AVERTISSEMENT

LIENS

DOSSIER DE CANDIDATURE AU DIPLÔME D'HABILITATION
A DIRIGER
LES RECHERCHES

Titre : Essays Empirical Banking

Présentée et soutenue le 13 Novembre 2015

Par

Ouarda Merrouche
Chargée de Recherche, Université de Lausanne

Sous la direction de

Jean-Charles Rochet

Membres du Jury

Rapporteurs

Mr Harald Hau	Professeur Université de Genève
Mr Laurent Weill	Professeur Université de Strasbourg

Suffragants

Mr Philippe Bacchetta	Professeur Université de Lausanne
Mr Thomas Mariotti	Directeur de Recherche CNRS-Toulouse I Capitole
Mr Steven Ongena	Professeur Université de Zurich
Mr Jean-Charles Rochet	Professeur Université de Zurich

Table des matières

Première partie

Liste des documents présentés

1. "Banks' Intraday Liquidity Management during Operational Outages", (with Jochen Schanz, BoE), Journal of Banking and Finance vol. 34(2), pages 314-323, February 2010, also featured in FT Alphaville 2008

2. "Payment Systems, Inside Money and Financial Intermediation", (with Erlend Nier, IMF), BoE working paper 371, Journal of Financial Intermediation, (Lead article), 2012, 21, (3), 359-382, also featured in World Bank research digest 2009

3. "Precautionary Hoarding of Liquidity and the Interbank Markets: Evidence from the Sub-Prime Crisis", (joint with Viral V. Acharya, NYU Stern), Review of Finance, 2013, 17, (1), 107-160, NBER wp no. 16395 and CEPR wp no 8859, 112 citations in 12 months

4. "Bank Capital: Lessons from the Crisis", (with Asli Demirguc-Kunt (World Bank) and Enrica Detragiache (IMF)), Journal of Money Credit and Banking, 45, Issue 6, pages 1147–1164,

5. "Recapitalization, Credit, and Liquidity" (with Mike Mariathasan), Economic Policy, 2012, 27, (72), 603-646

6. "Islamic Banking versus Conventional Banking: Business model, Efficiency, and Stability", (with Asli Demirguc-Kunt and Thorsten Beck), Journal of Banking and Finance, 37, (2), 433-447, TOP DOWNLOAD

7. "The Manipulation of Basel Risk-Weights", May 2012 (with Mike Mariathasan, Oxford University), Journal of Financial Intermediation, Volume 23, Issue 3, July 2014, Pages 300–321

Deuxième partie

Curriculum Vitae

Ouarda Merrouche
Research Economist
ouarda.merrouche@eui.eu
5A Voir-Creuse 1202 Genève Suisse
Mobile Phone:+41-(0) 79 199 23 69

CITIZENSHIP: French

GENDER Female

BORN 31 August 1976

FIELDS Banking and Macroeconomics

EDUCATION AND QUALIFICATION

PhD in Economics, European University Institute, Department of Economics, Florence, Italy
Masters in Economics, Paris I Pantheon Sorbonne (Paris School of Economics)
M.A. (D.U) in European Studies, Institut D'Etudes Politiques (SciencePo), France

RESEARCH AND TEACHING EXPERIENCE IN SWITZERLAND AND ABROAD

Since September 2014, Research Fellow (chargée de recherche), University of Lausanne, DEEP

November 2012-September 2014, Program Manager, Graduate Institute Geneva, training in macroeconomics and econometrics, for various central banks, design and implementation of courses in economics and finance, Geneva

Spring 2013 and 2014 External part-time (8%) lecturer, University of Bern, Department of Economics, teaching the course Economics of Financial Regulation

April-May 2014, International Monetary Fund visiting scholar, Kuwait Training Center

April 2013, Senior Fernand Braudel Fellow, European University Institute, Department of Economics, Florence Italy

December 2010 to October 2012, European Commission ESMA Agency (predecessor CESR from December 2010 to April 2011), Senior Economist, European Securities and Markets Authority, Paris

August 2009 to October 2010, The World Bank Research Department DEC, Economist Finance Research Group and External Consultant Chief Economist Financial Sector, Global Financial Development Report 2012

May 2007 to August 209, The Bank of England, Economist, Financial Stability Directorate, London UK

Marie Curie Post-Doctoral Researcher 01/2006 to 04/2007, Uppsala University, RTN network in Microdata Methods, Directed by Institute for Fiscal Studies, CEMFI Madrid, IFAU Sweden, Copenhagen University

September 2003 to May 2005, Research Assistant, Robert Schuman Center for Advance Studies, EURO-GULF Energy Project financed by the European Commission Florence Italy

PUBLICATIONS IN REFEREED JOURNALS

1. **"**Precautionary Hoarding of Liquidity and the Interbank Markets: Evidence from the Sub-Prime Crisis", (joint with Viral V. Acharya, NYU Stern), **Review of Finance**, 2013, **17**, (1), 107-160**,** NBER wp no. 16395 and CEPR wp no 8859, 112 citations in 12 months

2. "Bank Capital: Lessons from the Crisis", (with Asli Demirguc-Kunt (World Bank) and Enrica Detragiache (IMF)), **Journal of Money Credit and Banking,** 45, Issue 6, pages 1147–1164, September 2013**,** IMF working paper 10/286, two invited presentations at the Federal Reserve Bank of Chicago

3. "Recapitalization, Credit, and Liquidity" (with Mike Mariathasan), **Economic Policy,** 2012, **27**, (72), 603-646

4. "The Manipulation of Basel Risk-Weights", May 2012 (with Mike Mariathasan, Oxford University), Oxford University working papers series and CEPR working paper, **Journal of Financial Intermediation**, Volume 23, Issue 3, July 2014, Pages 300–321

5. "Islamic Banking versus Conventional Banking: Business model, Efficiency, and Stability", (with Asli Demirguc-Kunt and Thorsten Beck), **Journal of Banking and Finance, 37**, (2), 433-447, **TOP DOWNLOAD**

6. "Payment Systems, Inside Money and Financial Intermediation", (with Erlend Nier, IMF), BoE working paper 371*,* **Journal of Financial Intermediation, (Lead article),** 2012, **21**, (3), 359-382**,** ***also featured in World Bank research digest 2009***

