

# NONLINEAR DYNAMICS AND ECONOMIC APPLICATIONS

## Relatori

### David GOLDBAUM

Economics Discipline Group, University of Technology Sydney, Sydney, Australia

#### **"A robust route to randomness in a simple Cournot duopoly game where ambiguity aversion meets constant expectations"**

In this paper we investigate the dynamics of a duopoly game with ambiguity aversion regarding uncertainty in demand and constant expectations concerning competitor production. The focus is on an asymmetric Cournot game where players engage in robust optimization and have different beliefs about the possible realizations of the random parameters of the price function. The players' ambiguity aversion introduces multiple equilibria and instability that otherwise would not be present. The investigation of the global dynamics of the game reveals the emergence, through border-collision bifurcations, of periodic and chaotic dynamics.

### Moderata

Davide RADI

DiMSEFA, Università Cattolica del Sacro Cuore

### Anastasiia PANCHUK

Institute of Mathematics, National Academy of Sciences of Ukraine, Kyiv, Ukraine

#### **"Evolution of dishonest behavior in public procurement. The role of updating control"**

The process of public procurement includes many corruption risks due to certain advantages of dishonest behavior. Recent models are often based on an evolutionary process with honest and dishonest agents, which are allowed to change their attitude joining the opposite party. Following suggestions of some researchers, it is assumed that the agents are more inclined to honesty (the honesty propensity assumption). That is, a dishonest firm meeting an honest one will always change type if the honest behavior is more beneficial. However, not every honest firm meeting a dishonest one will change type even if a higher expected utility can be reached.

The present paper is a continuation of our earlier works, where we consider a two dimensional piecewise smooth map, describing the evolution of the dishonest firm fraction and of the monitoring level by the State, which is introduced endogenously in the model. In contrast to previous works, the current setup includes more sophisticated rule for changing the State's monitoring level, which leads to richer asymptotic dynamics.

### Ilaria FORONI

Department of Statistics and Quantitative Methods, University of Milano-Bicocca

#### **"Coexisting chaotic attractors and degenerate border collision bifurcations in a bimodal one-dimensional map"**

We study the tâtonnement model with cautious price adjustment introduced by Weddepohl in 1995. Specifically, we investigate the discrete time dynamics of the model when the original assumption of equal values for the maximum rate of increase and decrease of the price is relaxed. As a result, its analytic definition is expressed by a bimodal one-dimensional continuous piecewise smooth map which depends on three parameters. As it happens in general for bimodal maps, it is possible to describe the bifurcation structure in some regions of the parameter space of the model using the skew tent map scenario as a normal form. Nonetheless, we show that some border collision bifurcations which play a fundamental role for the asymptotic behavior of the map essentially pertain to its bimodal shape. Among them we highlight the ones that lead, for some specific parameter values, to the coexistence of two chaotic attractors. Moreover, we identify degenerate border collision bifurcations responsible for the peculiar shape of the chaotic attractors that distinguish the model.

## Seminario

Venerdì 27 ottobre 2023

Aula 200, ore 14.00

Via Necchi, 9 - Milano



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Per partecipare all'incontro [CLICCA QUI](#)



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