amse Newsletter

Events

January

11: Public lecture « Décarboner l'économie française : de l'ambition aux actes » - Alain Quinet, chairman of the commission on the tutelary value of carbon, and Aude Pommeret, economist, Université Savoie Mont Blanc

Location: Bibliothèque de l'Alcazar, Marseille
Organized by Yves Doazan

February

7-8: ADRES Doctoral Conference 2019

Location: AMSE (Îlot Bernard Dubois), Marseille
Organized by Frédéric Dufourt

Focus on

The Econometric Society   **# Habiba Djebbari** was elected Chair of the Africa Standing Committee of the Econometric Society for 2018-2021.

 # ASSET Conference 2018: The Louis-André Gérard-Varet prize for the best paper by a young researcher was awarded to Raghul Venkatesh, AMSE post-doctoral fellow, at the recently held ASSET conference in Florence (8-10 november 2018).

Aix*Marseille université Initiative d'excellence   **# Thesis Prize Aix-Marseille Université**: Anne-Charlotte Paret (former PhD AMSE) was awarded a thesis prize for her research work entitled «*Fiscal vulnerability and sustainability issues in emerging market countries*»

Call for papers

coalition theory network 24th conference
May 16-17, 2019 - Aix-en-Provence (France)

Coalition Theory Network - 24th Conference

Aix-en-Provence May 16-17, 2019

Deadline for application is 15/02/2019.
https://ctn2019.sciencesconf.org/

18th JOURNÉES LOUIS-ANDRÉ GÉRARD-VARET JUNE 13-14, 2019 Aix-en-Provence, France   **amse** école d'économie d'aix-marseille aix-marseille school of economics

International Conference in Public Economics

Deadline for application is 01/02/2019.
https://lagv2019.sciencesconf.org/

Outline

Omar Licandro

Omar Licandro is Professor of Macroeconomics at the University of Nottingham, Research Professor at the Instituto de Análisis Económico (Barcelona, on leave, Associate Professor at the Barcelona GSE and CESIfo fellow). Since 2013, he has been Secretary General of the International Economic Association (IEA) and the Executive Secretary of the Research Institute for Development, Growth and Economics (RIDGE). He was Associate Professor at Universidad Carlos III de Madrid, 1991-2000, Senior Researcher at FEDEA, 1994-2001 and Professor at the European University Institute, 2001-2009. He was Associate Editor of *Annales d'Economie et de Statistique*, **Investigaciones Economicas** and the *Spanish Economic Review*.

His main research field is Macroeconomics with special interest in Growth Theory. His main contributions are on vintage capital, embodied technical progress, the transition from Malthus to Modern Growth and the competitive role of trade under firm heterogeneity. He has extensibly published in top journals in economics, including the *Economic Journal*, the *Journal of Economic Theory*, the *Journal of Economic Growth*, the *Review of Economic Dynamics*, the *Journal of Economic Development* and the *Journal of Economic Dynamics and Control*, among others.

He is currently working on the welfare bases of GDP measurement, the interaction between trade and growth under firm heterogeneity, the pass-through of large devaluations, skill obsolescence and the joint dynamics of development and the environment. Omar Licandro is a visitor at Aix-Marseille University and a fellow of IMéRA for the period 1 September – 31 December 2018 ▪

Guests at AMSE during the first semester of 2019

Ramses Abul Naga from the University of Aberdeen will visit AMSE, through a joint AMSE-IMERA chair, from January 1st to June 30th 2019. He works on public and health economics, micro-econometrics and the measurement of inequality and well-being. He will be based at IBD, office 358.

Pavrita Paul from the University of Eastern Finland will visit AMSE from January 1st to June 30th 2019. He works on public health economics and will be based at IBD.

Justin Leroux from HEC Montréal will visit AMSE from February 1st to June 30th 2019. He works on environmental economics, cost-sharing and social welfare. He will be based at IBD.

Ted Loch-Temzelides from Rice University will visit AMSE from February 1st to July 31st 2019. He works on the effects of innovation in renewable and fossil energy production on economic growth and energy independence and on the design of efficient environmental policies. He will be based at IBD.