7. "Banks' Intraday Liquidity Management during Operational Outages", (with Jochen Schanz, BoE), **Journal of Banking and Finance** vol. **34(2),** pages 314-323, February 2010**,** ***also featured in FT Alphaville 2008***

8. "The Long Term Educational Cost of War: Evidence from Landmine Contamination in Cambodia", **Journal of Development Studies** vol. **47(3),** pages 399-416, 2011

9. "Macro-Economic Consequences of Wars: Evidence from Landmine Contamination in Mozambique", **Peace Economics, Peace Science and Public Policy** 2008, **14**, (1), 1-18

CONTRIBUTIONS TO BOOKS

"The Economics of Large-Value Payment and Settlement: Theory and Policy Issues for Central Banks", *Manning M., Nier E., and Schanz J. Eds. (2009),* **Oxford University Press**, Co—authored two Chapters

"The Role of the State in the Provisions of Financial Infrastructure", main contributor, **World Bank Global Financial Development Report Chapter V, September 2012**

NON-REFEREED ARTICLES

Interview and full article on the colonial origin of comparative development in Algeria, **Le Monde de l' Education March 2007**

"The Real Effect of Credit Rating Downgrades"**, VoxEU January 2015**

"The Global Financial Crisis: What Drove the Build-up?", with Erlend Nier IMF, **VoxEU March 2012 and Economist's View discussion, 17685 reads**

"Capital adequacy and hidden risk", with Mike Mariathasan Oxford University, **VoxEU June 2013, 11969 reads**

"Bank capital: Lessons from the Financial Crisis", avec Asli Demirguc-Kunt (World Bank) et Enrica Detragiache (IMF), **World Bank Research Digest, Volume 5, N 2, Hiver 2011**

WORKING PAPERS AND WORK IN PROGRESS

"Countercyclical Foreign Currency Borrowing: Eurozone Firms in 2007-09", with Philippe Bacchetta, first draft January 2015, presentation at the conference on Corporate Finance in Oxford March 2015

"Capital Inflows, Monetary Policy, and Financial Imbalances", (with Erlend Nier (IMF)), IMF working papers No 10/265**,** May 2014, CEPR DP 10015, revise and resubmit JIMF

"The Transmission of Liquidity Shocks: Evidence from Credit Rating Downgrades", (with Rima Turk and Moez Souissi, IMF), November 2015, CEPR Discussion Paper, under revision

"Bank (Implicit) Bailout and Moral Hazard", (with Mike Mariathasan, Oxford, and Charlotte Werger EUI), April 2014, CAREFIN and CEPR WP, submitted

COURSES TAUGHT

Economic Approach to Financial Regulation, University of Bern, Spring 2013 et 2014

Macroeconomic Policy (invited professor), University of Lausanne, Winter 2014

Financial Institutions and Markets (invited professor), University of Lausanne, Spring 2015

REFEREE ACTIVITIES

Journal of Finance, Journal of Financial Economics, Review of Finance, Journal of Financial Intermediation, Journal of Money Credit and Banking, Journal of Economic Dynamics and Control, Journal of Banking and Finance, Journal of Financial Stability, Journal of International Money and Finance, International Finance, International Review of Economics and Finance, Economic Notes, World Development, African Development Review, Peace Economics Peace Science and Public Policy, Journal of Productivity Analysis, North American Economic Journal.

INVITED PRESENTATIONS SINCE 2008

Federal Reserve Bank of New York, Conference on "The Role of Money Markets", May 2008
International Monetary Fund, Brown Bag Seminar, May 2008
Banque de France, Conference on "Payment System Interdependencies", June 2008
Financial Intermediation Conference, Anchorage Alaska, June 2008
CREDIT Conference, University of Venice, September 2008

MMF conference, Birbeck College London, September 2008
Bank of Canada Research Conference, November 2008
World Bank, Finance Research Group, March 2009
Institute for Fiscal Studies, RTN conference, April 2009
Bank of England, Financial Stability Seminar, June 2009
NBER Crisis conference, June 2009
ECB conference, "Challenges for Monetary Policy Beyond the Financial Crisis", November 2009
IMF Institute, Macro seminar series, January 2010
CEPR-ECB Conference on Macroprudentional Policy, September 2010
BIS-ECB Conference 2011, (declined)
Chicago Fed Conferences, three times in 2011
Federal Reserve Bank of Cleveland Banking Workshop, May 2011
Bocconi Banking Conference, Panel presenter, September 2011
CEPR Economic Panel meeting, Warsaw 2012
Bank of Cyprus-University of Cyprus Seminar Series, May 2012 (co-author attended)
ECB High Level Conference on the Measurement of Financial Stability, June 2012
Banco do Brazil Seminar on Risk, Financial Stability, and Banking, August 2012
CSEF, Universitat Napoli II, scheduled December 2012
Oxford Said Business School, scheduled October 2012
EBRD seminars, scheduled October 2012
Graduate Institute, Geneva Brown Bag seminar, March 2013
Universita Bocconi, June 2013
University of Basel, September 2013 (co-author)
UBS seminars and conferences, to take place in 2014 & 2015
European Finance Association Annual Meeting, Lugano, August 2014
University of Lausanne, Macro Workshop, September 2014
University of Montréal, Finance Seminar, October 2014
University Paris Dauphine, Finance Seminar, January and February 2015
University Aix-Marseille, Economics Seminar, January 2015
CEPR research conference in corporate finance, Oxford, (co-author) March 2015
World Bank and IMF, October 2015

AWARDS

CAREFIN Universita Bocconi Research Grant (Joint with Mike Mariathasan Oxford and Charlotte Werger EUI) 2013
BIS-GAMMA Foundation Research Award joint with Viral V. Acharya NYU Stern 2008
Marie Curie RTN Fellowship, DG-Research European Commission 2006
ENTER Fellowship, IDEA program Universita Autonoma de Bracelona 2003-2004
Lavoisier Fellowship for Doctoral Dissertation, French Ministry of Foreign Affairs (2000-2002)
European University Completion Fellowship, November 2004 -April 2005
Grant for Master Thesis, French Ministry of Education and Culture
Grant for Graduate Studies, City of Paris

