
Editorial

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Biographical notes: Jean-Luc Gaffard is a Professor of Economics at the University of Nice Sophia Antipolis and at SKEMA Business School. He is Scientific Advisor at OFCE Sciences-Po. He is Honorary Fellow of the Institut Universitaire de France, former Director of the Department for Research on Innovation and Competition at OFCE, former President of the International Schumpeter Society and Honorary Dean of the Department of Economy of the University of Strasbourg. His main research and lecture areas are in economics of innovation, growth and development, industrial organisation, and economic geography.

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Claudio Sardoni is a Professor of Economics at Sapienza University of Rome. After graduating in Statistics in Rome, in 1982 he obtained his PhD in Economics at the University of Adelaide, under the supervision of Geoff Harcourt. His main area of research is macroeconomics and monetary theory. On these topics he has published many papers, chapters in books and books.

This special issue of the *International Journal of Computational Economics and Econometrics* “Innovation, Economic Change and Policies: an Out-of-Equilibrium Perspective” presents a collection of papers celebrating Mario Amendola for his outstanding contributions to economic theory.

Most of the papers are revised versions of papers presented at the conference “Innovation, Economic Change and Policies: An Out-of-Equilibrium Perspective” (Sapienza University of Rome, 17–19 November, 2011), held to mark his official retirement from teaching, but certainly not from studying and research.

Mario Amendola belongs to that generation of Italian economists who, since the early 1960s, have significantly contributed to break the isolation that Italian economics had suffered until then because of Fascism and the war.

After having spent time in the UK as a young postgraduate student, Mario Amendola carried out his research and taught in many universities in several countries. What is more relevant, however, is that his research has dealt with issues and topics that were at the centre-stage of international debates. He participated in these debates by producing original and innovative contributions.

As a teacher of the universities of Siena and Rome, he was able to transmit his research interests to his numerous students, by exposing them to the discussions and debates in which he was participating. Many of his former students were then induced to proceed along the same path.

An important characteristic of Amendola’s contributions as a researcher and a teacher has been his refusal and rejection of dogmatic views and positions. He has always put originality and critical attitude before an uncritical acceptance of a particular theoretical position, even though it was his own position.

All this is also reflected by the nature of the contributions presented here. Although on topics close to Amendola’s research program, the authors of the papers deal with them in original and differentiated ways. They do not belong to any ‘Amendolian School’. They approach theoretical as well as empirical problems from different perspectives; what they share with their former teacher, colleague and/or friend is open-mindedness and critical attitude.

The first two papers address directly Amendola’s contributions to the analysis of the out-of-equilibrium processes. In particular, Velupillai and Dharmaraj deal with the simulation methodologies from an epistemological point of view. They both recognise the value of the Amendola and Gaffard’s work in rediscovering and implementing simulation methods to solve non-linear dynamic models, firstly introduced by Lundberg. The use of numerical simulations has now gained a new relevance in economic analysis, in particular, in the Evolutionary literature. The authors try to identify the type of dynamical questions to which the numerical procedures can give answers that analytical methodologies are not suited to tackle. The results of this analysis show that the use of this method can give rise to “new, non-equilibrium, non-maximum and research paradigms”.

Bianco presents a description of the main feature of the out-of-equilibrium heuristic, explaining why it is more suitable to assess macroeconomic policies in a context of economic change. He clarifies the sequence of account implicit in this literature with a direct reference to the new European System of Accounts (ESA2010).

The following three papers approach, in a more or less direct way, some issues that have been at the core of Amendola’s thinking: the process of technical change, the roots of innovation and the role of flexibility.

Antonelli et al. deal with the issue of productivity growth in a context of directed technical change. The authors set up a new methodology that accounts for changes in the output elasticity to inputs, identifying the bias effects related to the direction of the technical change. By applying this methodology to Italian data from 1861 to 2013, the authors show that the paradigm of the country's technological change has shifted from labour intensive to capital intensive biases. Both the direction and the pace of technological change have affected the overall economic performance. From their analysis, it emerges that the Italian secular growth has been harmed by a low technological congruence of the growth paradigm: the direction of technical change has biased the input mix of production towards the factors that were currently scarcer. As in the out-of-equilibrium literature, along a process of change the different parts of the economic system evolve together in a decisions–constraints–decisions sequence. Therefore, the direction of the technical progress is not neutral, once considered in its coevolution with factors as endowments and rewards.

