iRisk Workshop on decision-making under risk and uncertainty

7-8 July 2022 – IÉSEG School of Management, Lille, France

organized in honor of Prof. Louis EECKHOUDT

Organization Committee: Loïc BERGER, Ilke AYDOGAN, David CRAINICH, Thomas EPPER, Uyanga TURMUNKH
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Background and objectives

Uncertainty is pervasive and plays a major role in decision-making. Whether agents pursuing individual goals, or policymakers pursuing social objectives, decision-makers rarely know what the relevant states of the world are. A proper understanding of individual behavior in the face of uncertainty is of great importance for the construction of realistic economic models capable of making accurate predictions, as well as for prescriptive applications guiding decision-making processes.

To celebrate the launch of iRisk, its new research center, IÉSEG School of Management will hold a multidisciplinary workshop on decision-making under risk and uncertainty. Because the creation of the iRisk center would not have been possible without Professor Louis Eeckhoudt, **this workshop is also a unique occasion to celebrate Louis' career and contributions to decision theory and the economics of risk**.

The workshop will gather industry, policymakers, and academic participants and promote dialogs between theory, experimental findings, and applications (in the sense of actual decision-making or the construction of theoretical or empirical models in the social sciences).

Specifically, the workshop will bring together experts from various disciplines covering different aspects of uncertainty modeling and quantification. Ultimately, the workshop intends to:

- Bridge the gap between the theory and practice of decision research and provide an opportunity to discuss challenges faced by practitioners in addressing decision-making under risk and uncertainty
- Discuss the latest developments and practical applications in a variety of different fields
- Identify how perception and biases influence individual and collective decision-making processes and effective solutions for overcoming them
- Identify gaps in the literature that require further research or missing methods and tools for practical applications and opportunities for addressing these gaps
- Build interdisciplinary collaborations on complex decision-making challenges, both within different research fields and between research and practice

All invited talks will be given by leading experts in their respective fields. Theoretical talks will provide new theoretical models focusing on a real-world application and/or on how to make these models relevant in the real world. Fields of practical applications and real-world examples of decision-making include climate change, health, data science, finance, psychology, artificial intelligence, and economics, among others.

PROGRAM

Part I (Academic)

Thursday, July 7, 2022 – room E114

12.30 *Registration*

13.00 Welcome Address: Jean-Philippe AMMEUX (Dean of IÉSEG School of Management)
Setting the scene: Loïc BERGER (Director of Irisk)

Session 1: Foundations and elicitation (Chair: Ilke Aydogan)

13.10 Massimo MARINACCI (Bocconi University), *Modelling misspecification*

13.40 Ilke AYDOGAN (IÉSEG School of Management), *Experiments on reduction of compound lotteries with objective and subjective probabilities*

14.10 Sebastian EBERT (Frankfurt School of Finance and Management), *On Taking a Skewed Risk More than Once*

14.40 Peter WAKKER (Erasmus University Rotterdam), *A Critical Discussion of Popular Ambiguity Models*

15.10 *Coffee Break*

Session 2: Climate Change (Chair: Loïc Berger)

15:40 Valentina BOSETTI (Bocconi University), *Uncertainty and the Sixth Assessment Report of the International Panel on Climate Change (IPCC)*

15.45 Lars Peter HANSEN (University of Chicago), *How Should Climate Change Uncertainty Impact Social Valuation and Policy?*

16.30 Sara LE ROUX (Oxford Brookes Business School), *Climate Change Catastrophes and Insuring Decisions: A Study in the Presence of Ambiguity*

16.55 Loïc BERGER (CNRS, IÉSEG School of Management), *Are Policymakers Ambiguity Averse?*

Panel discussion: On the rationality of uncertainty aversion

17.15 Panelists: Itzhak GILBOA (HEC Paris), Mohammed ABDELLAOUI (CNRS, HEC Paris), André DE PALMA (Cergy Paris University)

18.15 Social aperitif and tribute to Louis Eeckhoudt by David CRAINICH (CNRS, IÉSEG School of Management)

19.30 *Conference dinner (by invitation)*

Part I (Academic)

Friday, July 8, 2022 – room E114

8.30 *Welcome Coffee*

Session 3: Health and Insurance (Chair: Thomas Epper)

9.00 Han BLEICHRODT (University of Alicante), *Incentives in health utility measurement do not matter*

9.30 Thomas EPPER (CNRS, IÉSEG School of Management), *Risk Taking, Time Discounting, and Variations in Household Risk*

10.00 Matteo GALIZZI (London School of Economics), *Risk and social preferences predict risky sexual behaviour amongst youth in Zimbabwe*

