

PART I.

Programme and Abstracts

ATACD
A topological Approach to Cultural Dynamics

Colloquium 3:
Models and markets: relating to the future
[SOAS](#), The Brunei Gallery
University of London

Provisional timetable

Thursday 9 October

- 11.00-12.30** **Conference working group meeting (Room B211)**
- 13.30-14.15** **Lunch / Registration (Room B211 / Foyer)**
- 14.15** **Welcome (B211)**
- 14:30** **Paper 1 and discussion:**
Beyond Robinson Crusoe economics: some ideas from physics
Gulia Iori (City University)
- 15:15** **Paper 2 and discussion:**
Ecology of strategies and their dynamics in financial markets
Esteban Moro (Carlos III Madrid)
- 16:00** **Coffee**
- 16.30** **Paper 3 and discussion:**
How to integrate good practices of measurement beyond the laboratory?
Marcel Boumans (UVA)
- 17:15** **Finish**
- 19.30** **Dinner at Bertorelli, Charlotte Street**

Friday 10 October

- 10:00** **Arrival and coffee (B201)**
- 10:15** **Paper 1 and discussion (B211):**
Mechanisms of performativity
Yuval Millo (LSE)
- 11.00** **Paper 2 and discussion (B211):**
“Landscape by number”: exploring emergent financial topologies
Michael Pryke (Open University)
- 11.45** **Coffee (B201)**

- 12:00** **Paper 3 and discussion (B211):**
Subjects and models: some ideas motivated by mathematics and finance
Mihail Zervos (LSE)
- 12.45** **Lunch (B201)**
- 14.00** **Steering Committee meeting (B201)**
- 15:00** **Coffee (for committee)**
- 16.00** **Steering Committee end**

Thursday 9 October

Paper 1: Beyond Robinson Crusoe economics: some ideas from physics

Gulia Iori (*City University*)

Interaction and heterogeneity of agents are pervasive characteristics of economic processes. Surprisingly, economic theory has neglected these features to a large extent until recently. Over the seventies and eighties the paradigm of modelling representative agents has emerged and originated from the need of tracing back the market behaviour of firms or households, to their underlying objectives of profit and utility maximization. This approach has led to the development and analysis of highly stylised, analytically tractable models that need to assume homogeneous (or few types of) agents, few periods of interaction, common knowledge, rational expectations, and perfect capital markets.

On the contrary, one of the main trends of statistical physics in the last two decades has been the emergence of new concepts and techniques to study the co-operative behaviour of disordered and frustrated systems. Such complex systems involve the study of worlds whose microscopic constituents, often heterogeneous, all react and adapt to each other generating aggregate behaviour which is difficult to predict from the individual behaviour.

In this talk we will see how some of these models developed in physics can be exported into economics and what additional issues may arise when interactions among particles is replaced by interactions among human beings.

Paper 2: Ecology of strategies and their dynamics in financial markets

Esteban Moro (*Carlos III Madrid*)

Financial markets provide a comprehensive tool to study the deployment and dynamics of different trading strategies and how they do collide and interact. In this talk I will discuss about mathematical models used to detect and characterize the different strategies present in a stock market. Financial markets behavior is then the emergent outcome of the interacting dynamics of an evolving ecology of strategies. In this framework we will discuss the appearance of crowding events, market dynamics and the design and implementation of different strategies around specific events. In this sense, our study is one of the first to study financial markets from the point of view of the dynamics of strategies instead of the dynamics of the market itself.

Paper 3: How to integrate good practices of measurement beyond the laboratory?

Marcel Boumans (*UVA*)

Decision-making and risk management require reliable information. Most information about cultural, social and economic developments is acquired by measurement outside the laboratory. Different disciplines tend to measure in different ways, often with little examination, nor any conception that there might be an underlying generally applicable rational foundation. The assessment of the reliability of measurement results outside the laboratory calls for information about context of measurement and environment of measurand. Misunderstanding the reliability of measurement results

is damaging and perilous. The aim of the workshop is to integrate accounts of measurement outside the laboratory across a wide variety of academic and practical activities. This will be achieved through cross-disciplinary transfer of understanding, insight and good practice of acquiring reliable information.

The dominant measurement theory is the Representational Theory of Measurement. Although rooted in experimental psychology, today it finds a broad range of applications in social and human sciences. This theory accounts for measurements taken in laboratories, that is, for measurements for which the environment is neutralized. This is also the case of metrology, as measurement science is being called in engineering. Its theories are developed to account for measurement inside laboratories. In other words, current measurement science falls short in accounting for the reliability of measurement outside the laboratory.

