AMSE Newsletter

Events

17th JOURNÉES LOUIS-ANDRÉ GÉRARD-VARET
JUNE 25-26, 2018
Aix-en-Provence, France

idep
amse

May

17-18: Search and Matching (SaM) workshop

Château Lafarge, Aix-en-Provence
Organized by Bruno Decreuse and Eva Moreno-Galbis

22-25: 1st GREEN-Econ Spring School in Environmental Economics

Location: Îlot Bernard Dubois, Marseille
Organized by Nicolas Quérou and Hubert Stahn

May-June

31-1: Quantitative Finance and Financial Econometrics (QFFE)

> 1st summer school > 28 – 30

> 1st international conference > May 30 – June 1

Location: Îlot Bernard Dubois, Marseille
Organized by Eric Girardin and Sébastien Laurent

June

25-26: Journées Louis-André Gérard-Varet #17
International conference in public economics

Location: Conservatoire Darius Milhaud, Aix-en-Provence
Organized by Charles Figuières

27-28: Workshop in honour of Alain Trannoy

Location: Îlot Bernard Dubois, Marseille
Organized by Cecilia Garcia-Penalosa and Nicolas Gravel

July

6: Workshop AMSE-Banque de France in Macroeconomics

Location: Îlot Bernard Dubois, Marseille
Organized by Céline Poilly

August

30-31: 5th FAERE Annual Conference

Location: Faculté de droit et de science politique d'Aix-Marseille, Aix-en-Provence
Organized by Charles Figuières

Focus on

Jess Benhabib

Jess Benhabib receiving a doctorate Honoris Causa at Aix-Marseille University

Jess Benhabib (New York University) will be guest keynote speaker at the 17th international conference on Public Economics "Journées Louis-André Gérard-Varet" on June 25-26. He was awarded a doctorate " Honoris Causa » by Aix-Marseille University on November 22, 2017.

Named Paulette Goddard Professor of Political Economy at New York University in 1991 - the position he holds today - Jess Benhabib is one of the most influential and prolific authors of his time in Macroeconomics. He was born on June 9, 1948, in Istanbul (Turkey). He obtained his PhD from Columbia University in 1976 under the supervision of Kevin Lancaster. He joined the Department of Economics at the University of Southern California in 1977. In 1980, he moved to New York University. In his early years at NYU he published several important papers with Kazuo Nishimura on the characterization of optimal paths in intertemporal maximization problems, shedding light on the interrelationships between business cycles and economic growth.

From 1984 to 1987 and from 1993 to 1996, he served as Chairman of the Department of Economics at New York University. He was then appointed NYU Dean of Arts and Sciences from 1997 to 2000 and Interim Dean of Arts and Sciences from 1998 to 2000. In the 1990s, Jess Benhabib played a leading role in research into problems of indeterminacy in macroeconomics and monetary theory. He has served on the editorial boards of many top economics journals. In particular, he became an associate editor of the Journal of Economic Theory and was its coeditor for the period 2000-2005. Jess Benhabib is also a Fellow of the Econometric Society.

In the context of increased macroeconomic instability since the global financial crisis of 2008, his work fosters the development of models that are able to accurately reproduce the main cyclical characteristics of macroeconomic data. It also opens the way to proposing optimal policies, in particular monetary, to reduce fluctuations and the ensuing decrease in well-being ▪

AMSE Visitor

Carmen Herrero

Carmen Herrero is Professor of Economics at the University of Alicante, Spain, and Senior Researcher at IVIE (Valencian Institute of Economic Research). She has been a visitor in the Universities of Oxford, Rochester, California (Davis), Bielefeld, Vienna, LUISS Guido Carli, and the European University Institute, among others. Her research interests stretch over different topics, from the axiomatic analysis of distributive problems or the construction of social indicators (most notably the HDI) to social welfare, equity issues and health economics. Her publications include articles in the *Journal of Health Economics*, *Health Economics*, *Journal of Mathematical Psychology*, *Economic Theory*, *Social Choice and Welfare*, *Plos One*.