10.30 *Coffee Break*

Session 4: Behavioral Aspects of Uncertainty (Chair: Uyanga Turmunkh)

10.50 Olivier L'HARIDON (University of Rennes), *Loss aversion is robust*

11.20 Uyanga TURMUNKH (IÉSEG School of Management), *Ambiguity in Voting*

11.50 Songfa ZHONG (National University of Singapore), *Narrowly Rational*

End of Part I

Part II (open to the public): Decision-making under uncertainty in practice

Friday, July 8, 2022 – room B050

The second part of the workshop consists in an inspiring conference on the theme: «**Decision-making under uncertainty in practice**».

The inspiring conference will be organized as a high-level panel discussion with four leading experts from the industry, policymaking, and academic community and will promote dialogs between theory and practice.

The conference will be broadcasted live on YouTube. Please note that the opportunity to engage in the conversation is only available to those attending the event on site.

12.30 *Lunch (optional)* [room A022]

13.30-13.35 **Welcome address: Inspiring Conferences (Caroline Roussel, Dean of IÉSEG School of Management)** [room B050]

13.35-14.35 **Panel discussion: Making decisions in an uncertain world**

14.35-14.45 **Open discussion**

Panelists:

Mathias DEWATRIPONT is a distinguished, and broad, economic theorist. He has been instrumental in the development of contract theory, and its applications to a large variety of topics. Mathias holds a Ph.D. in Economics from Harvard University (1986) and since 1990, he has been a Professor of Economics at Université libre de Bruxelles. As a fellow of the Econometric Society, he was appointed President of the European Economic Association in 2005 and became a founding member of the Scientific Council of the ERC. He is a member of the Académie Royale De Belgique and Foreign Honorary Member of the American Academy of Arts and Science. Mathias also served as the Executive Director of the National Bank of Belgium between 2011 and 2017, being its representative to the Basel Committee on Banking Supervision and the Supervisory Board of the European Central Bank. During the last two years, Mathias also participated in different management and exit strategy expert groups which are responsible for monitoring the evolution of the COVID-19 pandemic and provide an evaluation of the Belgian government's strategy. Mathias has published widely in the areas of contract theory, organisation economics, and banking and finance.

Christian GOLLIER is a Professor of Economics at the Toulouse School of Economics and an internationally renowned researcher in decision theory under uncertainty and its applications in climate economics, finance, and cost-benefit analysis. He holds a Ph.D. in Economics from Catholic University of Louvain and is a fellow of the Econometric Society. His 2001 MIT book "The Economics of Risk and Time" won the 2001 Paul A. Samuelson Award. Together with Jean Tirole, he founded the Toulouse School of Economics, where since 2017, he serves as director in his second term (after his previous term from 2009 to 2015). Among others,

Christian is also an author of the 4th and 5th reports of the Intergovernmental Panel on Climate Change (IPCC), which was awarded the Nobel Peace Prize in 2007. In addition, he regularly advises several governments on their public investment evaluation policies. In 2020, Christian was asked to lead the climate change component of the Commission of Experts on the Great Economic Challenges set up by President Macron. The work of the commission led to the production of a detailed report drawing recommendations to make economic policies more effective in responding to three long-term structural challenges. Christian's recent book for the general public, "Le Climat après la fin du mois" (PUF 2019), deals with the importance of taking action in the face of climate change and has been a great success in France.

Gilles MOËC is the AXA Group Chief Economist and AXA IM Head of Research since June 2019. He also oversees Responsible Investment activities pertaining to research, thought leadership, engagement and active ownership since September 2020. Gilles graduated from Institut d'Etudes Politiques de Paris in 1991. Between 1994 and 2006, he held several positions in the French civil service, at the national statistical institute (INSEE) and the central bank - notably as head of the International Economics Division of Banque de France. In 2006, he was appointed Senior European Economist at the Bank of America, before becoming Chief European economist of Deutsche Bank in 2009. From 2014 to 2019, he held the position of Chief European Economist at the Bank of America Merrill Lynch.

Vicky POLLARD (TBC) acts as Unit and Deputy Head of the "Foresight, Economic Analysis & Modelling" unit at the DG Climate Action of the European Commission since September 2019. Previously, she was the Environment and Climate Counsellor of the EU delegation to China and Mongolia. She has contributed to various topics concerning climate change for the Commission since 2006, covering international negotiations, relations with the US and other OECD countries, as well as domestic policy. Before 2014, she was the Deputy Head of Unit for the implementation of the EU ETS. She joined the European Commission in 2004 and worked on both the EU Lisbon Strategy and the review of the EU Sustainable Development Strategy. Prior to this, she advanced environmental policies as a consultant, Chief executive of the European Wind Energy Association and as an economist in the UK Government and Environment Agency.