Rajeev Dehejia from New York University will visit AMSE in May 2019. He works on econometrics, development economics, labor and public economics, with a focus on empirical microeconomic policy research. He will be based at IBD.

Garance Genicot from Georgetown University will visit AMSE from May 1st to July 31st 2019. She is a development economist working on aspirations, informal credit and insurance markets, intra-household bargaining, social networks and inequality. She will be based at Chateau Lafarge.

Mick Devereux from University of British Columbia will visit AMSE from May 15th to June 30th 2019. He works on international macroeconomics and international finance. He will be based at Chateau Lafarge ▪

"The thesis, a valuable asset in the world of quantitative analysts"

Yoann Bourgeois, quantitative analyst at Credit Agricole Investment Bank, in London

What are your current professional commitments?

I currently work at Crédit Agricole Investment Bank in London where I lead a team dedicated to quantitative strategy research, one of the sectors of the bank's front office, which aims to offer clients surveys and trade ideas. My team implements models and works on the valuation of derivatives, non-linear financial instruments whose value varies according to the evolution of an asset. Initially, derivatives were created so that companies could hedge against several risks: market volatility, credit risk. My activity has both an operational dimension and a research aspect. This sector irrigates the other Front Office teams: sales and trading desks, as well as external clients (like asset managers).

This activity requires skills both in econometrics and in applied mathematics. The complementarity between these two areas helps me detect derivative-based investment strategies that link discrete and continuous time, the former using statistical models and the latter using stochastic calculus.

I have always been involved in research, and I maintain this link through my current teaching on big data in the AMSE master's program, at Aix-Marseille University. I have taught for 20 years, starting in several Universities in addition to my professional activity at HSBC, then known as Crédit Commercial de France. On a personal level, the link with students helps me synthesize my experience and strengthen my didactic skills. Professionally, this teaching position keeps me in touch with academic research and puts me in the front line for questions from Front Office managers on research and development topics.

- Yoann defended his thesis at GREQAM in 2003. Supervisor: Anne Péguin-Feissolle
- He joined HSBC's Research and Innovation Department on 1st January 2002 as a research-oriented financial engineer.
- As of 2016, he is a quantitative analyst at Credit Agricole Investment Bank, in London.

Finally, teaching allows me to be in contact with potential trainees, whom I can recruit for specific research and development activities. The interns I recruit work on research-based developments including implementations, and are exposed to market practitioners.

Can you describe your professional trajectory since you finished the PhD?

My university career began at the University of Orléans. Then I decided to join Greqam for the DEA because, at the end of the 1990s, there were still few places where quantitative economics was taught. Because I wanted to do research, I enrolled on a thesis program at EHESS in Marseille. I completed my thesis in three years (1998-2001)

and defended it in March 2003; the Internet era was just beginning and I was interested in financial data. I quickly aimed to establish a link between my research and the real economy, understand how practitioners used financial data, discuss it with my thesis supervisor, Anne Péguin-Feissolle, and find an internship from January to June 2001 in the Research and Innovation Department at HSBC in Paris. This department, which has now disappeared, remains a reference. There were doctoral candidates doing a CIFRE thesis or former students of grandes écoles who had left their positions to do research.

I obtained a research grant and also taught from the first year of my thesis, usually supervising classwork (TD) but also giving lectures, which was more rare. I was offered a position as a «higher education monitor» (MIES) with a limited number of teaching hours (about 60 hours). Thus, in the third year of my thesis, I completed my course work in the first quarter of the academic year and the internship at HSBC afterwards.

I joined HSBC's innovation research department on 1st January 2002 as a research-oriented financial engineer. This department was transformed in 2004 into a model validation department because HSBC wanted to audit all quantitative models in the trading room. I was the specialist on fixed income derivatives models. I did a little less research than I was used to in this position, focusing on front office needs. Then, I did two years of trading as an algorithmic trader and developed, for example, a multiple co-integration model to establish stationary triplets of financial assets. However, as there were few of us, the research aspect shrank and I decided to go back to a more quantitative department.

