

# ANNUAL CONFERENCE OF THE SCOR-PSE CHAIR

## NEWSLETTER N°3

The **second annual conference of the SCOR-PSE Chair** took place on July 2, 2019. Several influential economists from Europe and the United States met at PSE to present and discuss their most recent research on macroeconomic risk. **The keynote lecture was given by Ricardo Caballero (MIT)**, who presented his work on risk-centric macroeconomics, safe asset shortages, and prudential monetary policy. The event ended with a **policy panel discussion, featuring Gilles Saint-Paul (PSE,ENS), Philippe Trainar (SCOR) and Natacha Valla (ECB).**

This newsletter includes an interview of Ricardo Caballero, a brief description of the research papers discussed at the conference, and a summary of the panel discussion. ➕



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# Risk-Centric Macroeconomics

AN INTERVIEW WITH RICARDO CABALLERO

**What is “risk-centric macroeconomics”? How have risk-markets disrupted the real economy in recent decades?**

**Ricardo Caballero:** As an economy grows, it generates new output and risks, both of which need to be absorbed by economic agents. The focus of standard short-run macroeconomics is on whether there is enough demand for output, and the role of policy is to directly address any output gap that may emerge. From this conventional perspective, equilibrium in the risk market is mostly a concern for the field of finance.

Risk-centric macroeconomics blurs this distinction between macroeconomics and finance. In particular, risk-centric macro thinks about the macroeconomic problem from the perspective of an imbalance in risk markets and how this feeds into macroeconomic imbalances. This approach not only offers a different perspective for conventional macroeconomic problems, but it is particularly useful when the core macroeconomic problem stems from imbalances in financial markets which has often been the case in recent decades. Moreover, financial markets respond to shocks much faster than goods markets. Thus a policy framework that gives a significant weight to financial markets and how they react to shocks is nimbler than the conventional output-gap-centric approach. It is also clear that policy makers in practice do give a lot of weight to financial markets, so why not make this more explicit in our models?

**In your recent research, you stress the importance of the feedback between aggregate demand and asset prices in causing recessions and low interest rates. Could you briefly explain how this works?**

**R.C.:** If there is too much supply of risk relative to demand for it—and the monetary authority doesn't do anything to correct this imbalance—then the price of the assets in which these risks are embedded (risky assets) needs to drop in order to increase their expected return and attract investors. However, this drop in asset prices depresses aggregate demand through a variety of channels, and creates an output gap. The monetary authority can break this chain of events by lowering interest rates, which raises the excess return of risky assets without the need for a sharp drop in their price. Thus the central bank stabilizes aggregate demand. In a risk-centric perspective, one thinks about monetary policy as an instrument for stabilizing financial markets by inducing investors to demand enough risk at the right asset price level; where the right asset price level means the one that generates enough perceived wealth to support aggregate demand consistent with potential output.

However, once interest rates approach the effective lower bound, the central bank loses its ability to offset excessive risk-intolerance, and the economy becomes very vulnerable to large risk-premium shocks. This is the world we live in today.

**How do financial speculation and high-valuation investors amplify this channel...**

**R.C.:** High-valuation agents are very important during a recession in which the central bank is constrained because they limit the drop in asset prices, and hence in aggregate demand. However, if they speculate excessively during the boom, their wealth will be depleted during the next severe recession and they will be unable to buy enough risky assets to prevent a sharp decline in prices.

**... and what would be the role for macro-prudential regulation?**

**R.C.:** The environment I just described has an aggregate demand externality built in. While high-valuation investors (and their lenders) may understand how a recession will affect their personal wealth, they ignore the effect of a more severe drop in asset prices on aggregate demand and output. Macro-prudential policy can curtail excessive risk taking by high valuation investors so they have enough wealth to support asset prices after the transition to recession. For similar reasons, when speculation is rampant, it may be optimal to tighten monetary policy during the boom beyond what conventional output-gap stabilization policies indicate.

**How well is the global economy positioned to withstand future risk-off events?**

**R.C.:** Not well. There is very limited policy ammunition left to deal with a large risk-off episode, and there is a lot of economic policy uncertainty and political uncertainty that could trigger a severe risk-off event. We are playing with fire.

**High-valuation agents are very important during a recession in which the central bank is constrained because they limit the drop in asset prices, and hence in aggregate demand.**





**You said that the world economy today can be characterized as an “Advanced Emerging Market Economy”. Could you briefly explain what you mean?**

**R.C.:** Historically, Emerging Market Economies have been vulnerable to large risk-off episodes. Not only are these shocks very large, but they often come with severe capital outflows and pressure on their currency. Because of the currency pressure, monetary policy must be used to defend the exchange rate and cannot soften the impact of the risk-off shock. In this sense the whole world looks like an Emerging Market Economy: it is vulnerable to a risk-off and has limited monetary policy to soften the blow.

