

Prelude

The “1^a Officina di Neuroeconomia”, held during the 2017 Brain Awareness Week at the School of Medicine of Università Politecnica delle Marche (Ancona), has been designed to intrigue Italian students and researchers towards new visions and methods that can lead to a better understanding of economic agents’ behaviour. Compared to the international academic context, Italian scholars who conduct interdisciplinary investigations to examine the neural aspects of individual decision making in the fields of economics and in finance are still few. A large number of researchers do not seem ready to overcome traditional theoretical and methodological perspectives used to explain human behaviour.

In the Western culture, a symbol of revolutionary scientific intuition dates back to 5th century B.C. when Anaximandro (610 BC-546 BC), philosopher and Talete's pupil, provokes the first substantial knowledge leap, resorting to his doubt, curiosity, intuition, and observation: the basic factors of science evolution. He described how the sun, stars and sky are fixed while the Earth floats in the air and it is not circular, flat, and motionless: he went beyond the acquired version sustained by his life mentor¹.

Only recently, the innovative concept that the human brain is responsible for modulating all cognitive and motor functions, driving the decision making process, has started influencing the economics’ discipline. This represented a first step of a very complex and troubled process in which the initial concept of psyche evolved to those of mind, intellect, reason and, finally, brain. This result

¹ See Carlo Rovelli: *Anaximander and his legacy*. Ed. Westholme Publishing. 2011. See Carlo Rovelli: *Six brief lessons on physic*. Ed: Penguins Books. 2016.

has been achieved by exploiting cultural and scientific knowledge, experiments, intuitions, confutations over a very long time. In the last decades, developments in technology and in computer science rapidly increased the efficiency of neural scientific research. Nowadays, we can observe and examine the human brain *directly, in vivo* and in a *non-invasive way*. It is possible to analyse the brain mechanisms of healthy people involved in decision making. This is a relevant innovation with respect to psychological knowledge used in behavioural economics and finance.

Neurophysiologists and neurobiologists agree that the human brain is the most complex organ largely influenced by the (inexplicable so far!) neural factor named 'emotion'. The new scientific results prove that neural functions are based on chemical-physical processes, which are automated, very fast and often unconscious. By deepening the knowledge of this wonderful organ functioning, we gather new information to understand its real (incredible) role in decision making in economics and finance. Neuroeconomics started from this opportunity. The scientific targets pursued with this new research area are not easy but it is becoming more and more necessary to reach them with tenacity, humility and new interdisciplinary visions. Surely, we need a long time before the human brain will be fully understood by... our brains.

In the meantime, among the researchers, wise ones accept the complexity of a new scientific challenge, working in multidisciplinary teams and using innovative research methods and instruments. Some other naive scholars try to take action by simply hoping to have some knowledge that is immediately convertible into an economic benefit. Finally, others, the conservative ones, consider the challenge useless and reject it. The aim of the "1^a Officina di Neuroeconomia" is to explain basic knowledge and to show recent scientific results to sustain, consolidate and satisfy the growing curiosity of the innovative group, limit the short sighted opportunism of the second group of researchers and try to seed new interest among the most conservative.

The 3-day seminar was introduced by Prof. Sauro Longhi, Rector of Università Politecnica delle Marche (UNIVPM) followed by greetings from Prof. Andrea Giovagnoni, Vice-Dean of the School of Medicine at UNIVPM. Mr. Michele Caporossi, General Manager of the Hospital "A.O.R. Ancona" welcomed all speakers, scholars and academic authorities. The "1^a Officina di

Neuroeconomia” received the patronage of the Italian Scientific Society of Neurology. A letter of congratulations had been sent by Sen. Valeria Fedeli, Ministry of Education, to the steering committee for the innovative seminar contents and the very interesting perspectives of Neuroeconomics.