I joined Crédit Agricole in London in 2007 to participate in the creation of a quantitative derivatives valuation research team that is not in contact with the client. For me, this is an important phase in my professional life. Since June 2016, I have been in charge of quantitative strategy, and I have created a new team. The objective this time is to help the client understand how markets work based on factual analysis (e. g., detecting changes in trends for example) and to find and backtest investment strategies. Due to fierce competition, you have to be able to stand out and since my grounding is in applied mathematics, I deal with theoretical subjects, coming back to econometrics.

How do you feel about your experience of doing a PhD at GREQAM?

GREQAM taught me the rules governing intellectual respect. There was also a real intellectual curiosity, nourished by seminars or by guest researchers of great international renown invited to the laboratory. It was a genuine opportunity to meet and exchange with these researchers. I had the chance, thanks to Anne Péguin-Feissolle 20 years ago, to explore some models now used in artificial intelligence. The PhD thesis taught me to have the necessary hindsight for the activity I carry out, for example, in the management function. It is also an unformatted training: in other words, a real asset today in the professional world!

Interview by Yves Doazan

Research Highlights

A model of Fiscal Dominance under the "Reinhart Conjecture"

Gilles Dufrénot, Fredj Jawadi and Guillaume Khayat, 2018, *Journal of Economic Dynamics and Control*, 93, 332-345.

The research program

A major consequence of the 2008 financial crisis was the sharp rise in public debt ratios in industrialized countries. Given the strong Keynesian effects of fiscal consolidation during economic downturns, fiscal policies were unable to bypass constraints to rapidly lower the high levels of sovereign debt. In this context, economic policy debates brought back the idea that monetary policy could come to the rescue of fiscal policy through the practice of fiscal dominance. Since 2008, we have been developing a research program centered on the question of the conditions required for fiscal dominance to work. We began by considering the historical dimension of this question, taking the example of the 30 years after the second world war. Public debt rose enormously during the war and was then eroded by high inflation and low nominal interest rates over a long period. Turning to recent decades, we are now investigating how central banks using unconventional monetary policies in a context of zero lower bound and low inflation rates can successfully fight economic stagnation while at the same time reaching fiscal and debt sustainability.

Paper's contributions

We propose a simple stylized model of fiscal dominance. We define fiscal dominance as a situation in which the central bank does not seek to prevent high inflation rates (the concern today would be more how to avoid potential deflationary episodes) but seeks to achieve a sustainable path for the sovereign debt ratio.

Unlike the settings in the previous literature, the central bank here does not monetize public deficits through seigniorage. Changes in long-term interest rates occur as a result of purchases and sales of sovereign bonds by the monetary authorities. Moreover, increases or decreases in the nominal interest rate modify the cost of public debt. After an increase in the nominal rate, the central bank has an explicit objective regarding rising inflation. To anchor agents' expectations, the rule for setting the inflation target is transparent: whenever the debt ratio moves above the level that would stabilize it, the monetary authorities' inflation target is raised and they support this with an unconventional expansionary policy. Conversely, when nominal rates fall and reduce the debt ratio, the inflation target is lowered.

While a large body of the literature on unconventional monetary policies focuses on the transmission channels of the real economy and the financial markets, we investigate their impact on the dynamics of inflation as an element determining public finance solvency. Inflation actually affects several key determinants of public debt ratios and leads to a decrease in the real interest rate, needed to stimulate production. Moreover, depending on the degree of anchoring

Short Biography

Gilles Dufrénot

Gilles Dufrénot is currently Professor of Economics at Aix-Marseille University. He received his PhD in 1995 from the University of Paris XII. His field of interest covers fiscal and monetary policies in the industrialized countries and growth policies in the developing countries.

of inflation expectations, inflation helps to accelerate the convergence of debt ratios towards their sustainable level in the medium term, when fiscal policy hits a fiscal limit. Finally, an "inflation tax" helps to offset the negative effects on the cost of debt following currency depreciations in open economies.

