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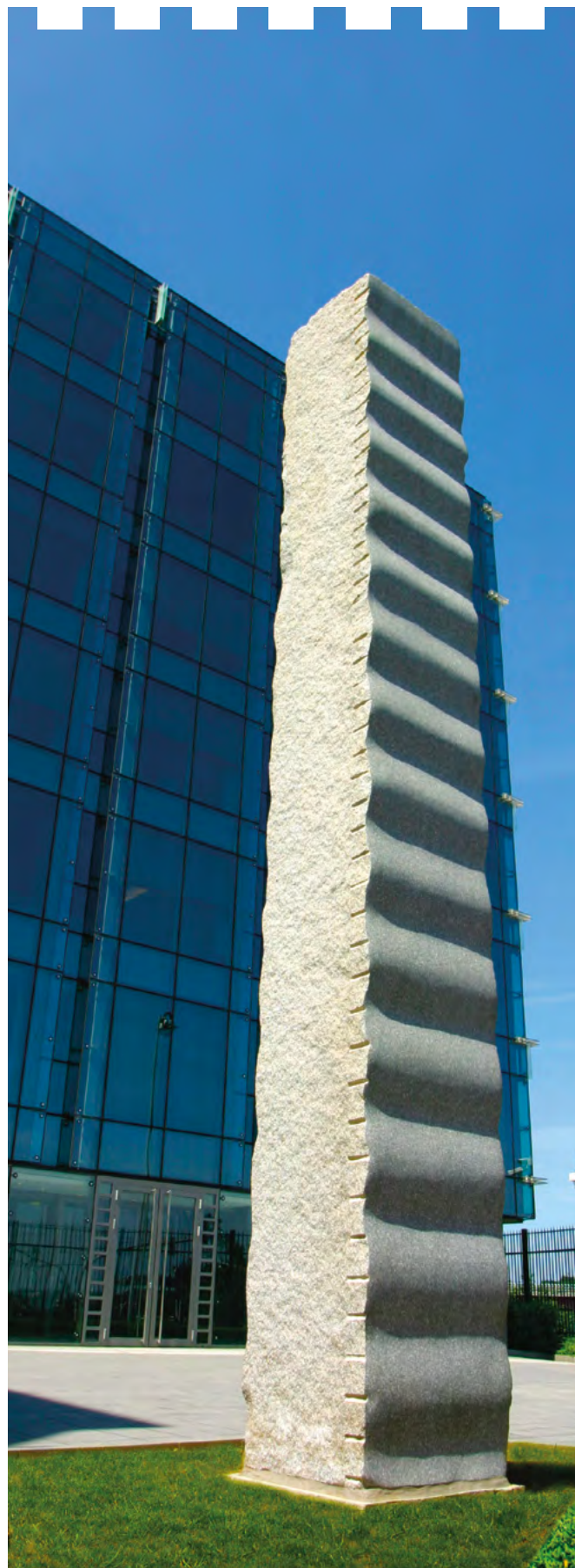
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BANQUE CENTRALE DU LUXEMBOURG
EUROSYSTÈME

Toulouse
School
of Economics

Banque Centrale du Luxembourg

Mid-term review, *May 2018*





An innovative research collaboration



The financial crisis of 2008 and the ongoing European sovereign debt crisis have put to the fore the need for a new thinking about the role of Central Bankings, the conduct of monetary policy and micro-and macro-prudential supervision as well as about risks and opportunities in the field of payment systems and services.

In 2015, BCL and TSE signed a research collaboration to address these challenges through innovative economic research. Macro-prudential policy and Virtual currency are the two main focus areas of the research activities and events conducted within the scope of this partnership.

The two institutions promote a tight and a mutually beneficial relationship through academic research, mentoring and brainstorming, and economics policy discussions, illustrated in this mid-term report.

RESEARCH TEAM



Bruno Biais

Professor at TSE (CRM/ CNRS), Bruno's work has been published in Econometrica, the JPE, the AER and the RFS. He has been a scientific adviser to Euronext and the NYSE, editor of the Review of Economic Studies and co-editor of the Journal of Finance. His research interests include market microstructure, corporate finance, financial contracting, political economy, psychology and experimental economics.



Bertrand Gobillard

Bertrand Gobillard is associate professor (MCF) at TSE and UTC. He is a microeconomic theorist whose research interests include social learning, markets with imperfect competition, market fragmentation and monetary environments. He joined TSE after completing a PhD in economics at the University of Paris X and visiting the department of economics at the University of Pennsylvania for a year.



