Toulouse School of Economics

SCOR The Art & Science of Risk | Foundation for science

TSE - SCOR Foundation for Science Journal

Risk Markets and Value Creation Chair

October 2021

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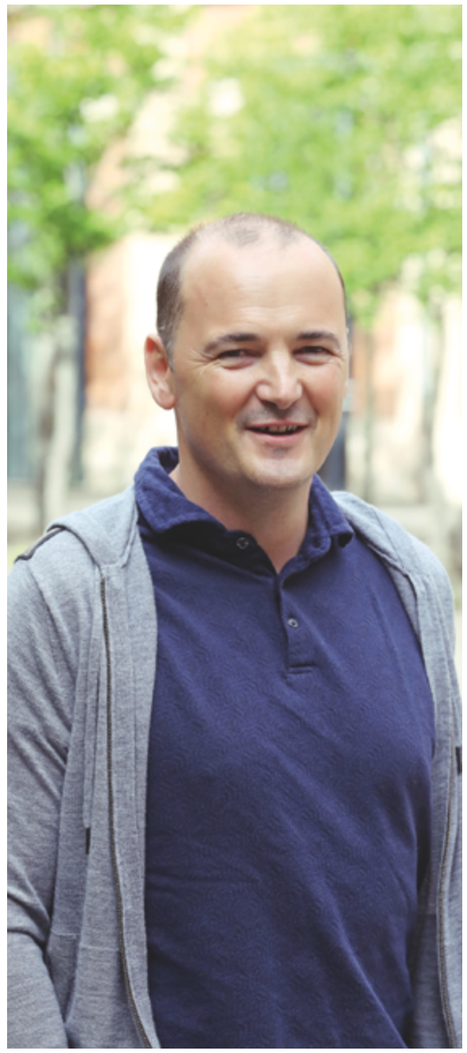
Editorial

Stéphane Villeneuve, *Scientific Director, SCOR-TSE partnership*



Dear readers,

We are pleased to share with you the second TSE-SCOR Foundation for Science Journal. This issue is dedicated to more theoretical subjects than the first one. We are very grateful to the SCOR Foundation for Science for its support and commitment to theoretical research.

This edition presents two articles from TSE researchers. The first article by Andrea Attar summarizes research that he has conducted over the past 10 years with his TSE colleagues Thomas Mariotti and François Salanié on a new approach to adverse selection. This work builds on two classic studies by George Akerlof (1970) and Michael Rothschild and Joseph Stiglitz (1976).

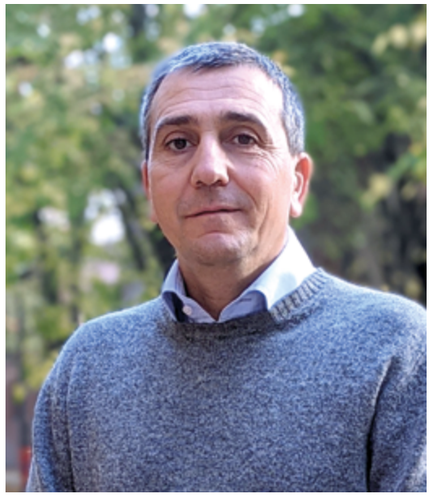
The other article presented by Emmanuel Thibault on his research with Chiara Canta (Toulouse Business School and associated faculty member at TSE) and Pierre Pestieau (University of Liège) focuses on the impact of long-term care costs on economic growth and capital accumulation.

The outreach section of this journal highlights various prizes awarded by TSE and the European Group of Risk and Insurance Economists (EGRIE), with the support of the SCOR Foundation for Science.

The end of this issue lists the scientific articles and working papers linked to the TSE-SCOR partnership.

We wish you a happy and fruitful reading.

Why do markets fail?



Andrea Attar *is a CNRS researcher, and he works at the Toulouse School of Economics. His research is centred on the relationship between financial markets and contracts.*

His works have been published in several leading journals in economics, including Econometrica, American Economic Review, Theoretical Economics, Journal of Economic Theory, Economic Journal, Games and Economic Behavior.

When buyers and sellers have different information about product quality, markets may fail to function efficiently. As part of a decade-long investigation into this adverse selection phenomenon, research by TSE's Andrea Attar and his co-authors studies a wide range of different scenarios, delivering new insights and results with important implications for research, business, and public policy.

Why is it important to consider the impact of non-exclusive contracts?