Carmen is a visitor at Aix-Marseille University and an IMeRA (Mediterranean Institute of Advanced Research) resident for the period January 15-July 12, 2018. She is currently working on a project entitled "Opportunity Bias: An Alternative Approach to Fairness" which is taking a novel look at equality of opportunities.

The project considers the outcome distributions of different types of people sharing similar circumstances as an estimate of the opportunities they enjoy. Then, the differences in opportunities are evaluated using a tool (balanced worth) developed in Herrero & Villar (2018) that compares the relative goodness of opportunities of the different groups through a series of tournaments. Opportunity bias in educational achievement in the OECD countries is analyzed using the PISA and PIAAC data, for children from different social backgrounds as well as for adults' parents' education and social status.

Carmen gains a twofold advantage from carrying out this project in Marseille: she has the support of AMSE and its faculty, and being an IMeRA fellow allows her to interact with people from very diverse backgrounds, providing an opportunity for interdisciplinary work▪

Next visitors:
- **Rohit Ticku,** Chapman University, April-August 2018
- **Mick Devereux,** University of British Columbia, mid-April-mid-June 2018
- **Garance Genicot,** Georgetown University, May-July 2018

Interview with Fabien Prieur, Economist at Paris Nanterre University

PhD dissertation defended at GREQAM in 2006

What are your current professional commitments?

I'm currently Professor of Economics at Paris Nanterre University. My primary areas of interest revolve around environmental & resource economics. Since my PhD, I have been particularly interested in analyzing the economic and policy implications of tipping points. Tipping points are now recognized as important drivers of the dynamics of natural processes, including the climate system. Crossing these thresholds, as a result of the pressure exerted by economic activities, may trigger abrupt and irreversible changes in ecosystems' dynamics, with potentially huge economic costs. The existence of tipping points challenges the basic idea behind the environmental Kuznets curve, according to which whatever the amount pollution today, the economy will always be able to reverse the trend in the future, once it becomes rich enough. My coauthors and I (re)assess the relationship between economic development and the environment under the existence of tipping points.

- Fabien defended his thesis at GREQAM in 2006. Advisors: Alain Venditti and Mabel Tidball
- He begun as an assistant-professor in 2007 at the University of Savoie, in Annecy (France).
- As of September 2016, he is professor of Economics at Paris West University.

In more recent work, I have started to explore different avenues such as climate-related migration and conflict. There is growing evidence that climate change will have the strongest impact on poor southern countries, thereby inducing massive south-south flows of people. This in turn is expected to interfere with the already weak social and economic institutions in the receiving countries and trigger internal conflicts, notably over access to scarce resources. Moreover, those people forced to migrate may choose to reach the wealthier north. This should modify the interactions between climate and immigration policies in the north by increasing the social cost of carbon.

On the teaching side, most of my courses are related to my research interests. For example, I lecture on environmental economics at the undergraduate level, and on topics related to growth and the environment at Master level. I also am in charge of the first year of the Master program on environmental economics offered by Nanterre.

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

I defended my PhD thesis in October 2006. It was devoted to a theoretical analysis of the relationship between growth and the environment. This gave me the great opportunity to be supervised by two experts in their respective fields, Alain Venditti and Mabel Tidball.

Directly after the PhD, I got an Assistant Professorship at the University of Savoie, in Annecy (September 2007). I spent three years there. It was an interesting and formative experience. At that point in your career, you have to prepare many new courses and teach while trying to publish the contents of your PhD thesis and beginning new research projects. In September 2010, I had the opportunity to hold a Junior Chair position in Environmental Economics, funded by the National Institute for Agricultural Research (INRA), and the University of Montpellier. This was an exciting period of five years, during which I enjoyed ideal working conditions, with a low teaching load and comfortable research fund. I took this opportunity to visit many colleagues, both in Europe and the US, and to start new collaborations. At the end of this period, I spent one year at the Toulouse School of Economics as a Visiting Professor. By the way, I should thank INRA for its support, from my PhD onwards. Finally, I was hired as a full Professor at Paris Nanterre University in May 2016.

