a macro model is to add an exogenous credit-risk premium into the expenditure function, à la Curdia and Woodford (2010). But the exogeneity of that credit-risk premium means that such an approach offers no guidance about factors cause financial crises. The differ-

ence between endogenous and exogenous default risk matters greatly for regulatory policies. Our framework allows us to examine important regulatory trade-offs. For example, regulations that mitigate the risk of default and fire-sales may also raise the costs of financial intermediation, thus resulting in higher borrowing rates, and potentially lower welfare. Our approach allows for the consideration of potential risk and efficiency trade-offs.

Financial regulation is dynamic in nature and a regulatory tool can have different ex-ante and ex-post effects. We consider a two period economy with uncertainty being realized in the second period. Households trade in each period to correct for the differences in their endowments and smooth their consumption over time. One household type (R) is very well endowed with 'housing', which is a durable good. A second household type is less well endowed with 'potatoes', a non-durable. Some of these agents are old households (P) who live and consume in both periods, and others are young households (F) who enter the economy in the second period as first time buyers and serve the role of supporting the demand for housing.

The two types of households trade with each other using money as the stipulated means of exchange. The role of the financial system is to intermediate funds between borrowers and lenders. Most importantly, it supplies credit to support purchases and facilitate the inter-temporal smoothing of consumption.

The desire to study the shadow banking system and the potential effects of regulatory arbitrage requires the inclusion of two types of financial institutions, a commercial bank and a shadow bank. Household R, being the natural lender, deposits some of the revenues from housing sales to the commercial bank, which extends credit to household P in order to accommodate its housing purchases in the initial period. Deposits are unsecured and can be withdrawn at any point in time, while credit to household P takes the form of a mortgage contract with the houses bought pledged as collateral in the event of default. Mortgages mature at the end of the second period while deposits are optimally withdrawn in the beginning of that period, thus creating a maturity mismatch and a need for liquidity by the commercial bank.

Apart from collecting deposits and extending mortgages, the commercial bank offers short-term loans to all households to facilitate their transactions in every period. Short-term loans are repaid at the end of the respective period and are free of credit risk. The bank faces a portfolio problem and can choose to securitize some of the mortgages it extended and package them in mortgage backed securities (MBS). The shadow bank having a higher appetite for risk is the natural buyer of these securities. Securitization allows the commercial bank to extend more credit without compromising its liquidity position. In addition, the introduction of a new asset (MBS) enhances the hedging opportunities of the commercial bank.

The shadow bank finances its MBS purchases with its own capital and a repo loan from the commercial bank. The purchased MBS are pledged as collateral in the event of default. Finally, the bank funds its operations with its equity capital, deposits and with short-term borrowing from the 'central bank', which stands in for the rest of the world. The borrowing from the central bank is always limited to what can completely repaid.

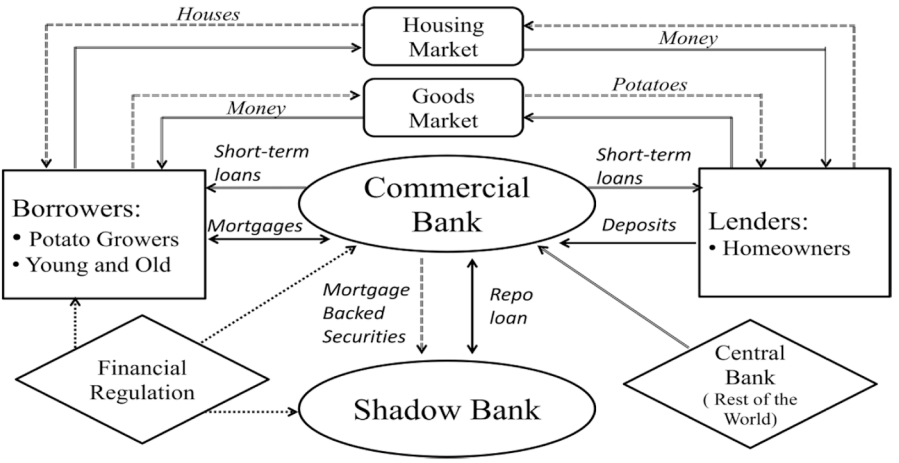
The decision to default is endogenous and depends on the relative value of collateral to the value of the loan obligation. Accounting for additional costs of default, such as reputational penalties, it is individually optimal for household P to default on its mortgage and have its house foreclosed when the market value of collateral is low enough. Similarly, the shadow bank will choose to surrender the MBS it holds when mortgages, which are the underlying asset, are in default. As discussed below, the fall in housing prices and the subsequent defaults on mortgages creates a number of knock-on effects: fire-sales, marginal spirals, and a credit-crunch. Financial regulation tries to mitigate the adverse effects of default due to a fall in asset/house prices. Regulation can be imposed either on the contributors to risk, i.e. household P and the shadow bank, or instead on the commercial bank, which is exposed to housing price risk and can amplify this risk when defaults on its depositors.

Figure 1 presents the structure of the model, the financial relationships and the flow of goods and houses in the real economy. We should note that this research program is just beginning and the modeling approach is very flexible. The general equilibrium setup with fully endogenous prices, portfolio decisions and default allows for this. So this model is better thought of as a framework for comparing different potential financial externalities under various market structures. Hence the longer term conclusions about regulatory design will depend on analyzing many variants of the model and determining which are robust to the many possible formalizations of the financial system.

7.3. Default, Fire-sales and Amplification

When the endowment of potatoes is low (which can be loosely thought of as an adverse productivity shock) house prices will collapse. This collapse is unavoidable and default on mortgages is optimal from an individual's point of view. However, there are several channels through which the financial system may amplify the initial impulse that will lead to other inefficiencies. Regulations may be useful if they can limit this amplification. One important property of the model is that there are no magic bullets. In particular, any regulations that dampen the effects of defaults create other distortions.

Figure 1: Structure of the Economy



The effective return on mortgages depends on the market value of houses, which the bank forecloses and puts up for sale, and it is lower than the promised mortgage rate. Consequently, the value of the MBS that the shadow bank holds in its portfolio goes down as well. When the fall in housing prices is big enough, this induces a second round of default on the repo loans and the commercial bank takes the MBS pledged as collateral back on its balance sheet. The commercial bank sees its assets fall in value and faces the decision to default on its deposit obligations. Given that deposits are withdrawn in the beginning of the period, the bank sells some of the MBS returned by the shadow bank in order to attain liquidity to repay its depositors. By doing so it contributes to a fire-sale.

This is the first channel of financial amplification which stems from the assumed cash-in-the-market pricing that governs sales of mortgage backed securities. The shadow bank, which is the natural buyer of mortgage backed securities, finds its capital depleted in the state of the world where housing prices collapse. Thus, the more MBS that the commercial bank returns to the market, the lower is the price of MBS. This simple formulation is intended to capture the Shleifer and Vishny (2011) characterization of a fire sale whereby prices for assets are depressed because the natural buyers of the assets are impaired at the time of sale. Obviously any regulation that limits the size of the initial repo default can potentially influence the size of the fire sale.

But the presence of the fire sale also creates three follow-on effects. The first comes because banks must make an active portfolio choice between holding onto its mortgage backed securities and extending new loans. The bank is assumed to be unable to issue equity (in the immediate aftermath of the bad shock), so its

balance sheet capacity is limited. Thus, the bank must trade off using its capital to hold a mortgage backed security or to initiate new loans. So the losses on the MBS sales from the cash-in-the-market pricing tighten this capital constraint and potentially create a 'credit crunch' for new borrowers (in that the bank's capital problem reduces the supply of loans that are available).

The second potential inefficiency comes because the repo default also raises the incentive for the bank to default on its deposit contracts. The losses to the depositor (R) reduce his wealth, causing him to sell additional housing to finance his purchases of goods. The additional housing sales will lead to lower housing prices.

Finally, there is a third channel that arises from the interaction of the cash-in-the-market fire sale and the other two follow-on effects. The bank always considers the arbitrage relation between MBS prices and the price of houses. When the bank receives the MBS that are issued against defaulted mortgages (from the shadow bank), either it can hold the MBS to maturity or it can sell the MBS right away, which depresses further not only MBS but also house prices. Therefore, the model also embodies the kind of downward spiral described in Brunnermeier and Pedersen (2009).

7.4. Financial Regulation

There are five regulatory tools for mitigating the effects of house price collapses. These are limits on loan to value ratios, capital requirements for banks, liquidity coverage ratios for banks, dynamic loan loss provisioning for banks, and margin requirement on repurchase agreements used by shadow banks. We describe the effect of these regulations on default and fire-sales in turn[1].

Increasing the required downpayment on mortgages, reduces both mortgage extensions and MBS issuance and leads to a higher repayment rate on mortgages in the case of a house price bust. The combination of having fewer mortgages in default which are paying back more of what is owed, as well as a smaller repo default, means that the bank is better insulated against a default. This allows the bank to payback more on its deposits and to fire sale fewer MBS.

Higher margin requirements result in fewer repo loans extended to the non-bank and less securitization. In turn, this raises mortgage rates and reduces the total amount of mortgages extended (although the amount of mortgages on the bank's balance sheet rises). When a default occurs the bank takes back fewer MBS and

[1] A detailed description of the effects of regulation on welfare can be found in the paper (Goodhart, Kashyap, Tsomocos and Vardoulakis, 2011).

has to fire sale less of them. This allows the bank to more fully honor its deposits and puts less pressure on house prices, so that house prices are higher.

While commercial banks contribute to all three knock on effects from the house price declines, regulating them, while not restricting leverage of households or shadow banks, is a relatively indirect way of moderating the effect of house price declines. Because the banks are collecting payments and making loans at various points in time, the bank regulations have a time dimension that adds further complexity to studying them.

Increasing the capital regulation before the realization of uncertainty could make the commercial bank respond by initiating fewer mortgages. Alternatively, assuming the risk weights on mortgages and secured repo lending differed, the bank could also respond by securitizing more of the mortgages that it did initiate. So, bank regulation in this model has the potential of pushing intermediation outside of the banking system, rather than simply reducing intermediation. On the other hand, a clean-up strategy requiring higher capital within the bad state of the world results in a big reduction of mortgage issuance and less fire-sales, but has the adverse effect of increasing considerably the spread for mortgage borrowing.

Interestingly, trying to lean against the wind to reduce the credit expansion and house prices when a good state materializes is not easy. The challenge comes because the boom brings increases in asset prices. The high prices deliver capital gains to all the existing owners of the assets. The gains to current mortgage holders improve their equity and lower the loan to value ratio on their mortgages. High home prices improve bank capital ratios both because the mortgages are less risky and because the home price appreciation creates capital gains that raise the value of bank equity. Shadow banks see their equity values rise because of higher MBS prices, which means their leverage falls. These three effects mean that during a boom it is difficult to impose higher loan to value requirements, to raise capital standards, or to lift margin requirements on repo loans enough to slow down credit expansion (and house price appreciation).

The two regulatory tools than can effectively 'lean against the wind' and potentially tame a boom are dynamic provisioning rules and liquidity requirements. The provisioning rules can be implemented directly to slow mortgage credit growth. Importantly, this kind of rule might bind only during a boom.

In contrast, using liquidity restrictions to slow a boom entails also changing bank lending during busts. Banks naturally have more liquid assets during booms than during busts (when liquidity optimally would be depleted to help cover deposit repayments). Therefore, if a liquidity ratio is binding during a boom it will be even more restrictive during a bust, making this kind of rule potentially very pro-

cyclical: in this model, imposing a single across the board liquidity requirement creates a massive fire sale during the bust.

7.5. Conclusions

Despite the many simplifying assumptions in the model, it produces several sharp results that appear to be generic. Most importantly it highlights the substantial payoff to having a formal general equilibrium model that takes a clear stand on the purpose and risks associated with having the financial system rely on shadow banks to deliver funding to the economy. The shadow banks exist here because they are less risk averse (and face lower default costs) than the conventional banks. This leads them to operate with higher leverage (and more concentrated portfolios) than traditional banks. When borrowers default the shadow banks pass losses back to the rest of the financial system and kick off a cascade of other problems: deposit defaults, credit crunches and fire sales that can create margin spirals. Each of these possibilities is intuitive but sorting through them and their potential interactions absent the discipline of the model would be impossible. One important next step will be to allow for other rationales for shadow banks to operate and to explore the resulting ramifications.

Given many complex interactions between the various agents in the model, no single regulatory tool is going to be sufficient to offset the many distortions arising from a default. The exact combination of tools that works best is no doubt specific to some of the details of the model, but the proposition that the multiple sources of inefficiency require multiple tools is general (Kashyap, Berner and Goodhart, 2011). The official sector has thus far has made substantial changes to capital rules, and much more limited progress on revising other regulations such as liquidity, margin requirements or time varying provisioning rules. This model suggests that capital alone is unlikely to be sufficient to contain the problems arising during a crisis.

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8. Financial Intermediation and the Real Economy: Implications for Monetary and Macroprudential Policies

Stefano Neri[1]

8.1. Introduction

Dynamic stochastic general equilibrium (DSGE) models of the new-Keynesian framework have undergone severe criticisms since the start of the 2007-08 financial crisis. Intensive research is ongoing in both the academia and at central banks that is aiming at incorporating financial intermediation into macroeconomic models. It will probably take some time before the profession eventually comes up with a new framework that will allow studying the linkages between financial intermediation and the real economy and the role of policies to promote and preserve financial stability. In this paper I offer three examples of how a model with financial intermediation can be used to address key issues related to monetary and macroprudential policies[2].

8.2. The New-Keynesian Model and the 2007-08 Financial Crisis

The new Keynesian framework (as described in Woodford, 2003), represents the core of many DSGE models. In its simplest version it describes a cashless economy in which a representative household and a representative firm live and interact. Prices and wages are sticky, credit markets are perfect and there is no role for financial intermediation. Medium-scale versions have been estimated and used in many central banks. These models were designed to explain 'normal' times when economies fluctuate around a balanced growth path. Their nature prevents their use in 'exceptional' times. The financial crisis showed that many of the assumptions behind DSGE models were wrong and also how financial markets are far from being efficient and matter in originating and propagating shocks.

During the financial crisis markets became severely dysfunctional and impaired the monetary policy transmission mechanism. The extraordinary supply of liquidity by central banks and governments' measures were crucial for improving

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2 Prepared for the SUERF\Deutsche Bundesbank/IMFS conference '*The ESRB at 1*', Berlin, 8-9 November 2011. The paper is based on my works with Paolo Angelini, Andrea Gerali, Fabio Panetta, Luca Sessa and Federico Signoretti. The views expressed in the paper do not necessarily reflect those of the Banca d'Italia or the Eurosystem.

conditions in financial markets in 2009. However, in early 2010 tensions emerged in some government bond markets of the euro area. Spreads between ten-year government bonds of some member countries relative to German Bunds sharply increased reflecting increasing concern about the sustainability of public finances. Tensions intensified in the summer of 2011; as a result of increasing difficulties in accessing market funding, balance sheet constraints and increasing borrowers' riskiness, banks tightened credit standards on loans to non-financial corporations and households.

8.3. A Critical View on Dynamic Stochastic General Equilibrium Models

Since early 2009, a few months after the bankruptcy of Lehman Brothers, some economists (Buiter, 2009, Goodhart, 2011, Cecchetti, 2009 and De Grauwe, 2010 just to mention some) expressed their criticism on DSGE models. Their main short-comings include the impossibility to answer questions about insolvency, default and illiquidity, to study the consequences of changes in regulation of intermediaries and markets and to provide suggestions on how to prevent booms and busts in asset markets.

The financial crisis represents an opportunity to modify the current macroeconomic framework. In the last two years, some important contributions have appeared in the literature (see, among others, Angeloni and Faia, 2009, Cúrdia and Woodford, 2010, Gertler and Kiyotaki, 2010, Gerali *et al.*, 2010 and Meh and Moran, 2010). It is beyond the scope of this short paper to offer a survey of all these contributions. For the purpose of this paper I will focus on the work by Gerali *et al.* (2010). In this paper, the authors set up a model that includes several real and nominal rigidities, financial frictions à la Kiyotaki and Moore (1997), monopolistic competitive banks and a role for bank capital. The model, which is estimated with Bayesian methods using data for the euro area over the period 1998-2009, is used to study: (*i*) the role financial frictions and banks in the transmission of shocks (Gerali *et al.*, 2010); (*ii*) the macroeconomic effects of a credit crunch (Gerali *et al.*, 2010); (*iii*) the procyclicality of Basel II regulation (Angelini, Enria, Neri, Panetta and Quagliariello, 2011); (*iv*) the interaction between monetary and macroprudential policies (Angelini, Neri and Panetta, 2011).