CONFERENCE PROGRAM COMMITTEE

European Finance Association Conference, Vienna, 2016
International Conference on Islamic Banking and Finance, Qatar, 2015
GIIDS-SECO Conference on "Monetary Policy Frameworks", Geneva, October 2013

PARTICIPATION TO FUNDED PROJECTS

Robert Schuman Centre for Advanced Studies, Mediterranean program 2003-2005
Fellow, RTN network in micro-data methods and practice 2006
Fellow, European Network for Training in Economic Research 2003-2004

LANGUAGES

French: Native; Arabic: Native Spoken; English: Fluent; Spanish: Fair; Italian: Conversational

Troisième partie

Résumé des Travaux

I. Résumé des Publications

1. Introduction

I started working in the area of banking and finance after my PhD when I joined the BoE in May 2007 as a research economist in the Payment System Research Team. I contributed to the project "Making Payment Systems Economics Mainstream" which included co-authoring chapters of a book on large-value payment systems and developing empirical methods to analyze risks and vulnerabilities in the UK large-value payment system and the overnight interbank market.

When I moved to the Research Group of the World Bank I shifted my research focus to the area of bank capital regulation. This part of my research analyses the role of bank capital –does it reduce risk-taking and improve bank stability during crisis, how should it be defined by regulators.

Since rejoining academia in 2013 I have pursued research on the identification and measurement of risks and vulnerabilities in the financial system. The objectives of my main ongoing project at the University of Lausanne is to understand the drivers of the rapid expansion in offshore dollar credit in different regions of the globe and assess the financial stability risks associated with this rapid expansion.

2. Contribution on payment systems and interbank markets

The objective of my first publication in collaboration with Jochen Schanz (article 1) was to develop and apply a novel empirical method to analyze the intra-day liquidity management strategy of banks in the UK payment system using a large amount of high frequency data.

Intraday liquidity requirements in large-value real-time gross payment systems can substantially exceed the liquidity that its direct members hold overnight on their accounts with the central bank. As an illustration, UK banks' aggregate holdings of reserve balances with the Bank of England fluctuated around £30 billion in 2008, while the daily amount of liquidity that banks pass through the United Kingdom's large-value payment system, CHAPS, was in the order of £250 billion. Effective intra-day liquidity management in these systems is therefore crucial to allow the completion of large transactions such as house purchases, interbank loans, and other financial market transactions. To this purpose, banks recycle liquidity in these systems during the day: that is, they partly rely on incoming funds to settle their outgoing payments.

The IT systems that member banks use to access large-value payment systems are occasionally affected by operational problems. These member-level operational outages are of concern to central banks (who oversee payment systems) particularly because they can inhibit the efficient intra-day recycling of liquidity. Not only can prolonged outages lead to a misallocation of liquidity between banks, they can ultimately also damage the stability of the financial system. The reason is that a comparatively common class of operational problems prevents the affected bank from sending payments but not from receiving payments on its account with the central bank. There is therefore a risk that the bank experiencing operational problems involuntarily absorbs liquidity and becomes a 'liquidity sink'. The liquidity that the affected bank holds becomes unavailable for the settlement of payments between other, healthy settlement banks. Thus, if (healthy) banks fail to sufficiently control their intraday liquidity requirements, operational risk at one bank can be a source of systemic risk.

We investigated how settlement banks in CHAPS react to outages experienced by another CHAPS settlement bank. Our aim was to improve our understanding of how banks manage intraday liquidity risk, and to assess the systemic importance of member-level operational outages.

The fact that banks stop making payments to a bank experiencing an outage reduces systemic risk: this bank does not become a liquidity sink, and liquidity remains available to settle outstanding payments between healthy banks. Indeed, we show that the value of payment flows between healthy banks remains virtually unchanged during an outage. Banks effectively contain the disruption caused by the operational outage: healthy banks stop making payments to the stricken bank (and more rapidly so when interbank funding markets are disrupted) while payment flows between healthy banks remain unaffected during an outage. Through this research we introduced novel empirical methods to facilitate the monitoring of activity in the payment systems which was previously rendered difficult by the large amount and high-frequency of the data generated by such activity.

The payment system is a key element of the financial infrastructure, its smooth functioning is crucial for the implementation of monetary policy. Institutional and technological characteristics of the payment system may cause differences in the optimal amount of reserve to achieve price stability. And an efficient payments system is indispensable to the functioning of the interbank markets. A weak payments system may severely drag on the stability and developmental capacity of an economy. In article 2 co-authored with Erlend Nier we assess the contribution to economic development of introducing modern and efficient payment systems. Using payment system reforms in Eastern European countries over the 1995–2005, we find evidence that payment system reforms were an important precondition for the credit boom observed in our sample countries. We also find that payment system reforms led to a shift away from cash (outside money) and towards demand deposits (inside money) as a medium of exchange and that this in turn enabled an expansion of credit in the sample countries. These findings have important implications for our understanding of financial intermediation, highlighting the nexus between banks' role as providers of payment services and as providers of credit.

3. Contributions on interbank markets

Interbank markets are generally the private lender-of-last-resort for banks' short-term liquidity needs. Inadequate liquidity flow through these markets has the potential to substantially impair real and financial sectors. The financial crisis of 2007–09 has highlighted the important role played by money markets (short-term borrowing and lending markets between banks and bank-like institutions) in allocating liquidity around the financial system.

If liquidity does not get channeled through the banking system to its most efficient use, then intermediation to households and corporations could stagnate. In addition, central banks' transmission mechanisms for monetary policy could be rendered less effective if its liquidity provision gets trapped on the balance sheets of some banks instead of lubricating the flow of credit among banks. In turn, central banks may be forced to resort to emergency lending operations, as was done by the New York Federal Reserve, the Bank of England (BoE), the European Central Bank (ECB), and other central banks during the crisis.

Article 3 is an attempt to understand some of these effects by examining the bank demand for liquidity and its effect on interbank markets during the crisis. We hypothesize and confirm a precautionary motive to liquidity demand by banks during this period and investigate its causal effect on interbank rates. The UK interbank market being a small market where few banks are active and have built strong relationships, we emphasize and confirm that heightened asymmetric information is not an important factor that caused this market to freeze so quickly in 2007-2008.