Today, and in view of my own experience, I would recommend to young PhDs that they find a post-doctoral position, ideally abroad, to focus on research activities and to learn from other academic systems. Spending two to four years as a post-doc is the best way to build a strong scientific dossier and to increase the chances of joining a good economics department. In France, recent developments have led to a two-tier system where a few internationally-oriented top places coexist with a majority of - I would say - more traditional and less well-endowed Universities.

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

During the PhD in Marseille, I always felt that the atmosphere at Greqam was both friendly and stimulating in general, and more particularly among the members of the Macrodynamics group, which I had the privilege of joining. This is where I met Philippe Michel. Philippe launched an environmental research network, « les rencontres de l'environnement », with colleagues from Paris and CORE, in Belgium. In perfect line with Philippe's mind, sessions of this network were very interactive and constructive, open to new ideas and friendly. Today, I try to promote the same atmosphere in the seminar I organize in Nanterre. I took away nothing but good memories of those years. I'm still grateful to my PhD supervisors, Alain and Mabel, for their patience and support. Alain's role was crucial: he took the time to make me understand what research was really about. Mabel Tidball was also very helpful to me. I can actually call them friends.

Through my research projects, I always seek to develop new collaborations and explore new literatures. For example, topics related to natural resources naturally led me to work with Raouf Boucekkine on the dynamics of institutional changes in resource-dependent countries. Of course, getting involved in a new literature represents a considerable investment, and the returns are far from certain. But career-building is not my priority. I prefer to keep reinventing myself.

Interview by Yves Doazan

Research Highlights

Matching with Phantoms

Arnaud Chéron, **Bruno Decreuse**, *Review of Economic Studies,* 2017, 84, 1041–1070.

The research program

This research emphasizes a novel form of market frictions based on the persistence of obsolete information about traders who have already found a match. We refer to these traders as phantom traders, or phantoms for short. Phantoms are a by-product of the search activity: when exiting the market, each trader may leave a trace that disappears over time, i.e., information about them remains visible despite their no longer being available. Phantoms result in a loss of time and resources for future traders who want to find a partner. Our purpose is to analyze this dynamic form of congestion and its implications for labor market dynamics.
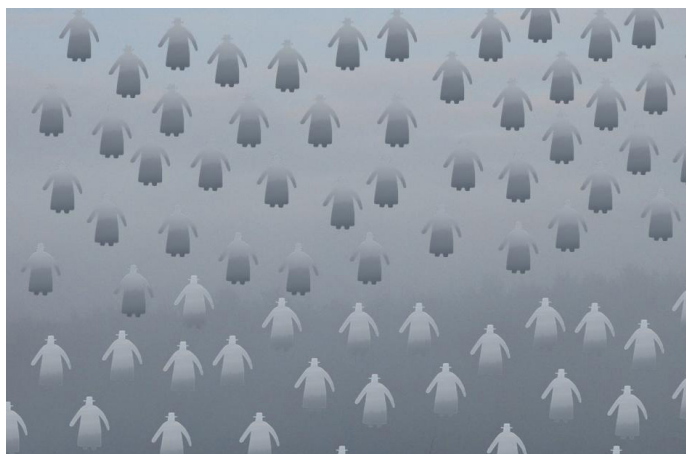
Paper's contributions

We first provide motivational evidence. Phantom traders are ubiquitous in search markets. Most people looking for a job, a house, or even a partner will have experienced situations where information regarding the object of the search was clearly outdated. On Craigslist, a major job board, the distribution of ads by listing age is uniform. This implies that employers never delete their obsolete postings – otherwise the density would be decreasing. A conservative computation suggests that at least a third of all ads are phantoms on this platform.

We then study the impact of such phantoms by sketching a simple scenario where information obsolescence is the only source of matching frictions. The key insight is as follows: today's matches fuel the phantom stock, thereby generating tomorrow's frictions. This scenario generates an aggregate matching function, the Phantom Matching Technology (PMT), featuring intratemporal and intertemporal externalities.