The model shares some of the limitations that have characterized DGSE models of the pre-crisis generation. The most relevant limitation of all the models that have recently appeared in the literature is that they all fall short of modelling systemic risk, the objective of recently established supervisory agencies such as, for example, the European Systemic Risk Board (ESRB) in Europe and the Finan-

cial Stability Oversight Council (FSOC) in the United States[3]. Almost all economists agree that more research is needed in modelling and measuring systemic risk. However, a meaningful measurement requires a clear definition of systemic risk and a thoughtful modelling, which is still at an early stage.

8.4. Monetary and Macroprudential Policies in a Model with Financial Intermediation

In this Section I present three applications of the model in Gerali *et al.* (2010) focusing on the implications for monetary and macroprudential policies. The first application allows quantifying the contribution of shocks originating in the banking sector to the 2009 recession in the euro area and the role of the monetary policy of the European Central Bank. The second application focuses on the interaction between monetary and macroprudential policies. The last application studies the role of macroprudential policy in leaning against the financial cycle. For the last two exercises I modified the model to include Basel II regulation and countercyclical capital requirements (see more on this in Angelini, Enria, Neri, Panetta and Quagliariello, 2011).

8.4.1. The Link between the Banking Sector and the Real Economy

In this section I use the model to quantify the contribution of shocks originating in the banking sector to the contraction of euro-area economic activity in 2009 and 2010. The shocks in the model are grouped into three categories: a 'macroeconomic' group, which pools shocks to neutral technology, to preferences, to housing demand, to the investment-specific technology, and to price and wage markups; the 'monetary policy' group isolates the contribution of the non-systematic monetary policy; the 'banking' group consists of shocks to the loan-to-value (LTV) ratios on loans, shocks to the markup on bank interest rates and a shock to banks' balance sheet. Figure 1 below reports the results for some key variables.

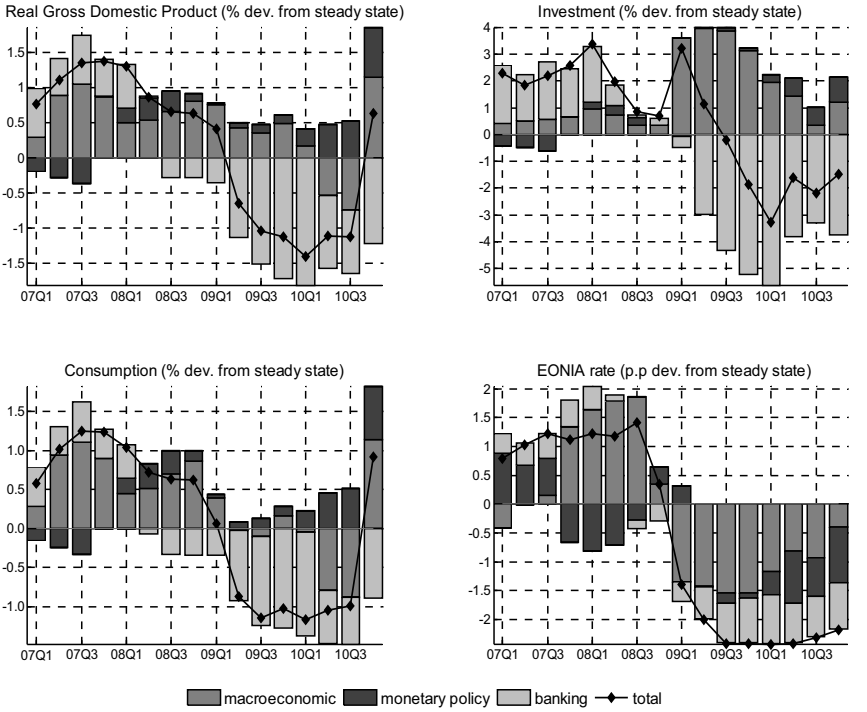
The sharp contraction that started in 2008 was almost entirely caused by adverse shocks to the banking sector and, to a smaller extent, by the simultaneous retreat of the positive stimulus coming from macroeconomic shocks[4]. The upturn in output at the end of 2010 was the result of positive macroeconomic shocks and

[3] From the webpage of the ESRB: "[…] *The ESRB contributes to the prevention or mitigation of systemic risks to financial stability in the Union that arise from developments within the financial system.* […]". From the webpage of the FSOC: "[…] *the (FSOC) will provide, for the first time, comprehensive monitoring to ensure the stability of our nation's financial system* […]". From the webpage of the Bank of England: "*The Bank has a statutory objective to "contribute to protecting and enhancing the stability of the financial systems of the United Kingdom"*.

[4] The model represents a closed-economy and as such it does not capture the effects of the contraction in global demand.

expansionary monetary policy shocks that more than offset the still large effect of shocks originating in the banking sector. The sharp reduction of key policy rates by the ECB in 2008 and 2009 contributed to attenuating the strong and negative effects of the financial crisis on the euro-area economy.

Figure 1. Contribution of Selected Shocks to the Euro-area Economy: 2007-2010



Note: Results are based on the median of the posterior distribution of the parameters of the model.

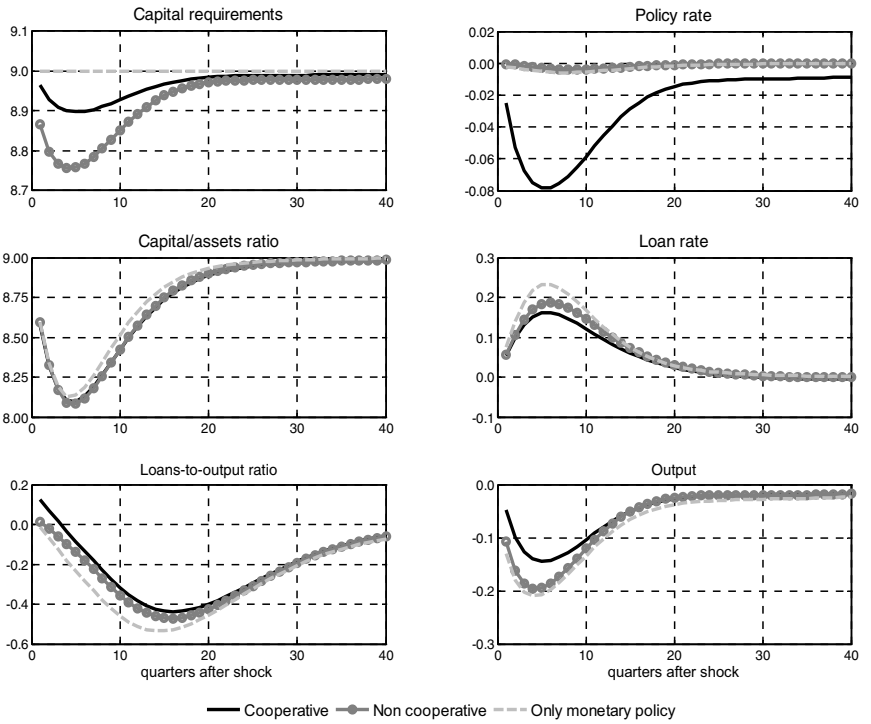
8.4.2. Monetary and Macroprudential Policies

The paper by Angelini, Neri and Panetta (2011) focuses on the interaction between monetary and macroprudential policies and quantifies its impact on the real economy. There are reasons to expect *a priori* that the two policies can influence each other, for example, through their effects on asset prices, credit aggregates and banks loan rates.

To model macroprudential policy Angelini, Neri and Panetta (2011) draw on policy-makers' stated goals and actions to characterise the objective and tools of the macroprudential authority. As for the objective, there is broad consensus on avoiding 'excessive' lending and containing the cyclical fluctuations of the economy. In modelling the interaction between monetary and macroprudential policies, Angelini, Neri and Panetta (2011) consider two cases: a cooperative one in

which the two policies are set by a single policy-maker that controls the two instruments (the monetary policy rate and capital requirements) and minimizes a joint loss function; a non-cooperative case in which each authority chooses her instrument, as to minimize her loss function, taking as given the policy of the other authority[5]. Figure 2 shows that under cooperation, the monetary and macroprudential policies are eased in response to an exogenous fall in bank capital. In the non-cooperative case, instead, the reaction of monetary policy is practically negligible, which induces a stronger macroprudential response; the shock has a larger effect on output and the loans-to-output ratio than in the cooperative case.

Figure 2. Impulse Responses to a Negative Shock to Bank Capital (percentage deviations from steady state)



Angelini, Neri and Panetta show that in 'normal' times – when the economy is driven by supply shocks – macroprudential policy yields negligible additional benefits over the case in which there is only monetary policy, even if the two authorities cooperate. If the two authorities do not cooperate, the policy tools

[5] The loss function of the central bank depends on the volatility of inflation, output and the changes in the policy rate, while that of the macroprudential authority depends on the volatility of the loans-to-output ratio, output and the changes in capital requirements.

become extremely volatile. The reason is that macroprudential and monetary policies act on closely related variables (bank rates, credit and asset prices) but have different objectives, so that they may push in different directions. The benefits of introducing macroprudential policy become sizeable when economic fluctuations are driven by financial shocks, which affect the supply of loans through a fall in bank capital, and are even larger when the two authorities cooperate.

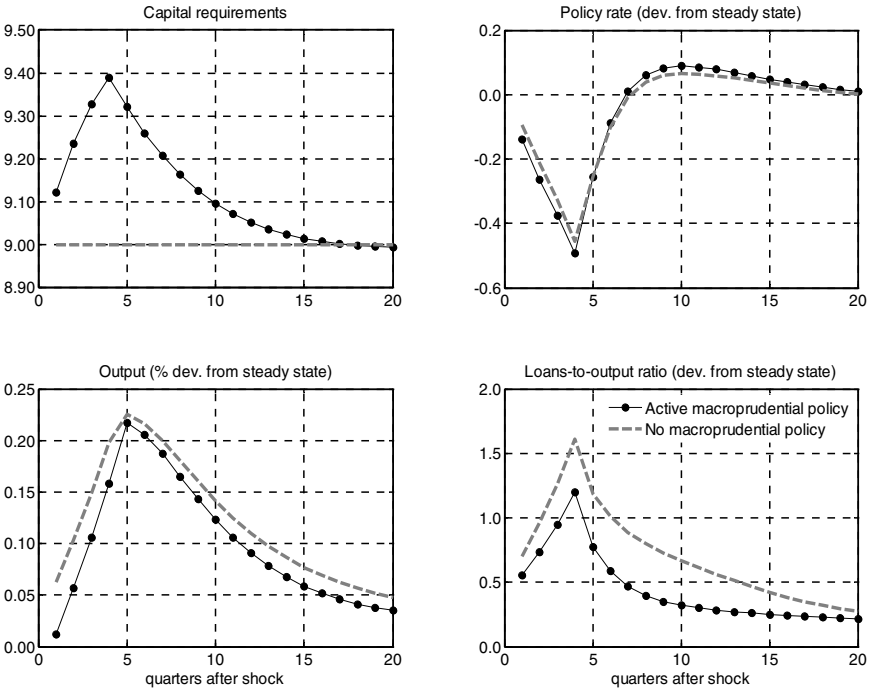
8.4.3. Leaning against the Financial Cycle: Implications for Macroprudential Policy

The model by Angelini, Neri and Panetta (2011) can help quantifying the effectiveness of macroprudential policy in preventing the build up of financial imbalances and containing the upswings and downswings in the financial cycle.

Expectations of lower risk premia in the future can increase asset prices and start a credit boom through their effect on Value at Risk (VaR) measures which are key in determining the size and leverage of banks' balance sheets (Adrian and Shin, 2010). There are various reasons behind a persistent reduction in aggregate volatility and investors' perception of risk including improved market liquidity and the rapid growth of the market for risk transfer instruments (see Panetta *et al.*, 2006). Suppose agents expect a reduction of the aggregate risk in the economy in one year time and assume that banks have a target for leverage. The fall in risk implies that banks are required to hold, *ceteris paribus*, less capital. For a given target for the leverage ratio, the expected fall in aggregate risk, thus, provides an incentive to expand lending. Following Schmitt-Grohe and Uribe (2008) I assume that agents receive news about the value of capital in a year time (which as just described is equivalent to assuming that agents expect a future reduction in aggregate risk) after which, banks immediately expand credit and reduce rates. Figure 3 reports the results of the simulation.

Following the positive news on bank capital, intermediaries immediately increase the supply of credit to households and firms and reduce bank lending rates. Output and the loans-to-output ratio immediately increase. In response to the expansion in economic activity, macroprudential policy tightens capital requirements while the central bank slightly reduces the policy rate in response to falling inflation. After a year, banks realise that the positive shock has not occurred and immediately reduce lending to the economy forcing output to return to its steady state. Consequently, macroprudential policy slowly brings back the capital requirement to its steady state level. A very different picture emerges when capital requirements are not actively used. In this case, the increases in output and the loans-to-output ratio are larger than in the case in which macroprudential policy tightens capital requirements. This finding suggests that countercyclical capital requirements can be useful in containing upswings in the financial cycle.

Figure 3. Impulse Responses to a Positive News Shock about Future Bank Capital



8.5. Concluding Remarks

Macroeconomic models belonging to the new-Keynesian framework have undergone severe criticisms since the start of the 2007-08 financial crisis. In future research, particular attention should be paid to risk, systemic risk and banking intermediation. Researchers in policy institutions and in the academia need to closely cooperate in developing new ways of incorporating financial intermediation in a meaningful way in the current framework for policy analysis. In the meanwhile, one possibility is to adapt the current generation of DSGE models with a stylised role for financial intermediation and use them to study the role and the effectiveness of macroprudential policy and its interaction with monetary policy.

In this paper I have studied monetary and macroprudential policies in the model developed by Gerali *et al.* (2010), which features a stylised role for financial intermediation, and I have derived the following implications. First, an aggressive easing of monetary policy can mitigate the negative impact of shocks originating in the banking system on the real economy. Second, monetary and macroprudential policies should closely co-operate. Third, the use of capital requirements can yield significant benefits when the economy is hit by financial shocks that reduce the

supply of credit. Fourth, macroprudential policy can be effective in leaning against the financial cycle by adjusting capital requirements.

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9. Macro-prudential Supervision and Financial Integration – the ESRB at 1

Jürgen Stark

Ladies and gentlemen,

It is a great pleasure for me to be here this evening. The growing integration of Europe's financial markets and the financial crisis of 2007-2009 have raised important questions about the design of European banking supervision. If we had relied on effective macro-prudential oversight and policy instruments back then, one can argue that the social and economic costs of the crisis would have been much lower. Crucial improvements to the financial system were needed, and are still needed, to prevent and mitigate systemic risk. In particular, financial institutions should be allowed to fail without imposing unacceptable costs on the rest of society. Tonight, I shall reflect on the recent developments in European macro-prudential supervision and try to clarify our understanding of what European macro-prudential policy is and what it is not, and what it can achieve and what it cannot.

To start with, I would like to quickly review the root causes of the global financial crisis, which give you the background to why and how the European Systemic Risk Board (ESRB) was set up. Then I will dwell on the inherent tensions that exist between a need for financial integration within European Monetary Union (EMU) and the micro-prudential supervision and fiscal policies that have remained national competencies. Finally, I will take a critical look at the role, power and limitations of the European Supervisory Authorities (ESAs), which I see as significant steps in the right direction towards shaping a system that will ensure financial stability.

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Let me begin by looking back. The causes of the recent crisis have been attributed to macroeconomic factors, to major weaknesses in corporate governance in financial institutions and, also, to an inadequate level of supervision and regulation. At the macroeconomic level, rapid credit expansion over a protracted period of time in a benign environment of low inflation, high growth and large and persisting imbalances fostered important leverage and maturity transformations, as well as a significant underpricing of risk. At the same time, at the microeconomic level, financial innovations were implemented in a manner that fostered wrong incentives, notably in the securitisation process, which should have helped,

in principle, to better diversify and manage economic risk. The securitisation of assets made it possible for financial institutions to sell loans within complex and opaque financial products and to take them off their balance sheets. These financial techniques weakened incentives for the prudent screening and monitoring of credit risk and led to banks loosening their lending standards. Eventually, when the global financial system was thrown into crisis, many policy-makers were shocked to discover that they did not have the macro-prudential tools to deal with part of the financial system spiralling out of control. Up until then, the common view in policy circles had been that the whole financial system would be stable as long as its single parts were sound. The financial crisis painfully demonstrated how supervisory arrangements have not been sufficiently focused on ensuring the stability of the financial system as a whole. Therefore, to be able to monitor, assess and mitigate systemic risk, policy-makers have been working on creating new tools for a new policy area, namely giving a macro-prudential orientation to financial regulation and supervision.