Our broad conclusion is that events unfolding since August 9 2007 increased the funding or rollover risk of banks, in response to which banks, especially the weaker ones, hoarded liquidity. Given their

increased opportunity cost of giving up liquidity to other banks, interbank rates rose in both secured and unsecured markets, suggestive of interest rate contagion through the interbank market.

As our first piece of evidence, we show that settlement bank liquidity experienced a significant upward jump upon the onset of the subprime crisis (Figure 1).

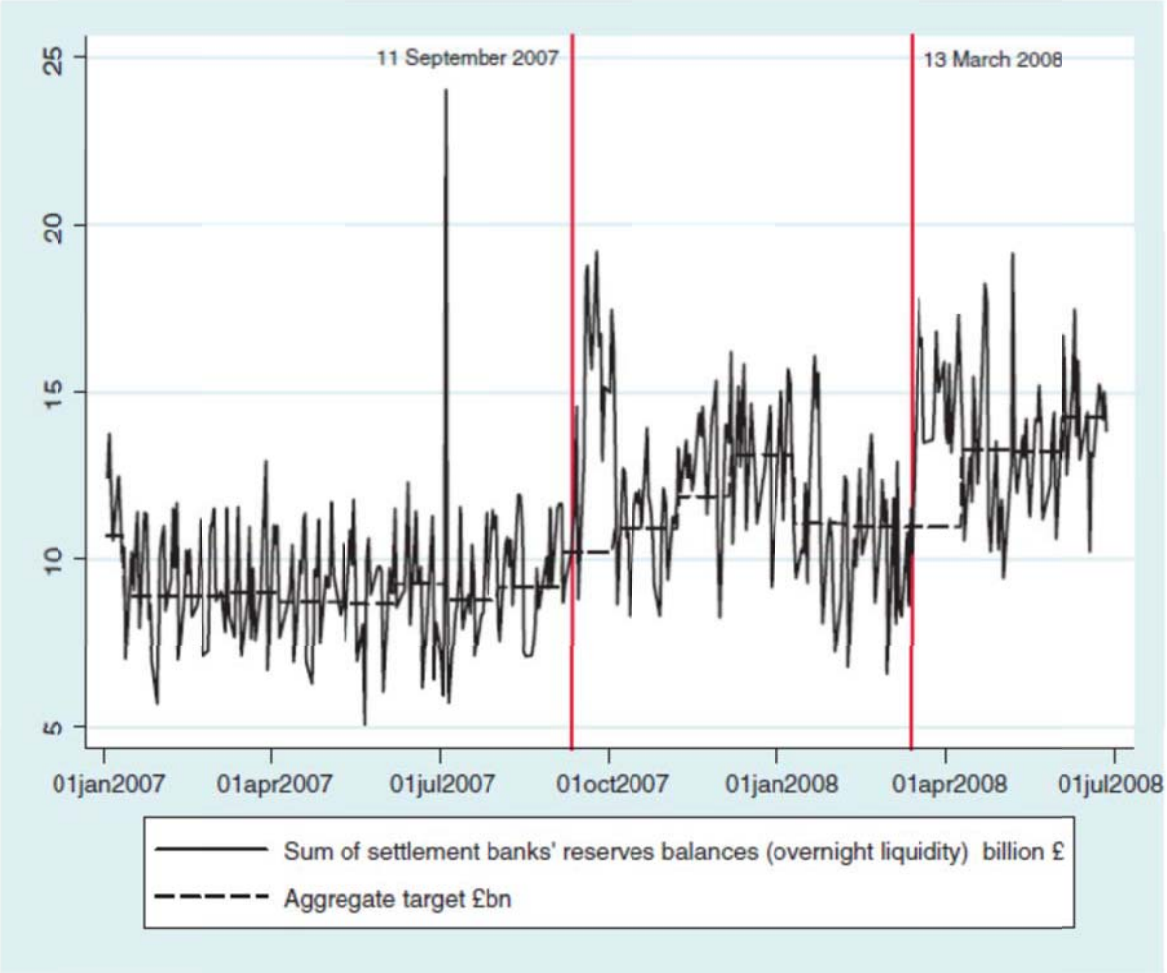

Figure 1.

As our second piece of evidence, we show that this build-up of bank liquidity was precautionary in nature. First, we verify that settlement banks held more liquidity on days with greater predictable aggregate payment activity; indeed funding needs arising from idiosyncratic payments fluctuations are more easily met through borrowing from other banks in the overnight market.

Such a response of settlement bank liquidity to aggregate payment activity was nonexistent in the precrisis period. Next, we employ bank-level variations in liquidity, funding risk proxies, solvency risk proxies, and economic health during the crisis. We find that banks that during the crisis had higher funding or rollover risk, and higher solvency risk hoarded more li uidity (Figure 2). Further, these banks held more liquidity in response to increases in payment activity. Even though, on average, there was no increase in variability in payment activity in the sterling money markets during the crisis, our results confirm that, given the funding problems, settlement banks viewed the same variability of payment activity during the crisis with greater precaution. This setting therefore allows us to f cus on a

broader factor, that is, financial constraint driving precau ionary demand, rather than factors internal to the payment system (such as an increase in the variability of payment activity).