**While there is some space for unconventional monetary policy, a fiscal expansion [...] is extremely powerful, because it expands the net supply of widely-demanded safe assets.**

**Focusing on the current period, we see unprecedented stocks of negative-yielding bonds in financial markets. Are we in a Safety Trap?**

**R.C.:** It seems clear that, at historically normal interest rates, there is much more demand for store-of-value instruments than their supply. This shortage is particularly acute in safe assets, and this is why we refer to the current situation as a safety trap rather than a liquidity trap.

Note that this scarcity has spread to many credit instruments due to the direct intervention of central banks and the limited freedom that many institutional investors have.

Moreover, this shortage is most pronounced in Euro instruments—indeed the Euro zone is uncomfortably close to a safety trap.

**Which policy tools are most effective in this situation? Has unconventional monetary policy reached its limits?**

**R.C.:** Here the distinction between a liquidity trap and a safety trap matters. Unconventional monetary policy that swaps risky assets for safe assets is more or less irrelevant in a liquidity trap but very effective in a safety trap. There is still space for this sort of asset swap in Europe. While there is some space for unconventional monetary policy, a fiscal expansion (by whomever can produce safe assets—given the low yields on government bonds this is not so hard at the moment) is extremely powerful, because it expands the net supply of widely-demanded safe assets.



**Ricardo J. Caballero** is the Ford International Professor of Economics, a director of the World Economic Laboratory at the Massachusetts Institute of Technology, and an NBER Research Associate. Caballero was the Chairman of MIT's Economics Department (2008-2011). His teaching and research fields are macroeconomics and finance. His current research looks at the macroeconomic implications of reduced risk tolerance and safe asset shortages, global capital markets, speculative episodes and financial bubbles, and systemic crises prevention mechanisms. Caballero has an extensive list of publications in all major academic journals. Among his major awards, he was the winner of the 2002 Frisch Medal of the Econometric Society for “Explaining Investment Dynamics in U.S. Manufacturing: A Generalized (S,s) Approach”, *Econometrica*, 67(4), July 1999 (joint work with Eduardo Engel); the Smith Breeden Prize by the American Finance Association for “Collective Risk Management in a Flight to Quality Episode”, *Journal of Finance*, 63(5), October 2008 (joint with Arvind Krishnamurthy); *Journal of Finance* 2014 Brattle Group Prize for distinguished papers for “Fire Sales in a Model of Complexity,” joint with Alp Simsek. In April 1998, Caballero was elected a Fellow of the Econometric Society and subsequently of the American Academy of Arts and Sciences in April 2010.



# Strategic Default in Financial Networks

**Nizar Allouch and Maya Jalloul**, Strategic Default in Financial Networks, Working Paper, February 2018 .  
The paper was presented by N. Allouch (University of Kent) and discussed by Jean-Edouard Colliard (HEC Paris).

Financial institutions are connected to each other through a complex web of financial contracts. Transactions between financial institutions enable them to share funding and transfer risks. However, these connections can also facilitate the diffusion of shocks, as painfully demonstrated by the global financial crisis of 2008. Since then, the impact of the financial network architecture on systemic risk has become a central topic for both research and policy making.

Linkages between institutions can create systemic risk through chains of default, as explained by Eisenberg and Noe (2001): "A default by firm A on its obligations to firm B may lead B to default on its obligations to C. A default by C may, in turn, have a feedback effect on A." Beyond this direct cascade effect, cyclical financial interconnections can also lead to strategic complementarities in default decisions. Indeed, whether an institution defaults or not will impact the incentives of other institutions to default. As a consequence, it may also have an effect on the other institutions' willingness to take actions beforehand to reduce their own risk of default.

## STRATEGIC COMPLEMENTARITIES AND MULTIPLE EQUILIBRIA

To study strategic default decisions in financial networks, Allouch and Jalloul build a theoretical framework where institutions hold each other's financial liabilities. Liabilities take the form of defaultable debt. In addition, institutions receive exogenous cash flows from outside the financial

system. In this model, an institution defaults not only when its exogenous cash flows are too small to cover its liabilities, but also when its debtors default on their obligations.

## Whether an institution defaults or not will impact the incentives of other institutions to default.

Of course, institutions can build up buffers and store part of their cash flow beforehand in order to avoid default. When losses due to the default of other borrowers increase, institutions need to store ex-ante larger amounts of cash flow to avoid their own default. However, incentives to do so decrease.