The European Systemic Risk Board (ESRB) was established as the main body for macro-prudential oversight and surveillance of EU financial markets.

As you probably know, the European Central Bank (ECB) has close links with the ESRB. These include, first, a personal link: the President of the ECB also serves as the Chairperson of the ESRB. Second, the ECB provides logistical and administrative support by hosting the ESRB secretariat. And lastly, the ECB provides analytical and statistical support, collecting and processing information that feed into the ESRB's discussions.

Despite this, however, the ESRB remains a body that is quite distinct and separate from the ECB. The ESRB does not change in any way the functioning of the ECB's statutory role and its unambiguous primary mandate for delivering price stability. The new institutional set-up, and the ECB's role in it, rests on solid institutional and legal foundations. The ECB has participated closely and constructively in the legislative process leading to the establishment of the ESRB. It has thus focused on establishing in Europe the most effective and robust macro-prudential supervision set-up possible to prevent and mitigate systemic risk.

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The question remains, however, as to whether, within this new macro-prudential framework, there might not be some tension between inter-connectedness born out of the growing integration of financial markets and matters of national competencies. Let me look at two of the challenges we currently face.

First, increasing financial integration, both in Europe and globally, has had important implications for the cross-border propagation of systemic risk. Since

the introduction of the euro, we have seen growing integration of European financial markets. This has been illustrated by a significant convergence in interest rate differentials in wholesale and interbank markets, by a significant degree of convergence for the cost of capital for equity and debt issuance across countries and, by a gradually decreasing home bias in the composition of asset classes in most regulated investment funds. This closer integration has been facilitated by the growing importance of the euro as a reserve currency, as well as by the rapid technological advances that have enabled markets to operate more easily in a cross-border environment. As financial markets have become more interconnected, the structure of banking markets and their management has also changed significantly. Large banking groups have been created from a growing number of cross-border bank mergers. Today, many banking groups have major operations in multiple jurisdictions, where they can pose systemic risk to a host banking system.

At the same time, over the last decade, EU legislation has been growing dramatically in scope and coverage for many areas and segments of financial markets. However, the implementation and enforcement of this legislation has been ultimately left to the discretion and authority of supervisors in the individual Member States, based on the principle of home country control and mutual recognition. The recent financial crisis has clearly illustrated these substantial cross-border implications and the need for a more robust macro-prudential supervisory framework and micro-prudential supervisory regime.

The second challenge concerns another aspect of policy-making left to the authorities in the individual Member States: namely, of course, fiscal policies. A consequence of financial integration is that European banks are exposed to a wide range of risks in European government debt and not only to domestic sovereign risk. This implies that, in a crisis, distressed government debt tends to become a common liability for all governments, at least through the interdependence of banking system vulnerabilities across jurisdictions. The current sovereign debt crisis in Europe is proving to us that fiscal policy should be more grounded – in a similar way to monetary policy – within a rules-based framework with clear medium-term objectives. And for rules and sanctions to be fully credible, they should be stricter, automatic, and as free as possible from the political process, so that countries have the right incentives to address their problems. This calls for substantial improvements in the quality of fiscal institutions and policy frameworks in Europe.

All in all, a lesson to take from the current sovereign debt crisis is that there is an undeniable tension between, on the one hand, the need for financial integration to ensure a smooth functioning of Monetary Union, and, on the other hand, micro-prudential and fiscal competencies that have remained at the local level.

And this tension has the potential to exacerbate the risk of future financial crises and hinder effective crisis management. We need bold steps towards a fiscal union. We need to go beyond and create a financial union. In one word, the crisis has clearly shown us that we need 'more Europe'.

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The new EU supervisory framework is actually based on two pillars: first, the ESRB for macro-prudential supervision and, for micro-prudential supervision, a second pillar comprising three different European Supervisory Authorities (ESAs) – one for banking, one for insurance and one for the securities markets. This framework provides a more consolidated and rational institutional design for linking the micro-prudential supervision of individual institutions with the supervision of linkages between institutions and within the broader system.

However, as the ESAs were only established at the beginning of 2011, they are too young for us to judge their effectiveness. Under the current framework, all supervisors in the Member States continue to be responsible for assuming their individual supervisory functions, but they have to report on their practices to the relevant authority. The ESAs' regulations provide for a review of the new institutional arrangements by the European Commission in early 2014. Should the ESAs be deemed not to have adequate tools and powers, there may be a case for greater integration of the supervisory framework – including tools for crisis management and resolution. There may indeed also be some support for a single EU financial supervisor. The main argument for such an institutional consolidation is that given the growing financial 'inter-connectedness' of Europe, a centralised supervisory body would promote a more efficient level playing field in supervisory practices. Moreover, it might enhance both the efficacy of supervision and the crisis management capabilities over credit institutions with a strong cross-border presence. Although there are obvious benefits of such a centralised institutional structure, there are also obvious concerns about the issue of national sovereignty.

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Let me wrap up and conclude. By providing the basis for payments and by acting as the principal intermediary between savers and borrowers, the banking system plays a role similar to the electricity supply network as a vital part of the economic infrastructure. However, as recent experience has shown, if the stability of the system is undermined, considerable disruption can ensue, leading to considerable effects on social and economic costs.

For these reasons, financial stability may be seen as a 'public good' which requires adequate regulation. Regulators need to tread a careful path between controls

that ensure the stability of the financial system and over-bearing regulation, which would hinder competition and efficiency.

The new regulatory reform and the macro-prudential oversight now in place constitute an unprecedented achievement. At the same time, key challenges remain, in particular regarding the interaction between macro-prudential and micro-prudential authorities, especially against a background of growing inter-connectedness of financial markets and the sovereign debt crisis. Looking forward, the coming years will be crucial to judge the functioning of the new financial supervision framework, to assess the efficiency of the new tools and methodologies that are being developed as academic research progresses in this field, and to minimise and correct potential inefficiencies. The achievements made so far are clearly a major step towards creating a safer financial system, but further ambitious arrangements may be needed to enhance the robustness of our financial systems. Not only stricter fiscal rules and the creation of a fiscal union are needed, but it has to be complemented with a financial union.

Thank you for your attention.

10. Deleveraging and Recovery

Előd Takáts and Christian Upper[1]

Abstract

Advanced economies, such as the United States or Spain, saw strong private credit booms turning into financial crisis. Past experience and current expectations alike suggest that households and firms will reduce their debt levels in the coming quarters. What does this deleveraging imply for economic recovery? To answer the question we examine 19 similar financial crises, i.e. crises which were preceded by credit booms. We find that the strength of economic recovery is consistently uncorrelated with private debt deleveraging as measured by real debt or by the debt-to-GDP ratio. The results suggest that fears that a deleveraging by the private non-financial sector will stall growth are overdone.

10.1. Introduction

Household and corporate debt increased significantly in many advanced economies in the years before the crisis. Today, high loan delinquency rates indicate that much of this lending was not sustainable and that debt levels will have to fall. Historical analogies also point to debt reduction. In a study of 20 past financial crises that followed a credit boom, Tang and Upper (2010) find that 17 were followed by significant deleveraging. On average, the ratio of private non-financial debt to GDP fell by a total of almost 40 percentage points over a period of five years. There are signs in many countries, including the United States, the United Kingdom, Spain and Ireland, that a similar deleveraging is under way today.

Many observers believe that this deleveraging of the non-financial private sector will reduce growth during the coming years. For example, the Institute of International Finance (2011) argued that "private sector deleveraging will remain a major headwind to growth in the years ahead." But is this true? Does deleveraging necessarily reduce growth and thus slow the post-crisis recovery? More precisely, does deleveraging *after* a massive increase in debt slow the post-crisis recovery? We investigate 19 financial crises preceded by strong debt growth in emerging and advanced economies and test whether the amount and speed of private deleveraging affected the speed of recovery.

[1] The views expressed here are those of the authors and do not necessarily represent those of the Bank for International Settlements. We would like to thank Garry Tang for his work with the data and seminar participants at the BIS, the Deutsche Bundesbank, the Netherlands Bank, the University of Lausanne and EPLF, and at the SUERF/Deutsche Bundesbank/IMFS 'The ESRB at 1' conference for useful comments.

Much to our initial surprise we find that deleveraging is not correlated with growth in the aftermath of the crises. This result is robust both for real debt and debt-to-GDP ratio – and also for several deleveraging and recovery time periods and for several additional controls. The paper thus complements existing research on creditless recoveries to show that private debt growth is less important in recoveries after those financial crises which were preceded by credit booms than in usual post-crisis recoveries (or normal growth periods).

The question is particularly worth exploring because economic theory is ambiguous about the role debt plays in the economy. Debt under normal circumstances is good, i.e. positively correlated with economic growth. As firms borrow to invest and households borrow to consume, economic output increases. This 'good debt' is what we see in a simple growth accounting exercise or in long-term data.

However, debt is not always good. Especially after excessive debt growth, 'bad debt' can arise which is negatively associated with economic growth. Several economic models explain how debt can be bad. Lamont (1995) and Philippon (2009) show that debt overhang, i.e. excessive debt, prevents firms from undertaking profitable investments. As the profits from new investment would accrue to existing debt holders, new financing is not available for investors. As debt overhang is associated with excessive amount of debt, perhaps 'bad debt' is especially relevant after periods of excessive debt growth. Similarly, Caballero, Hoshi and Kashyap (2008) show how continued financing of zombie firms and banks hampered economic growth after the Japan crisis by preventing new, more efficient firms from emerging and slowing Scumpeterian creative destruction.

Furthermore, empirical evidence is also growing about 'bad' debt. For instance, Cecchetti, Mohanty and Zampolli (2011) find in international data that high levels of household and corporate debt tend to be associated with relatively low output growth. In addition, the experience of Japan in the 1990s highlights the potential negative impact of zombie firms and banks on economic growth.

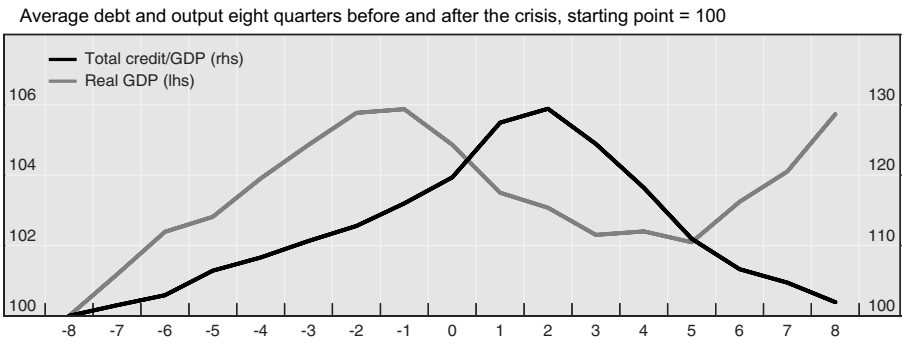
In sum, debt is normally good but under certain circumstances it might be bad. The question for policymakers is what role debt plays in advanced economies facing financial crisis today. Does debt help or hurt growth? And thereby, does deleveraging help or hurt the recovery?

In order to answer the question, we undertake an empirical analysis. We investigate 19 emerging and advanced economy financial crises over the last 30 years which are similar to the crises we see today, i.e. crises which have been preceded by credit booms. Graph 1 shows the average financial crisis experience in terms of output and debt. Real GDP (green line) increases before the outbreak of the crisis (in period 0) and falls sharply thereafter – and eventually recovers. Interest-

ingly, the debt-to-GDP ratio (red line) keeps increasing for around two quarters after the outbreak of the crisis, and only thereafter starts its continuous decline. On average, real GDP levels recover their peaks around eight quarters after the onset of the crisis, while debt-to-GDP ratios remain well below their peaks for several years.

In the analysis, we focus on the relationship between recovery (i.e. real GDP increases from the post-crisis trough) and deleveraging (i.e. changes in debt levels after the trough). We use two measures for debt: real debt and debt-to-GDP ratio and consider 1, 2, 3 and 4 year windows after the trough. In all specifications we control for the size of the output decline between peak and trough. Though on average both debt and real GDP fall (as Graph 1 shows), there is substantial heterogeneity across countries. We observe slower and faster recoveries as well as slower and faster debt reductions after financial crises. In fact, we even observe no deleveraging and continued debt increases in three crises.

Graph 1: Deleveraging and recovery[1]



[1] Simple average across countries where dates are indexed by quarters to their respective crisis dates

Sources: Datastream; IMF, *International Financial Statistics, World Economic Outlook*; national data; BIS calculations.

We find that the pace of deleveraging is consistently uncorrelated with the strength of economic recovery after controlling for the crisis drop in output. The results remain robust for controlling a large number of policy variables including public debt, real exchange rates or drop in private debt during the crisis. The results confirm that creditless recoveries are possible following Calvo *et al.* (2006) and Claessens *et al.* (2009). However, the results also tell something new. Our main contribution is to document that private debt deleveraging is not particularly important for recoveries from financial crises which were preceded by massive private debt increases. Though on average creditless recoveries are slower than recoveries with credit as Abiad *et al.* (2011) documents, once we focus exclu-

sively on those recoveries which were preceded by private debt increases the picture changes: deleveraging becomes uncorrelated with the strength of recoveries.

The result is surprising, but given our discussion on 'good' and 'bad' debt it is perhaps not as unexpected as it would seem on first sight. Good and bad debt have the opposite effects on growth: while increasing good debt useful for growth, bad debt (i.e. excessive debt associated with debt overhang, immobile households and zombie firms) hinders economic growth. It might well be that aggregate debt to the private sector is less important than what happens to good and bad debt, respectively. Reducing 'bad debt' and increasing 'good debt' would improve growth, while increasing 'bad debt' and reducing 'good debt' slows the recovery. In this sense, monitoring only aggregate private debt numbers might be misleading when private debt increases preceded the financial crisis.

Furthermore, our results confirm the earlier findings in the literature that real effective exchange rates play a crucial role in the recovery. On average, the real effective exchange rate declines fast and substantially after the start of the crisis, and remains low for an extended period. In our analysis, the real exchange rate is the explanatory variable we could find that consistently and significantly explains growth across different specifications. The faster the decline in real effective exchange rates, the stronger is the recovery.

The results seem to be highly relevant when thinking about current economic policy challenges in advanced economies, because many advanced economies also saw private debt increases prior to their crisis. Our results suggest that aggregate private debt figures might not be the most relevant for economic growth in the coming recovery. Even if aggregate private debt stagnates or declines, it might not be as negative for economic recovery as many fear. Perhaps, efforts to identify 'good debt' and 'bad debt' could be used to encourage the former and discourage the latter. Furthermore, the results on real exchange rates confirm that structural reforms to increase economic flexibility would be crucial for stronger recovery, especially where nominal channels for real exchange rate adjustments are closed. In sum, focusing on aggregate debt instead of structural reforms might be a mistake.

Of course, our results should be read with appropriate caveats. Though we devote more space later to discuss them, we feel important to highlight that we are aware of the limitations of such historical exercises. Most importantly, the economies currently in crisis differ from our sample in many important aspects, which might make past experiences not directly useful for policymakers.

The rest of the paper is organized as follows. The second section introduces the database. The third one details the empirical analysis. The fourth discusses the findings and caveats. The last one concludes.

10.2. Data

We focus on financial crises which have been preceded by strong debt increases. We start with the 124 crises Laeven and Valencia's (2008) crisis resolution database. We remove 84 crises: one the one hand those which happened before 1980, primarily in Africa and in small emerging markets; and on the other hand those where deleveraging has not yet run its course (such as the United Kingdom and the United States after 2007). From the 40 remaining crises we cut further. We drop the seven crises that took place in economies that were in the early stages of a transition from a centrally planned to a market economy and three that occurred in an environment of hyperinflation since we believe that neither is likely to provide useful information on the current episode. In addition, we drop five financial crises for which we do not have reliable quarterly data. This leaves us with 25 crises. We then test whether crises which were preceded by strong increase of private sector debt. We define strong debt increase as an expansion in private sector debt/GDP for several consecutive quarters.[2]

The above process leaves us with a sample of 19 crises which were preceded by debt increase: Argentina (1995 and 2001), Chile (1981), Colombia (1998), Dominican Republic (2003), Finland (1991), Indonesia (1997), Japan (1997), Korea (1997), Malaysia (1997), Mexico (1994), Nicaragua (2000), Norway (1991), Paraguay (1995), Philippines (1997), Russia (1998), Sweden (1991), Thailand (1997) and Uruguay (2002).

Though debt reduction followed most crises, in three cases (Argentina 1995, Korea 1997, Paraguay 1995) the ratio of private sector debt to GDP expanded after the crisis. These three crises are somewhat special. In Korea, overall debt figures have increased post-crisis due to a very large increase in household lending, particularly mortgages, while lending to non-financial firms fell (see Mohanty *et al.* (2006)). In Argentina and Paraguay, primarily external contagion from the devaluation and reconversion of public sector debt in Mexico in December 1994 triggered the crisis.