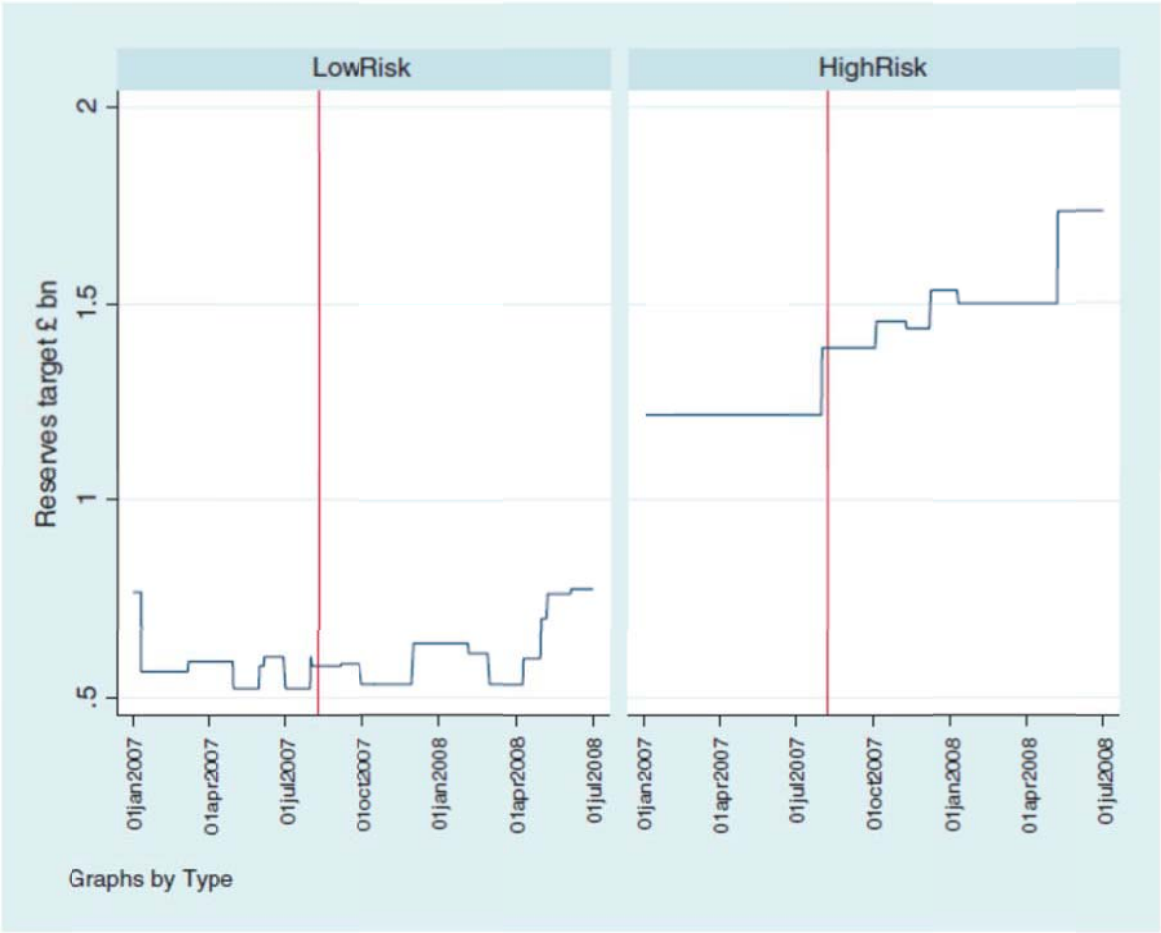

Figure 2. Average reserve targets of the high-risk banks (three anks with highest loan to retail deposits ratio), and the low-risk banks (three banks with lowest loan to retail deposits ratio), in billions of pounds. The data cover 10 UK settlement banks (foreign banks are omitted).

In our third piece of evidence, we study the effect of settlement banks liquidity demand on interbank markets. In normal times, the “arbitrage” hypothesis in money markets postulates that if interbank rates become higher than the BoE policy rate, then banks that experience an exogenous rise in their liquidity release the liquidity to other needy banks to capture the spread. This should induce a negative relation between settlement ban liquidity and interbank preads.

We call this the “arbitrage” effect. Our crucial observation is that this relation may be reversed when the rise in liquidity demand of settlement banks is endogenous, in particular, a precautionary response to heightened risks and funding concerns. In this case, settlement banks need to be compensated more for releasing liquidity to others. We call this the “liquidity” effect.

The results reveal a strong effect of settlement bank liquidity on interbank rates, but in a manner that differs sharply between precrisis and postcrisis periods. We find evidence supportive of the liquidity

effect: the effect of liquidity is to raise overnight interbank rates in the period during the crisis. In contrast, the relation between liquidity and interbank rates was significantly negative in the period prior to the crisis, consistent with the arbitrage effect of settlement bank liquidity on interbank rates. It is striking that the effect of settlement bank liquidity on secured rates—in transactions secured by UK gilts—is as high and significant as on the unsecured rates, if not stronger.

We interpret these findings to imply that, since access to capital markets and wholesale borrowing in commercial paper markets was impaired for banks, especially for banks with significant rollover or credit risk, these weaker banks engaged in liquidity hoarding as a precautionary response. Such hoarding raised borrowing rates for safer banks too, suggesting a contagion-style systemic risk operating through interbank markets. In particular, the overnight sterling interbank rates in the 1st year of the crisis did not seem to have been driven purely by the counterparty risk concerns of lending banks about the borrowing banks. In addition, since smaller, second-tier banks borrow mainly from large settlement banks in the secured interbank market, the latter market was also substantially affected by the liquidity hoarding of large settlement banks.

Finally, we use bilateral transaction data, which allow us to more cleanly separate out the precautionary effect from the counterparty risk effect, and we find further supportive evidence for our interpretation. The rate charged by one bank to another (the bilateral spread) during the crisis is negatively associated with the borrower liquidity buffer, but more importantly, the rate is positively associated with the lender liquidity buffer: a lender who has a higher demand for liquidity during the crisis charges a higher price to release it during the crisis. This finding confirms that the positive relationship between rate and liquidity demand observed in the aggregate data during the crisis contains a precautionary demand effect. We also show that high risk banks participate less in the market (lending and borrowing less and trading with fewer counterparties), but this is true both before and during the crisis.

Article 3 cuts across a number of different strands of literature, particularly, regarding (i) reasons why firms hoard cash, (ii) the function played by interbank markets and the reasons why they may experience stress, (iii) the transmission of bank-level stress as contagion in the financial sector, and (iv) the micro-structure of interbank markets in terms of reserves requirements by central banks and the monetary policy. The fact that the onset of the subprime crisis led banks to hoard liquidity as a precaution against funding risk finds its parallel in the corporate finance literature on financial constraints. Large banks in the payments system settle a large volume of transactions on a daily basis and when the volume becomes large or uncertain, they hold extra liquidity simply to be able to effect these transactions smoothly. If their access to external financing dries up, this theory predicts they will hoard more cash.