Intratemporal externalities result from the fact that an increase in the number of agents on the long side of the market reduces the proportion of phantom traders. Intratemporal externalities imply that the PMT displays increasing returns to scale in the short run. Intertemporal externalities

Short Biography

Bruno Decreuse

Bruno Decreuse is a Professor of Economics at AixMarseille University. He received his PhD from GREQAM and was a CNRS chargé de recherches in Paris from 2001 to 2004. His special interest is the modelling of search frictions. He is co-founder of the Search and Matching (SaM) European research group and a member of the *Conseil National des Universités*.

result from the fact that current matches fuel phantom traders, thereby lowering the future number of matches. Intratemporal and intertemporal externalities balance each other, and the PMT features constant returns to scale vis-à-vis the whole history of traders in the long run.

Lastly, we embed a generalized version of this function into an equilibrium search unemployment model. Short-run increasing returns generate excess volatility in the short run and endogenous fluctuations based on self-fulfilling prophecies. When employers believe that the supply of vacancies will be large, they actually expect that the phantom vacancy proportion will be small. This leads them to post many vacancies so as to benefit from a fast matching process, and this confirms the belief. Therefore information obsolescence not only provides a rationale for the properties of the long-run matching function, but also offers a natural source of aggregate volatility. We illustrate these properties in the case of a limit cycle, which is based on the countercyclicality of the phantom vacancy proportion. The cycle features the US volatility and covariance of unemployment and vacancy-to-unemployment ratio. To some extent, it can also reproduce the degree of persistence of such data.

Future research

The existence of phantoms implies that older job listings are less likely to represent true vacancies than younger ones. Jim Albrecht, Susan Vroman and I build a model where job seekers direct their search based on the listing age for otherwise identical listings. Forming a match with a vacancy creates a phantom of the same age. Therefore the magnitude of the negative informational externality associated with match formation increases with the listing age. The directed search behavior of job seekers leads them to over-apply to younger listings.

We also plan to study listing renewal and listing destruction. The general idea is to come up with a model of mutual search behavior on digital platforms. Ultimately, the model would be applied to alternative platforms and markets. The empirical side of the research involves web scraping techniques. Morgan Raux, Marc Sangnier and I are building a panel dataset of ads from the US job boards Craigslist, Monster and Indeed. We will estimate the hazard rates of job listings by listing age, distinguishing ads that exit the dataset from ads that are subsequently renewed.

Research Highlights

Banking and Sovereign Debt Crisis in a Monetary Union Without Central Bank Intervention

Jin Cheng, Meixing Dai, and **Frédéric Dufourt**, 2017, *Journal of Mathematical Economics*, 68, 142-151.

The research program

The economic situation of the Eurozone in the aftermath of the recent financial and economic crisis was unprecedented in economic history. It was the first time that a major twin banking and sovereign debt crisis threatened an economic area composed of rich industrialized countries, many with decent or moderately strong economic fundamentals (the so-called PIIGS countries including Italy, Portugal and Spain). In the literature, the traditional sovereign debt and financial crisis models were mainly designed to cover the situation of emerging countries. During summer 2011, when sovereign debt concerns about peripheral Eurozone countries started to emerge, my co-authors and I felt it would be worth trying to construct a model that explained how a twin banking and sovereign debt crisis could occur within a monetary union like the Eurozone.

Paper's contributions

We analyze the conditions of emergence of a twin banking and sovereign debt crisis within a monetary union composed of countries with moderately strong economic fundamentals. Departing from the traditional financial crisis literature, we argue that the Eurozone (EZ) had, at the beginning of the crisis, several particular features that require specific analysis. In particular, in contrast to emerging countries: (i) government bonds issued by EZ countries were mostly denominated in local currency (the Euro), so that these countries were not exposed to the kind of currency risk preponderant in previous financial crises, and (ii) EZ countries had implemented significant financial safety nets (banking regulation and government deposit guarantee) designed precisely to prevent such large-scale banking crises. Our aim is to investigate why these financial safety nets failed in the context of the Eurozone.