On the vast majority of markets, non-exclusivity is the rule: Agents can simultaneously and secretly trade with multiple others. In some circumstances, prices may convey all the information buyers need to know. Yet in situations of adverse selection - such as the sale of shares in a firm with different returns, or the trade of insurance contracts with consumers with different risk - information imbalances can limit even mutually beneficial trade, or cause it to fail altogether. Uninformed buyers are forced to glean missing information from the seller's behavior, and such inferences are even more difficult when trade is non-exclusive.

How have economists traditionally studied adverse selection?

Two main approaches have been proposed to model markets prone to adverse selection. In Akerlof's classic 1970 study of the market for defective used cars (or 'lemons'), privately informed sellers and uninformed buyers act as price takers. All trades are assumed to take place at the same price. Since rational buyers are only ready to pay for the average quality traded, sellers of high-quality goods are deterred from offering them; this may lead to a complete market breakdown.

To investigate whether such a drastic outcome can be avoided, Rothschild and Stiglitz (1976) let buyers compete by offering to trade different quantities at different unit prices, thus allowing sellers to credibly communicate their private information. They show that low-quality sellers trade efficiently, while high-quality sellers end up trading less than if information was complete. For instance, in insurance markets (where firms are considered as uninformed "buyers" and consumers as informed "sellers"), high-risk consumers are fully insured but low-risk ones only obtain partial coverage.

> **In situations of adverse selection — such as the trade of insurance contracts with consumers with different risk — information imbalances can limit even mutually beneficial trade**

How does your research build on these classic studies?

Working with **Thomas Mariotti** and **François Salanié** over the past 10 years, we have developed a research agenda that relaxes the assumption of exclusive competition which is central to Rothschild and Stiglitz's model, and to the simplest versions of Akerlof's model. Our 2011 paper *'Nonexclusive Competition in the Market for Lemons'* studies a simple model in which a seller can privately trade different fractions of a good to multiple uninformed buyers. From the viewpoint of a single buyer, the fact that the seller can also contract with his opponents makes it more difficult to screen different qualities according to the aggregate quantity purchased on the market. Sellers of low quality end up trading their whole endowment, while higher quality goods are not traded at all.

Overall, the fundamental insight is that, under non-exclusivity, Akerlof's market breakdown occurs regardless of the richness of the instruments available to buyers. Market failure occurs even if buyers are allowed to design sophisticated tariffs instead of being restricted to trade at linear prices. From an applied perspective, however, this analysis remains limited by the assumption of a fixed endowment. This prevents the study of financial markets in which agents can take arbitrary positions. At the same time, our assumption of linear preferences prevents analysis of risk-sharing and insurance motives.

How have you refined your analysis to reflect modern insurance markets, in which multiple contracting and non-exclusivity are prominent?

In subsequent works, we develop an approach to non-exclusive competition in which few, if any, restrictions are put on the informed party's preferences. In *'The Social Costs of Side Trading'* (2020) we focus on the tariffs that prevent an insurance firm entering the market and making a profit by offering additional coverage, given that each consumer is free to combine a contract offered by the entrant with a trade along the market tariff. Once again, our allowance for non-exclusivity has a dramatic impact on market outcomes.

We show that a firm can profitably enter the market by providing high-risk consumers additional coverage to be traded on top of that traded by low-risk types. In addition, only one market tariff is robust to entry by an uninformed insurance company. Along this tariff, low- and high-risk consumers purchase the same amount of basic coverage, which is fairly priced at an average cost. Then high-risk consumers complement this basic layer by purchasing additional coverage, which is fairly priced for high-risk types.

The corresponding allocation, described by Jaynes (1978), Hellwig (1988), and Glosten (1994) in different contexts, stands out as new reference for market outcomes under adverse selection. In particular, it turns out to be an optimal allocation from the viewpoint of a regulator that is unable to observe consumers' riskiness or monitor their trades with all insurance firms.

> **In a fully deregulated scenario, insurance markets are destabilized by firms that strategically exploit cross-subsidization between contracts**

Can insurance markets succeed at sharing risk in the absence of a regulator?

In *'Nonexclusive Competition under Adverse Selection'* (2014) and *'On Competitive Nonlinear Pricing'* (2019), we look at a fully deregulated market in which insurance firms compete by offering bilateral contracts to privately informed consumers. In this non-exclusive setting, we show that markets are destabilized by firms that strategically exploit cross-subsidization between contracts. A firm may gain by only selling basic coverage to low-risk consumers, while incurring a small loss by selling complementary coverage to high-risk consumers at slightly better terms than its competitors. Overall, "free" markets in which no restriction is put on firms' pricing therefore fail to be an effective device to achieve risk-sharing.