Our private debt measure uses besides the standard domestic bank credit to the private sector (from the IMF IFS database) the claims by foreign banks on the domestic nonbank financial sector (from the BIS consolidated banking statistics). This definition excludes bonds and other debt securities; loans by other financial institutions (e.g. insurance corporations), securitised credit (held by non-commer-

[2] We also experimented with a number of measures based on Harding and Pagan's (2002) methodology to date business cycles without arriving to a strong identification. Tang and Upper (2010) also use two other measures of credit booms, namely that by Mendoza and Terrones (2008) and by Borio and Drehmann (2009). Both measures define a credit boom as an episode in credit/GDP or real credit, respectively, exceeds its long-term trend by a certain threshold. We decided not to use these approaches because the long term debt trend was negative in some cases, which would have led to identifying debt increases with contracting debt.

cial banks), trade credit. Thus, our dataset is not directly comparable to flow of funds data, which is not available for the vast majority of episodes in our sample. Nevertheless, our dataset captures bank debt precisely which was by far the most dominant source of finance for both households and non-financial corporations in all the crises in our sample. Unfortunately, this data might be less useful for analyzing the current advanced economy financial crises where securitization was widespread.

The definitions and sources of other variables are shown in the appendix.

10.3. Empirical Analysis

In the empirical analysis, we focus on what happens after the crisis bottomed out and real GDP has reached its trough. We do this because financial crises tend to be associated with sharp drops in output, which often take place before any deleveraging gets under way. By focusing on the recovery phase, we implicitly assume that crisis related output loss is over by that time. The regression we run is formalized in equation 1:

$$\Delta_{trough}^{trough+n} y_i = \alpha + \beta \Delta_{trough}^{trough+m} d_i + \gamma \Delta_{peak}^{trough} + \varepsilon_i \quad (1)$$

where y denotes real GDP in natural logarithms, d debt (we allow for two different measures: real debt in natural logarithms and debt-to-GDP ratio in percentages), α, β and γ are model parameters and ε the error term; *trough* represents the time real GDP is the lowest, *peak* the time real GDP was the highest prior to the crisis; n and m denote the window taken for recovery (Δy) and deleveraging Δd, respectively. The subscript i denotes the individual crises. In the subsequent analysis, we augment the regression with additional controls. As equation (1) shows we control for crisis related output loss (from trough to peak) in all specifications. Intuitively, deeper crises imply steeper rebounds as part of the output loss was not permanent.

The regression results unfortunately cannot establish causality. Furthermore, the size of the database limits econometric techniques and the number of control variables. Consequently, we are content to report the results as correlations.

10.3.1. Baseline Estimation

Table 1 documents the correlations between real GDP recovery and deleveraging – that is parameter β in equation 1. Table 1 also shows the t-statistics in parenthesis. We take 1, 2, 3 and 4 year windows for recovery and deleveraging. We focus on weakly shorter deleveraging windows (m, columns on Table 1) than recovery windows (n, rows on Table 1) because we are interested in the effect of

debt on economic growth. For example, the correlation coefficient between two year change in real debt *(m = 2)* and four year recovery *(n = 4)* is –0.005 with a t-statistic of –1.05.

The results are striking for two reasons: First, the correlations are statistically insignificant in all specifications. The absolute value of t-statistics ranges from 0.11 to 1.70 and the estimates never become significant even at 10% level – even though one would expect a few weakly significant correlations even from 20 regressions on independent variables.

Table 1: Deleveraging and Recovery

		Deleveraging (debt reduction, years after trough)							
		Change in real debt				Change in debt/GDP			
		1	2	3	4	1	2	3	4
Recovery (output growth – years after trough)	1	–0.001				–0.093			
		(–0.11)				(–1.05)			
	2	–0.001	–0.001			0.084	0.016		
		(–0.37)	(–0.19)			(1.16)	(1.70)		
	3	–0.003	–0.005	–0.008		0.032	0.077	0.113	
		(–1.02)	(–0.87)	(–0.81)		(0.52)	(0.93)	(1.09)	
	4	–0.003	–0.005	–0.007	–0.008	0.019	0.043	0.064	0.082
		(–1.18)	(–1.05)	(–1.00)	(–0.91)	(0.41)	(0.68)	(0.81)	(0.89)
Coefficient b and t-statistics from equation (1) where rows represent different recovery windows (n) and columns different deleveraging windows (m).									

Second, the estimates are also economically insignificant – and are often negative. In fact, all estimates are negative for real debt (left-hand columns), i.e. lower real debt is correlated with *higher* output. These coefficient estimates are elasticities because both recovery and deleveraging are in natural logarithms. Hence, the coefficient represents a correlation between x percent increase in output and one percent change in real debt. Aside from negativity, even taking the largest absolute values (–0.008, m = n = 3) would imply only 14 basis points output response over three years given that the average decline in real debt is 17% over three years. This is very small, especially if we consider that on average economic growth averaged 17% in the first three years of the recovery.

Though most correlations are positive for the debt-to-GDP ratio as independent variable, the estimates are still insignificant economically. As debt-to-GDP is measured in percentage points, the coefficient represents a correlation between x percent increase in output and one percentage point change in real debt-to-GDP ratio. Taking again the largest values (0.113, m = n = 3) and noting that average decline in debt-to-GDP ratio was around 20 percentage points over three years implies around 0.23% change in output. Again, this is certainly not large compared to the average growth of 17% in the first three years of the recovery phase.

Furthermore, the estimates often change sign which also suggests economic insignificance.

The lack of economic significance is much more important than statistical insignificance. Statistical insignificance might be simply the consequence of small sample size. However, economic significance might well imply that there is no strong, robust relationship between deleveraging and recovery. In order to make sure that our results hold under different specifications, we undertake a series of robustness tests in the next section.

10.3.2. Robustness Tests

Given the somewhat surprising results, we undertake comprehensive robustness tests to exclude that weak correlations arise due to data problems. First, we extend the investigations to cover changes in nominal debt as an explanatory variable. Second, we replace output growth as the dependent variable by the growth of private consumption and investment to take out the impact of net exports and the government. Third, we add various control variables.

Tables 2A and 2B show the results. The stars (*) show the significance of the coefficient on our measure of deleveraging (nominal or real debt, and debt-to-GDP ratio) with one, two and three stars implying significance at 10, 5 and 1 percent, respectively. The crosses (#) show the significance of the coefficient on the control variables (such as the real exchange rate) in Table 2 and again with one, two and three crosses implying significance at 10, 5 and 1 percent, respectively. (Though we do not display all the details due to lack of space, all regression results are available upon request.)

10.3.2.1. Nominal Debt as Measure for Leverage

If we estimate equation (1) using nominal debt as a measure for private sector leverage, the coefficient on leverage β becomes significant at the 10% confidence level in two instances, which is more than what pure chance would indicate. Essentially, short run, one year reductions in nominal debt reduces output growth over three and four years, but not over shorter periods. However, the significant coefficients are due to few outliers. Simply excluding countries with large swings in nominal credit, such as Indonesia, from the sample renders most coefficients insignificant. In Indonesia large stock of outstanding foreign currency debt made nominal debt measures extremely responsive to swings in the exchange rate. As the exchange rate appreciated rapidly, nominal debt – as measured in local currency – declined by more than 40% during the first year of recovery. Given that foreign currency debt is negligible in advanced economies facing crisis today,

results on real debt remain more relevant than the results on nominal debt to understand the future impact of deleveraging.

Table 2A: Robustness Tests

Window sizes										
m	1	1	1	1	2	2	2	3	3	4
n	1	2	3	4	2	3	4	3	4	4
Alternative leverage measure: Change in nominal debt (Δ D)										
			*	*						
Alternative dependent variable: Change in private consumption + private investment										
Leverage measure: change in real debt (Δ D/P)										
Leverage measure: change in debt/GDP (Δ D/Y)										
*,**,*** Deleveraging variable significant at 10, 5 and 1% level. Changes in dependent variables and control variables are from trough to trough + n. Changes in debt variables are from trough to trough + m.										

10.3.2.2. Consumption plus Investment as Alternative Dependent Variable

The coefficients on the deleveraging measure could be insignificant because public spending or net exports boost growth, thus undoing the adverse effects of debt reduction. We test for this by replacing GDP growth as the dependent variable in equation (1) by growth in private consumption and private investment. The blanks in Table 2A show that the coefficients on the deleveraging variable in these regressions are not significant, suggesting that debt reduction by the private sector does not hinder even private consumption or investment.

10.3.2.3. Additional Explanatory Variables

We rerun our baseline regressions with a long list of control variables. Due to the small sample we are facing, we are able to introduce these variables only one-by-one, not simultaneously, although in all cases we continue to control for the drop in output in the aftermath of the crisis. The additional controls we consider are the real exchange rate, the size of the decline in debt-to-GDP from peak to trough, the change in the public debt ratio, the growth rate of debt-to-GDP over the 5 years before the crisis, the change in the current account-to-GDP, the debt gap at start of crisis (defined as the deviation of nominal debt from its long-term trend), the debt-to-GDP gap at start of crisis (the deviation of debt/GDP from its long-term trend),[3] the nominal interest rate, the real interest rate, growth of trading partners, the VIX index, and world economic growth. The footnotes of Table 2B give more details on the windows over which the individual variables are calculated.

[3] See Borio and Drehmann (2009) for a discussion of credit gaps.

As Table 2B shows, we continue to find no correlation between deleveraging and recovery during the recovery phase in spite of additional control variables. This turns out to be uniformly the case for real debt or debt to GDP as deleveraging measures. The control variables, except for the real exchange rate and public debt, remain all insignificant. The former is always significant and the latter is so for specific windows. In sum, our results suggest that in those financial crises which have been preceded by debt increases, deleveraging and growth are robustly uncorrelated.

Table 2B: Robustness Tests

m	1	1	1	1	2	2	2	3	3	4
n	1	2	3	4	2	3	4	3	4	4
Dependent variable: change in real debt (ΔC/P)										
Control variable										
Δ real exchange rate[1]	##	##	##	##	##	##	#	##	##	##
Δ debt-to-GDP peak-trough										
Δ Public debt ratio[2]		#	##	##		#	#	#	#	
Δ debt-to-GDP prev.5 years[3]										
Δ Current account/GDP2										
Debt gap at start of crisis[4]										
Debt/GDP gap at start of crisis[4]										
Nominal interest rate[2]										**
Real interest rate[2]										*
Growth trading partners[2]										
VIX[2]										
World economic growth[2]										
Dependent variable: change in debt/GDP (ΔC/Y)										
Control variable										
Δ real exchange rate[1]	#	##	##	##	##	##	##	##	##	##
Δ debt-to-GDP peak-trough										
Δ Public debt ratio[2]			#	#					#	
Δ debt-to-GDP prev.5 years[3]										
Δ Current account/GDP[2]										
Debt gap at start of crisis[4]										
Debt/GDP gap at start of crisis[4]										
Nominal interest rate[2]										
Real interest rate[2]										
Growth trading partners[2]										
VIX[2]										
World economic growth[2]										

*,**,*** Deleveraging variable significant at 10, 5 and 1% level. #,##,### Control variable significant at 10, 5, 1% level. Changes in dependent variables and control variables are from trough to trough + n. Changes in debt variables are from trough to trough + m.
[1] Average effective real exchange rate between trough and trough + n minus that observed in the two years before the crisis. [2] trough to trough + m. [3] 5 years before the crisis. [4] Deviation of debt or debt/GDP from HP-trend with λ = 14400.

Strikingly, the correlation coefficient on real exchange rate is both statistically and economically significant in all specifications. Hence, Table 3 reports the real exchange rates coefficients separately. The correlation between real exchange rates on recoveries is significant both statsistically and economically. Take the case where m = n = 4. In the average crisis in the sample, the real effective exchange rate during this window is 22% below that seen in the two years before the crisis. The coefficient estimate of approximately 0.44 indicates that this would be associated with a growth that is 10% higher over this entire period, or approximately 2% per year. The finding that real exchange rates matter is particularly surprising given that it remains obscure in our exercise how the real devaluation after financial crises feeds into higher output as the coefficient on the change in the current account is insignificant in almost all specifications.

Table 3: Coefficients on Real Exchange Rates

		Measure of Deleveraging (debt reduction, window length)							
		Change in real debt				Change in debt/GDP			
		1	2	3	4	1	2	3	4
Recovery (output growth – window length in years after trough)	1	–0.144**				–0.115*			
		(–2.30)				(–1.82)			
	2	–0.320**	–0.313**			–0.306**	–0.263**		
		(–2.58)	(–2.34)			(–2.53)	(–2.16)		
	3	–0.413**	–0.404**	–0.428**		–0.419**	–0.388**	–0.407**	
		(–2.52)	(–2.23)	(–2.58)		(–2.64)	(–2.35)	(–2.52)	
	4	–0.454**	–0.462*	–0.500**	–0.436**	–0.461**	–0.441**	–0.457**	–0.446**
		(–2.26)	(–2.09)	(–2.44)	(–2.29)	(–2.33)	(–2.18)	(–2.28)	(–2.26)
Coefficient b and t-statistics from equation (1) where rows represent different recovery windows (n) and columns different deleveraging windows (m). *,**,*** Significant at 10, 5 and 1% level, respectively.									

Our results controlling for changes in public debt suggest that increased government spending could boost the recovery in its initial stage, but the effect disappears as time progresses. The estimated coefficients, collected in Table 4, are statistically and economic significant only for short periods of public releveraging. A 1% increase in public debt in the first year of recovery would be associated with growth that is 40 basis points higher during the first four years of recovery, or approximately 10 basis points per year. This is in line with the argument made in Roxburgh *et al.* (2012) that fiscal spending in the early stages of the recovery can boost growth.

Table 4: Coefficients on Changes in Public Debt

		Measure of Deleveraging (debt reduction, window length)							
		Change in real debt				Change in debt/GDP			
		1	2	3	4	1	2	3	4
Recovery (output growth – window length in years after trough)	1	–0.095				–0.020			
		(–1.45)				(–0.45)			
	2	–0.220*	–0.061			–0.121	–0.040		
		(–1.89)	(–1.20)			(–1.56)	(–1.19)		
	3	–0.314**	–0.102	–0.083*		–0.167*	–0.058	–0.057	
		(–2.27)	(–1.70)	(–1.82)		(–1.78)	(–1.36)	(–1.68)	
	4	–0.399**	–0.125*	–0.103*	–0.060	–0.204*	–0.068	–0.069*	–0.059
		(–2.61)	(–1.80)	(–1.98)	(–1.25)	(–1.90)	(1.37)	(–1.76)	(–1.62)
Coefficient b and t-statistics from equation (1) where rows represent different recovery windows (n) and columns different deleveraging windows (m). *,**,*** Significant at 10, 5 and 1% level, respectively.									

10.4. Discussion and Caveats

We mentioned that the results look surprising at first sight. Normally, debt is supposed to be positively associated with economic growth as even simple growth accounting suggest. The break from this positive association calls for explanation. Though our main contribution is to document the lack of correlation between deleveraging and recovery in financial crises following debt increases, we discuss some plausible explanations and relevant caveats here.

We argue that the result is less surprising once we take the excessive debt increases prior to the financial crisis seriously. As we discussed in the introduction, excessive amount of outstanding debt can hamper economic growth for a number of theoretical reasons.

Consider first classical debt overhang. The basic intuition is simple: Let's assume that the outstanding debt (D) is higher than the value of the firm's cash flow CF (D > CF). Now, assume further that the firm can undertake a project with positive net present value (NPV > 0). Given that some part (precisely D – CF) of the project revenue would accrue to the existing debtholders, the firm is unwilling to undertake (and unable to finance externally) some new positive net present value projects (precisely where 0 < NPV < CF – D). Renegotiating and writing down debt until the new debt level eliminates the overhang (precisely to D' = CF) leads to a Pareto improvement as creditors are paid the same as under debt overhang (i.e. CF) and the firm can finance and undertake additional positive net present value projects.

Second, households can also have excessive debt levels. Classical debt overhang is possible, as under excessive debt levels households have less incentive to accept higher effort-higher pay jobs – as parts of the payoffs would accrue to the credi-

tors. Furthermore, high household debt can reduce mobility and thereby introduce additional frictions. For instance, credit constrained households with high nominal mortgages might be unable to relocate for new jobs (Ferreira *et al.*, 2011).