Martial Dupaigne

Professor at Paul Valéry University in Montpellier, Martial has been closely involved with Toulouse research since 2001. His research interests include macroeconomics, international economics, applied econometrics, fiscal policy and business cycles. He earned his PhD from University Paris I.



Patrick Fève

Professor at TSE and UTC, Patrick has also been director of the doctoral school, a research fellow at Banque de France and co-editor of Annals of Economics and Statistics. His research interests include macroeconomics, international economics and applied econometrics. He received his PhD at University Paris I.



Alexander Guembel

Alexander is a professor of finance at the Toulouse School of Management, where he is affiliated with CRM and TSE. Alexander's research in finance focuses on incentive problems and information aggregation. His work has been published in the Journal of Finance, Review of Economic Studies, European Economic Review and the Journal of the European Economic Association.



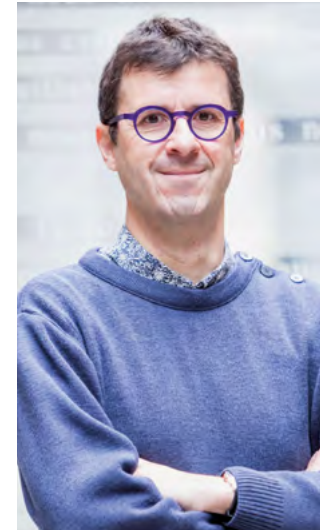
Franck Portier

TSE researcher currently professor of Economics at University College London, Franck is a senior member of the Institut Universitaire de France. He is an outstanding macroeconomist with a very broad research agenda. He is also a member of the scientific board of the Fondation Banque de France.



Jean-Charles Rochet

Jean-Charles is Swiss Finance Institute professor of banking at Zurich University and research associate at IDEI and TSE. He has published more than 80 articles in international scientific journals and seven books, including Microeconomics of Banking. His research interests include banking, financial stability, industrial organization of financial markets and contract theory.



Emmanuel Thibault

Professor at University of Perpignan, TSE researcher Emmanuel Thibault's research interests in macroeconomics and public economics include population economics, economics of the family, growth and fiscal policies. He earned his PhD from Aix Marseille University.



Jean Tirole

Jean is affiliated with MIT, where he holds a visiting position, and is also the co-founder of the Institute for Advanced Study in Toulouse. His research covers industrial organization, regulation, finance, macroeconomics and banking, and psychology-based economics & has published over two hundred articles in international reviews, as well as twelve scientific books. He is laureate of numerous international distinctions, including the 2007 CNRS gold medal and the 2014 Sveriges Riksbank prize in economic sciences in memory of Alfred Nobel.

PRESENTATION

Since June 2015, over 10 presentations were made in BCL by TSE experts, who presented their latest research on topics of high relevance to the executives of BCL.

➤ **“What doctrine for macro-prudential regulators?”**, Jean-Charles Rochet, 1 September 2015

Abstract: Evidence suggests that banks tend to lend a lot during booms and very little during recessions. We propose a simple explanation for this phenomenon. We show that instead of dampening productivity shocks, the banking sector tends to exacerbate them, leading to excessive fluctuations of bank credit, output, and asset prices. Our explanation relies on three ingredients that are characteristic of modern banks' activities: moral hazard, high exposure to aggregate shocks, and the ease with which capital can be reallocated to its most productive use. At the competitive equilibrium, banks offer privately optimal contracts to their investors, but these contracts are not socially optimal: banks reallocate capital excessively upon aggregate shocks. This is because banks do not internalize the impact of their decisions on asset prices. We examine the efficacy of possible policy responses to these properties of credit markets, and derive a rationale for macroprudential regulation in the spirit of a Net Stable Funding Ratio.

