

Introduction: long term economic development – demand, finance, organization, policy and innovation in a Schumpeterian perspective

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The general theme of the 13th International Joseph A. Schumpeter Society Conference, held during June 21st–24th, 2010 at Aalborg University in Denmark, was the exploration of the interrelated phenomena of innovation, organization, sustainability and crises. By addressing these phenomena an attempt was made to confront some of the underexplored parts the Schumpeterian legacy, but there was also room for new results concerning more well-developed parts of evolutionary economics.

The five plenary sessions concerned: advances in the understanding of industrial evolution; new research on entrepreneurship, spill-overs and regional development; the analysis of innovation-based growth, fluctuations and crises; the current crises in a long-term historical perspective; and the processes of development in relation to the problems of catching-up, falling behind and forging ahead.

The scope of the conference can be recognized by the broad range of topics that was covered by the 62 parallel sessions. The session titles included: finance and innovation; evolutionary economic development; perspectives on patenting and licensing; creative destruction and labor mobility; consumption and evolution; evolution and development; incentives, learning and complexity; agent-based modeling; financial innovation and financial crisis; innovation in pharmaceuticals; knowledge networks; capitalism, labor markets

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and reorganization; innovation in the medical industry; the environment and sustainability; clusters and industry evolution; innovation in consumption goods; modeling technical change and growth; modeling industry dynamics; discontinuities and continuities; technological and regional relatedness; perspectives on innovation studies; R&D and patents; survival of firms; public policy and innovative growth; growth and resilience; eco-innovations; Schumpeterian analyses of growth and fluctuations; structural change and growth; firm practices and innovation; outsourcing and offshoring; public action and innovation; financial constraints on innovation; regulation and innovation; environmental policy and innovation; Schumpeter and innovation; entrepreneurship and evolution; high-tech clusters; sustainable emergence; firm growth and innovation; technological regimes and change; biotechnology; persistent performance; diversity and knowledge creation; innovation in Africa; innovation policy and policy innovation; universities and business innovation; entrepreneurship in regions; learning and locating; perspectives on catching up; innovation and market concentration; organizational forms; small and new firms; perspectives on networks; entrepreneurship and self-organization; Schumpeterian creative destruction; innovation and interaction; perspectives on Chinese transitions; environmental sustainability and innovation; the role of patents; technology and cycles; R&D, spillovers, and innovation; and preferences and evolution.

The special issue following the 2010 conference of the International Schumpeter Society starts with the presidential address given by Esben Sloth Andersen with the title “Schumpeter’s Core Works Revisited: Resolved Paradoxes and Remaining Challenges”. The paper starts with an analysis of Schumpeter’s core works in German and English that serves to characterize the Schumpeterian legacy and its challenges for modern evolutionary economics. The analysis is partly made through the distinction between microevolution and macroevolution, and major tasks for future research concern the latter phenomenon. Other research issues emerge from the distinction between Schumpeter’s three major evolutionary models: the entrepreneur-driven model (Mark I), the oligopoly-driven model (Mark II), and the model of socio-economic coevolution (Mark SC).

Evolutionary economics sometimes is still characterized as dominantly supply-side oriented. In this view the relationship between innovation and demand are not at the forefront of evolutionary research. This is without doubt rather surprising given that no innovation could have successfully diffused without consumers adopting the new technology. In 2001 the *Journal of Evolutionary Economics* pioneered with the publication of a special issue “Economic growth – What happened on the demand side” edited by Ulrich Witt (*Journal of Evolutionary Economics*, Vol. 11, No. 1, 2001) and triggered a continuously increasing number of publications dealing with the dynamic interplay between innovation, demand, income generation, consumer capabilities and changing distributions of consumption expenditures. Therefore the criticism of an exclusive supply-side orientation of evolutionary economics is no longer justified. The first paper in this special issue takes up this rich research agenda.

Andreas Chai and Alessio Moneta ask the question “Back to Engel?” and give empirical evidence for Ernst Engel’s hierarchy of needs which he published already in 1857. The challenging question addressed in this paper deals with the dynamics of consumption patterns. Is the order of consumption which Engel has introduced more than 150 years ago still observable and how do rising incomes and increasing choices of consumption influence the behavior of consumers?