Finally, dysfunctional zombie banks might finance and keep alive dysfunctional zombie firms after the crisis (Caballero, Hoshi and Kashyap, 2008). This could be part of gambling for resurrection – or simply the way to sustain banks by abusing regulatory forbearance. In this case 'bad debt' prevents efficient resource allocation: inefficient firms and banks continue to employ and waste resources. This can prevent efficient new firms and banks to enter the market and harm growth by blocking Schumpeterian creative destruction.

In short, not all debts are created equal. Normally, debt is good. It is used to finance investments, consumption, share risks and shift consumption across time. Consequently, normally we would expect debt and recovery to correlate strongly positively. However, there is 'bad debt' as we discussed. Excessive debt levels associated with debt overhang, immobile households or zombie firms is detrimental to economic growth. Reducing this 'bad debt' improves growth prospects.

Thus, with bad debt present declines in aggregate debt levels can possibly fasten the recovery. It is possible that the debt increases preceding the financial crisis led to the accumulation of such 'bad debt'. In fact, our insignificant correlations might well capture the presence of such bad debt.

Obviously and less charitably, endogeneity issues might also render the coefficients small and insignificant. For example, the adverse effect of deleveraging could trigger structural reforms, which would in turn boost growth. However, the issue is not as severe as it seems. Structural reforms may boost growth, but they do so over rather long time periods, well beyond the length of most of our windows. In addition, most shocks, like debt supply shocks or external demand shocks, affect GDP and debt the same way. It is, however, possible to construct shocks that affect debt and output in the opposite way. For instance, economic crisis in large foreign export and funding markets could imply negative shocks to output (through external demand) and positive shock to credit conditions (due to lower foreign country monetary expansion to offset the downturn). Such shocks could also weaken the observed correlation in the data. However, the fact that foreign economic activity or the current account turn out to be insignificant in our regressions suggests that at least this particular shock did not play a significant role in the crises of our sample.

Given potential uncertainties, we would stress that the results should be read with appropriate caveats. First, deriving general economic lessons from specific historical examples is inherently risky undertaking. Though we believe that the most

important common feature of the financial crises advanced economies face currently and those in our sample is the debt increases which preceded them, there remain numerous differences. Advanced economies in crises are much larger, wealthier, are more dependent on debt than the advanced and emerging markets in our sample, with the exception of Japan.

10.5. Conclusion

We found that recovery and deleveraging are uncorrelated in those financial crises that were preceded by debt increases. The results suggest that the coming deleveraging in advanced economies might not be as harmful for the recovery as many fear. Furthermore, policy makers might want to focus more on structural reforms than aggregate debt to fasten the recovery.

The results imply for policy makers that maintaining or aggressively increasing aggregate debt would not necessarily fasten the recovery. The intuition that we advance is that the increase in private debt levels which preceded the financial crisis saddled the economy with 'bad debt', i.e. excessive debt contributing dysfunctional economic conditions such as debt overhang, immobile households or zombie firms. Reducing this 'bad debt' is as positive for economic recovery as increasing 'good debt' which finances exports, consumption and positive net value investments. Hence, if our interpretation is correct, focusing on aggregate debt figures might be a distraction to hasten the recovery. Policy makers should rather focus on identifying and simultaneously reducing 'bad debt' while ensuring access to 'good debt'.

Furthermore, the results confirm that structural reforms to increase economic flexibility are crucial for strong recoveries. In many economies, especially in Europe, real effective exchange rate depreciations can only come through more flexible wages and increased productivity. Taken together with the result on aggregate debt, the results would call for focusing more on structural reforms than on providing aggregate debt stimulus.

However, we are also aware that these results come with a long list of caveats. While we strongly believe that our results provide an important and unexpected contribution to the crisis literature, we are also keenly aware that we need more research to understand debt dynamics, financial crises and how recoveries work. We hope that this research paves the way for further investigations on this question.

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11. Macroeconomic Factors and Microeconomic Bank Risk

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11.1. The Issue

How are macroeconomic shocks transmitted to bank risk and other banking variables? What are the sources of bank heterogeneity, and what explains differences in individual banks' responses to macroeconomic shocks? These questions are at the core of current policy and academic discussions on systemic risks in banking and on the link between banks and the macroeconomy. In this note, we discuss how factor-augmented VAR (FAVAR) models can be used to address these questions. We first present the set-up and the advantages of these models (Section 11.2.), we then describe results using US data on bank behaviour and macroeconomic developments (Sections 11.3. and 11.4.), we discuss implications for stress testing (Sections 11.5.) and banking regulation (Section 11.6.), and we conclude with remarks on future research (Section 11.7.).

11.2. Advantages of FAVAR Models

Factor-augmented VAR models are empirical tools that allow exploiting information from lots of (macroeconomic and financial) data and modelling the dynamic interaction between them. When applied to the analysis of the links between banks and the macroeconomy, they can make several contributions. First, the FAVAR model allows analyzing the mutual feedback between bank-specific and macroeconomic developments in a flexible way. Several VAR-studies allow for the interaction between credit and macroeconomic factors (e.g. Ciccarelli *et al.* 2010), but these studies typically do not focus on bank risk or bank-specific effects. On the other hand, bank-level studies on the risk-taking or bank lending channel of monetary policy allow macroeconomic factors to affect bank risk, but macroeconomic factors are not modelled as a function of banking variables. The FAVAR model accounts for the endogeneity of both, macroeconomic and banking factors.

Second, the FAVAR model allows including lots of bank-level data. The factor model exploits the comovement between individual banks and allows modelling

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linkages between banks. The need to account for linkages between financial institutions is one key lesson of the recent crisis (Brunnermeier 2008). Moreover, one can model the interaction between different banking variables, including the risk and the return of banks, and thus accounting for the fact that, in 'search for yield', banks may increase risk (Hellwig 2009, Rajan 2005). Another important implication of the fact that one can include a large amount of bank-level information in our model is that the exposure of each individual bank to macroeconomic shocks can be assessed.

Third, previous papers analyzing the bank lending channel or the risk-taking channel regress bank-level lending or risk on the monetary policy interest rate, GDP growth, or asset prices (e.g. Altunbas *et al.* 2009, Cetorelli and Goldberg 2008, Ioannidou *et al.* 2009, Jiménez *et al.* 2007, Kashyap and Stein 2000). The macroeconomic indicators are reduced-form constructs, and their developments may reflect the pass-through of different types of shocks. Instead, identified orthogonal macroeconomic shocks can be considered in FAVARs which allow us to gain a deeper insight in the common structural drivers of banking developments.

Fourth, FAVAR models have previously been fitted to large macroeconomic datasets (e.g. Bernanke *et al.* 2005, Boivin and Giannoni 2007) or aggregate financial datasets (e.g. De Nicoló and Lucchetta 2010, Eickmeier and Hofmann *forthcoming*). The methodology, however, allows exploiting even richer information, and its application also to micro-level data is the natural next step. Omitting bank-level information might in fact bias estimates of impulse responses and shocks series. Dave *et al.* (2009), for instance, use bank-level data to analyze the bank lending channel of monetary policy for US data using a FAVAR model, and one of our studies presented below makes a related contribution.

11.3. Heterogeneity Across Banks

In a first application of the FAVAR model to US banking data, we analyze the exposure of banks to macroeconomic developments in the US over the period 1985-2008 (Buch, Eickmeier and Prieto 2010). A standard macroeconomic VAR comprising GDP growth, inflation, house price inflation, and the monetary policy interest rate is extended with a set of factors summarizing a large amount of information from bank-level data. The bank-level dataset contains as a measure of (*ex post*) bank risk the ratio of non-performing loans over total loans which is our focus. We also include bank capitalization, profitability, and loans as bank-level variables which affect the transmission mechanism of macroeconomics shocks on risk. Data for a balanced panel of about 1,500 banks are taken from the US call reports. We decompose the banking data into common and idiosyn-

cratic components. A set of macroeconomic (supply, demand, monetary policy and house price) shocks is identified and, based on an impulse response analysis, their transmission through the banking system is assessed. We look at the effects of the shocks on aggregate bank variables, but also on individual banks. Using cross-sectional regressions, we study which bank-level features can explain differences in banks' responses to macroeconomic shocks.

The study is related to theoretical and empirical work on the effects of macroeconomic (mostly monetary policy) developments on bank risk. Financial accelerator mechanisms imply that changes in interest rates may have countervailing effects on bank risk. On the one hand, lower interest rates reduce the interest rate burden for firms, lower the risk of outstanding flexible loan contracts, thereby increasing the probability of repayment and the value of the underlying collateral. On the other hand, the borrowing capacity of high-risk firms increases with the value of pledgeable assets. Also, banks might engage in riskier, high yield, projects to offset the negative effects of lower interest rates on profits. Risk might increase. Conversely, higher interest rates increase the agency costs of lending, banks reduce the amount of credit to monitoring-intensive firms, and they invest more in safe assets ('flight-to-quality') (Bernanke *et al.* 1996, Dell'Ariccia and Marquez 2006, Matsuyama 2007).

While the original financial accelerator models do not assign a specific role to banks, recent macroeconomic models explicitly analyze the feedback between banks and the macroeconomy in the context of dynamic stochastic general equilibrium (DSGE) models (e.g. Angeloni and Faia 2009, Dib 2010, Gerali *et al.* 2010, Meh and Moran 2010, Zhang 2009). In these models, the impact of expansionary shocks on bank lending is unequivocally positive, but the impact on bank risk is less clear cut. In Angeloni and Faia (2009), for instance, a declining interest rate, following an expansionary supply or monetary policy shock, reduces banks' funding costs and increases the probability to repay depositors. To maximize profits, banks optimally choose to increase leverage. But the decline in interest rates also lowers banks' return on assets and this, together with higher leverage, increases bank risk. In Zhang (2009), on the contrary, expectations of future outcomes play a central role. A positive technology shock, for instance, increases the return on capital above its expected value which in turn corresponds to a lower than expected loan default rate. The bank thus realizes unexpected profits on its loan portfolio. Bank capital is accumulated through these earnings, strengthening banks' balance sheet positions and reducing risk.

A small set of empirical papers looks at the impact of monetary policy shocks on bank risk, with ambiguous findings. A few recent papers analyze the risk-taking channel of monetary policy and investigate whether low policy interest rates encourage lending to high-risk borrowers (Rajan 2005, Borio and Zhu 2008).

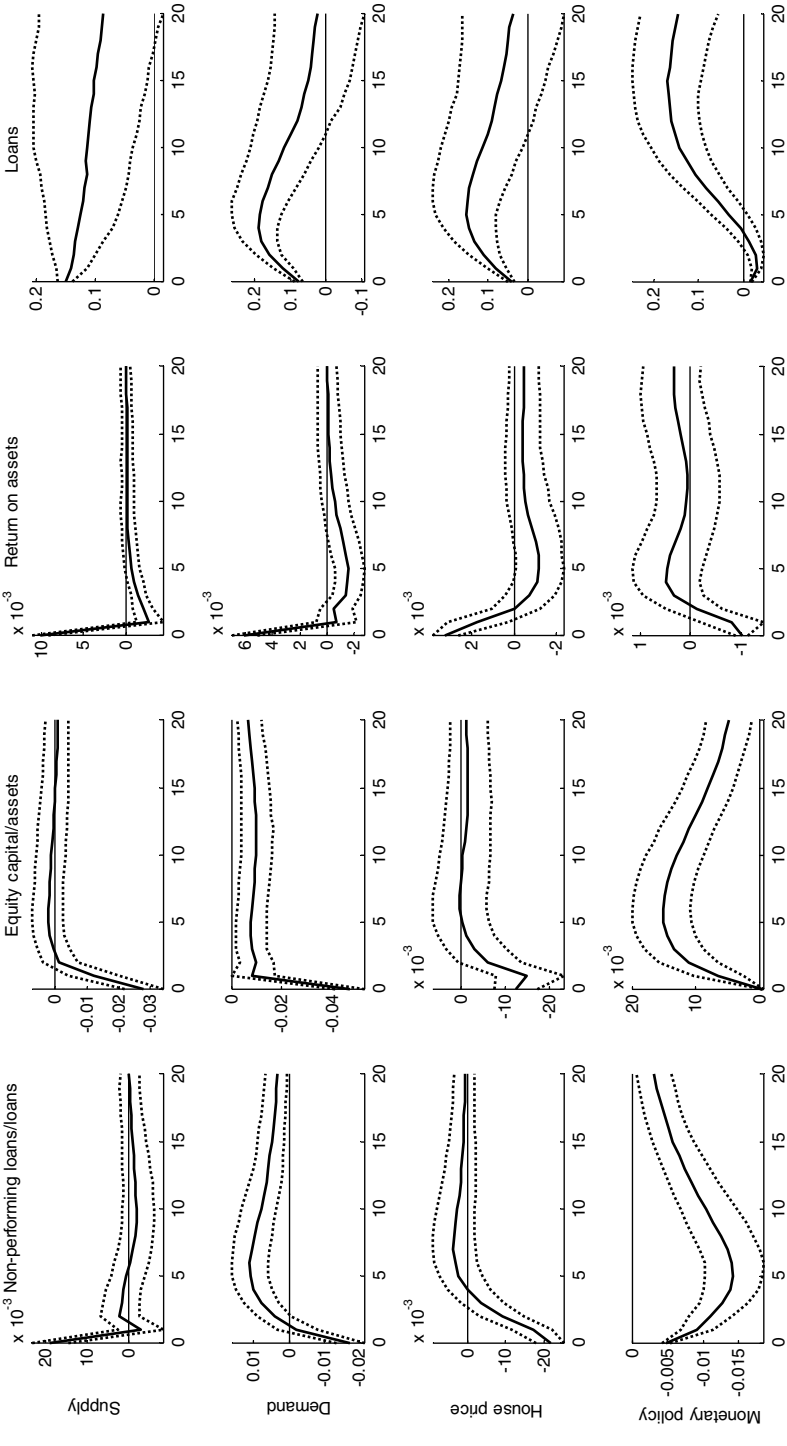
Empirical studies based on bank-level data find evidence that lower interest rates increase bank risk (Altunbas *et al.* 2009, Gambacorta 2009, Ioannidou *et al.* 2009, Jiménez *et al.* 2007). Based on time series evidence for the US, Eickmeier and Hofmann (*forthcoming*) and Angeloni *et al.* (2010) find a decline of various credit risk spreads and an increase of bank balance sheet risk, respectively, following an expansionary monetary policy shock. Using a model that captures the feedback between bank-level distress and the macroeconomy, De Graeve *et al.* (2008), in contrast, find a decline in German banks' probability of distress after a monetary policy loosening. The impact of other shocks has, to the best of our knowledge, so far not been subject to careful empirical investigation.

The FAVAR modeling approach implicitly accounts for the key mechanisms stressed in the theoretical papers and provides empirical evidence on the net effect of macroeconomic shocks on bank risk. The main findings of Buch *et al.* (2010) are as follows: (i) Average bank lending increases following expansionary shocks (Figure 1). Average bank risk declines after most expansionary macroeconomic shocks. House price and monetary policy shocks are particularly important for bank risk. (ii) There is a substantial degree of heterogeneity across banks both in terms of idiosyncratic shocks and the asymmetric transmission of common (banking and macroeconomic) shocks (Figure 2). While average risk declines, risk of a sizeable fraction of banks rises in response to expansionary shocks. As a last step we regress the individual banks' impulse responses on several bank characteristics and find that the degree of capitalization, the exposure to real estate loans, the riskiness and the presence of foreign affiliates matter for individual banks' risk responses.