On the policy front, our evidence suggests that regulatory attempts to thaw such money market stress and reduce the variability of interbank rates, if successful, can have salubrious effects on healthier parts of the banking sector. Our results, however, suggest that, to the extent that a part of the stress emanates from the liquidity hoardings of banks with troubled funding and balance sheet conditions, such a thawing should involve addressing insolvency concerns (e.g., early supervision and stress tests, and the recapitalization of troubled banks), and not just provisions of emergency liquidity.

4. Contributions on bank capital

The global financial crisis has led to widespread calls to reform bank regulation and supervision. Changes in bank capital regulation have been at the heart of the policy discussions. In redesigning prudential standards to incorporate lessons from the recent turmoil, the Basel committee of supervisors has grappled with two important questions among others: what type of capital should banks hold to ensure that they can better withstand periods of economic and financial stress? And

should a simple leverage ratio be introduced to reduce regulatory arbitrage and improve transparency?

The empirical findings and policy lessons from the research I carried out with colleagues at the World Bank are manifold. First, we find support for the view that a stronger capital position is an important asset during a systemic crisis, suggesting that the current emphasis on strengthening capital requirements is broadly appropriate. Second, our results indicate that the introduction of a minimum leverage ratio to supplement minimum risk-adjusted capital requirements is important, as properly measuring risk exposure is very difficult especially for large and complex financial organizations, and complex definitions of regulatory capital give room to manipulation. Finally, our studies indicate that greater emphasis on "higher quality capital" in the form of Tier 1 capital or tangible equity is justified.

In article 4 co-authored with Asli Demirguc-Kunt and Enrica Detragiache we study whether better-capitalized banks experienced higher stock returns during the financial crisis. We differentiate among various types of capital ratios: the Basel risk-adjusted ratio; the leverage ratio; the Tier 1 and Tier 2 ratios; and the tangible equity ratio.

Since the first Basel capital accord in 1988, the prevailing approach to bank regulation has put capital at front and center: more capital should make banks better able to absorb losses with their own resources, without becoming insolvent or necessitating a bailout with public funds. In addition, by forcing bank owners to have some "skin in the game," minimum capital requirements should curb incentives for excessive risk taking created by limited liability and amplified by deposit insurance and bailout expectations. Over the last 20 years, regulatory capital requirements have been refined and broadened to cover various types of risk, differentiate among asset classes of different risk, and allow for a menu of approaches to determine the risk weights to be applied to each asset category. In the process, the rules have become increasingly elaborate, reflecting the growing complexity of modern banking, but also the need to address ongoing efforts by regulated entities to circumvent the requirements through financial innovation. While regulatory consensus has viewed capital as an essential tool to limit risk-taking, there has been less agreement among economic theorists. A number of theoretical models bear out the relationship posited by regulators that minimum capital requirements ameliorate the moral hazard created by deposit insurance, but others find that such requirements, by reducing the charter value of banks, have the opposite effect.

The recent financial crisis undoubtedly demonstrated that existing capital regulation, in its design or implementation, was inadequate to prevent a panic in the financial sector, and once again governments around the world had to step in with emergency support to prevent a collapse. Many of the banks that were rescued appeared to be in compliance with minimum capital requirements shortly before and even during the crisis. In the ensuing debate over how to strengthen regulation, capital continues to play an important role.

We evaluated the effectiveness of Basel II capital regulations and tested existing theories that motivate the use of capital regulation to curb bank risk taking. If bank capital truly helps curbing bank risk-taking incentives and absorbing losses, we would expect that, when a large, unexpected negative shock to bank value materializes—as was the case with the financial crisis that began in August 2007—equity market participants would judge better-capitalized banks to be in a better position to withstand the shock, and the stock price of these banks would not fall as much as that of poorly capitalized banks.

A second question that we address in article 4 is which concept of capital was more relevant to stock valuation during the crisis. Existing capital requirements are set as a proportion of risk exposure; but if the risk exposure calculation under Basel rules did not reflect actual risk, capital measures based on cruder risk-exposure proxies, such as total assets, may have been considered as more meaningful by equity traders. The flaws of Basel I risk weights included the 50% risk weight for loans secured by

mortgages, the zero risk weights on sovereign debt, and incentives to engage in regulatory arbitrage caused by the lack of differentiation among commercial loans of different quality. Critics of Basel II questioned the increased reliance on credit rating agencies to determine risk weights (given that rating agencies are paid by the rated parties) and the reliance on banks' own (internal) models, which are not transparent and create problems of consistency between banks.

A third issue is the types of instrument that are counted as capital for regulatory purposes. As recognized by the Basel Committee on Banking Supervision, under some banks were able to show strong capitalization while holding a limited amount of tangible common equity, which is the component of capital that is available to absorb losses while the bank remains a going concern. In our regressions, we test whether banks with higher quality apital were viewed more positively by equity market participants.

We find support for the hypothe is that better-capitalized banks experienced a smaller decline in their equity value during the crisis. However, the effect is large and robust only for a subsample comprising the larger banks. For this group, we also find that stock returns durin the crisis were more sensitive to the leverage ratio than to the risk-adjusted Basel ratio, an indication that market participants may have viewed the risk-adjustment under Basel as uninformative during the crisis (Figure 3). Finally, we also find some evidence that Tier 1 capital was seen as the more relevant notion of capital, especially in the sample of larger banks.