We build an open-economy model in which banks pool resources collected from domestic residents and external investors and invest them efficiently in short-term and long-term (illiquid) investment projects. As in Diamond and Dybvig (1983), the maturity mismatch between assets and liabilities is associated with the existence of two equilibria in the laissez-faire economy: a "good" equilibrium in which investors do not run and which decentralizes the second-best resources allocation, and a "bad" equilibrium in which investors run, forcing banks to liquidate long-term investment projects before finally going bankrupt.

To prevent such large-scale bank runs, the member states of the monetary union implemented a financial safety net, based on two pillars: a liquidity regulation that forces banks to hold a fraction of their assets in the form of high-grade government bonds, and a government deposit guarantee, coupled with a commitment to raise any possible additional resources on financial markets in order to bail out banks with insufficient liquidity.

We analyze the conditions under which this financial safety net is sufficient - or not - to prevent a nationwide bank run following a negative shock on economic fundamentals. It is at this stage, we argue, that the legal framework delimiting the role and functions of the central bank is of crucial importance. In particular, we show that when the central bank is not empowered to play the role of lender of last resort in government bond markets, the effectiveness of the financial safety net crucially depends on investors' expectations concerning the creditworthiness of the government.

Increasing concerns about government solvency have two mutually-reinforcing negative effects on the financial safety net: first, the interest rate at which the government can raise financial resources to rescue the banking system strongly increases. Second, the liquidity buffer that banks can obtain by selling their government bonds in the secondary market strongly decreases. Both effects reduce the ability of the financial safety net to destroy the run equilibrium triggered by negative (and self-fulfilling) investors' expectations. We further derive conditions under which the financial safety net actually aggravates, instead of improves, the financial situation of domestic banks and of the government.

Research process

A landmark in the research process was that, as we were drafting the paper, the head of the ECB, Mario Draghi, made his famous speech declaring that the ECB would do "whatever it takes" to rescue the Euro. This speech has been interpreted as reflecting a major change in the doctrine of the ECB, indicating that it is now willing to play the role of lender of last resort in sovereign debt markets if necessary. Interestingly, the speech was followed by a rapid decline in sovereign bond rates for Eurozone countries.

Short Biography

Frédéric Dufourt

Frédéric Dufourt is a Professor of Economics at Aix-Marseille University. He obtained his PhD in 2001 from Panthéon-Sorbone University (Paris 1).

He was Maître de Conférences at University of Strasbourg in 2002 and became Professor in 2006. He joined AMSE in 2012. He is a Junior honorary member (2010-2015) of the *Institut Universitaire de France*.

A Cost-benefit Approach for Prioritizing Invasive Species

Pierre Courtois, **Charles Figuières**, Chloé Mulier, Joakim Weill, *Ecological Economics*, 2018, 146, 607-6020.
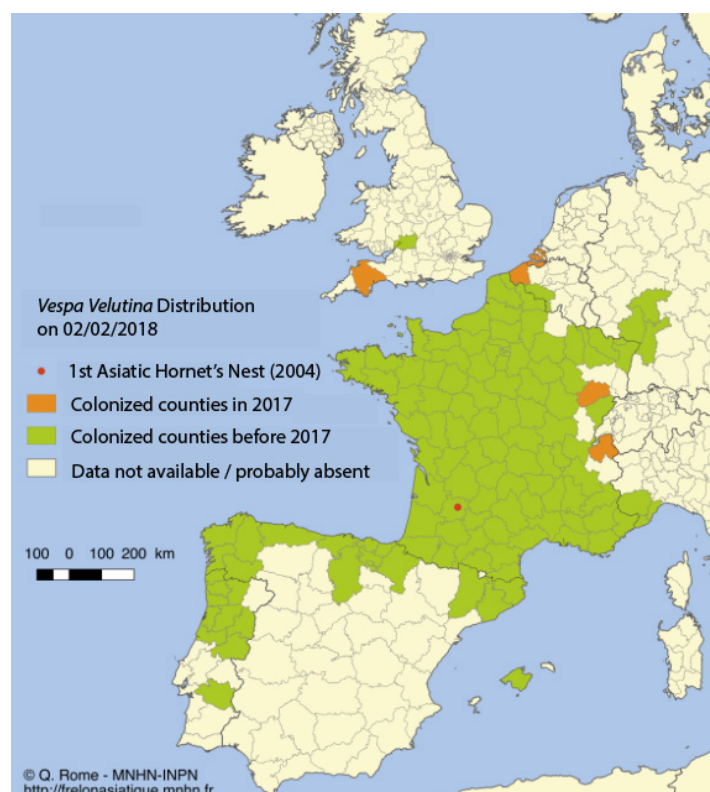
The research program