Moderator

Thibault LIEURADE heads the section Economics + Business at The Conversation France. A graduate of ESCP Europe and Grenoble Ecole de Management, Thibault Lieurade is a journalist and editorial consultant specializing in economics and management. Before joining The Conversation, he worked in several national newsrooms, including France 24 and the web TV Xerfi Canal.

End of Part II

ABSTRACTS

Ilke AYDOGAN (IÉSEG School of Management): ***Experiments on reduction of compound lotteries with objective and subjective probabilities***

The reduction principle underlies some modern theories of decision making under ambiguity and is crucial for the applications of those theories with prescriptive purposes. We examine preferences over compound sources of uncertainty that require reduction with objective and subjective probabilities. Our investigation sheds light on the nature of those preferences in three important ways. We provide (1) a comprehensive analysis of attitudes (aversion & likelihood insensitivity) towards such sources by using the rigorous matching probability design, (2) an additional analysis of subjective beliefs elicited by using proper scoring rules with Bayesian truth serum, and (3) a comparison of the preferences of risk professionals with those of a convenience sample of students to understand the potential role of sophistication.

Loïc BERGER (CNRS, IÉSEG School of Management): ***Are Policymakers Ambiguity Averse?***

We investigate the ambiguity preferences of a unique sample of real-life policymakers at the Paris UN climate conference (COP21). We find that policymakers are generally ambiguity averse. Using a simple design, we are moreover able to show that these preferences are not necessarily due to an irrational behaviour, but rather to intrinsic preferences over unknown probabilities. Exploring the heterogeneity within our sample, we also show that the country of origin and the degree of quantitative sophistication affect policymakers' attitudes towards compound risk, but not towards ambiguity. Robustness results are obtained in a lab experiment with a sample of university students.

Sebastian EBERT (Frankfurt School of Finance and Management): ***On Taking a Skewed Risk More than Once***

This paper collects results on the repeated risk-taking of skewed risks. An extensive body of theoretical and experimental literature has shown that, in one-time decision situations, humans are skewness-seeking and dislike risks that feature unlikely but large losses (i.e., negatively skewed risks). We show that, contrary to intuition, the often-observed phenomenon of penny-picking—repeatedly taking negatively skewed risks—is not at odds with skewness-seeking, but, to the contrary, may even be caused by it. The skewness of the distribution that results from repeatedly taking a skewed risk depends in non-trivial ways on the risk-taking strategy and may even differ in sign from that of the individual risk. With sufficient time available, every risk—no matter how negatively skewed—can be gambled in such a way that, in total, skewness is positive. Because recent work has shown that skewness is decisive whether risk is taken, this result may be important for economics and finance on a fundamental level.

Thomas EPPER (CNRS, IÉSEG School of Management): **Risk Taking, Time Discounting, and Variations in Household Risk**

We study decision-making under risk and over time in a field experiment with maize farmers in Uganda. A fundamental part of the risk borne by households in our sample stem from their farming investments, with households facing substantial income shortfalls in the event of harvest failure. Using a randomized controlled trial, we distribute free index insurance to half of our farmers, thereby reducing their households' risk exposure fundamentally. We investigate how this reduction of household risk affects farmers' risk taking and time

discounting decisions in separate decision-making tasks and investigate how risks and the dated outcomes are integrated with household risks and income flows. Lastly, we test the interaction of risk and time preferences according to theories postulating that these two preference domains are closely intertwined. We explore whether variations in household risk affect the link between risk and time preferences.

Matteo GALIZZI (London School of Economics): **Risk and social preferences predict risky sexual behaviour amongst youth in Zimbabwe**

Young people in sub-Saharan Africa are particularly at high risk of Human Immunodeficiency Virus (HIV) and other sexually transmitted infections such as Herpes-Simplex Virus type 2 (HSV-2). Using data from economic experiments conducted amongst 1,568 persons aged 15-29 years in Zimbabwe, we document the association between risk aversion, altruism, present-bias and future-bias at baseline and HSV-2 status and number of sexual partners measured 12 months later. Women measured to be more altruistic at baseline were more likely to be HSV-2 positive 12 months later. Men measured to be risk averse at baseline were less likely to be HSV-2 positive at follow-up. We find limited association of preferences with number of sexual partners. Results highlight gender differences in the influence of preferences on HIV risk behaviours and potential for future research to design targeted interventions based on preferences.