We find three main conditions for the success of a fiscal dominance strategy in terms of stabilizing debt ratios over time. First, the impact of an unconventional monetary policy on output needs to be high enough. This means that the quantitative easing (QE) policy must induce significant changes in the exchange rate and in the long-term interest rate. Second, inflation expectations need to be anchored to the debt-stabilizing inflation rate for rapid convergence of the debt ratio to its medium-term value. Third, while the interest rate growth differential can occasionally be positive if the fiscal policy is Ricardian, it must always be negative if the fiscal policy is non-Ricardian.

Following the theoretical model, we empirically examine whether these conditions are fulfilled in some major industrialized countries. This indicates whether fiscal dominance strategies could have been successful in stabilizing sovereign debt had they been used in Japan, the United Kingdom, the United States or the Euro area after 2008. Our empirical findings highlight several factors. First, fiscal policy alone could not have achieved debt solvency since the primary balance required to stabilize debt ratio was below the historical primary balance. Second, although the effective cost of public debt has been declining in all these countries, the speed and magnitude of the decline differ. A comparison of the long-term interest rate with the estimated natural rate of these economies suggests that unconventional monetary policy has been less expansionary in the Eurozone. Despite this difference, we find that the situation that best characterizes these countries is one of 'strong' fiscal dominance, with monetary policy determining the sustainability as well as the convergence of debt ratios.

Future research

Our paper is silent on several factors, suggesting avenues for future research. First, the long-run nominal interest rate may hit a zero lower bound (different from the short-term zero lower bound) for several reasons (the monetary authorities want to avoid bubbles and are faced with commercial banks' strategies to limit the decline in banking sector profitability). Second, above a given inflation rate, fiscal dominance is likely to generate costs. Third, there is also the question of an exit from a fiscal dominance strategy involving timing and ways of avoiding the risk of a return to deflationary traps.

Intra-household Behavioral Responses to Cash Transfer Programs. Evidence from a Regression Discontinuity Design

Marcelo Bergolo and **Estefanía Galván**. *World Development*. 2018, 103, 100-118.

The research program

Conditional Cash Transfer (CCT) programs grant monetary payments to poor households with children provided that their members meet certain conditions. A common feature of many CCT programs is that payments are targeted to the mother or female responsible for childcare. Yet most of the existing literature on the behavioral effects of CCTs considers the household implicitly as a single unit, even when the benefits of such social policies are assigned to specific adults within a household rather than to a unitary household unit or in equal proportion to all family members. Gender-based targeting raises a range of questions that therefore remain unanswered, such as whether the CCT programs yield intra-household distributional effects impacting in a non-intended way the economic and social spheres of household members.

Paper's contributions

Our paper helps to close this gap in the literature by focusing on two-parent households and analyzing the extent to which the Asignaciones Familiares-Plan de Equidad (AFAM-PE), the major social assistance program for low-income families with children in Uruguay, affects economic and social outcomes within the household. Specifically, we study the program's impact on couples' decision-making processes and marital dissolution, as well as on women's and men's labor market decisions, i.e. employment and hours worked, and on formal (registered) employment choices.

The AFAM-PE program offers an excellent opportunity to study intra-household distributional effects. First, the gender-based targeting of CCTs means the program modifies not only household resources but their distribution among household members. Second, the rule that determines eligibility provides us with a reliable counterfactual where that redistribution within the household would not exist. Eligibility for AFAM-PE is assessed in two steps. First, the household per capita income must be below a predetermined threshold (i.e., the income test). Second, once the applicant household passes the income test, a predicted income score is computed based on their baseline socioeconomic characteristics. Because only those applicant households with an income score above a determined threshold are eligible for the AFAM-PE, this rule generates a strong discontinuity in the probability of being assigned to the program, which we exploit for identification. Once eligible, the intended recipient of the monetary transfer is the mother of the children.

Based on a sharp regression discontinuity design and on a follow-up survey matched with administrative records of applicant households, our study analyzes the effect of the program on individuals' behavior by comparing outcomes of couples just above (i.e., the treatment group) and below (i.e., the comparison group) the program eligibility cut-off. We find that the program affects the labor market behavioral responses of women in beneficiary households. In particular, it has significant negative effects on the formality choice of women, reducing registered employment by 17–22 percentage points at the eligibility cut-off. These responses seem to be associated with a lower rate of transitions from unregistered jobs to formality. We also find evidence suggesting that the program results in women taking greater (perceived) responsibility for decisions in specific spheres of household expenditure.