Inspired by John Hicks, Mario Amendola stressed the bias of measuring productivity changes. In 'Macchine, Produttività e Progresso tecnico' the Solow-residual measure is analysed in its strong limits and bias when the technological change is not Harrod-neutral (labour saving), but takes instead the Solow-neutral or Hicks neutral features. Furthermore, he also stressed the misleading nature of the concept of productivity itself, whenever "costs come before proceeds", that is, whenever we assume production to be a phenomenon occurring in time.

Baumol's paper points out some flaws of Schumpeter's analysis of the innovative entrepreneurship. Although the author acknowledges the relevance of the Schumpeterian approach to the innovative activity, he claims that an insight on the statements that are not supported by historical and empirical evidence can shed new light and suggest new research hypotheses on the role and the aims of innovators. In particular, there are three statements questioned. The first is that inventors do not bear the risk of innovation – an assertion that ignore the role of the various innovator's opportunity costs. The second is related to the role of expected profits as the main incentive for innovators. Empirical evidence shows that the average earnings of self-employed innovative entrepreneur are lower than those of an employee with similar skills. Other incentives can drive the entrepreneurs' behaviour, both monetary (whenever the realisation of an innovation has an effect similar to that of lotteries, where the expected utility theory loses its heuristic value) and non-monetary such as physical benefits, fame and similar.

This interpretation of the behaviour of innovators is in line with that of Amendola and Gaffard in their out-of-equilibrium approach, where the decision to start a new and different production process is not modelled in an optimisation framework. As Amendola has admitted in later discussions, the title 'The innovative choice' of his book may be misleading because the analysis is carried out to explore what makes an innovative process viable, without explaining the concept of 'choice'. Choices have to be explained outside the purely economic sphere since, as he often said to his students, "it is exactly this kind of choice that distinguishes an economist from an entrepreneur".

The third point is Schumpeter's prediction of declining and routinising trend of entrepreneurship activities. This prediction is strongly contradicted both by the dynamics of R&D and the tendency of firms to outsource such activities. In particular, the authors recall that pathbreaking innovations are usually realised by small firms or by self-employed innovators. This is in line with Amendola's view of the innovative process, in which innovation is at odds with routine since its chances to be realised correspond

exactly to the chances of breaking the routine. Nevertheless, the routinisation of innovating activities predicted by Schumpeter calls for the ancestral approach to technological change as something that reduce the human activities, and innovation among them. Amendola has always criticised this view, by explaining the temporary nature of the displacement effect (see ‘L’automazione flessibile’) and stressing the role of technical progress in widening the range of human activities, including the innovative ones.

In his paper, Howitt proposes a model of financial booms and crises based on the interaction between leverage and stability. A large literature has tried to explain the roots of the recent financial crisis by drawing inspiration from Minsky. Howitt integrates approaches based on adaptive expectation by jointly considering the role of leverage. The model is a simplified version of the Lucas’ tree model (1978) with adaptive expectation. The dynamics of the model are compatible both with the Reinhart and Rogoff findings on the pre-crisis increase in the interest rate and with the Calvo’s view that in small economies crises are precipitated by a sudden stop of capital inflows. In this perspective, the paper shows how, in addition, to a ceiling to leverage, a further and more effective policy consists in putting a floor to deleveraging, to contrast the downward overshooting effect deriving from adaptive expectations.

The idea of introducing ceilings and floors into dynamic non-stationary processes is also present in the out-of-equilibrium literature, which points out how an excess of flexibility can harm the process of transition, as it hampers the coordination of the different parts of the economy. In his latest works (*The market way to riches* and *Inequality, debt and taxation*) also Amendola pays attention to the role that an excessive leverage plays in crises, even though he argues that over indebtedness is essentially due to the rise of inequalities rather than to the expectational bubble mechanism.