Lars Peter HANSEN (University of Chicago), **How Should Climate Change Uncertainty Impact Social Valuation and Policy?**

We develop and apply methods for confirming uncertainty and its impacts, broadly speaking, for the design and conduct of public policy. This research brings tools from decision theory and asset pricing to study uncertainty evaluation including the particular ramifications for the social cost of carbon.

Olivier L'HARIDON (University of Rennes): **Loss aversion is robust**

Several papers have challenged the robustness of loss aversion, claiming that it is context-dependent and disappears for choices with small stakes. We show that these findings may have been confounded by diminishing sensitivity and probability/event weighting and perform a new test that controls for these confounds. In a choice-based task, we found significant loss aversion for both small stakes and high stakes. The overall loss aversion coefficient varied between 1.25 and 1.45, less than commonly observed. Loss aversion decreased slightly for small stakes, but the effect was small and usually insignificant. Overall, the results indicate that loss aversion is robust although not as strong as previous studies suggest, and that stake size has little effect on it.

Sara LE ROUX (Oxford Brookes Business School): **Climate Change Catastrophes and Insuring Decisions: A Study in the Presence of Ambiguity**

There has been very little research to test whether ambiguity affects individuals' decisions to insure themselves against the catastrophic effects of climate change. This paper attempts to study how individuals respond to the availability of an insurance that would safeguard their interests if a climate change catastrophe occurred. If such an insurance is available to them, do individuals insure themselves sufficiently? Further, the study investigates if information regarding the past occurrence of the catastrophic event leads to an increase in insurance subscriptions and/or the emergence of a lemons market. Finally, policy implications are investigated - Can an indirect intervention in the form of a "nudge" ensure a better outcome?

Massimo MARINACCI (Bocconi University): **Modelling misspecification**

We use decision theory to confront uncertainty that is sufficiently broad to incorporate "models as approximations." We presume the existence of a featured collection of what we call "structured models" that have explicit substantive motivations. The decision maker confronts uncertainty through the lens of these models, but also views these models as simplifications, and hence, as misspecified. We extend the max-min analysis under model ambiguity to incorporate the uncertainty induced by acknowledging that the models used in decision-making are simplified approximations. Formally, we provide an axiomatic rationale for a decision criterion that incorporates model misspecification concerns.

Uyanga TURMUNKH (IÉSEG School of Management): **Ambiguity in Voting**

Riker and Ordershook (1968) proposed that a key parameter that influences a citizen's decision to vote is her perception of the closeness of the votes to be received by the frontrunner and the runner-up in the election. Thus, they argued that election turnout can be explained by people's (subjective) beliefs about the pivotality of the results. To date, however, direct tests of the determinants of voting behavior have found little support for the influence of beliefs, finding instead that voting behavior is mostly driven by factors other than beliefs, such as the perceived levels of importance that people attach to the election outcomes, the costs of voting, and people's sense of civic duty (e.g., Gerber et al. 2020; Blais et al. 2000). This is puzzling, because presumably the importance that people attach to the election outcomes ought to be moderated by whether (or not) they consider their own votes to have any impact on bringing about those outcomes in the first place. In this paper, we hypothesize that beliefs about closeness, like most beliefs about real-world events, cannot easily be probabilized. Ambiguity (unknown probabilities) plays a role. The role of ambiguity in voting behavior has not been studied in the literature to date. Prior papers mostly assumed the traditional Expected Utility model, with no possibility for studying the role played by ambiguity.

Peter WAKKER (Erasmus University Rotterdam): **A Critical Discussion of Popular Ambiguity Models**

This lecture discusses the currently most popular ambiguity models, with pros and cons from a normative and descriptive perspective. It aims to be more of a group discussion than lecture, where the audience is invited to express their opinions.

Songfa ZHONG (National University of Singapore): **Narrowly Rational**

The revealed preference analysis allows the inference of underlying preferences from observable choices, and numerous studies have shown that choice data are generally rationalizable by some utility function for the given settings. This study examines whether choice data can be rationalized across settings. In an experiment, we compare portfolio allocations in one setting between two equiprobable Arrow securities, and in another setting between one risk-free asset and one with risky asset that delivers either positive return or nothing with equal probability. We show that choice data is rationalizable within settings, but inconsistency is pervasive across settings. We further show that some heuristic rules may underpin the rationalizability of choice behaviour. Our study contributes to the literature on revealed preference analysis, rule-based decision making, and the nature of risk preferences.

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