➤ **“Academic Research on Macro-Prudential Regulation: recent contributions and remaining challenges”**, Jean-Charles Rochet, 1 June 2015

Abstract: Evidence suggests that banks tend to lend a lot during booms and very little during recessions. We propose a simple explanation for this phenomenon. We show that instead of dampening productivity shocks, the banking sector tends to exacerbate them, leading to excessive fluctuations of bank credit, output, and asset prices. Our explanation relies on three ingredients that are characteristic of modern banks' activities: moral hazard, high exposure to aggregate shocks, and the ease with which capital can be reallocated to its most productive use. At the competitive equilibrium, banks offer privately optimal contracts to their investors, but these contracts are not socially optimal: banks reallocate capital excessively upon aggregate shocks. This is because banks do not internalize the impact of their decisions on asset prices. We examine the efficacy of possible policy responses to these properties of credit markets, and derive a rationale for macro prudential regulation in the spirit of a Net Stable Funding Ratio

➔ **“Aggregate Investment Externalities and Macroprudential Regulation”**, Hans Gersbach, and Jean-Charles Rochet, Journal of Money, Credit and Banking, vol. 44, December 2012, pp. 73-109. <https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1538-4616.2012.00554.x>

➤ **“How to attain Financial Stability: what have we learned from recent academic research?”**, Jean-Charles Rochet, 1 June 2015

Abstract: The Global Financial Crisis has shown that our understanding of banking activities was flawed. Both bankers and regulators were (and are still) using wrong models and this has led banks to take on excessive leverage. There is an urgent need to develop new and more realistic models to guide the policy makers in their decisions on financial stability, which remains the focus of this presentation.

➤ **“Electronic Currencies - Virtual Currencies Some Food for Thought”**, Franck Portier, 7 October 2015

➤ **“Expansions, Liquidations and Recessions”**, Franck Portier, 7 October 2015

Abstract: Recessions often happen after periods of rapid accumulation of houses, consumer durables and business capital. This observation has led some economists, most notably Friedrich Hayek, to conclude that recessions often reflect periods of needed liquidation resulting from past over-investment. According to the main proponents of this view, government spending or any other form of aggregate demand policy should not be used to mitigate such a liquidation process, as doing so would

simply result in a needed adjustment being postponed. In contrast, ever since the work of Keynes, many economists have viewed recessions as periods of deficient demand that should be countered by activist fiscal policy. In this paper they reexamine the liquidation perspective of recessions in a setup where prices are flexible but where not all trades are coordinated by centralized markets. The model illustrates why liquidations likely cause recessions characterized by deficient aggregate demand and accordingly suggests that Keynes' and Hayek's views of recessions may be closely linked. In our framework, interventions aimed at stimulating aggregate demand face a trade-off whereby current stimulus post-pones the adjustment process and therefore prolongs the recessions, but where some stimulative policies may nevertheless remain desirable.

➔ **“Reconciling Hayek's and Keynes Views of Recessions”**, Franck Portier, Paul Beaudry and Dana Galizia, forthcoming Review of Economic Studies. TSE Working Paper, n° 16-735, novembre 2016. https://www.tse-fr.eu/sites/default/files/TSE/documents/doc/wp/2016/wp_tse_735.pdf

➤ **“Marking to market versus taking to market”**, Jean Tirole, 1-2 December 2015

Abstract: Building on the idea that accounting matters for corporate governance, this paper studies the equilibrium interaction between the measurement rules that firms find privately optimal (which interestingly involve gains trading), firms' governance, and the liquidity in the secondary market for their assets. This equilibrium approach reveals a socially excessive use of market-value accounting: Corporate performance measures rely excessively on the information generated by other firms' asset sales and insufficiently on the realization of a firm's own latent capital gains. This dries up market liquidity and reduces the informativeness of price signals.

➔ **“Marking to Market versus Taking to Market”**, Jean Tirole and Guillaume Plantin, forthcoming, American Economic Review

➤ **“Shadow Banking and other current regulatory issues”**, Jean Tirole, 1-2 December 2015

➤ **“International Contagion, Market Segmentation and Banking Structures”**, Alexander Guembel, 25-26 January 2016

Abstract: Leveraged investors may be subject to contagion when sales of repossessed collateral create a downward spiral in re sales prices, increasing margin requirements and drying up the supply of liquidity. This raises the question whether market integration is desirable when the risk of contagion is significant. While a policy that erects barriers to the free flow of liquidity across countries (fragmentation) can mitigate the incidence of contagion, it creates another problem: Liquidity may remain idle in one country while its neighbor suffers a financial crisis. We conduct a welfare analysis to net out the two effects. We show that, by itself, fragmentation has a negative welfare effect: It can only fend off mild financial crises, at the cost of exposing the country to more severe ones. At the same time, since liquidity is under-provided in a competitive equilibrium, governments should inject more of it, which could involve fragmentation, in some cases. Nevertheless, in the absence of coordination, governments are likely to fragment over and above the social optimum. Such sub-optimal fragmentation is particularly likely when governments become massive suppliers of liquidity. It follows that the recent increase in fragmentation may reflect the implementation of beggar-thy-neighbor policies rather than the proper treatment of market failures.