11.4. Macroeconomic Shocks and Bank Risk Taking

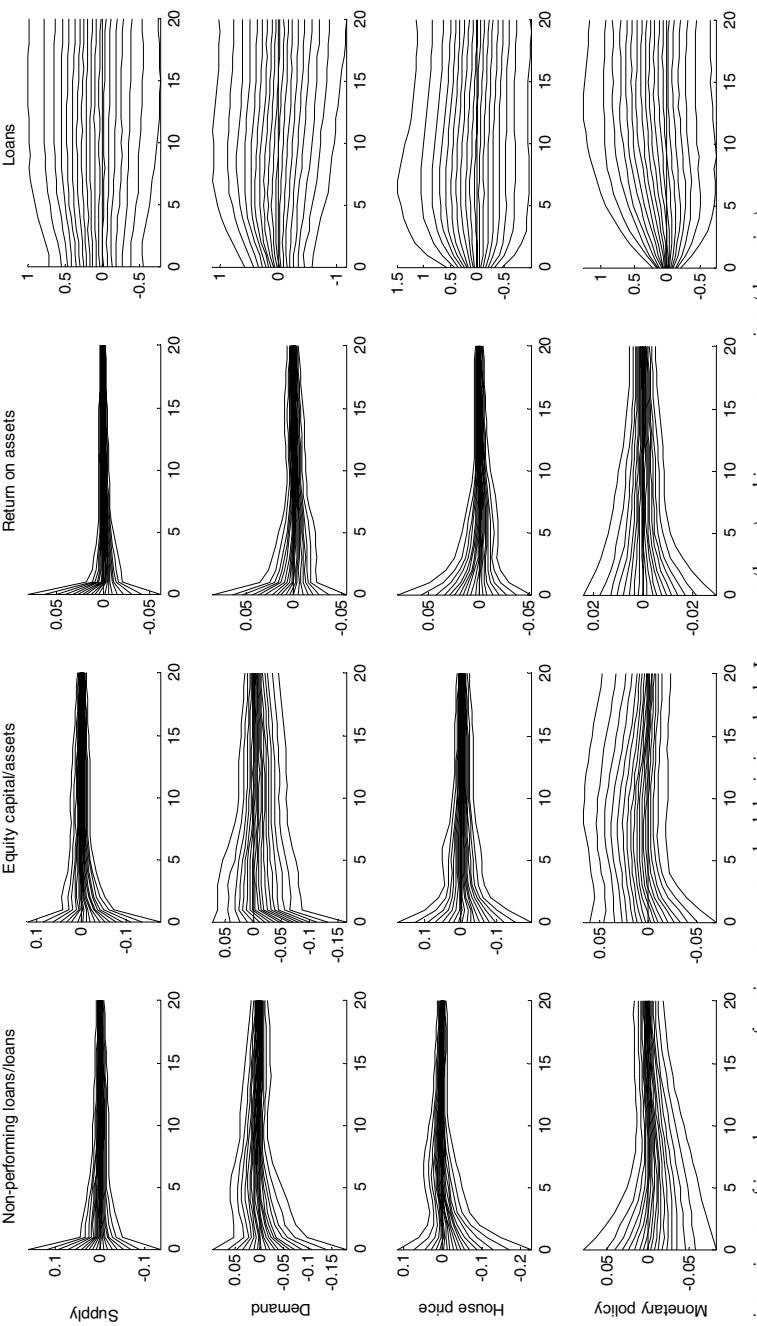
In a second application (Buch *et al.* 2011), we look at the impact of macroeconomic shocks on bank risk taking more explicitly.This study is motivated by the observation that there is growing consensus that the conduct of monetary policy can have an impact on financial and economic stability through the risk-taking incentives of banks. Falling interest rates might induce a 'search for yield' and generate incentives to invest into risky activities, as has been observed in the years preceding the global financial crisis. This can have implications for optimal central bank policy, which may want to take into consideration aspects of financial stability. Conducting optimal central bank policy, however, requires a thorough understanding of banks' attitude towards risk taking following monetary policy actions. Providing evidence on the link between monetary policy and, as an additional factor, commercial property prices and the risk-taking incentives of banks is the purpose of the second paper reviewed here.

Figure 1: Impulse Response Functions of Median Banking Variables



Notes: We show the median and the one standard deviation confidence bands. In percent (loans) and in percentage points (the ratios).
Source: Buch et al. 2010.

Figure 2. Impulse Response Functions of Individual Banks (5th to 95th Quantiles)



Notes: Point estimates of impulse response functions to one standard deviation shock. In percent (loans) and in percentage points (the ratios).
Source: *Buch et al. 2010.*

This study is motivated by theoretical work showing the conditions under which banks increase risk following a decline in the monetary policy rate. In the model by Dell'Ariccia *et al.* (2010), for instance, banks hold a portfolio of risky loans, financed with deposits and equity. Monitoring can increase the probability of loan repayment. The deposit rate is fixed at the policy rate, and equity is priced at a mark-up over the policy rate. In this baseline model, there is a pass-through effect in the sense that lower policy rates decrease loan rates. This pass-through effect lowers the incentives to monitor (i.e. risk increases) and it can be interpreted as a 'search for yield' effect. In addition, risk can be shifted from depositors to equity-holders. The importance of this risk-shifting effect depends on the degree of leverage of the bank: if bank equity is low, monitoring increases with a lower policy rate; if bank equity is high, monitoring decreases.

The model can be extended by allowing lending to be backed by collateral. An increase in the liquidation value of collateral reduces the gains from monitoring. Ceteris paribus, banks optimally reduce monitoring and end up with a riskier loan portfolio. Overall, the model shows that the degree of capitalization of banks, monitoring costs, and the degree of market power affect banks' responses to macroeconomic shocks. Hence, the model provides an explanation for why banks with different characteristics can react differently to monetary policy or collateral shocks.

We then use a FAVAR for the US which comprises GDP growth, GDP deflator inflation, commercial property price inflation (as a measure of collateral values for business lending), the monetary policy interest rate, and a set of factors summarizing information on business lending provided in the Federal Reserve's *Survey of Terms of Business Lending* (STBL). The STBL questionnaire asks the banks to rate the risk of new loans each week based on the borrower's credit history, cash flow, credit rating, access to alternative sources of finance, management quality, collateral, and quality of the guarantor. It provides information on new loans, not on outstanding loans. The risk-taking channel as advanced by Rajan (2005) and Borio and Zhu (2008) describes the incentives to engage in *ex ante* riskier projects. Hence, a clear distinction between new and outstanding loans is important which the survey allows us to do. (Notice that this distinguishes this FAVAR application from the previous one where we used information on outstanding, not on new loans, and where we focused on *ex post* risk.) Again, the FAVAR has the advantage that all information contained in the survey, especially information on new business loans associated with different risk categories, can be exploited. We then assess the reaction of banks' risk taking to monetary policy and property price shocks.

Buch *et al.* (2011) do not find evidence for a risk-taking channel for the entire banking system after expansionary monetary policy shocks. This masks, however,

important differences across banking groups. Small domestic banks take on more new risk, while foreign banks lower risk, and large domestic banks do not change their exposure to new risk. Descriptive statistics on changes in the portfolio composition of banks' loan portfolios show this effect as well (Figure 3). The paper also provides suggestive evidence that small domestic banks are more highly capitalized, face higher monitoring costs, and have less market power than large domestic and foreign banks. These features may, from a theoretical point of view, indeed explain the differential response of banks to the shocks. Shocks to commercial property prices lead to higher risk across all banking groups, but only small banks load additional new risk. Changes in risk after the two shocks materialize not only through the volume of lending but also through the pricing of risk: banks shift their (new) loan portfolio towards higher risk loans, *and* they charge a lower risk premium.

11.5. Implications for Banking Regulation

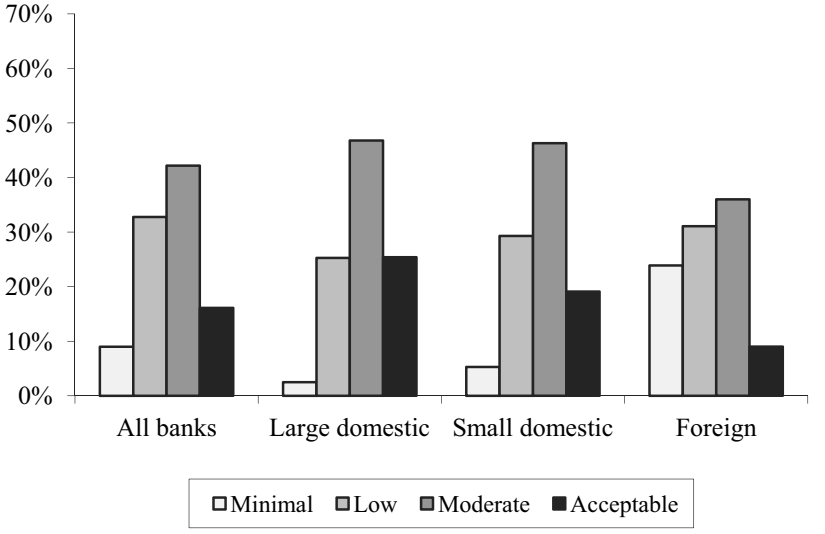
The exposure of banks to macroeconomic factors also features prominently in recent proposals for regulatory reforms (Basel Committee 2009). Rochet (2008) suggests on the basis of a theoretical model that banks should face a capital requirement and a deposit insurance premium that increases with their exposure to macroeconomic factors. Farhi and Tirole (2009) analyze the incentives of banks to coordinate their exposure to macroeconomic shocks, and they argue that banks which react more to macroeconomic factors should be regulated more tightly. Gersbach and Hahn (2009) propose a regulatory framework under which a banks' required level of equity capital depends on the equity capital of its peers and, in this sense, on the macroeconomic environment. Implementing these proposals requires information about individual banks' exposures to macroeconomic factors. Our results inform this debate.

Hence, the findings summarized above are interesting from a banking regulation perspective. The result that less liquid and not well capitalized banks react more to macroeconomic shocks support proposals requiring more capital and higher liquidity ratios if regulators are concerned that the banking sector acts as an accelerator of macroeconomic shocks. At the same time, we find that small and purely domestic banks are more vulnerable to macroeconomic shocks and that the risk taking channel is especially relevant for these banks. But one should also take into account that the systemic impact of these banks on the macroeconomy might be rather small. Regulatory policy would therefore need to balance different criteria (the relevance of an institution for systemic risk and its exposure to macroeconomic shocks) when deciding upon new capital or liquidity requirements.

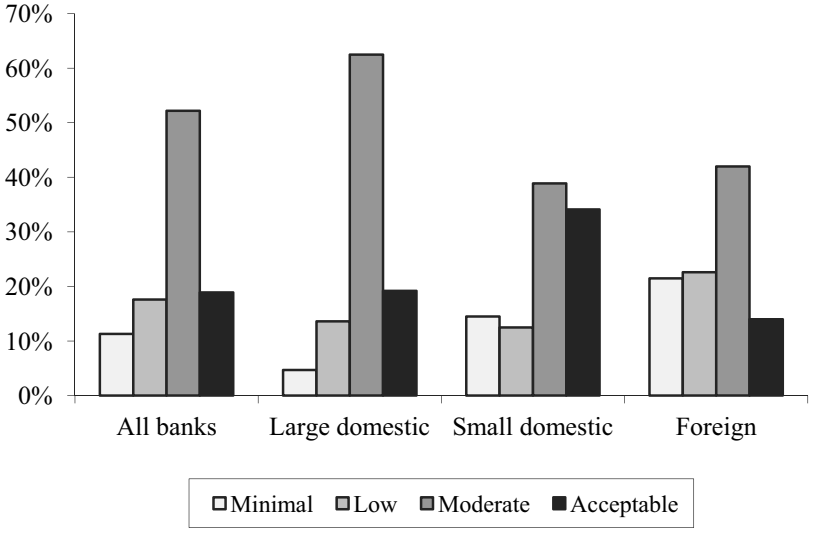
Figure 3. Share of Risky Loans Across Banking Groups

This figure shows the composition of banks' loan portfolios across the different risk categories.

(a) Structure of banks' loan portfolio in 1997



(b) Structure of banks' loan portfolio in 2007



Source: Survey of Terms of Business Lending (STBL); own calculations.

11.6. Implications for Stress Testing

In addition to describing the adjustment of banks to macroeconomic shocks – as well as the feedback from banks to the macroeconomy – factor models can also be used for stress testing exercises. Generally, stress-testing models have the aim of determining under which conditions the aggregate capitalization of the banking system is low, to create scenarios for macroeconomic conditions, and forecast implications for bank losses and capitalization.

To fulfil these purposes, a large amount of information is required, including the exposure and reactions of banks to macroeconomic conditions (i.e., the common exposures across all banks), idiosyncratic shocks affecting large banks, interdependencies among banks (both, direct and indirect, through common exposures or business models), feedback effects between the banking system and the macroeconomy and forecasts of macroeconomic conditions. Moreover, possible structural changes must be addressed ('Lucas critique'). Factor models can address several of the above challenges and they have, in fact, been suggested as a tool for stress-testing (De Nicolo and Lucchetta 2010).

In this context, there are several advantages of dynamic factor models. First, they can be use to analyze feedback between the banking sector and the macroeconomy. Second, they highlight the importance of systemic risk arising from common exposures to macroeconomic shocks, and the importance of the banking sector for the macroeconomy can be assessed as well. Third, they can be applied in a data-rich environment and provide high flexibility with regard to variables considered. Finally, they can be applied to all banks, not only publicly traded banks. One disadvantage of these models, however, is that they can probably not be used for explicitly analyzing shock transmission between individual banks, which requires some form of network models. Overall though, factor models can be a useful part of the toolbox for macroeconomic stress-testing. Because these models require large cross-section and time dimensions, databases should be build up that provide sufficiently long time series and make them available for researchers.

11.7. Avenues for Future Research

Overall, the research reviewed in this note can be seen as a first step into the direction of jointly modelling dynamics of the banking sector and the macroeconomy. They suggest that these feedback effects are relevant for both, understanding macroeconomic dynamics as well as the behavior of banks. Research of this type would certainly benefit from high-quality microeconomic panel data in order to compare results for the US to those for other countries. In terms of future research, there are three additional issues which we consider promising. First, it would be interesting to disentangle domestic and global macroeconomic shocks

and to assess if internationally active banks are worse off after adverse global shocks. Second, non-linearities, e.g. in the reaction of banks to common (macroeconomic and banking) shocks, may be present in exceptional situations such as banking crises. Our model has to be seen as suitable to analyze macro-banking feedbacks in 'normal' times, but could be extended to allow for non-linearities. Third, the role of shocks to large banks for macroeconomic dynamics would be worth examining in detail.

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12. What Have We Learned about Creditless Recoveries?

Abdul Abiad, Giovanni Dell'Ariccia and Grace Bin Li[1]

12.1. Introduction

Bank credit is considered as a critical factor in facilitating economic activities. However, we do observe creditless recoveries after some recessions, namely economic growth without credit growth. This phenomenon was first documented by Calvo, Izquierdo and Talvi (2006), who study what happens to output and credit after global or 'systemic' sudden stop episodes. They find that, on average, output returns quickly to pre-crisis levels, but with weak investment and virtually no recovery in domestic or external credit (so-called 'Phoenix miracles').

In a recent paper, Abiad, Dell'Ariccia and Li (2011) address a broad set of questions regarding creditless recoveries. How common are they, and under what conditions do they tend to occur? How do they differ from 'normal' recoveries? Do they reflect impaired financial intermediation? And finally, can and should policymakers respond to them? In this article, we provide a non-technical summary of the new findings in Abiad, Dell'Ariccia and Li (2011) and discuss some of the policy related issues.

Our study proceeds in two steps. First, we use macro data to identify and examine creditless recoveries in a broad set of countries. This analysis focuses on correlations and studies the frequency, duration, shape, and composition of the recoveries. It investigates which types of downturns are more prone to be followed by creditless recoveries. And it asks whether creditless recoveries are associated with worse growth performance, and if so, which components of growth are most affected. Second, we turn to sectoral data to investigate the mechanism behind creditless recoveries. In particular, we use a difference-in-difference approach to identify causal links between credit growth and output performance. If disruptions of financial intermediation are at the roots of creditless recoveries, their effect should be felt disproportionately more by those sectors that rely more heavily on external finance.

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We find that creditless recoveries – defined as episodes where real credit growth is negative in the first three years following a recession – are not rare. They follow about one in five recessions in a wide set of countries. And while they seem to be more common in developing countries and emerging markets, they also occur in advanced economies.

Creditless recoveries are only incomplete 'miracles'. On average, activity recovers by substantially less than in recoveries with credit: output growth is on average a third lower. Put differently, creditless recoveries tend to be weaker and more protracted (i.e., it takes longer for output to return to trend). This result remains when controlling for the characteristics of the preceding recession. And these averages mask wide variations – many creditless 'recoveries' are followed by stagnant growth.

Looking at what pre-conditions tend to precede creditless recoveries, the frequency of creditless recoveries doubles when the downturn was preceded by a credit boom, and more than doubles when the downturn was preceded by or coincided with a banking crisis. If the downturn was preceded by both a banking crisis *and* a credit boom, the subsequent recovery would almost certainly be creditless. Currency and sovereign debt crises have a smaller effect, and in the presence of a banking crisis they do not significantly increase the likelihood of a creditless recovery. These findings suggest that the relatively weak macroeconomic performance during creditless recoveries is the result of constrained growth due to impaired financial intermediation. This is consistent with Calvo *et al.* (2006) who argue that the lack of credit growth during these recoveries can be rationalized with financial frictions preventing firms from obtaining funding for new investment.

Output decompositions buttress this perspective. Investment – which is likely to depend more on credit than consumption – has a disproportionately smaller contribution to growth in creditless recoveries relative to other recoveries, although consumption takes a hit as well. Interestingly, creditless recoveries are not jobless recoveries – employment dynamics are no different on average from those in normal recoveries. Instead, it is productivity and capital deepening which are adversely affected.