The negative impact on women's formal employment seems to be an unintended effect of the program's participation rule and design. Because only earnings from registered sources of labor income can be monitored by the Social Security Administration, it introduces incentives for strategic behavior on the labor market. Reducing this disincentive effect on formality would involve redesigning the income testing by smoothing the implicit tax on household formal earnings at the predetermined threshold for eligibility. Our findings provide insights relevant to the ongoing debate on the impacts of CCT programs on women's agency in developing countries, suggesting the need to consider redesigning social assistance programs to reduce their discouraging effects on formality.

Research process

I got involved in this project while working at the Instituto de Economía (IECON), in Uruguay. Researchers at IECON already had experience in evaluating social programs in collaboration with the Ministry of social development and they participated in the design of the follow-up survey that we use in this study. While previous evaluations of this program mainly analyze its effects on well-being and children's school attendance, our project focuses on the non-intended effects of the program on women's and men's labor market outcomes and intra-household decisions. This research is part of the project Social Protection and Beyond (IDRC), which includes evaluations by local teams of different social programs in Latin America and their impacts on the labor market and women's economic empowerment.

Short Biography

Estefanía Galván

Estefanía Galván is a PhD student at AMSE since September 2016. Her main research interests are applied labor economics, gender, inequality and development. She previously worked as research assistant at the Instituto de Economía, Universidad de la República, Uruguay.

Is the Emergence of New Sovereign Wealth Funds a Fashion Phenomenon?

Jeanne Amar, **Christelle Lecourt**, Valérie Kinon, *Review of World Economics*, 2018, 154, 4, 835-873.

The research program

Sovereign Wealth Funds (SWFs) are public investment vehicles that manage part of countries' wealth. They have grown both in number and in size since the beginning of the 2000s, boosted by the commodity boom, the rise of emerging countries and especially the current account surpluses of fast-growing Asian countries. In recent years, SWFs have continued to emerge despite the economic downturn, market volatility, the sovereign debt crisis and the decline of commodity and oil prices. 62 SWFs, more than 67% of the existing total, were created between 2000 and 2016, with assets amounting to 7.4 trillion dollars (SWF Institute). Not only developed countries, but also all the emerging countries, are seeing this trend.