➔ **“A Welfare Analysis of Segmented Liquidity Markets”**, Alexander Guembel, and Oren Sussman. TSE Working Paper, n. 10-240, June 25, 2010 - http://idei.fr/sites/default/files/medias/doc/wp/2011/guembel_sussman.pdf - revised and resubmitted at Review of Economic Studies.

➤ **“Financial Regulation and Shadow Banking: A Small-Scale DSGE Perspective”**, Patrick Fève, 16-17 March 2017

Abstract: In this paper, we revisit the role of regulation in a small-scale dynamic stochastic general equilibrium (DSGE) model with interacting traditional and shadow banks. We estimate the model on US data and we show that shadow banking interferes with macro-prudential policies. More precisely, asymmetric regulation causes a leak towards shadow banking which weakens the expected stabilizing effect. A counterfactual experiment shows that a regulation of the whole banking sector would have reduced investment fluctuations by 10% between 2005 and 2015. Our results therefore suggest to base regulation on the economic functions of financial institutions rather than on their legal forms.

➔ **“Financial Regulation and Shadow Banking: A Small-Scale DSGE Perspective”**, Patrick Fève and Olivier Pierrard, July 2017, BCL Working Paper N° 111 - http://www.bcl.lu/fr/publications/cahiers_etudes/111/ - Submitted

➤ **"The Blockchain Folk Theorem"**, Bruno Biais, 23 March 2017

Abstract: Blockchains are distributed ledgers, operated within peer-to-peer networks. If reliable and stable, they could offer a new, cost effective way to record transactions, but are they? We model the proof-of-work blockchain protocol as a stochastic game and analyse the equilibrium strategies of rational, strategic miners. Mining the longest chain is a Markov perfect equilibrium, without forking, in line with Nakamoto (2008). The blockchain protocol, however, is a coordination game, with multiple equilibria. There exist equilibria with forks, leading to orphaned blocks and persistent divergence between chains. We also show how forks can be generated by information delays and software upgrades. Last we identify negative externalities implying that equilibrium investment in computing capacity is excessive.



"The blockchain folk theorem", Bruno Biais, Christophe Bisière, Matthieu Bouvard, and Catherine Casamatta, TSE Working Paper, n. 17-817, May 2017, revised January 2018.
https://www.tse-fr.eu/sites/default/files/TSE/documents/doc/wp/2017/wp_tse_817.pdf
In principle accepted Review of Financial Studies

➤ **"A Fiscal multipliers analysis"**, Martial Dupaigne and Emmanuel Thibault, 28-29 June 2017

Abstract: This paper inspects the mechanism shaping government spending multipliers in various small- scale DSGE setups with endogenous labor supply and capital accumulation. We analytically characterize the short-run investment multiplier, which in equilibrium can be either positive or negative. The investment multiplier increases with the persistence of the exogenous government spending process. The response of investment to government spending shocks strongly affects short-run multipliers on output and consumption.



"Persistent Government Spending and Fiscal Multipliers: the Investment-Channel", Martial Dupaigne, and Patrick Fève, European Economic Review, Elsevier, vol. 89, October 2016, pp. 425-453.
https://www.tse-fr.eu/sites/default/files/TSE/documents/doc/wp/2016/wp_tse_655.pdf

➤ **"EMU architecture and the future of risk sharing in Europe"**, Jean Tirole, 21 September 2017

The Bridge – Forum Dialogue is a non-profit organisation established in Luxembourg, which serves as a platform for interdisciplinary debates. Under the chairmanship of Mr. Gaston Reinesch, Governor of the Central Bank of Luxembourg (BCL) and President of The Bridge Forum Dialogue a.s.b.l., Professor Jean Tirole gave a speech on 'EMU architecture and the future of risk sharing in Europe'. A distinguished audience of approximately 400 participants gathered for this event, including representatives from the European institutions and bodies, members of the Luxembourg government, members of the corps diplomatique, numerous public authorities and actors of the international, academic, economic and social sphere.