Biological invasions are causing substantial damage to ecosystems and economic activities. In Europe alone, their total monetary cost has been estimated at 12 billion euros per year.

Take for example the Asian hornet (Vespa Velutina), observed for the first time in France in 2004, probably introduced from containers of Chinese pottery imported into the Lot-et-Garonne region. The hornet is now present (in 2017) almost throughout metropolitan France. It threatens the food chain around its nests and constitutes a threat to diversity.

Meaningful management efforts to combat such biological invasions are needed. However, the budgets allocated to managing biological invasions are limited. Decision makers are faced with tricky questions like which management strategies to employ, and how best to spend a limited budget when facing multiple endangered species, multiple invasive species, or multiple invasion pathways.

As highlighted by Aichi Target 9 of the Convention on Biological Diversity, the ultimate goal for invasive species management is that "by 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated and measures are in place to manage pathways to prevent their introduction and establishment".

Vespa Velutina Distribution on 02/02/2018

- 1st Asiatic Hornet's Nest (2004)
- Colonized counties in 2017
- Colonized counties before 2017
- Data not available / probably absent

100 0 100 200 km

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http://frelonasiatique.mnhn.fr

Paper's contributions

This paper first reviews current invasive species prioritization methods and explicitly highlights their pitfalls. Then it argues that a cost-benefit approach rooted in optimization theory can overcome these pitfalls. This approach allows us to capture accurately and exhaustively the cascade of benefits resulting from invasive species control. Three key theoretical contributions are made. Firstly, we explicitly model species interdependencies. Secondly, we assume a multi-component objective function combining ecological and economic considerations. Thirdly, a contribution and key motivation of this paper is to develop the theoretical foundations of an approximated cost-benefit decision criterion for the management of multiple invasive species. The outcome is a general ranking formula that could be used as a rule of thumb by managers and politicians in order to design a reliable, easy-to-apply, and economically sound tool for management decisions.

Research process

This article is part of a series of works on biodiversity protection. They have in common the Noah's Ark metaphor, a thought experiment inspired by the biblical story, which allowed Weitzman (1998) to propose a conceptual framework for the rationalization of species protection. This pioneering article, despite its merits, had a well-known limitation: it ignored the role played by ecological interactions between species. While this did not prevent reflection on the issues of ex situ protection of species, i.e. outside their natural habitats such as in gene banks, it was a serious impediment in the more general and important case of in situ protection. In 2014, my co-authors and I published a theoretical article in Plos One that removed this barrier. At present, the numerous challenges posed by the in situ protection of biodiversity are open to analysis such as our invasive species study.

Future research

There are several promising research directions for future work on this topic. The first, from an operational research perspective, consists in designing a progress indicator based on this work and an easy-to-use interactive interface. The second avenue for future research concerns applications of our methodology to other management problems involving species interactions. An obvious one would be the prioritization of natural sites. Deciding where and when to implement invasive species controls, or how to build a network of national reserves, requires considering both budget constraints and species interdependencies.