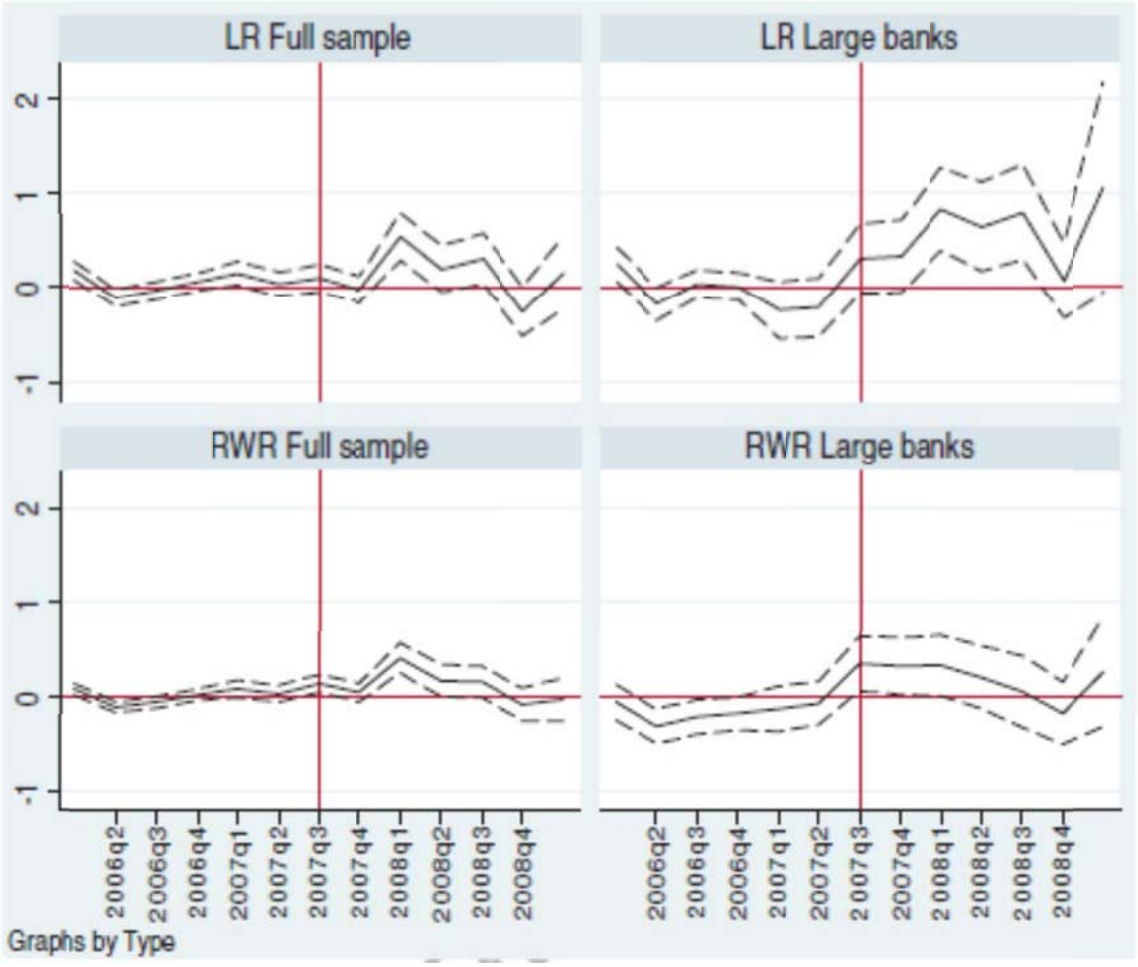

Figure 3.

In articles 5 and 6 we provide further evidence that better capitalized banks fared better in the crisis and reduced credit to the non-financial sector less when they held capital of higher quality and when they were subjected to a limit on leverage.

Article 5 documents the characteristics of public recapitalizations of banks undertaken since 2008 and examines their relationship with bank lending. We show that banks with a higher Tier1 capital ratio had a lower probability of being recapitalized and received less capital and that only large and high loss-absorbing capital injections had salubrious effects on bank lending. Since banks that receive public capital also had lower solvency and liquidity ratios immediately before the crisis, one can argue that our actually estimated effects of recapitalization on credit supply are potentially biased downwards. Whilst this concern leaves our qualitative results largely intact, it implies that our point estimates should be regarded as lower bounds.

This work augments the recent literature on bank bailouts by analysing the effect of public recapitalizations at the bank level. The benefit from this degree of disaggregation is that we could look at specific bank and bailout characteristics in order to inform future policies and to derive lessons for the many conditionalities that the theoretical literature has proposed.

In article 6 we provide evidence that the fact the Islamic banks performed better in the crisis and are less likely to des-intermediate than conventional banks is essentially attributable to the fact that they were better capitalized.

Article 7 provides further support for the introduction of a leverage ratio alongside risk-based capital. Here we report direct evidence that banks misreport risk. A number of recent reports and academic papers suggest that the risk-sensitivity of Basel II risk-weights is limited. Using a larger sample and focusing on the effect of IRB approval, we are able to provide evidence suggesting that banks did indeed make strategic use of methodological changes.

We find that reported riskiness declines once banks are allowed to use internal-rating models and becomes disconnected with actual risk (see Figures 4 & 5)), and that the effect is stronger among weakly capitalised banks. The latter result, in particular, is consistent with theoretical work suggesting that: (a) the IRB introduces an opportunity for banks to under-report the riskiness of their assets, and thus to overstate regulatory capital; and (b) low levels of capital strengthen the incentives to exploit this opportunity. Additional support for the hypothesis of systematic bias under the IRB is derived from observing a less marked decline in risk-weights when supervisory scrutiny is high, and from showing that reported riskiness tends to increase prior to bank failure if banks had not adopted the IRB. In cases where they had adopted it, we find no increase, and if banks were also weakly capitalised, reported riskiness declined prior to resolution. Weakly capitalised banks also appear to raise dividend payments more upon IRB approval, and their risk models do not appear to be less precise. Consistent with regulatory arbitrage, these findings suggest that more fragile banks generally behave less prudently, and that their risk-weights are not just accidentally biased.

These findings complement narrative evidence of banks overstating regulatory capital and lend empirical support to the theory of risk-weight manipulation. They also corroborate the intuition that a regulated entity should not be involved in setting its own constraints, and emphasize that regulatory complexity encourages regulatory arbitrage. Generally, our work is also related to the literature showing that banks exploit regulatory ambiguities.