Further reading: <https://forum-dialogue.lu/?event=emu-architecture-and-the-future-of-risk-sharing-in-europe>

➤ **"Shadow Banking"**, Jean Tirole, 21 September 2017

Abstract: Traditional banking is built on four pillars: SME lending, access to public liquidity, deposit insurance, and prudential supervision. This paper unveils the logic of the quadrilogy by putting core services to "special depositors and borrowers" at the heart of the analysis, and makes room for bank and depositor implicit and explicit guarantees. It analyzes how prudential regulation must adjust to the emergence of shadow banking. The model also rationalizes ring fencing between regulated and shadow banking and the sharing of liquidity in centralized platforms to counter syphoning and financial contagion.



"Shadow Banking and the Four Pillars of Traditional Financial Intermediation", Emmanuel Farhi and Jean Tirole, December 21st, 2017. https://scholar.harvard.edu/files/farhi/files/shadow_banking_100617.pdf

➤ **"Shadow Banking and Business Cycles"**, Patrick Fève, 26-28 March 2018

RESEARCH COLLABORATION

MENTORING

11 academic publications of BCL received the expert guidance and the expertise of TSE researchers.

"Financial Regulation and Shadow Banking; A small-scale DSGE perspective"

Olivier Pierrard with Patrick Fève, BCL working paper 111, July 2017.

About the paper: Revisit the role of regulation in a small-scale DSGE model with interacting traditional and shadow banks. Estimate the model on US data and show that shadow banking interferes with macro-prudential policies.

- Co-authored by Patrick Fève

This paper was presented at various conferences listed below:

- BCL Seminar of March 2017
- Advanced Macro Workshop, Ghent University, May 2017
- SCE-CEF Annual Conference, New-York, June 2017
- EEA/ESEM, Lisbon, August 2017
- T2M Annual Conference, Paris, March 2018

"Shadow banking and business cycles"

Olivier Pierrard, Alban Moura, Patrick Fève, BCL Working paper,

About the paper: Estimated DSGE model of US economy with traditional banks and shadow banks interacting through securitization. Shadow banks amplify shocks from traditional banks. Great recession due to loan cost shock. Slow recovery to shadow wedge shock. Regulating liquidity in shadow banks stabilizes cycle.

- Co-authored by Patrick Fève

This paper will be presented at:

- BCL Seminar of March 2018
- UQAM seminar of April 2018
- SCE-CEF annual Conférence, Milan, June 2018
- EEA/ESEM at Cologne 2018.

"Investment shocks, sticky prices, and the endogenous relative price of investment"

Alban Moura, BCL working paper 105, March 2017. Review of Economic Dynamics 2018, vol 27, pp. 48-63

About the paper: Incorporate sticky investment prices in two-sector monetary model of business cycles. Estimated on quarterly U.S. time series, model suggests that price rigidity in the investment sector is the most friction to match the data.

- Mentored by Martial Dupaigne, Patrick Fève and Emmanuel Thibault

"LU-EAGLE: A DSGE Model for Luxembourg within the euro area and global economy"

Alban Moura, Forthcoming BCL working paper.

About the paper: Luxembourg version of Euro-Area and Global Economy DSGE model EAGLE. Adapted for high import content of government consumption and important share of cross-border workers. Calibrated to analyse standard shocks.

- Mentored by Bruno Biais, Martial Dupaigne and Patrick Fève

"Monetary theory reversed: Virtual currency issuance and miners' remuneration"

Luca Marchiori, BCL working paper 115, February 2018. Submitted for publication in academic journal.

About the paper: Analyze the effects of virtual currency growth in a general equilibrium model, extending standard cash-in-advance framework with (I) 'virtual' goods sold for virtual currency, and (II) 'miners' providing payment services. Declining currency issuance, as in Bitcoin, raises

the price of virtual goods, which counteracts the traditional impact of a reduced inflation tax. Fiat money growth affects the welfare effects of virtual currency creation.

- Mentored by Martial Dupaigne, Patrick Fève, Bertrand Gobillard and Emmanuel Thibault

“Multi-currency issuance and Luxembourg funds”, Luca Marchiori, Julien Ciccone and Romauld Morhs.
An ongoing research study at a stage where the database is constructed, and first empirical results obtained.

About the study: Analyze the effects of multi-currency issuance on the flow-performance relationship of Luxembourg funds.

- Mentored by Bruno Biais and Patrick Fève

“The revisions to the National Accounts data in Luxembourg”, Bob Krebs, BCL working paper draft in progress.

About the paper: Examine the revision histories of the QNA in Luxembourg for GDP and several variables.

- Mentored by Martial Dupaigne and Emmanuel Thibault

“The dynamics of bank business models in Luxembourg: A descriptive analysis”,
Natalie Andries and Gaston Giordana, BCL working paper draft in progress.