The sequence of papers, in these proceedings, respects the scientific programme carried out during the 3-day seminar. The first section includes an initial synthetic description of the evolution from theoretical visions and research methods of neo-classic economics to those of behavioural economics and finance up to the introduction of the emerging theories and methods of neuroeconomics. The second paper, written by Prof. Nicola Biagio Mercuri, Dr. Rocco Cerroni and Dr. Maria Albanese, is dedicated to a basic description of the brain’s anatomy structure and physiology. Dr. Girolamo Crisi, the author of the next paper, explores the use of functional Magnetic Resonance Imaging in neuroeconomics. Prof. Gabriele Polonara and Prof. Mara Fabri, in the next chapter, offer a technical description of instruments and methods used to collect, process and interpret neural correlates of decision making. The 2nd section starts with a paper by Prof. Simona Luzzi. She clarifies the way emotions influence individual decision making and highlights the pervasive role of emotions in personal preferences, choices and behaviour. The paper presented by Prof. Maria Gabriella Ceravolo and Dr. Lucrezia Fattobene offers important and new knowledge on the neural representation of perceived risk in different frameworks (risky, uncertain or ambiguous). Prof. Giuseppe Di Pellegrino and Dr. Manuela Sellitto present their recent conclusions on neural mechanisms involved in intertemporal choices. The 3rd section has been wholly dedicated to show results on neural aspects of individual decisions in economic and financial markets. Its first paper, by Prof. Frank Hartmann, describes the evolution of neuroaccounting. With the next paper, Prof. Gianpiero Lugli presents his recent interesting applications of neuroscience methods to marketing at an operational level. Neuromarketing seems a fast growing research area that some scholars try to consider this area scientifically autonomous. An impressive research in neurofinance is illustrated with the paper by Prof. Maria Gabriella Ceravolo and Dr. Lucrezia Fattobene. They present a complex research about neural correlates of traders’ decision making, examined through an innovative and ecological experimental protocol. Prof.

Luca Passamonti, in his paper, illustrates a new approach to examine the link between personality and psycho-pathological behaviours driving towards individual dominance. This is an important step towards a better knowledge of the brain's role in an individual achieving leadership.

As already suggested, each presentation has encouraged a passionate debate among the participants. We have the pleasure of including three selected interesting papers. The first one, authored by Prof. Sergio Barile, Dr. Francesca Iandolo and Dr. Stefano Armenia deepens a viable social approach to social neuroscience. The second essay by Prof. Vincenzo Farina and Prof. Lucia Leonelli, with others, recommends taking advantage of neuroeconomics in finance researches and also proposes the new eye-tracking method to analyse how the brain selects information (unconsciously) through his visual system.

The third one by Mr. Riccardo Guerrini suggests different keypoints for neuroeconomists to examine new aspects of individual and collective behaviour in the insurance market.

The "1^a Officina di Neuroeconomia" ended with a panel discussion between Prof. Sauro Longhi, Rector of UNIVPM, Prof. Sergio Barile, council member of the Italian Academy of Business Economics (Accademia Italiana di Economia Aziendale - AIDEA), Prof. Leandro Provinciali, President of the Italian Scientific Society of Neurology (Società Italiana di Neurologia - SIN), Prof. Fiorenzo Conti, President of the Italian Society of Neurosciences (Società Italiana di Neuroscienze - SINS), and Prof. Roberto Grassi, incoming President of the Italian Society of Radiology (Società Italiana di Radiologia Medica-SIRM). They discussed enthusiastically about Neuroeconomics' perspectives in the domestic academic context. We considered the salient ideas emerged in the final reflections of these proceedings.

We would like to express our thanks to the Health Care Management Center of UNIVPM School of Medicine for its financial, administrative, and organisational support. We would also like to express our gratitude to everyone who has contributed in different ways to the success of this 1st Officina in Neuroeconomics: speakers, participants, students, administrative, and organisational staff.

The local academic interdisciplinary teams that are involved in neuroeconomics and neurofinance will continue to project and implement

researches, seminars and events to spread Neuroeconomics in the domestic academic context. We are waiting for new ideas and collaborative proposals that should come from young forward-looking researchers.

Our hope is that the essays collected will stimulate new curiosities and interests, especially among young researchers, towards the interdisciplinary visions of neuroeconomics and neurofinance.

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