

MATHEMATICIANS MEET ECONOMISTS, AND CONVERSELY

NOVEMBER 27-29 2024

SALA DELLE LAUREE, FACOLTÀ DI ECONOMIA UNIVERSITÀ SAPIENZA ROMA

ITALO CAPUZZO DOLCETTA, DEBORA DI GIOACCHINO, THIERRY PAUL, ORG.

TITLES AND ABSTRACTS

Giuseppe Attanasi (with A. Maffioletti, G. Papini, P. Sbriglia, M.L. Signore) [Sapienza]

Beyond the threshold: How electoral size-dependent uncertainty affects majority determination

Riassunto/Résumé : Individual preferences for a specific majority threshold can be influenced by voters attitudes toward uncertainty. It has been theoretically demonstrated and experimentally verified that a higher majority threshold is associated with risk aversion, serving as a means to protect against the tyranny of the majority (Attanasi, Corazzini & Passarelli 2017). In this paper, we posit that the absence of ex-ante information regarding the likelihood of the voting outcome introduces an additional layer of uncertainty - namely, ambiguity - which motivates decision-makers to seek increased protection.

We model the impact of both the level of ambiguity and ambiguity aversion on the desired majority threshold of a voting lottery in a KMM environment (Klibanoff, Marinacci and Mukerji 2005). We assume that as the number of voters increases, so does the level of complexity and consequently, the ambiguity of the voting lottery, which in turn activates ambiguity attitudes. We test our predictions through a series of 32 classroom experiments conducted between 2020 and 2024, involving approximately 1,200 undergraduate and graduate students in Italy and France, with voter group sizes ranging from 7 to 281.

Our findings confirm a positive correlation between risk aversion and the desired majority threshold. Additionally, we provide support for our two novel predictions: first, that the desirable threshold is positively correlated with ambiguity aversion, and second, that it increases with the number of voters through this channel. These results highlight the significance of ambiguity in strategic voting.

Fabio Camilli [Sapienza]

A network model for urban planning

Riassunto/Résumé : In this seminar we present a mathematical model to describe the evolution of a city, which is determined by the interaction of two large populations of agents, workers and firms. The map of the city is described by a network with the edges representing at the same time residential areas and communication routes. The two populations compete for space while interacting through the labour market. The resulting model is described by a two population Mean-Field Game system coupled with an Optimal Transport problem. We prove existence and uniqueness of the solution and we provide some numerical tools to develop several numerical simulations. This is a joint work with Adriano Festa (Politecnico di Torino) and Luciano Marzuffero (Libera Università di Bolzano)

Eloisa Campioni [Università Roma II]

Keeping the agents in the dark: Private disclosure in competing mechanisms

Riassunto/Résumé : Classical mechanism-design theory identifies the holding of private information by economic agents as a fundamental constraint on the allocations of resources (Hurwicz, 1973). How agents communicate their private information then becomes crucial for determining the set of allocations that can be implemented. In pure incomplete-information environments with a single uninformed principal, one can restrict all private communication to be one-sided, from the agents to the principal, and limit the communication from the principal to the agents to the public announcement of such a mechanism without any impact on the equilibrium allocations (Myerson, 1979). In competitive settings the implementation of an allocation is no longer in the hands of a single principal, but of several principals who non-cooperatively design mechanisms, each of which controls a specific dimension of the allocation. In such strategic settings, we show that allowing for private communication from the principals to the agents can significantly affect the set of equilibrium allocations even in pure incomplete-information environments, in which the agents take no payoff-relevant actions, arguably the least favourable scenario for this form of private communication to have bite. Specifically, we show that private disclosures, whereby principals asymmetrically inform agents of how their mechanisms operate, have two effects. First, they raise principals' individual payoff guarantees, protecting them against their competitors' threats. Second, they support equilibrium payoffs that cannot be supported via standard mechanisms. These results challenge the folk theorems la Yamashita (2010) and the canonicity of universal mechanisms of Epstein and Peters (1999). We then propose a new approach to competing-mechanism games retaining key elements of classical mechanism-design theory while exploiting private disclosures to simplify the description of equilibrium communication.

Michela Chessa [LMI Universit Cte dAzu]

The dynamics of Pre-Electoral Coalitions on Voting Strategies: a Two-System Comparison

Résumé/Riassunto: In contemporary democracies with multiparty systems, pre-electoral coalitions have become the norm. Political contenders often strategically coalesce before the election to enhance their chances of success and garner broader support. These coalitions profoundly affect voters behavior, causing tensions between ideological loyalty and the desire for adequate government representation and often resulting in strategic voting. Moreover, different voting rules can shape differently the degree to which both candidates and voters engage in strategic behavior.

This paper examines from a theoretical perspective the decision-making process of candidates in forming pre-electoral coalitions, and its impact on the subsequent voters' choices under two electoral systems: plurality and runoff. We generalize the model by Shin (2019) and introduce a centrist party, next to two left and one right party. In our model, pre-electoral opinion polls and ideological distances matter, and play a fundamental role in defining the best strategies for both candidates and voters.