## Strategic complementarities in default decisions imply multiple equilibria.

The authors provide a new algorithm which exploits the financial network structure to characterize the set of equilibria. **Equilibria can be ranked from the most to the least socially efficient:** The worst equilibrium is the one where institutions expect many other institutions to default. In this case, individual incentives to store cash flows and avoid default are low – it becomes optimal for each institution to default as well. On the other hand, in the best equilibrium, incentives to avoid default are high because no or only very few institutions are believed to default.

## CENTRAL CLEARING COUNTERPARTY AS A COORDINATION DEVICE

Given the multiplicity of equilibria, what kind of policy can be implemented to solve the coordination problem and reach the desired equilibrium? This paper argues that a central clearing counterparty (CCP) may not only limit default contagion but



also allow institutions to coordinate on the efficient equilibrium. The introduction of a CCP replaces the original liability between a debtor and a creditor by two new liabilities: one between the debtor and the CCP and another between the CCP and the creditor. By breaking down cyclical financial connections, central clearing reduces the minimum cash flow necessary to escape default and, therefore, increases the incentives to do so.



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# The Transmission of Shocks in Endogenous Financial Networks: A Structural Approach

Jonas Heipertz, Amine Ouazad and Romain Rancière, The Transmission of Shocks in Endogenous Financial Networks: A Structural Approach, NBER Working Paper No. 26049, 2019 . The paper was presented by R. Rancière (University of Southern California) and discussed by Stéphane Guibaud (Science Po).

A seminal literature has shown that financial networks can facilitate the diffusion of shocks and lead to systemic risk. So far, **a typical aspect of prior research is that it considers fixed and unchanging bilateral exposures between financial institutions.** Each day, however, large amounts of financial assets are traded and financial institutions' balance-sheets change in response to new information, regulation or monetary policy. A key challenge is to identify the micro-economic behaviour that drives the endogenous formation of financial networks and the transmission of shocks.

In this paper, Heipertz, Ouazad and Rancière build and structurally estimate a general equilibrium model of trade in financial assets between heterogeneous financial institutions, including banks. The model micro-founds a financial network where shocks propagate due to each bank's endogenous asset demand and supply decisions, **which causes ripple effects on other banks' demands and supplies due to the impact of portfolio reallocation on equilibrium prices.**

## SHOCK PROPAGATION IN GENERAL EQUILIBRIUM

Each bank's portfolio of assets and liabilities is shaped by its beliefs about future returns, its risk preferences, and its constraints. Beliefs play a key role in portfolio allocation. In response to a change in beliefs about returns, risks, or correlations, for example, a bank can re-optimize its balance-sheet. In partial equilibrium, this generates excess demand or supply on different markets. In general equilibrium, asset prices change and induce other banks to re-balance their portfolios as well. Depending on how strongly banks substitute between different financial assets, a shock can propagate even across seemingly unrelated assets and across seemingly unrelated banks. In addition, small banks can also have large effects. These novel findings, arising from network endogeneity, run in vast contrast to the "rule of thumb" that the largest banks are necessarily the most systemic ones.

**The model micro-founds a financial network where shocks propagate due to each bank's endogenous asset demand and supply decisions.**

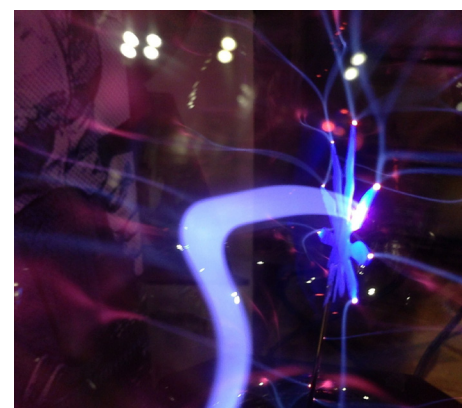


## EMPIRICAL IDENTIFICATION AND NETWORK EFFECTS OF QUANTITATIVE EASING

A key challenge for the estimation of the model is that banks' belief about the future distribution of returns is fundamentally unobserved. The paper's insight is that the way banks adjust their balance sheet positions over time in response to shocks reveals their beliefs about returns, risks, and correlations. If, in addition, banks use dynamic factor models to forecast returns – a common assumption in empirical asset pricing – a factor model on holdings maps one-to-one into the factor model of return beliefs.

The authors estimate beliefs about future returns, risk-preference and trade costs for the universe of French banks over the 2013 to 2018 period. This period is one where the ECB ramps up its quantitative easing (QE) programs.