Short Biography

Charles Figuières

Charles Figuières defended his thesis in Economics in 1999 at GREQAM. He has since held positions at CORE (postdoc), University of Bristol (lecturer), INRA in Montpellier (research fellow from 2003 to 2016). In 2016 he was appointed Professor at Aix-Marseille University. He is Director of IDEP and Vice-President of the French association of environmental and resource economists (FAERE).

Democracy for Polarized Committees: The Tale of Blotto's Lieutenants

Alessandra Casella, Jean-François Laslier, Antonin Macé, *Games and Economic Behavior* 2017, 106, 239-259.

The research program

The article relates to institutional design, which conceives mechanisms (in our case voting mechanisms) to achieve certain social goals, such as efficiency, representativity or fairness. While the theoretical part of the field is often concerned with optimal mechanisms, our focus is more practical and modest: we look at one mechanism, storable votes, that is simple enough to be applied in practice. The idea is to allow voters in a committee to shift votes across decisions: any member can abstain today if she wishes to cast two votes on tomorrow's decision, or vice versa. This idea is the brainchild of Alessandra Casella, co-author of this study, who showed that it is often more efficient than the usual majority rule with non-storable votes. In this article, we study the fairness properties of the mechanism, both theoretically and experimentally.

Paper's contributions

We consider a fairly general situation in which a committee is polarized in two groups. This division may have political, religious or ethnic origins in a political context; or it might reflect the divide between science and the humanities in a university committee. In such a situation, when the committee votes on many decisions, the majority rule leads to the tyranny of the larger group (majority), while fairness concerns would require the smaller group (minority) to have some say on at least some decisions. Our article shows that this can be achieved by the storable votes mechanism.

The first part of the article is theoretical: we develop a model of the strategic situation at stake so as to make predictions on the outcome of the mechanism. While the game is complex, we are able to characterize solutions (equilibria) in some cases, hinting at a general pattern: the minority is sometimes decisive by concentrating its votes on a small number of decisions, and this concentration is more pronounced when

the minority's relative size is smaller. Moreover, we show that the minority as a group can guarantee to be decisive on a positive fraction of the decisions, no matter how the majority group allocates its votes.

To gain further insights on the mechanism, we test it in an ``economics laboratory'', where groups of 12 to 18 students participate in one-hour sessions. The experimental design is neutral: subjects are asked to play a game allocating colored balls to urns, which mimics the storable vote mechanism in a polarized committee, and where incentives are provided by monetary payments at the end of the experiment. The experiment consists in several treatments each corresponding to a particular size of minority and majority, and each treatment is tested in several sessions. As we aim to obtain results that are robust to the potential communication taking place before voting, each session is divided into two parts: one without communication, and one in which subjects can communicate within their group by chat messages before voting.

Our experimental results confirm the main predictions of the theoretical analysis: the minority is decisive on a significant fraction of the decisions, because it concentrates its votes on a small number of decisions. Moreover, the result does not depend on the majority's play: even if majority members behaved optimally in reaction to the minority's play, the proportion of decisions won by the minority would be non-negligible.

Research process

The project started after Jean-François Laslier, my Ph.D. advisor at the time, and I visited Alessandra Casella at Columbia University in 2014 under the Alliance Program. We worked on the model, met from time to time in Paris, and decided to conduct an experiment on the mechanism. Supported by the labex AMSE, I went back to Columbia in May 2015 to help Alessandra Casella organize the experiments at the Columbia Experimental Laboratory for Social Sciences. After further meetings, we submitted the article and were asked by the editor to provide more information on the chat messages exchanged during the experiment. We performed this analysis, included it in an appendix, and the article was accepted for publication.

Short Biography

Antonin Macé

Antonin Macé has been a CNRS research fellow at AMSE since 2015.

He obtained his PhD in 2014 from *Ecole Polytechnique* in Paris and was an Assistant Professor at AMSE in 2014-2015.