About the paper: Identify and describe the business models of banks in Luxembourg between 2008 and 2014. Analyse changes in bank classification across time.

- Mentored by Patrick Fève

“Short run side effects of borrower-based macro-prudential policy: a welfare dominance approach”

Gaston Giordana and Michael Ziegelmeyer, BCL working paper in progress

About the study: Study short-run impact on household welfare of borrower-based macro-prudential policies. Evaluate impact of tightening LTV limit using 2014 Household Finance & Consumption data for Luxembourg.

- Mentored by Martial Dupaigne, Patrick Fève and Emmanuel Thibault

“Growing-up: population ageing and the potential role of social networks as retail payment systems”

Paolo Guarda and Gaston Giordana, BCL working paper in progress.

About the study: Analyze factors inducing social networks to introduce digital currencies. Identify conditions for these to become widely accepted, potentially competing with state-issued currencies. Micro-simulations to study ageing.

- Mentored by Martial Dupaigne, Patrick Fève and Emmanuel Thibault

“Cross-country spillovers of real and financial shocks” Paolo Guarda and Roberta Colavecchio, BCL working paper in progress.

About the study: Study feedback between macro-economic and financial variables using vector autoregressive models. Distinguish domestic/foreign shocks in LU (block-recursive structure). Identify US & EA monetary policy shocks.

- Mentored by Patrick Fève

“What Drives Gross Flows in Equity and Investment Fund Shares in Luxembourg?” Gabriele Di Filippo, BCL working paper 112, August 2017.

About the paper: The paper analyses gross portfolio investment flows in equity and investment fund shares (EIFS) in Luxembourg – a small open economy with a financial center – over the period 2002Q1-2016Q3.

- Mentored by Fany Declerc and Patrick Fève

“Capturing Macroprudential Regulation Effectiveness: A DSGE Approach with Shadow Intermediaries”

Federico Lubello and Abdelaziz Rouabah, BCL working paper 114, October 2017

About the paper: Shadow intermediaries activities have registered a spectacular increase during the last decades. Recently, their market shares have rapidly been gaining momentum partially due to “regulatory arbitrage”. Although their centrality to the credit boom in the early 2000s and to the collapse during the financial crisis of 2007-2009 is widely documented, the number of contributions studying the implications on the real economy and the underlying transmission mechanisms is surprisingly limited. The research contributes to filling this gap and devise a new DSGE model whose productive sector captures key characteristics of the European economy by accounting for small and large firms vertically linked in a production chain.

- Mentored by Martial Dupaigne

RECRUITMENT

Two PhD students of TSE are recruited by BCL.

➡ Macroeconomist, **Alban Moura** was recruited in September 2016 in the Economics and Research Department, where he is an active researcher and has published three significant papers.

- “Investment Shocks, Sticky Prices, and the Endogenous Relative Price of Investment”
Review of Economic Dynamics, 27, January 2018, 46-63.
- “The Effects of Government Spending Endogeneity on Estimated Multipliers in the U.S”
Annals of Economics and Statistics, 121-122, June 2016, 359-384
- “Reexamining the Cyclical Behavior of the Relative Price of Investment”
with Paul Beaudry and Franck Portier. Economics Letters, 135, October 2015, 108-111.

➡ Macroeconomist, **Pablo Garcia Sanchez** will join Alban Moura in the Economics and research department from September 2018, right after he has defended his thesis. He has recently published two papers.

- “The Macroeconomic Consequences of Bank Capital Requirements”. In revision Annals of Economics and Statistics
- “State-Dependent Risk Taking and the Transmission of Monetary Policy Shocks”.
Joint with: Patrick Fève and Jean-Guillaume Sahuc. TSE Working Paper 17-872. Published: Economics Letters (March 2018)

VISITING

TSE had the pleasure of receiving the BCL delegates on a research visit to Toulouse

01 - 05 February 2016
Olivier Pierrard

20 - 24 February 2017
Olivier Pierrard

05 - 07 July 2017
Olivier Pierrard and
Alban Moura

31 March - 1 April 2016
Gaston Reinesch

Mid 2016, TSE had the honor and the pleasure to receive the Governor Gaston Reinesch.

During his visit, Governor Reinesch met with the TSE Research team working on the BCL partnership. During a Business Talk addressing students of TSE, he spoke about the role of economists in the central banks. He also met with the PhD students and discussed their research and provided them insightful information.



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