Paper's contribution

We analyze the factors contributing to the creation of a SWF. Faced with the accumulation of foreign-currency reserves, policymakers may set development objectives that they deem appropriate. Such objectives include stabilization of fiscal revenues, financing of pensions, savings for future generations, optimization of returns or the diversification of the economy. One challenge for policymakers establishing their policy objectives is to determine whether or not they should set up a SWF. Once they have decided to set up a fund, policymakers will have to define operational objectives as well as a strategic asset allocation consistent with their policy objectives.
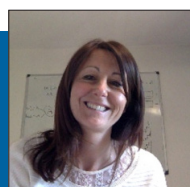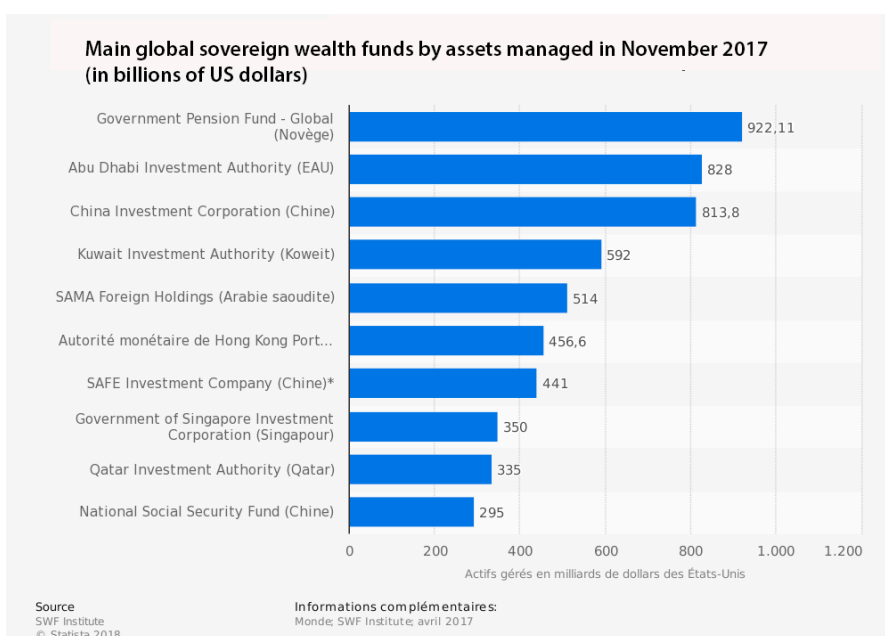
Using a unique and original database on SWFs, we assess the economic, political and institutional factors explaining a country's decision to establish a SWF. The following key insights are yielded. 1) The probability of setting up a fund is positively related to the country's wealth and to revenue in inflows, i.e. excess foreign exchange reserves due to natural resources rents for resource-rich countries and current account surpluses for non-commodity countries. This means that countries with large excess cash flows can allocate these funds to a SWF. 2) The creation of commodity-based funds, especially stabilization/savings funds, can be explained by the volatility of oil prices. The aim of these funds is to diversify the economic exposure of countries dependent on a single commodity like oil. 3) Resource-rich countries whose real exchange rate is appreciating are more likely to establish a commodity-based fund. The aim is to invest the proceeds from natural resources and fiscal surplus wholly abroad, thereby reducing the appreciation of the real exchange rate and mitigating the Dutch Disease effect[1].

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1 The "Dutch disease" is the process by which a boom in a natural resource sector results in a shrinking non-resource tradable sector. This

4) A country's decision to set up a SWF has both an economic and a political dimension: non-democratic countries with a high level of corruption are more likely to create SWFs. These countries tend to prefer to establish a reserve investment fund whose primary aim is to transform non-renewable resources into financial assets.

Future research

We plan to study the question of whether creating a SWF is an efficient way to manage excess foreign exchange reserves and therefore to mitigate the Dutch Disease effect. In the paper, we do not specifically test the Dutch Disease hypothesis because both economic and institutional variables are used in our model as explanatory variables explaining the decision to create a SWF. The short- and long-run effects of natural resources rents on the real exchange rate as well as the effect on manufacturing sector productivity should be taken into account.

Main global sovereign wealth funds by assets managed in November 2017 (in billions of US dollars)

Fund	Assets (billions USD)
Government Pension Fund - Global (Novège)	922,11
Abu Dhabi Investment Authority (EAU)	828
China Investment Corporation (Chine)	813,8
Kuwait Investment Authority (Koweit)	592
SAMA Foreign Holdings (Arabie saoudite)	514
Autorité monétaire de Hong Kong Port...	456,6
SAFE Investment Company (Chine)*	441
Government of Singapore Investment Corporation (Singapour)	350
Qatar Investment Authority (Qatar)	335
National Social Security Fund (Chine)	295

Actifs gérés en milliards de dollars des États-Unis

Source
SWF Institute
© Statista 2018

Informations complémentaires:
Monde; SWF Institute; avril 2017

Short Biography

Christelle Lecourt

Christelle Lecourt is Professor of Finance at Aix-Marseille University. She obtained her PhD in 2000 from University of Lille.

She was associate professor at University of Namur in 2002, full professor in 2011 and joined AMSE in 2013.

process leads to increased specialization in the resource and non-tradable sectors, leaving the economy more vulnerable to resource-specific shocks.

Research Highlights

The Origins of Human Prosociality: Cultural Group Selection in the Workplace and the Laboratory

Patrick François, Thomas Fujiwara, and **Tanguy van Ypersele**, *Science Advances,* 2018, 4, 9.

Tanguy van Ypersele

Tanguy van Ypersele is professor at Aix-Marseille University. He obtained his PhD in 1996 from *the Université catholique de Louvain*. He held academic position in Tilburg University and the University of Namur. He joined AMSE in 2003.