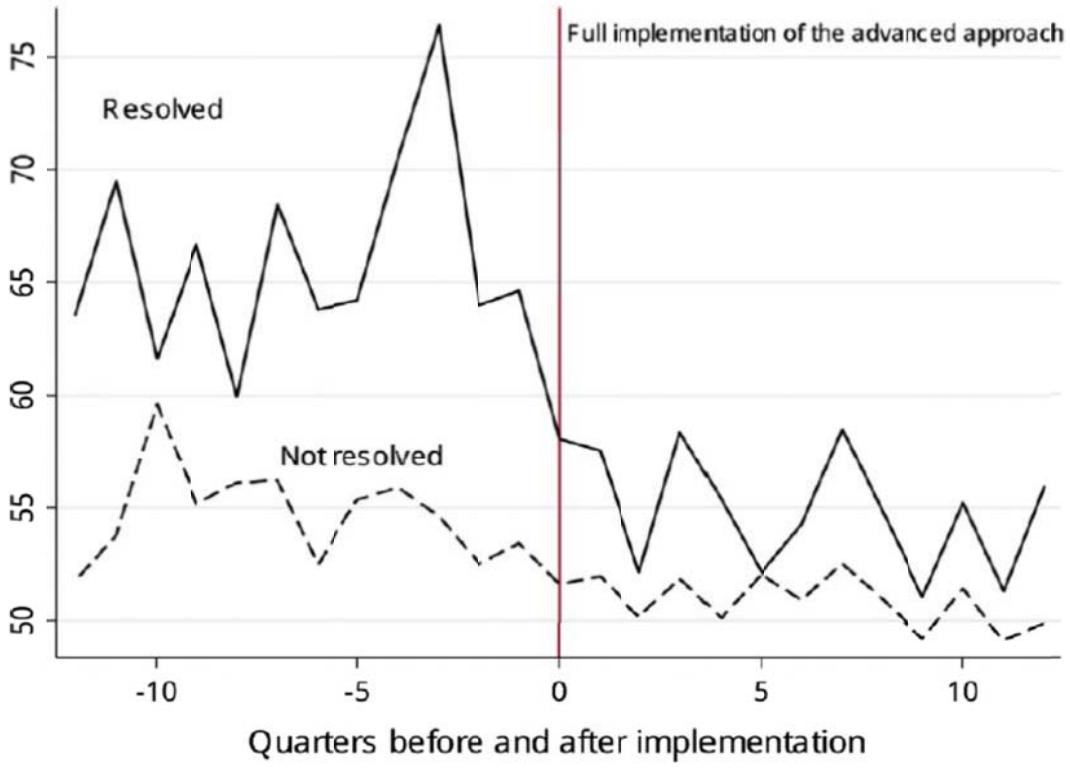

Figure 4.

Figure 5.

II. Travaux en cours

I am currently working, in collaboration with Philippe Bacchetta, on a project on the offshore dollar credit market. In this section I would like to briefly summarize the motivations, objectives, and first findings from this work.

Motivation

Since 2009, offshore dollar credit, i.e. dollar credit to non-US resident, has boomed to unprecedented levels. According to the Bank for International Settlement (BIS) data the level of activity in this market had reached $ 8 trillion by mid-2014, representing 13% of non-US GDP. This expansion has been fuelled by low US interest rates leading corporate issuers to shift from domestic currency to dollar, most notably in high interest rate countries and among distressed Eurozone corporates. Interestingly, most of the offshore dollar credit is in countries that are not usually considered dollarized economies and is extended by non-US banks.

Despite its importance we know very little about the offshore dollar credit market, apart from aggregate descriptive statistics of the size of the market and its geographical distribution.

Foreign currency credit has implications for the effectiveness of the borrowers' home country monetary policy transmission mechanism and for financial stability. Surges in foreign currency capital inflows in the form of cross-border bank credit can enable credit booms that threaten the stability of global banks, and of domestic borrowers who are vulnerable to sudden withdrawal and exchange rate risk. There is aggregate evidence from the macroeconomic literature that massive inflows of capital are related to credit booms and busts and a rapid build-up of leverage. And that past history of credit growth is a robust predictor of financial crisis.

In this project we exploit microeconomic data of the offshore dollar credit market (at the borrower and bank level) to study in more details the link between credit expansions and financial fragility. Microeconomic data covering several countries allow us to identify the direct causal effect of a credit expansion on lending standards and the quality of global banks' portfolios and to explore heterogeneous effects across banks and across different market structures. Understanding heterogeneous effects is relevant to draw policy insights and recommendations.

Research questions

The objective of the project is to address the following questions:

1. Is the recent boom in offshore dollar credit demand or supply driven? Is the level of competition among lenders an important conditioning factor of the switch from domestic currency to dollar?
2. Is an expansion in offshore dollar credit associated with a softening of credit policies and hence a deterioration in global banks' portfolio? More precisely, has the boom been associated with more lending to low-credit quality borrowers and to unhedged borrowers (borrowers with a negative exposure to a dollar appreciation)? When foreign banks chose to lend in dollar to unhedged borrowers they transfer the currency risk to the borrower but also

transform it into credit risk. The reason is that unhedged borrowers are likely to default on their dollar debt when the dollar appreciates.

3. Do banks price the additional risk of lending to unhedged borrowers? Does the underlying market structure matter in determining the extent to which banks adjust credit policies in a boom and whether they adequately price risk?

4. How is the quality of the offshore dollar portfolio of global banks affected by factors such as bank capital and geographical diversification? Does bank capital curb risk taking? Is geographical diversification associated with weaker monitoring efforts?

We study separately the case of emerging market borrowers and Eurozone leveraged borrowers because drivers of the demand and supply of dollar credit may be quite different in these two cases. For example, we expect that in the Eurozone the contraction of domestic credit and disruptions in interbank and swap markets may have played an important role in triggering the shift to dollar. In emerging markets, interest differentials should matter more.

Findings so far: Eurozone case study

In this first study we document that, despite international financial disintegration, foreign currency borrowing among leveraged Eurozone corporates has boomed during the financial crisis. Using firm-level borrowing data, we trace this increase to two main symptoms of the global financial crisis: (1) a domestic credit crunch causing leveraged corporates to switch to foreign banks; and (2) a higher funding cost in the borrower home currency causing foreign banks to increasingly transfer currency risk to the borrower.

Further, we show that disruptions in swap markets led exporters to increasingly shift from currency swaps to foreign currency bank credit. While large high-credit quality corporates could tap the bond market during the credit crunch, lower-credit quality borrowers turned to foreign banks, which increased their market power.

Although global bank lending is often reported to amplify the international credit cycle, we show that foreign banking acted as a shock absorber that weathered the real consequences of the credit crunch for Eurozone corporates that suffered most from the credit crunch.

Other working papers (see CV)