Habiba Djebbari [Aix-Marseille School of Economics]

The Provision of information on mobile banking by local ambassadors: experimental evidence from Peru (with M. Agartos, S. Sarangi, B. Silupu, C. Trivelli and J. Torres)

Résumé/Riassunto: Using a RCT, we compare the effectiveness of two information-delivery mechanisms to boost interest in and adoption of a new mobile-banking platform in periurban and rural communities in Peru. In the treatment group, mobile-banking information workshops are led by individuals who are personally known to the invited participants. This mechanism exploits the existing social ties. In the control group, comparable individuals are invited to attend similar workshops, but these are led by agents external to the community. Attendance to the workshop and adoption of mobile banking are twice as large in the treatment group compared to the control one; and the impact on attendance is higher among low-trust individuals. Our findings thus suggest that network-based information delivery is a promising approach for mobile-banking adoption as it may help overcome information and trust barriers.

Fausto Gozzi [Luiss]

On Optimal Control and Differential Games for Pollution Management and Agreements on Global Warming

Riassunto/Résumé : Over the last decade, pollution and global warming have become a research focus across several disciplines. To our knowledge, few papers consider the problems of designing international environmental policies in the framework of dynamic optimal control/game theory (typically under strong linearity assumptions). Our papers are a contribution to the study of such problem in a more general nonlinear context, while, at the same time, retaining tractability. The models are formulated as optimal control problems or differential games in continuous time. We expose the models, some ideas for their solution in simple cases, some first insights and some open problems.

Valerio Leone Sciabolazza (Sapienza)

Networks in politics, the role of social connections within and outside the US Congress

Riassunto/Résumé : In economics, the importance of (social) relations outside the market is now well recognized. Individuals share information, learn from each other's, and influence each other in many contexts. With this presentation, we provide an overview of how the structure of social relations impact a specific outcome, that is the behavior of politicians. A number of applications will be provided to answer the question how social connections among US politicians, and between US politicians and donors, affect their behavior and electoral success. Finally, we will discuss the case when social relations in politics are abruptly severed, analyzing how chances of being elected change for a US politician after the death of a top donor.

Luca Panaccione [Sapienza]

Stochastic Cooperation of Non Mutually Dependent Sellers

Riassunto/Résumé : Our theoretical analysis considers two sellers with asymmetric interdependency: the price of the independent seller affects the demand of the dependent seller but not vice versa. By exploiting the one-sided externality, sellers can profit from cooperation via maximizing their joint profit and, in case of side payments being possible, sharing it. Our analysis considers all probabilities of such cooperation and derives the equilibrium prices and the associated expected profits in order to answer whether both sellers would gain from an increase in the likelihood of cooperation. Whereas the independent seller always gains when cooperation is more likely, the dependent seller's expected profits decrease with the likelihood of cooperation when this is quite low. Although a sufficiently large cooperation probability can recover, and even overcompensate the transient losses of the dependent seller, there could be an obstacle when non-mutually dependent sellers want to gradually increase their cooperation probability. The dependent seller should anticipate losing from low cooperation probability and both sellers may fear that drastically jumping to large cooperation probabilities would come under scrutiny of antitrust authorities.

Fabio L. Spizzichino (Sapienza)

A target-based solution to Allais paradox

Riassunto/Résumé : The target-based approach to decision problems under risk (see Castagnoli and Li Calzi (1996)) amounts to fixing a target T and selecting, among several available prospects, the one with the largest probability of exceeding T . The prospects and the target are intended as scalar random variables defined on a same probability space. Such an approach can be seen as a wide generalization of the standard logic, based on the expected utility principle. In fact, in the special case when the prospects and the target are stochastically independent, the former actually can be reduced to the latter by taking the distribution function of T as a utility function. One can wonder if, by appropriately fixing a non-independent random target, it is however possible to give mathematical justifications to cases of apparently paradoxical behavior, incompatible with the existence of a utility function. It

will be shown in the seminar how a positive answer to this question can be given in the case of the celebrated Allais Paradox. This is joint work with Rachele Foschi, at University of Pisa.

Xavier Venel [Luiss]

Continuous Social Networks

Résumé/Riassunto: We develop an extension of the classical model of DeGroot (1974) to a continuum of agents when they interact among them according to a DiKernel. We show that, under some regularity assumptions, the continuous model is the limit case of the discrete one. We provide some applications of this result. First, we establish a canonical way to reduce the dimensionality of matrices by comparing matrices of different dimensions in the space of DiKernels. Then, we develop a model of Lobby Competition where two lobbies compete to bias the opinion of a continuum of agents. We give sufficient conditions for the existence of a Nash Equilibrium. Furthermore, we establish the conditions under which a Nash Equilibrium of the game induce an ϵ -Nash Equilibrium of the discretization of the game. Finally, we put forward some elements for the characterization of equilibrium strategies.