Short Biography

No small part of the spectacular success of the human species is due to our unusually high levels of cooperation among non-related individuals. The scale of this cooperation in human non-kin is rare in the animal kingdom, unique among mammals, and strongly at odds with our closest genetic relatives. But the origins of and reasons for the continued existence of this prosociality remain a major puzzle.

Cutural Group Selection (CGS) is one of the theories trying to explain that puzzle. It posits that our "social" world co-evolved with our social instincts. As a species, we evolved a psychology expecting life to be structured by moral norms, and we developed features designed to help us learn and internalize norms. By at least 70,000 years ago, most human populations resembled the hunter-gathering societies of the ethnographic record, that is, tribal-scale societies of a few hundred to a few thousand people. Competition across these populations induced selection of group-beneficial (prosocial) but individually costly traits (in the form of normative prescriptions or culture). "Selection" occurred as societies with the fitness-enhancing norm/institution combinations proliferated, both by defeating less successful groups in direct conflict or taking their resources and because they were imitated by their less successful neighbors .

The scope of this paper is to test the predictions of CGS in contemporary settings. CGS emphasizes the non-hardwired features of behavior such as norms, and group-level competition should help sustain cooperative norms, and hence observed prosocial behavior, even in modern contexts. The most ubiquitous avenue of group-level competition occurring in contemporary settings is likely to be competition across firms. Individuals within firms need to undertake (at least some) group-beneficial but individually costly actions. Moreover, competition across firms affects returns from cooperative versus selfish individual acts and, we conjecture, should help select the firms most successful in obtaining cooperative efforts from their workers.

We study individuals employed in organizations that vary in their degree of competition. We assess whether variation in cross-group competitiveness affects a measure of individuals' prosociality, reporting on a variety of individual data sources, both cross-sectional and at panel (within-person) level. We used the generalized trust question, or a close variant of this, as our proxy for the prevalence of prosociality in the empirical analyses reported here. "Do you think that, on the whole, people can be trusted or that you can't be too careful in dealing with people?" This question has been shown to represent a "weakly institutionalized" setting: "Answering this question, subjects consult either their own experiences and behaviors in the past or introspect how they would behave in situations involving a social risk".

The evidence presented is drawn from four sources:

(i) U.S. cross-sectional correlations between competitiveness within industry of employment and individual trust. We show that individuals employed in more competitive industries answer the trust question more positively.

(ii) U.S. state-level policy changes that altered cross-firm competition at the state level, inducing changes in individual trust. We build on a well-documented US natural experiment arising from the deregulation of the banking sector. The deregulation increased competition in the non-banking sector by increasing the rate of firm creation and firm destruction. We show that states experienced an increase in "trust" after the deregulation took place.

(iii) German panel data evidence showing that changes in the competitiveness of individuals' industry of employment induced changes in individual trust.

All three forms of evidence confirm a strong and statistically significant effect of increased competition across firms on increased individual trust.

We augment these findings with evidence drawn from laboratory experiments conducted in France. We divided subjects into groups, with group-level rewards shared across members in a public goods game setting. We manipulated the degree of competition across groups in a manner intended to mimic the variation in competition across firms observed in the data. We tested whether this variation replicates the correlations observed between competition and generalized trust in the data. It does: increased competition across groups leads to increased generalized trust reported by individuals within the groups.

Future research

Our theoretical model shows that when competition increases the probability of eviction of inefficient firms, it induces an increase in trust. We intend to explore situations where competition may decrease the probability of survival of both efficient and less efficient firms. Competition-induced international trade in sectors with a comparative disadvantage would be an interesting avenue to pursue.

Research Perspectives

On the Long-memory Effect of Joseph and Noah and the Use of Big Data

Like many other time series in most scientific fields, the risk of most assets has an important property called long memory: daily volatility of today's assets, e.g. the CAC40, is still correlated with its volatility of several years ago. This property prompts risk managers to use long-memory models in which the conditional expectation of a series $y(t,i)$, representing the risk of an asset i at time t, is a weighted sum of an infinite number of past values of $y(t,i)$ and where the weights decay very slowly (i.e., hyperbolically, and not exponentially as in short-memory models), creating this long-memory effect.