How should policymakers address the problems of side trading and multiple contracting?

In *'Regulating insurance markets: Multiple contracting and adverse selection'* (2021), we consider a straightforward proposal: Restrict firms' strategies to prevent them from destabilizing the market through dumping practices. Specifically, we consider a non-exclusive scenario in which firms compete by proposing insurance contracts that consumers are free to combine, and a regulator can punish any firm that profits from cross-subsidization. In this regulated setting, we show that the Jaynes-Hellwig-Glosten (JHG) allocation can actually be implemented. Public intervention under multiple contracting and adverse selection should thus arguably target firms' pricing strategies, leaving consumers free to choose their preferred amount of coverage.

An alternative proposal, which we examine in *'Entry-Proofness and Discriminatory Pricing under Adverse Selection'* (2021), is based on a market structure that allows firms to directly punish unilateral deviations by their opponents. Specifically, we model interactions between firms as a discriminatory ascending auction. Prices are quoted sequentially, with sellers publicly announcing the maximum quantity they are ready to trade at each quoted price. Each consumer then selects the amount she wants to trade with each firm at each price. This trading protocol allows greatly simplifies strategic analysis and also supports the optimal JHG allocation. A possible interpretation is that this result supports existing arguments in favor of organizing insurance and financial markets as batch auctions.

SUMMING UP

A long-term research project by Andrea Attar and his coauthors proposes a new approach to adverse selection. They relax the classic assumption of exclusive competition, which states that each seller can only trade with one buyer. For researchers, their results provide a new set of testable predictions on the empirical relevance of adverse selection. For policymakers, they identify a new set of possible welfare-based regulatory interventions in financial markets.

FURTHER READING

To view the papers mentioned here, and other research by Andrea Attar, see www.tse-fr.eu/people/andrea-attar

Long-term care funding and capital accumulation

Emmanuel Thibault *is a Professor at University of Perpignan and TSE researcher.*

Emmanuel's research interests in public economics and macroeconomics include population economics, economics of the family, growth and fiscal policies. In 2000 his PhD entitled "Microeconomic analysis and macroeconomic effects of intergenerational transfers" received the award of "Best Thesis of the Year" from Aix Marseille University (Interdisciplinary PhD Prize).

The aging of the baby boomers has been described as a demographic earthquake that will shake the foundations of the long-term care (LTC) system. Expanding on work by Pierre Pestieau (TSE, University of Liege) featured in the previous issue of this newsletter, research by TSE's Emmanuel Thibault addresses the question of dependency and the practice of LTC insurance via the interactions between the market, the government, and the family. This three-way interaction approach is a novel and unique way of tackling the LTC issue. He also examines the trade-offs involved when individuals must choose between proactive spending on health to improve life expectancy or (eventual) later-life LTC costs if they become old. The main objective is to analyze the impact that alternative ways of financing LTC may have on capital accumulation and, consequently, on economic growth and longevity.

Why must any reform of LTC consider the interplay between the State, the family, and the market?

In light of recent demographic, societal and financial changes, demand for formal care services for dependents has grown rapidly and continuously. Instead of being provided and funded by the market or the State, the cost of caring for the majority of dependents assisted at home is currently borne by family members. In France, almost five million people care for a dependent relative; for the majority, this task consumes an average of six hours a day. This is an increasingly unsustainable situation that requires the market and the State to provide a substitute or, at the very least, a real complement to the family contribution.

In a realistic context in which the State must interact with families and the market, it is essential first to understand what motivates family solidarity and how this is influenced by the existence of public or private insurance programs. These programs must then be given special attention, since they have an undeniable impact on the nature of the recommendations that must be considered by public policymakers.

"In France, almost five million people care for a dependent relative; for the majority, this task consumes an average of six hours a day. This is an increasingly unsustainable situation

Does private insurance help economic growth?

I recently presented a theoretical study with **Chiara Canta** and **Pierre Pestieau** that puts together the essential information required to help policymakers define the real consequences — both micro and macro — of different scenarios for LTC financing reform. This research breaks new ground by including in the same framework all possible LTC funding sources (unfunded public insurance, private insurance, family help, and precautionary savings) and their interplay, the psychological bias of the dependent towards family support, intergenerational imitation by the carer, dynamic intergenerational aspects, and the role of prices such as wages and interest rates.