Using sectoral data, we test more formally the hypothesis that the weaker macroeconomic performance during creditless recoveries stems from disruptions of financial intermediation. We use industry-level data covering 28 manufacturing industries in 48 countries, from 1964 to 2004, and follow Braun and Larrain (2005) who focus on recessions rather than recoveries and analyze an industry's performance with the growth rate of industrial production. This measure is then regressed on an array of controls, including multiple sets of fixed effects (to take care of industry-year, and industry-country specific omitted factors), and our var-

iable of interest, the interaction of a measure of the industry's financial dependence and the creditless recovery dummy.

Braun and Larrain (2005) find that more financially dependent industries perform relatively worse during recessions. Consistent with their result, we find that these industries perform relatively better than less financially dependent industries during all typical recoveries (although, similar to their analysis of 'booms', the result is generally weak and not always significant). During creditless recoveries, however, industries that are more dependent on external finance tend to grow disproportionately less than those that are more self-financed. This result appears economically meaningful. During creditless recoveries, the growth rate of industries that are highly dependent on external finance (at the 85th percentile of the index distribution) is over 1.5 percentage points lower than in 'normal' recoveries. The same difference drops to 0.4 percentage points for low-dependence industries (those at the 15th percentile). This differential effect appears robust. It is present in both advanced economies and emerging markets. It survives when controlling for capital inflows. And it does not seem to depend on measurement issues that may stem from large fluctuations in credit aggregates due to exchange rate movements (in the presence of foreign denominated loans).

The finding that creditless recoveries are suboptimal outcomes associated with impaired financial intermediation is relevant from a policy standpoint. Had causality gone the other way – that is, had creditless recoveries resulted instead from an exogenous decline in the demand for credit, for example due to weak growth prospects – there would have been little room for policy action beyond countercyclical macro measures typically adopted in 'normal' recoveries. Given the evidence, however, policies aimed at restoring credit supply should lead to fewer credit constraints and higher growth. The findings are also relevant for the recent global financial crisis. Given the widespread financial sector distress, the retrenchment in cross-border capital flows, and the occurrence of credit and property booms in several countries, the recovery from the crisis is likely to be creditless in a number of economies, and thus slower than average. To contain this effect, continued policy action is required to restore the supply of credit, cushion the effects of deleveraging, and address the undercapitalization of several financial institutions.

The rest of the article is organized as follows: Section 12.2. examines creditless recoveries from a macro perspective. Section 12.3. presents the sectoral analysis. Section 12.4. concludes.

12.2. Macro Perspective

In this section, we study creditless recoveries from a macro perspective. We examine how creditless recoveries differ from 'normal' recoveries, and analyze and compare the duration, shape, and frequency of these recoveries. We also examine whether creditless recoveries are peculiar to certain sets of countries or follow particular events such as banking crises, currency crises, debt crises, sudden stops, or credit booms. For now, we focus on associations and do not attempt to establish causal links between the variables, leaving that for the sectoral analysis in the next section.

In this section, we address what we have learned about creditless recoveries, including:

1. how to define creditless recoveries?
2. how common are they?
3. how are creditless recoveries different from other recoveries?
4. how to decompose creditless recoveries?

Before we can define creditless recoveries we first need to define what countries are recovering from. We identify economic downturns following the methodology in Braun and Larrain (2005). Recessions are identified based on fluctuations of real annual GDP.[2] Specifically, a Hodrick-Prescot filter is used to extract the trend in the logarithm of real GDP. The smoothing parameter is set at 6.25 as recommended for annual data by Ravn and Uhlig (2002). Recessions are identified whenever the cyclical component of GDP (detrended real output) exceeds one country-specific standard deviation below zero. The recession is then dated as starting the year following the previous peak in (detrended) real output, and continuing until the year of the trough (when the cyclical component is at its lowest point). We then define the 'recovery period' as the first three years following the trough of a recession. This simplifies the distinction between creditless and normal recoveries and limits problems associated with 'double dip' recessions. This methodology identifies 388 recoveries, roughly equally divided between advanced OECD countries, emerging markets, and low-income countries[3].

We focus on bank credit to the private sector, as measured in line 22d of the *IFS*. This is a choice of necessity. The series is the only one available with broad cross-country and time-series coverage. One shortcoming is that it does not include credit extended by non-bank financial intermediaries. For most countries this is

[2] We use real GDP data from WDI, extended using WEO data to 2008-09 where available. This data covers 172 countries, from 1960-2009 (unbalanced).

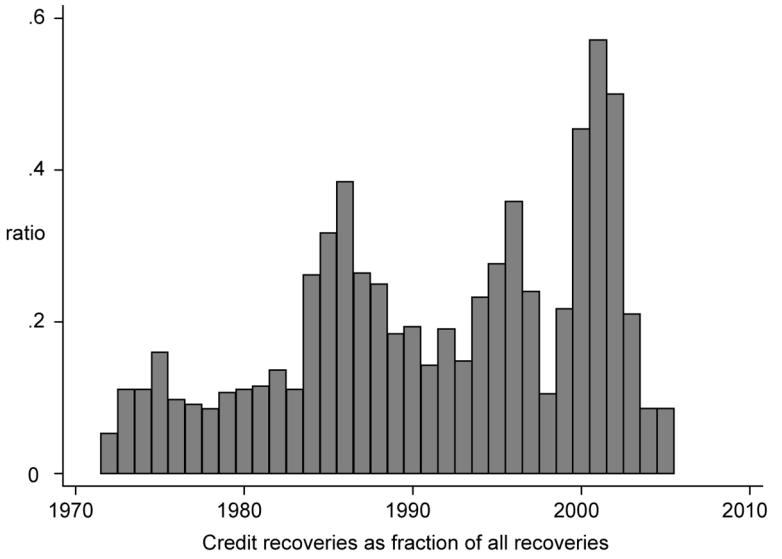
[3] The country groups are defined in the Data Appendix of Abiad, Dell'Ariccia and Li (2011). Emerging markets are the 26 countries covered in the MSCI EM index, advanced OECD refers to the 23 OECD members not in the emerging markets group, and LIC refers to low-income countries according to the World Bank's income classification.

not a major issue. But for a couple of cases, such as the US, a critical portion of the financial sector is not covered by the data. A *creditless recovery* is then defined as one in which the growth rate of real bank credit (deflated by the GDP deflator) is zero or negative in the first three years of recovery.

Creditless recoveries are not rare. They represent about one-fifth of all recoveries. But there are more than slight differences in their distribution across country groups. In particular, creditless recoveries are more common in low income countries and emerging markets than in advance economies, where they represent only about 10 percent of all recoveries. Indeed, a Pearson chi-square test rejects at the 10 percent level the null hypothesis that the relative frequency of creditless recoveries is the same across country groups. This suggests that these events tend to be more common in countries with less developed financial markets. Indeed, the cross-country correlation between financial development (measured by the average credit-to-GDP ratio over the sample period) and the frequency of creditless recoveries is about -0.2.

There is also substantial time-series variation in the relative frequency of creditless recoveries. In particular, creditless recoveries tend to be clustered geographically and around three peak periods (Figure 1). These clusters follow the Latin American debt crisis of the early 1980s, the ERM crisis and Scandinavian banking crises of the early 1990s, and the Asian crisis of the late 1990s.

Figure 1. Creditless Recoveries over Time



The question then arises: to what extent are creditless recoveries associated with the nature of the preceding recession? In particular, we are interested in the predictive power of specific events such as credit booms, banking and currency crises, and real-estate booms and busts. If creditless recoveries are the result of an impaired financial intermediation, they should be more likely in the aftermath of events associated with disruptions in the credit supply.

We first focus on downturns associated with a systemic banking crisis, as defined by Laeven and Valencia (2008). If a systemic banking crisis occurred in the two years prior to or the year coinciding with a downturn, the frequency of creditless recoveries is three times as high as when there is no banking crisis. Nevertheless, only about half of banking crises are followed by a creditless recovery.

Both currency and sovereign debt crises seem to have some influence independent of the effect of banking crises. In the absence of a banking crisis, a currency crisis preceding a recession doubles the frequency of creditless recoveries, and a sovereign debt crisis more than doubles it. But conditional on a banking crisis, the occurrence of either a currency crisis or a sovereign debt crisis does not seem to be associated with a significantly higher frequency of creditless recoveries.

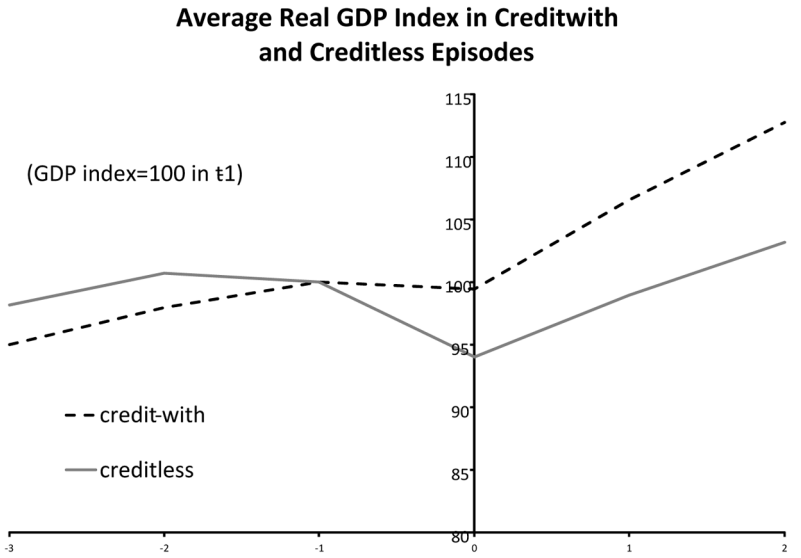
Finally, we look at downturns preceded by a credit boom, using the methodology developed in Mendoza and Terrones (2008). The occurrence of a credit boom prior to the downturn doubles the relative frequency of creditless recoveries. But the effects of a credit boom are weak when there is no banking crisis; instead, it is when downturns are preceded by both a credit boom *and* a banking crisis that creditless recoveries become most likely.

If creditless recoveries tend to follow a credit boom-bust cycle, do they also tend to follow boom-bust cycles in the property market? In the absence of reliable cross-country housing price data, we rely on construction investment data as a proxy, and we do find that creditless recoveries are associated with construction boom-bust cycles. In particular, we find that, on average, creditless recoveries are preceded by a collapse in construction investment (with an average decline of about 17 percent). In contrast, construction investment growth is essentially zero before recoveries with credit. To the extent that a collapse in construction investment signals a housing bust, we interpret this result as evidence that creditless recoveries are associated with the destruction of collateral value (and the consequent increase in agency problems) stemming from sharp declines in real estate prices.

Creditless recoveries are less desirable than 'normal' ones from a growth performance standpoint. For our broader sample of recessions, average output growth in creditless recoveries is 4.5 percent per year, compared to about 6.3 percent in recoveries with credit. As a consequence, output is also slower to return to trend.

Output returns to trend within three years from the end of the recession in less than half of creditless recoveries, compared to over two thirds of recoveries with credit. In part, this reflects the fact that creditless recoveries tend to be preceded by deeper recession. But it is also the result of the differential in growth rates. This is consistent with financial accelerator models. Greater destruction of collateral value associated with a deeper recession will translate in a more sluggish credit growth in the recovery, as shown in Figure 2.

Figure 2. Comparison of Creditless with Normal Recoveries



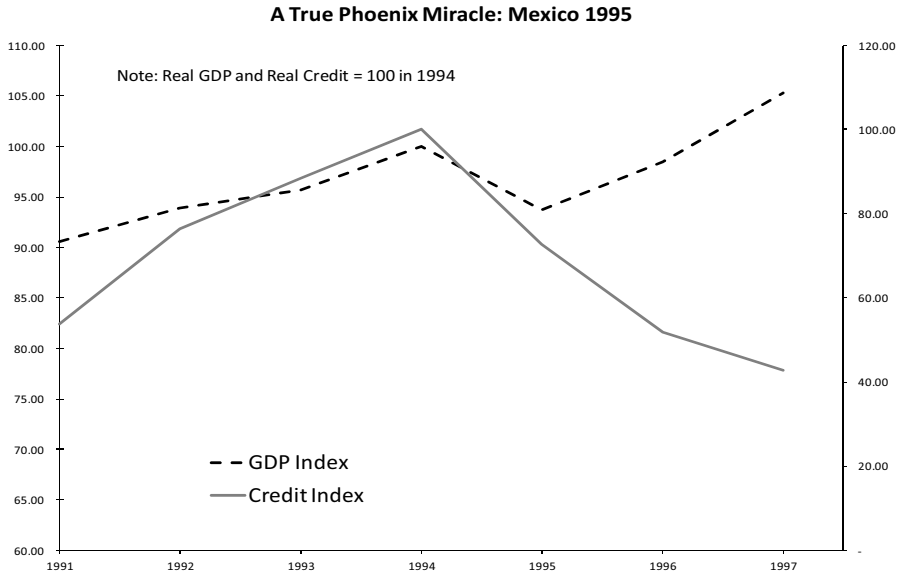
Calvo *et al.* (2006) document the characteristics of recoveries after systemic sudden stop (3S) episodes. They find that after these episodes economies on average experience a quick, but creditless, recovery and dubbed the phenomenon a 'Phoenix miracle'. We find that over half of 3S episodes in our sample are indeed creditless, and average growth during 3S creditless recoveries is indeed quite high – 3.9 percent, compared to 4.3 percent during 3S recoveries with credit – which is consistent with Calvo *et al.*'s (2006) findings.

A closer inspection, however, reveals a bimodal distribution, similar to what Huntley (2008) describes. But going beyond Huntley (2008), we identify the cause of the bimodality: what matters is whether the 3S episode is associated with a banking crisis or not. For 3S episodes that did not result in a banking crisis, the recovery has always been one with positive real credit growth, and output returns to trend within three years in most (5 out of 6) cases. In contrast, during 3S episodes associated with a banking crisis, 80 percent of the recoveries are credit-

less, and in two-thirds of these episodes output does not return to trend within three years.

That said, we do find a few 'true miracles'; exceptional cases in which output recovers sharply in the absence of credit growth. In our sample, Chile and Uruguay in 1984-86, Mexico 1995-98, Argentina 2003-05, fit this description. Figure 3 shows an example of true Phoenix Miracles, observed in the Mexico 1995 episode. These events follow exceptionally deep recessions. Mexico, the possible exception, experienced a drop in output in excess of 6 percent in 1996, and the other three countries all witness double-digit falls during their recessions. It is, then, possible that these 'miracles' are in part due to a rebound effect.

Figure 3: One Example of Phoenix Miracles



To shed some light on the difference in macroeconomic performance between creditless and 'normal' recoveries, we decompose aggregate growth in its demand components. During creditless recoveries, the contributions of consumption and investment to output growth are roughly one percentage point lower than during normal recoveries, fully accounting for the two percentage point difference in output growth between creditless and with-credit recoveries. In relative terms, however, the contribution of investment falls by roughly half against a fall by a third in that of consumption. This suggests that the components of aggregate demand more dependent on credit contribute the most to the difference in growth rates relative to with-credit recoveries. Net exports do not, on average, contribute to output growth during recoveries, regardless of credit dynamics. To be clear, the

external sector does contribute positively to growth during the recession as the current account improves (often swinging from negative to positive). But during the recovery, both exports and imports increase, resulting on average in a roughly null contribution to growth.

Growth accounting points in the same direction. Lower growth during creditless recoveries can be ascribed to lower capital accumulation and lower TFP growth. These results are consistent with what Calvo *et al.* (2006) find for 3S episodes. Lower capital accumulation is consistent with the results for demand decomposition. Lower TFP growth may indicate that younger and start-up firms, which typically have higher productivity growth, find it more difficult than others to obtain credit during these episodes. It is also consistent with the notion that an impaired financial system is less efficient in reallocating capital across sectors as needed to absorb asymmetric shocks.

In contrast, employment growth (or alternatively, the decline in the unemployment rate) seems independent from the evolution of credit during the recovery. We interpret these results as suggesting that it is, again, the more credit dependent components that suffer during creditless recoveries. As pointed out by Calvo *et al.* (2006), these results are consistent with a situation where, because of financial frictions, firms can obtain short-term credit for working capital but cannot obtain long-term financing for physical capital.

12.3. Sectoral Analysis

In this section, we test empirically the hypothesis that creditless recoveries (and the associated lower output performance) are the result of impaired financial intermediation. Our identification strategy relies on the notion that, in the presence of market imperfections, different sources of funds (bank credit, the issuance of tradable bonds, and equity) are not perfect substitutes. Then, if creditless recoveries stem from disruptions in the supply of bank credit, firms and industries that are more reliant on credit should perform relatively worse. By contrast, if the creditless nature of the recovery were demand driven, sector's performances should not differ in a systematic way.