Recently, in Chevillon, Hecq and Laurent (2018), we proposed a novel explanation for this long-memory effect. We show that a simple n-dimensional (with n very large) short-memory vector autoregression (relying solely on data in t-1), a VAR(1) model, can generate long memory in the individual series $y(t,i)$. Schennach (2018) obtained a similar result on network models.
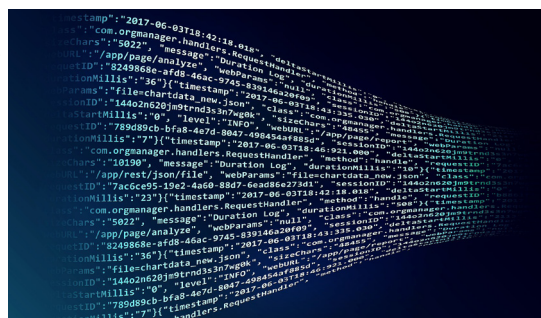
Long memory is one of the manifestations of a statistical property named self-similarity. Two main examples dating back to Mandelbrot and Wallis (1968) are called the Joseph and the Noah effects. The Joseph effect characterises the low-frequency variations in the flooding levels of the Nile: in the Bible, Joseph interpreted Pharaoh's dream of seven fat cows chased by seven lean cows as indicating that the cows represented the produce of the crops in the Nile Valley (hence seven years of bountiful crops followed by seven lean years). The Joseph effect therefore refers to the presence of dependence at low frequencies, which resembles periodic patterns. The Noah effect means that the effects of a rare or large-magnitude event (e.g. The Flood) can be felt over an extremely long period of time. Both Joseph and Noah effects imply that averages of the series over time do not satisfy standard laws and need to be modelled using the fractional Brownian motions that generate fractal patterns.

Chevillon, Hecq and Laurent (2018) prove an odd and interesting feature: a link between dependence among individuals (cross-section dependence) and dependence (in the form of long memory) for a single individual object over time. We show specifically that long memory (for one variable over time) can arise as a consequence of very weak dependence (at one point in time) among a large numbers of individual variables (big data). This finding shows inter alia that the Joseph and Noah effects, instead of being two distinct causes, may be the same phenomenon viewed using two different instruments.

The importance of this new modelling approach lies in revealing that standard laws of statistics (e.g., the central limit theorem) may fail to hold in contexts that have been overlooked so far, which potentially challenges existing findings. Its implications extend to fields other than finance.

- Social networks: where each agent's action depends on and impacts those of his/her peers (Schennach, 2018);
- Effects of large shocks to the macroeconomy: one shock (e.g. the 2007 crisis) can have long- term effects;
- Monetary Policy: explaining why macro variables, such as inflation, exhibit long memory (because of the dependence among prices of numerous items);
- Energy production: hydrologists working on water basins often rely on long-memory models, whereas our new model suggests that weak dependences across basins can impact river-flow dynamics. This is important in particular for renewable energy production (dimensioning of dams);
- Agriculture: crops are also known to exhibit long memory, but its origin has proved hard to identify. Weak geographic dependence of fields across locations may be a mechanism generating long memory;
- Climate Change: the effect of one Volcano eruption, considered to be one of the main sources of long-term global temperature cooling. The authors are investigating the impact of the absence of large eruptions over the last few centuries. As volcanos have a global effect, albeit difficult to measure, they induce weak geographic dependence;
- Medicine: the findings of Chevillon et al (2018) point to the invalidating impact that hidden (weak, unnoticed) dependence across individuals may have on inference. This could prove a major issue for controlled experiments in medicine, where independence between treated and control groups (those who receive a placebo) cannot be fully ascertained.

References
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· Mandelbrot, B., Wallis, J., 1968. Noah, Joseph and operational hydrology. *Water Resources Research*, 4, 909–918.
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Short Biography

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Sébastien Laurent is professor of Econometrics at IAE-Aix and a Junior member of the *Institut Universitaire de France*.

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