Self-fulfilling Prophecies as Drivers of Business Cycles

In 1875, the English economist William Jevons was analyzing the cause of business cycles that led to fluctuations in prices. He attempted to establish, on the basis of a statistical correlation, an influence of sunspots (fluctuations in the activity of the sun) on the price of wheat. He noticed a relatively good "fit" between sunspot cycles and harvest fluctuations. Unfortunately, no scientific evidence could subsequently be produced in support of such causality. However, assume that agents believe, for one reason or another, that the presence of sunspots will influence the price of wheat on the markets. These agents therefore have an interest in buying wheat today, thus causing an increase in demand and price, which "validates" the initial belief.

Over the last 25 years, economic research has been concerned with the conditions that generate such "sunspot" equilibria, or equilibria "with self-fulfilling prophecies". Under these equilibria, changes in expectations are influenced by extrinsic variables that are not correlated with economic fundamentals but are compatible with the agents' rationality. This type of "extrinsic uncertainty" is usually viewed as a complement to the "intrinsic uncertainty" considered in DSGE models, where fluctuations are due to stochastic shocks on the fundamentals. Benhabib and Farmer (1994) initiated a strong line of research showing that, when there are externalities in production leading to increasing returns, sunspot fluctuations can occur in standard Ramsey-type models considered as the benchmark framework to discuss aggregate fluctuations and public policies. A major challenge has been to find model formulations capable of reproducing fundamental stylized facts following a demand shock. Such stylized facts include pro-cyclical co-movements of output, consumption, investment and labor, and hump-shaped responses of aggregate variables such as GDP, as documented by the empirical literature.

Three crucial questions have been raised. The first concerns the amount of increasing returns needed to generate sunspot fluctuations. Empirical estimates have shown this amount to be low. The second question is whether it is actually possible to replicate the pro-cyclical co-movements of aggregate variables in a simple economy in which fluctuations are only driven by expectations, i.e. without real shocks on the fundamental. If not, sunspot models would be limited to replicating some amplification mechanisms. The third question is the ability of sunspot models to reproduce hump-shaped responses of aggregate variables. This property is of fundamental importance if sunspot models are to serve as an effective framework in which to discuss the impact of macroeconomic policies.

The best-performing sunspot model so far was provided by Benhabib and Wen (2004). It is a one-sector model where externalities in production have been complemented by an endogenous rate of capital utilization. This new ingredient introduces an "elasticity effect" which increases the capital-output elasticity, and a "returns-to-scale effect" which increases the effective amount of returns-to-scale. Expectation-driven fluctuations then occur under a lower level of increasing returns and can account for pro-cyclical co-movements of GDP without relying on real shocks. However, the model does not replicate hump-shaped responses. While such a model does not appear to be structurally unable to reproduce hump-shaped dynamics, Dufourt et al. (2018) show in a generalized formulation that the "shape" of the hump is characterized by excessive persistence.

A promising avenue of research considers two-sector economies producing differentiated consumption and investment goods. As capital and labor can be freely allocated between sectors, sunspot fluctuations occur with much smaller externalities. Optimizing this property with respect to the formulation of fundamentals, Dufourt et al. (2015) confirmed that pro-cyclical co-movements can be much more easily obtained, but this again requires considering that sunspot shocks are correlated to real shocks. Introducing endogenous capacity utilization in a two-sector model therefore appears to be a credible option to provide a positive answer to all three fundamental questions. Preliminary analyses show that under pure sunspot shocks, both pro-cyclical co-movements of aggregate variables and hump-shaped responses of GDP can be obtained. Two-sector models can then become a new benchmark to analyze aggregate fluctuations based on self-fulfilling expectations and to study the stabilizing effect of macroeconomic policies in an empirically credible framework.

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Short Biography

Alain Venditti

Alain Venditti is a CNRS directeur de recherches at GREQAM since 2003 and an associate professor at EDHEC in Nice since 2009. He is the current director of AMSE.

He obtained his PhD from Université de la Méditerranée in 1994. He was a CNRS chargé de recherches at GREQAM between 1995 and 2003, an associate professor at University of the Littoral Opal Coast, Boulogne-sur-Mer in 1995-96 and associate professor at *Ecole Supérieure de Mécanique de Marseille* in 1996-97.