Practices of measurement outside the laboratory are characterized by statistical modelling and one will find these practices across various disciplines. It is, however, striking that these widespread practices of statistical modelling, while facing similar measurement problems, mainly have developed their own methods and techniques separately of each other, with only little cross fertilization. An explanation for this is that measurement outside the laboratory requires specific field expertise, that is, knowledge not only about the measurand but also about its environment. This contextual knowledge is not easy transmittable to other fields.

Numbers travel well, so do probabilities. The problem, however, is that these numbers do not carry information about the context from which they were derived, running therefore the risk of misinterpretation, particularly when they are transmitted to another expert field. In Evidence Based Medicine medical information (on diseases and test results) is packed in probabilities with the explicit purpose of easy transmission. If these numbers are transmitted without their contextual knowledge, they may lead to wrong diagnoses. Another example is the use of statistics in forensic science. Legal systems all assume the irrelevance of who is being called as expert witness as long s/he is expert in the relevant discipline. Not acknowledging the existence of different approaches within a discipline, each based on different assumptions how context feeds in, may lead to regrettable convictions.

A recurrent problem of measurement outside the laboratory is the complexity of the measurand's environment. Besides having to deal with this complexity anyhow, another issue is whether the phenomenon to be measured really exists or is an artifact of its environment. To find out whether a 'hot hand' exists in sports, one has to model a sport game, which is certainly a complex system.

Understanding the nature of measurement is a non-trivial task. Numbers never speak for themselves, but has to be interpreted through the ways of their acquirement. If these numbers are acquired outside the laboratory, assessment of their reliability requires an account of context and environment. Any general theory of measurement has to explicate and analyze these issues.

Friday, 10 October

Paper 1: Mechanisms of performativity

Yuval Millo (*LSE*)

Performativity of economics, presented by Callon (1998) and developed further by MacKenzie & Millo (2003) is gradually becoming an important conceptual framework in the analysis of complex organisations, in particular financial markets. Performativity of economics presents the possibility that economic theories, once interwoven into the techno-social fabric of markets, would not only describe and predict the price behaviour of markets, but would also *affect* the way in which markets behave.

This general hypothesis, which is the radical core of the performativity approach, also exposes it to criticism. The main thrust of that criticism refers to the social constructivism that is implied in performativity. Performativity suggests that theories are enacted, or sometimes 'become accurate' through the activities in markets. If that is so, then will any theory do? Can we assume that any theory is performative, and if not, what is special about the theories that are performative?

This paper addresses this question by suggesting a more fundamental theoretical framework than existed hitherto. The theory uses the notion of 'public experiments' to present and analyse the fundamental building blocks of the performative process in organisations. In doing so, the analytical discussion identifies two pivotal elements in the mechanism of performativity that can help in predicting the likelihood of performativity emerging. First, the actors' effective agency: given that actors are aware of the content of a theory, the actors' ability to intervene in the field for which the prediction is made determines how effective would be the efforts to act in accordance with the theory. Second, the internal validity of the public experiment: the more easily comparable are the results of the predictive theory to and those of the field being predicted, the easier it would be for performativity to emerge. With regard to second element, the paper develops a discussion about the differences between 'scientific' and 'organisational' accuracy and validity.

Paper 2: 'Landscape by number': exploring emergent financial topologies

Michael Pryke (*The Open University*)

Contemporary finance relies upon mathematical models to innovate and engineer financial products. The world has now been coded to facilitate the movement of finance as mathematical signs replace time zones. The techniques of mathematised finance and the use of innovative instruments such as derivatives (financial innovations produced through mathematical procedures) appear to generate endless streams of finance that mix not only market segments and risk profiles but also spacetimes in highly novel, topological, ways. Arguably, these emergent financial topologies become apparent only in moments of crisis. This paper asks how useful it might be to explore financial markets as practices that generate financial topologies.

Paper 3: Subjects and models: some ideas motivated by mathematics and finance

Mihail Zervos (*LSE*)

The evolution of modern international finance has been profoundly influenced by the development of new financial models, such as the Black and Scholes model, as well as by the wider adoption of a range of investment strategies. During the last three decades, the financial sector has enjoyed spectacular growth, and has experienced a number of shocks, the most severe of which is the current, so called, credit crunch crisis. In this seminar, we explore some of the effects that aggregate decision making driven by perceived "knowledge" potentially has on the occasionally excessive magnification of certain economic and social phenomena. No background in mathematics or finance is assumed.