The impact of such QE is significant: a quarter of Eurozone government bonds purchases (of 180 billion EUR) reduces French government bond yields by 44 bps; these purchases also flatten the yield curve. The paper shows that QE caused a higher fragility and systemicness of the financial network. Indeed, QE causes a chain sequence of banks' balance sheet re-balancings and affects the structure of the financial network itself. The median bank increased its risk taking by rebalancing its holdings from debt (–0.77 percent) to equity, reducing its distance to insolvency.



# Understanding Uncertainty Shocks and the Role of Black Swans

**Anna Orlik and Laura Veldkamp**, Understanding Uncertainty Shocks and the Role of Black Swans, NBER Working Paper No. 20445, 2015 . The paper was presented by A. Orlik (Federal Reserve Board) and discussed by Laurent Ferrara (Banque de France).

Economic uncertainty is a powerful force in modern economies. Recent work has shown that fluctuations in uncertainty can trigger business cycles, bank runs and asset price movements. However, less is known on what triggers the observed sudden and large surges in uncertainty.

Typically, models assume that economic agents know the true distribution of economic outcomes. In this case, the world is more uncertain when the volatility of the conditional distribution of future shocks increases. In the real world though, also the distribution governing the realization of economic outcomes is unknown: economic agents need to estimate the probabilities of alternative outcomes. As a consequence, changes in uncertainty may arise also when agents update their beliefs on what is the true model explaining the economic world.

In this paper, Orlik and Veldkamp provide a data-disciplined theory of belief formation. **The authors build forecasting models where agents use real-time data to learn the parameters of a possibly skewed distribution.** It is the combination of these two features, parameter learning and tail risks –

so-called black swans (Taleb, 2010) – which generates large, counter-cyclical fluctuations in uncertainty and allows to match key moments of professional forecaster data.

## PARAMETER LEARNING AND TAIL RISKS

A central assumption of the mechanism is that agents use everyday events to revise their beliefs about the full distribution of economic outcomes, including tail events. Probabilities of everyday occurrences are easy to learn and do not change significantly after a short period of time. In contrast, tail events are rarely observed and their size is difficult to assess. Small changes in the

data can “wag the tail” of the distribution and trigger large revisions in conditional probability of large negative outcomes. Since the variance of a distribution is the expected squared distance from the mean, changes in the probabilities of events far from the mean have outsized effects on conditional variance, and thus, on uncertainty.

Applying the forecasting model to vintages of U.S. real GDP growth over 1968Q4 to 2013Q4 period reveals large and highly counter-cyclical uncertainty shocks. It also confirms the importance

of tail risks for economic uncertainty. **75% of the variation in uncertainty in U.S. GDP growth can be explained by changes in black swan risk, i.e. the conditional probability of an extremely low growth realization** (here -6.8%, a 1-in-100-year event). For example, black swan risks increased during the 2008 financial crisis (from 3.5% in 2007:Q1 to over 4.6% in 2009:Q3). Tail risks also increased in the early 1970s. In the first case, the forecaster observes a large negative outlier and revises skewness to be more negative. In the second case, following several quarters of positive GDP growth, forecasters had updated their mean belief upwards. Negative realizations were therefore perceived as more extreme. As such, when GDP growth actually decreased, the estimate of skewness rose.




## RELATION TO OTHER UNCERTAINTY MEASURES

Comparing the model-based uncertainty series to commonly-used uncertainty proxies reveals that uncertainty in the model is less volatile, but more persistent than the usual proxies. The model-based series correlates more with: the Baker, Bloom, and Davis (2016) policy uncertainty index, the price of a volatility option (VIX), and the Jurado, Ludvigson, and Ng (2015) macro uncertainty index (cf. Newsletter #1, Box 1: selected uncertainty measures).

**Small changes in the data can “wag the tail” of the distribution and trigger large revisions in conditional probability of large negative outcomes.**



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# Long-Term Risks for the World Economy

Gilles Saint-Paul (PSE, ENS), Philippe Trainar (SCOR), and Natacha Valla (ECB) were invited to discuss about long-term risk in the global economy. The panel was moderated by Nicolas Dromel (PSE, CNRS).

## NEW ROLES FOR CENTRAL BANKS

The panel opened with the following question, on monetary policy: How can central banks provide stability in the future? Undoubtedly, central banks have played an essential role in the policy responses since the financial crisis of 2008. However, in the current situation, they face a daunting challenge. In the Euro zone, unprecedented monetary policy measures have pushed interest rates into negative territory and at the effective lower bound.