"Elderly spousal carers (aged 66-96) who experience caregiving-related stress have a 63% higher mortality rate than non-caregivers of the same age

As expected, the presence of family help and/or public insurance changes both individual behavior and the dynamics of capital accumulation. However, the main message is counterintuitive: In the presence of family support, individuals choose private insurance if the pay-as-you-go social insurance is generous enough; and the more generous the latter, the higher the economic growth. Thus, the fact that an aging population leads the State to establish generous unfunded public insurance also encourages individuals to insure themselves privately and is therefore beneficial for growth. This finding sheds new light on an important debate, contrasting with earlier economic studies which suggest that social LTC coverage and unfunded pension schemes discourage capital accumulation by crowding out precautionary private savings.

What is the size and impact of the costs borne by individuals?

In France, more than 20% of people over the age of 85 live in a nursing home (EHPAD). Their average out-of-pocket expenses are €1,850 per month. This exceeds their current resources in 75% of cases and highlights an unavoidable lifecycle trade-off: Invest in health capital at a young age (and thus increase your life expectancy) or save to cope with (eventual) dependency.

Using a theoretical model with endogenous longevity, I study the impact of this trade-off on individuals' health spending, as well as on economic growth and longevity. This framework shows that savings and health expenditure are complementary. Surprisingly, the costs of dependency are therefore beneficial for growth. Although, all else being equal, these costs can reduce health expenditure, it is possible (via a general equilibrium effect) that they actually increase it. Taking into account the costs of dependency may also explain the slowdown in the increase in life expectancy in rich countries.

What are the next steps for research in this area?

My hope is that future research will expand the study of multiple LTC funding channels — public and private insurance, family caregiver, and/or self-insurance — in a world with health expenses. I would also like to see a more refined interpretation of out-of-pocket LTC expenses, in terms of the probability and cost of dependency, to better target the economic impact of LTC financing policies and to distinguish life expectancy from healthy life expectancy. This issue goes beyond the economic sphere to become a public health issue: An important step would be for caregivers' health to be taken into consideration in impact studies. Carers are indeed those who pay the ultimate price for providing LTC: Elderly spousal carers (aged 66-96) who experience caregiving-related stress have a 63% higher mortality rate than non-caregivers of the same age!

SUMMING UP

Emmanuel's research focuses on the impact of LTC costs on economic growth. Surprisingly, he finds that when family care is an established social norm, public LTC insurance may be a complement to private insurance and hence foster capital accumulation. He also shows that an individual's savings and health investments are complementary, such that out-of-pocket LTC expenses can improve economic growth.

FURTHER READING

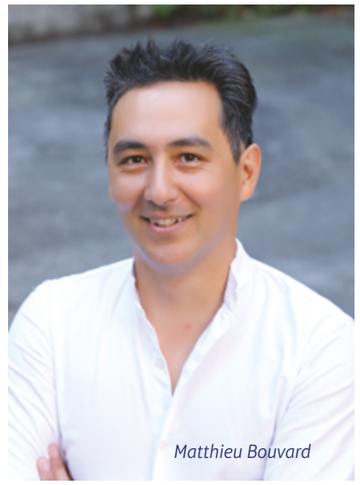
Chiara Canta, Pierre Pestieau and Emmanuel Thibault, 2016, *'Long-term care and capital accumulation: the impact of the State, the market and the family,'* Economic Theory. Emmanuel Thibault, 2022, '*Long-term care expenditures, endogenous health investment and capital accumulation*', TSE working paper.

Outreach

2020 & 2021 Best Young Researcher in Finance and Insurance Prizes

In March 2021, during an event co-organized by the Institut Louis Bachelier, the SCOR Foundation for Science awarded the 2020 and 2021 Best Young Researcher in Finance and Insurance prizes to **Matthieu Bouvard** (TSE, Toulouse School of Management) and Kim Peijnenburg (EDHEC).

Matthieu's research focuses on financial intermediation and the impact of technological innovation in finance. His 2019 article, *"The Blockchain Folk Theorem"*, published in the very prestigious Review of Financial Studies and co-authored with **Bruno Biais, Christophe Bisière and Catherine Casamatta**, has attracted particular attention. Reviewing analyses of blockchain using game theory, the authors reveal two major sources of inefficiency. First, coordination failures and manipulative behavior can lead to instability. Second, miners are encouraged to over-invest in computing power.



Matthieu Bouvard

"With this award, which is being presented for the fifth consecutive year, SCOR and its Foundation for Science are proud to encourage innovative and original young researchers who are working on key areas at the frontiers of our knowledge of new technologies and agents' financial decisions.