Our analysis follows the difference-in-difference approach employed by several studies focusing on the real effects of banking crises and financial development. We use industry-level data from manufacturing sectors in both advanced economies and emerging countries during 1970-2004. Industries are ranked according to the Rajan and Zingales index of external financial dependence, defined as capital expenditures minus cash flow from operations divided by capital expenditures. The differential performance of growth in real value-added and industrial

production during recoveries across these industries within a particular country is the main channel through which the real impact of credit is identified.

We adopt the same working assumption as in Rajan and Zingales (1998), later employed among others by Braun and Larrain (2005), Krozner *et al.* (2007), and Dell'Ariccia *et al.* (2008): External dependence is determined by technological factors, such as production time, capital intensity, and the importance of R&D investment. And while the absolute value of the index may vary across countries and time, for the methodology to work it is sufficient that the industry ranking remains broadly the same. Rajan and Zingales (1998) support this assumption with data from Canada.

We start by looking at the relative performance of credit-dependent sectors during all recoveries (irrespective of credit conditions). Braun and Larrain (2005) find that more credit-dependent sectors suffer disproportionately during recessions (when agency problems become more severe). Hence, one would expect them to perform relatively better during recoveries, as agency problems diminish.

We run the following regression on recoveries as our baseline specification.

$$Growth = \alpha_1 Share_{i,c,t-1} + \alpha_2 Recovery_{c,t} + \alpha_3 CreditlessRecovery_{c,t} + \alpha_4 (Recovery_{c,t} \times Dependence_i) + \alpha_5 (CreditlessRecovery_{c,t} \times Dependence_i) + \sum_{i,c} \beta_{i,c} \times d_{i,c} + \sum_{i,t} \beta_{i,t} \times d_{i,t} + \varepsilon_{i,c,t}$$

The dependent variable is the growth rate of industrial production in industry i at time t in country c. Regressors include two sets of fixed effects (industry-year and industry-country) and the variable of interest, an interaction term equal to the product of the financial dependence measure for industry i and the recovery dummy for year t and country c. Following Rajan and Zingales (1998), we also include the lagged share of industry i in country c to account for 'convergence' effects, i.e., the tendency of larger industries to experience slower growth.

The variable $d_{i,t}$ denotes the industry-year dummy, and $d_{i,c}$ is the industry-country dummy. $Share_{i,c,t-1}$ is the size of the industry in the country at the time t-1. $Dependence_i$ is the industrylevel financial dependence, which follows the Rajan and Zingales (1998) methodology, and is assumed to be constant across years. $Recovery_{c,t}$ is a dummy taking value 1 in the three years following the trough of a recession in country c at year t. $CreditlessRecovery_{c,t}$ is a dummy equal to one when real credit growth is negative during a recovery. We expect the sum of α_2 and α_3, reflecting the level effect of creditless recoveries, to be positive. But based on the results from the macro section, we expect α_3 to be negative; the macroeconomic performance during creditless recoveries is weaker than during standard ones. Furthermore, the coefficient α_5 allows us to have a comparison

between the sectoral growth and the type of the recovery. In particular, a negative α_5 would indicate that sectors more reliant on external finance perform relatively worse during creditless recoveries. This would in turn lend support to our claim that creditless recoveries are the result of disruptions in the credit supply.

The evidence from sectoral data suggests that creditless recoveries are indeed the result of impaired financial intermediation. During these episodes, sectors more dependent on external finance perform relatively worse. These results are statistically and economically significant and survive several robustness tests.

Table 1: The Effect of Creditless Recoveries on Sectoral Growth

VARIABLES	OECD+EM	OECD	EM
size (lagged)	-0.0064	0.0703*	-0.0654
	[-0.187]	[1.873]	[-1.249]
recovery	0.0273***	0.0230***	0.0328***
	[17.645]	[14.366]	[11.473]
creditless recovery	-0.004	-0.0048	-0.004
	[-1.147]	[-1.291]	[-0.639]
recovery x dependence	0.0091**	0.0049	0.0147**
	[2.380]	[1.193]	[2.105]
creditless recovery x dependence	-0.0190**	-0.0200**	-0.0265*
	[-2.169]	[-2.033]	[-1.730]
Observations	35,796	20,006	15,790
R-squared	0.207	0.347	0.186
Creditless Recovery			
Change in growth rate for high depedence industry	-1.5%	-1.6%	-2.0%
Change in growth rate for low depedence industry	-0.4%	-0.4%	-0.4%
Implied differential effect	-1.1%	-1.2%	-1.5%

Robust t-statistics in brackets
*** p<0.01, ** p<0.05, * p<0.1

This table presents the results from Regression in the text.

The dependent variable is the yearly growth rate in the production index of each ISIC-3 industry in each country computed from the UNIDO Indstat-3 (2006) data set. Lagged size is the share of a country's total manufacturing value added that corresponds to the industry in the previous year. Recovery is a dummy variable that takes a value of 1 when the year and country observation has been identified as recovery as explained in the text, and is 0 otherwise. Creditless recovery is a dummy variable that takes a value of 1 when the year and country observation has been identified as creditless recovery as explained in the text, and is 0 otherwise. External finance dependence is the average figure for each industry in the Rajan and Zingales (1998) index. The set of dummies includes industry-year and country-industry (two sets of cross dummies) fixed effects (coefficients not reported).

The findings of our regression are shown in Table 1. The level coefficient for creditless recoveries is negative as expected, but is not significant, suggesting that the gap in performance between creditless and with-credit recoveries identified in the macro analysis depends in large part on sectoral effects. Indeed, the coefficient of the interaction term of creditless recoveries and credit dependence is consistently negative across all specifications. This indicates that industries more dependent on external finance perform relatively worse when the recovery is not accompanied by credit growth. The result loses some significance but remains stable when we split the sample in advanced countries and emerging markets. The difference in performance is economically meaningful. During creditless recoveries, the growth rate of industries that are highly dependent on external finance (at the 85th percentile of the index distribution) is over 1.5 percentage points lower than in 'normal' recoveries. The same difference drops to 0.4 percentage points for low dependence industries (those at the 15th percentile). This across-industry difference in performance is even more pronounced in emerging markets (the cross-sector differential is 1.5 percentage points versus 1.2 percentage points for advanced economies), likely reflecting the scarcity of alternative sources of funding and/or more pervasive agency problems.

In addition to the baseline specification, we perform a variety of robustness tests. Details are provided in Abiad, Dell'Ariccia and Li (2011). The results of the robustness tests support our baseline findings. First, we exclude all episodes with exchange rate depreciations in excess of 20 percent. The concern here is that sharp exchange rate falls may lead us to misclassify creditless recoveries as with-credit recoveries, through their effect on the stock of foreign credit measured in domestic currency. Our main coefficient of interest maintains sign and significance. Further, consistent with our concern of depreciation blurring the line between creditless and with-credit recoveries, it is larger than in our baseline specification. Second, we control for the effect of capital inflows. Again, the coefficient of interest maintains sign and significance, and remains broadly stable in size. The coefficient of the capital-flows-to-GDP variable is positive and significant as expected. In addition, capital flows seem to favor sectors that are more heavily dependent on external finance.

In addition, to control for omitted country-time specific variables, we include a third set of fixed effects in the regression. As discussed above, these will take care of any omitted variable that does not vary simultaneously across all three dimensions of our data. All coefficients maintain the same sign and significance as in the previous regressions. The differential effect between sectors at the 85th percentile and the 15th percentile of the distribution of the external dependence index continue to range between about 1 percentage points and 1.5 percentage points, which are roughly of the same magnitude as in the other regressions.

12.4. Conclusion

This article summarizes our new findings in Abiad, Dell'Ariccia and Li (2011) regarding the puzzling phenomenon of creditless recoveries. In contrast to previous studies, we find: (1) Creditless recoveries, while not the norm, are far from rare. They follow about one in five recessions. (2) Creditless recoveries are somewhat less desirable than 'normal' recoveries. Output growth is on average a third lower. (3) They are preceded by events likely to disrupt the supply of credit, such as banking crises, credit booms, and real-estate boom-bust cycles. (4) Investment has a disproportionately lower contribution to growth than in 'normal' recoveries and productivity and capital deepening are adversely affected. (5) Industries more reliant on external finance seem to grow disproportionately less during creditless recoveries.

Overall, both the macro-level and sectoral evidence supports the hypothesis that creditless recoveries are the result of impaired financial intermediation: their lower growth performance likely the outcome of a constrained allocation of resources. The results are consistent with agents delaying or downsizing their more credit dependent investment and expenditure decisions and firms more dependent on external finance being forced to curtail their activities.

This finding is relevant from a policy standpoint. During creditless recoveries, policy measures aimed at restoring financial intermediation are likely to lead to higher growth. Of course, the obstacles to efficient financial intermediation will vary from case to case and policies should be adapted accordingly. For instance, the lack of credit growth may be caused by stress on banks' balance sheets that could be addressed by recapitalizing banks (possibly with public intervention). Alternatively, the lack of credit growth could result from an over-indebted private non-financial sector. Even in the presence of relatively healthy banks, debt overhang would exacerbate agency problems and prevent an efficient allocation of capital. In this case, the response would be much more complex and would have to entail policies to facilitate deleveraging or possibly debt restructuring. Finally, given the association of creditless recoveries with banking crises, credit booms, and real-estate boom-bust cycles and their lower growth performance, supportive measures (including a more expansionary macroeconomic stance) could be taken in anticipation of a less buoyant recovery phase when the recession is associated with these events.

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13. Macro-prudential Instruments for Containing Systemic Risk: the ESRB View

Francesco Mazzaferro

The start of the global financial crisis revealed serious shortcomings in the framework of financial supervision in the EU as well as elsewhere in the world. The need for developing financial supervision has been broadly discussed especially following the publication in the EU of the de Larosière report and also linked with the Squam Lake Report in the US.

This discussion highlighted the necessity of complementing the traditional micro-level supervision with a macro-prudential perspective. Previously, financial supervision had failed to anticipate adverse macro-prudential developments and to prevent the accumulation of excessive systemic risks.

Little emphasis had been placed on macro-prudential oversight and on interlinkages between the financial system and the broader macroeconomic developments. Along with the start of the financial crisis, it was evident that new type of systemic response was required to address systemic risks threatening stability of the financial system.

To enhance financial supervision in the EU, the European Parliament and the Council adopted regulations in autumn 2010 establishing the European System of Financial Supervision (ESFS). As part of the ESFS, the European Systemic Risk Board (ESRB) started its operations at the beginning of 2011. In particular, the ESRB was launched to bring the macro-prudential angle to the new EU supervisory framework that is bringing together the financial supervisors at national level and at the level of the EU, including three new European Supervisory Authorities (ESAs).

As stipulated by the legislation, the ESRB is an independent EU body "responsible for the macro-prudential oversight of the financial system within the Union". It is supposed to contribute to the prevention and mitigation of systemic risks to financial stability in the EU.

The scope of the ESRB activities is extensive: its macro-prudential oversight covers not only banks, but all financial intermediaries, markets, products and infrastructures that might raise systemic risks to financial stability. The ESRB places its focus on the risks that have systemic implications at the level of the EU financial system.

But what are the tools and instruments that can be used to contain systemic risks? And what is the ESRB doing to reach its mission of macro-prudential oversight?

I will first shortly discuss what the ESRB can do to reach its mission as well as its practical experiences during the first year of its existence. Thereafter, I will examine in more general terms the possible instruments of macro-prudential policy from the viewpoint of the ESRB.

13.1. The Range of ESRB Tools

The ESRB itself does not have any binding powers for macro-prudential policy. Instead, it is able to issue warnings on significant systemic risks and recommendations for remedial actions to address such systemic risks. If deemed appropriate, the warnings and recommendations can also be published. Through the warnings or recommendations, the macro-prudential concerns of the ESRB should be transformed into action by other authorities or bodies.

The ESRB may address its warnings and recommendations to the EU as a whole, one or more Member States, ESAs or national supervisory authorities. In respect of legislative issues, recommendations may also be addressed to the European Commission.

The warnings and recommendations of the ESRB are legally non-binding. The recommendations are however supported by an 'act or explain' mechanism where the addressees are obliged to provide a justification in case they do not follow the recommendations. From the viewpoint of the ESRB, it is essential that competent authorities have sufficient powers to act based on macro-prudential concerns and be able to follow the recommendations of the ESRB.

To be fully effective the ESRB warnings and recommendations have to be credible, based on robust analysis and comprehensive data on relevant developments in the financial system and in the real economy. For the quality of its analysis on systemic risks, it is crucial that the ESRB brings together a broad range of relevant views through its wide membership.

All the decisions of the ESRB are made by its General Board, and it is externally represented by its Chair. However, the activities of the ESRB also rely on thorough preparations and contributions of its other structures. One of the important structures of the ESRB is the Advisory Scientific Committee consisting of mainly academic experts representing a wide range of skills and experiences. With its more scientific approach, the Committee complements the work of other bodies of the ESRB, in which the central banks, supervisors and other authorities are represented.

13.2. ESRB Experiences During its First Year

I should highlight that the ESRB began its activities surrounded by extremely difficult conditions in the financial system. While it is not a body for financial crisis management, it is obvious that the ESRB has to take into account prevailing circumstances in its actions.

During its first year, the ESRB paid its main attention to the macro-prudential aspects of the current difficult situation in the EU. Repeatedly, it called for swift and decisive action by all relevant authorities. In particular, the ESRB urged the full and timely implementation of measures agreed on the EU summit during the year. It also conveyed a message on the need to increase the resilience of the financial sector.

In October 2011, the ESRB published its first recommendations – on lending in foreign currencies. Lending in foreign currencies to borrowers that are not protected against exchange rate risk has become common practice in some EU countries. It is a phenomenon that entails significant risks for the financial sector.

Given the risks to financial stability and the potential for cross-border contagion the ESRB decided to adopt policy recommendations that were addressed to supervisory authorities and Member States. These recommendations focus on policies aimed at addressing risks stemming from new loans extended in foreign currencies to unhedged borrowers.

In addition, the ESRB has been active in several other risks that might individually or together with other risks threaten the resilience of the EU financial system. For instance, the ESRB has worked on the need to reduce vulnerabilities of large EU banks in US dollar funding markets. This work has pointed to a need to further enhance monitoring of US dollar funding mismatches and to strengthen banks' plans for contingency funding.

Regarding more structural, medium-term issues, the ESRB has in particular responded to two public consultations of the European Securities and Markets Authority (ESMA). In these consultations, the ESRB provided a macro-prudential perspective on concerns related to UCITS exchange-traded funds and structured UCITS as well as to high-frequency trading.

13.3. Instruments for Macro-prudential Purposes

So far, the experiences on using policy instruments for macro-prudential purposes are still quite limited in the EU. Consequently, it is an important future challenge to work towards a more established macro-prudential policy framework where macro-prudential authorities with sufficient mandates are able to apply effective,

well-defined instruments for achieving different macro-prudential objectives. Even though constructing such a framework is not a simple, short-term project, it is an important element in efforts to prevent future financial crises.

To this end, the ESRB has started – among its first activities – to examine potential policy instruments that could be used for macro-prudential purposes in a view to contain systemic risks. Such policy instruments could be used by competent national or EU level authorities, for instance on their own initiative or based on a recommendation of the ESRB.

This stream of work is ongoing, starting from identifying a potential set of policy instruments that could in principle be used for macro-prudential purposes. This work stream also includes classification of policy instruments according to their specific targets as well as possible selection of a more limited set of core instruments. Furthermore, there is a need for further analysis to facilitate their operational implementation.

Some of the possible key instruments for macro-prudential policy are being established in EU legislation, based on global initiatives, like Basel III Agreement. In particular, the draft capital requirement regulation and directive proposed by the European Commission in July 2011 would implement countercyclical capital buffer that could help modify banks' capital requirements so as to enhance the resiliency of the banking sector and to dampen possible pro-cyclical effects of banks' behaviour.

The ESRB has been closely reviewing the relevant legislative initiatives in the EU and their impact on the use of prudential instruments for macro-prudential purposes. The severe conditions prevailing in the EU financial system highlight the importance of robust action to address systemic risks. Therefore, the national macro-prudential authorities in the EU should be able to tighten settings of instruments to levels above those provided for in EU legislation in a timely manner based on local conditions.

13.4. Conclusion

To conclude, I would like to stress the fact that the ESRB, at 1, is only taking its first steps, in an exceptionally difficult environment. The new Board has been active, but there is still a lot of work ahead of us to develop a sound policy framework and instruments for macro-prudential purposes. And this work should indeed be done if we want to contain systemic risks to the financial system and their impact on the real economy in the future.

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