According to Natacha Valla, it is not clear for how long interest rates can remain negative, especially if fiscal policy remains constrained. Central banks may still be able to provide further important monetary stimulus though, through forward guidance and reinvestments of proceeds from maturing debt securities bought by central banks under quantitative easing programs. In the long run, central banks might also be called upon to widen their mandate and address long-term

developments such as climate change and environmental risks, as signaled by Mark Carney in his recent "New Horizon" speech (Carney, 2019).

## THE UNIVERSE OF RISK IS EXPANDING

Philippe Trainar pointed out that understanding the economic consequences of the risk of climate change is of vital importance for SCOR as a reinsurance company. However, the universe of risk has also expanded in many other areas. After decades of progressive inclusion, the world is re-fragmenting again at many levels: economically for example, in the form of trade barriers, or politically, with the risk of populism. This makes global risk diversification a much more difficult endeavor. Technical progress could also be a source of risk. In particular, substantial progress in digital technology seems only to have translated into minor increases in corporate profits.

## THE RISK OF ROBOTIZATION

In the long-run, the rise of robots could prove to be a major source of risk for the workers of the world economy. Historically, technical progress was beneficial to workers, because it increased their productivity. Gilles Saint-Paul argued that, this time, it might be different, because robots constitute not only capital but also labor. Therefore, robotization could put an end to factor complementarity in the production process. All tasks performed by humans could potentially be performed by robots.

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Gilles Saint-Paul

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**Mark Carney**, A new horizon, Speech at European Commission High-Level Conference: A global approach to Sustainable Finance, Brussels, March 21, 2019. [+](#)



**Gilles SAINT-PAUL**, the scientific director of the SCOR-PSE Chair, is Professor at the Paris School of Economics and Ecole Normale Supérieure, and a Global University Professor at NYU Abu Dhabi. He is also a research fellow of many think-tanks such as the CEPR. He is a former member of the Council of Economic Advisors to the Prime Minister of France. He served as consultant for various central banks, ministries, and international institutions. His research, which spans a variety of macroeconomics topics from labor markets to political economy to bubbles to fiscal policy, has been published in leading journals such as the American Economic Review, Journal of Political Economy, Quarterly Journal of Economics, among others. He has also authored several books.



**Philippe TRAINAR** is a former Chief Risk Officer and Chief Economist at SCOR (2006-2016). He has served in several institutions and ministries, and he acted as a consultant to the Prime Minister of France from 1993 to 1995. He is also a former member of the Council of Economic Advisors. He graduated from the Ecole Nationale d'Administration and the Institut d'Etudes Politiques of Grenoble. He has taught economics and finance in the Institut d'Etudes Politiques in Paris and Bordeaux, in Paris-Dauphine, and at the Ecole des Ponts et Chaussées. He has published papers in journals such as The Journal of Risk and Insurance, the Geneva Papers, Economie & Statistique, or the Revue Economique. He is member of the scientific committee of the ACPR and the "Cercle des Economistes", and the editor-in-chief of the "Revue Française d'Economie".



**Natacha VALLA** is the Deputy Director General for Monetary Policy at the European Central Bank. She also teaches at NYU Abu Dhabi and is a board member of SUERF (European Money and Finance Forum). Prior to that, she was Head of the Policy Strategy Division at the European Investment Bank and Deputy Director of CEPII, the main French think tank in International Economics. She was a member of the Commission Economique de la Nation and the Conseil d'Analyse Economique, as well as of the Société d'Economie Politique. Before joining CEPII, Natacha Valla was Executive Director at Goldman Sachs Global Economic Research, where her focus was on financial economics and macroeconomic developments in the euro area, France and Italy. Prior to that, she worked at the European Central Bank on the monetary policy stance and aspects of policy implementation in money markets. In 2005, she was seconded at the Research Directorate of the Banque de France in Paris. Earlier on, she has been a consultant for the IMF and the OECD, and taught at the Universities of Florence, Paris-Dauphine, H.E.C. and Sciences-Po. She received a PhD in Economics from the European University Institute (Florence) in 2003.

## ANNOUNCEMENTS

**Axelle Ferriere** has replaced **Nicolas Dromel** as executive director of the SCOR-PSE Chair, as Nicolas Dromel has taken new responsibilities with the French ministry of Research. Nicolas Dromel played an essential role in coordinating the SCOR-PSE chair since its inception. We wish him a productive and successful career at the Ministry.

## COMING NEXT

December 5, 2019, 4 pm

PSE: 48 boulevard Jourdan, 75014 Paris, R2-21  
SCOR-PSE Chair Annual Lecture – Nick Bloom

January 17, 2020, 10 am

PSE: 48 boulevard Jourdan, 75014 Paris, R2-21  
SCOR-PSE Chair Workshop on China Risks



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