Philippe Trainar, SCOR

www.institutlouisbachelier.org/en/ilb-rising-talents-in-finance-and-insurance

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INSTITUT Louis Bachelier

2021 SCOR - EGRIE Young Economist Award

Julia Holzapfel (LMU Munich) received the SCOR-EGRIE Young Economist Award for her paper: "Classification risk in healt h insurance: The interaction of prevention and guaranteed renewable insurance".

2021 SCOR - Geneva Risk and Insurance Review Best Paper Award

Congratulations to **Christian Gollier** (TSE) who is the 2021 laureate for his paper :

"Pandemic economics: optimal dynamic confinement under uncertainty and learning".

European Group of Risk & Insurance Economists

SAVE THE DATE
January 28, 2022

SCOR/TSE Workshop
on Long Term Care and Aging

This workshop, by invitation,is reserved for TSE and SCOR personnel.

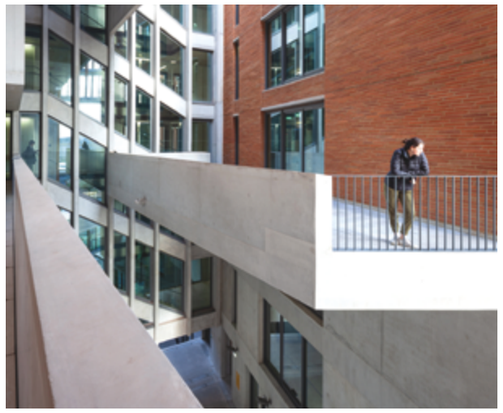
Scientific contibutions

Articles in peer-reviewed journals

- **Helmuth Cremer, Justina Klimaviciute,** and **Pierre Pestieau,** "A political economy of loose means-testing in targeted social programs", *Economics Letters,* vol. 202, n. 109810, May 2021.
- **Andrea Attar, Thomas Mariotti,** and **François Salanié,** "Entry-proofness and discriminatory pricing under adverse selection", *American Economic Review,* March 2021, forthcoming.
- **Helmuth Cremer** and **Chiara Canta,** "Opting out and topping up reconsidered: Informal care under uncertain altruism", *Canadian Journal of Economics,* Toronto, vol. 54, n. 1, February 2021, pp. 259-283.
- **Linqun Liu** and **Nicolas Treich,** "Optimality of winner-take-all contests: the role of attitudes toward risk", *Journal of Risk and Uncertainty,* 2021, forthcoming.
- **Matthew Adler, Maddalena Ferranna, James K. Hammitt,** and **Nicolas Treich,** "Fair innings? the utilitarian and prioritarian value of risk reduction over a whole lifetime", *Journal of Health Economics,* vol. 75, n. 102412, January 2021.
- **Christian Gollier,** "Cost–benefit analysis of age-specific deconfinement strategies", *Journal of Public Economic Theory,* vol. 22, n. 6, December 2020, pp. 1746–1771.
- **Giuseppe Marco Attanasi, Hippolyte D'Albis,** and **Emmanuel Thibault,** "An experimental test of the under-annuitization puzzle with smooth ambiguity and charitable giving", *Journal of Economic Behavior and Organization,* vol. 180, December 2020, pp. 694–717.

Working papers

- **Catarina Goulão** and **Agustín Pérez-Barahona,** "Health capital norms and intergenerational transmission of non-communicable chronic diseases", *TSE Working Paper,* n. 21-1236, July 2021.
- **Helmuth Cremer** and **Jean-Marie Lozachmeur,** "Coinsurance vs. copayments: reimbursement rules for a monopolistic medical product with competitive health insurers", *TSE Working Paper,* n. 21-1223, May 2021.
- **Helmuth Cremer, Justina Klimaviciute,** and **Pierre Pestieau,** "A political economy of loose means-testing in targeted social programs", *TSE Working Paper,* n. 21-1174, April 2021.
- **Francesca Barigozzi, Helmuth Cremer,** and **Jean-Marie Lozachmeur,** "Gender wage and longevity gaps and the design of retirement systems", *TSE Working Paper,* n. 21-1217, April 2021.
- **Linqun Liu** and **Nicolas Treich,** "Optimality of winner-take-all contests: the role of attitudes toward risk", *TSE Working Paper,* n. 21-1194, February 2021.
- **Jessica Martin** and **Stéphane Villeneuve,** "A class of explicit optimal contracts in the face of shutdown", *TSE Working Paper,* n. 21-1183, January 2021.



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