In the second contribution to this special issue by Christian Garavaglia, Franco Malerba, Luigi Orsenigo and Michele Pezzoni demand aspects also matter even if the focus of the paper is on the developing industrial structure of biopharmaceutical industries. In their paper “Technological regimes and demand structure in the evolution of the pharmaceutical industry” the authors apply a history-friendly simulation model to analyze the mutual interaction between the nature of the demand and the development of industry concentration. They show that the fragmented feature of the demand in pharmaceuticals expressed in the competition for new market niches leads to a seemingly high degree of competition in the pharmaceutical market despite the high R&D and marketing intensities.

Supply relationships, intermediate demand and real as well as financial interactions in supply chains are the topic of the contribution by Giulio Cainelli, Sandro Montresor and Giuseppe Vittucci Marzetti. To bring together the complex interactions between firms comprising different forms of exchange the authors apply the network metaphor and develop an analytical model to analyze “Production risk sharing and financial linkages in inter-firm networks” concerning the “structural variety, risk sharing and resilience” in these networks. The authors use the network terminology also to highlight the important geographical dimension of innovation. Different occurrences of network indicators like connectivity measures are applied to assemble various forms of industrial clusters which show to be characterized by specific possibilities to process shocks among the network members.

Kenneth Carlaw and Richard Lipsey challenge core neoclassical theories like Real Business Cycles (RBC) in their contribution “Does history matter? Empirical analysis of evolutionary versus new classical views of the economy” and dispose their discussion in a tradition which started with Nelson and Winter (1982). With their evolutionary growth model they produce artificial macro data which they analyze for stylized facts of RBC theory. When applying the same econometric tests which are applied to real time series the artificial macro data exhibit stationarity features although they were created by an evolutionary model with strong path dependencies. Therefore, the question of the role of history cannot be meaningfully answered with standard econometric methodology. Carlaw and Lipsey go one step further and take real data from six OECD countries and show that the stationarity conditions do not hold among others with respect to the short-run, negatively sloped Philips curve, nor the short and long-run general equilibrium conditions or a vertical long-run Phillips curve. Thus, the answer to the question asked in their title is an unconditional “Yes”.

The contribution by Jorge Niosi, Petr Hanel and Susan Reid “The international diffusion of biotechnology—the arrival of developing countries” addresses a similar question on the sectorial level. The hypothesis challenged is the one which deals with economic and technological convergence processes among countries prevalent in conventional economic approaches. In an empirical study including eight developing countries, namely China, India, Korea, Singapore, Argentina, Brazil, Chile and Mexico the countries’ endeavors to establish biopharmaceutical industries are analyzed. Their results show that a trickling down of technologies can be observed; however, the particular trajectories are different, path dependent and strongly shaped by national institutions.

Schumpeter’s contradictory statements concerning the size of firms and their potential to innovate has triggered a very long scientific discussion. The question is whether path breaking innovation activities are to be found dominantly among small entrepreneurial start-ups (Schumpeter Mark I, Schumpeter 1911) or whether large, diversified companies in high concentrated markets are responsible for radical innovation (Schumpeter Mark II, Schumpeter 1942). Exactly this question is addressed by Roberto Fontana, Alessandro Nuvolari, Hiroshi Shimizu and Andrea Vezulli in their contribution “Schumpeterian patterns of innovation and the sources of breakthrough inventions: evidence from a data-set of R&D awards” by exploiting the “R&D 100 awards” data set of the magazine *Research & Development*, which yearly awards since 1963 technologically significant new products. Today, the picture is even more complex because many industries are characterized by a co-existence of large established and new entrepreneurial companies. E.g. after the deregulation of telecommunication industries the former national monopolists co-exist with smaller technology-oriented companies and also in the pharmaceutical industries the biotechnology companies did not replace the large diversified pharmaceutical companies but co-exist and cooperate in innovation. In their paper, however, the authors show, that breakthrough innovations are more likely in the turbulent world with small entrepreneurial companies engaged in innovation competition which corresponds to Schumpeter Mark I.

Of course, innovation and entrepreneurial activities are not restricted to the industrial pillars and the demand side of economies but encompass also their financial and public pillars (Hanusch and Pyka 2007). Public sector innovation, public entrepreneurship, social innovation and innovation and venture financing are some keywords which express the comprehensive nature of the required approach to design the future-orientation of economic systems. What characterizes the symbiotic and twin-track relationship between innovation and finance? Mariana Mazzucato and Massimiliano Tancioni test in their contribution “R&D, Patents and Stock Return Volatility” the direct relationship between innovation and stock return volatility. Their results reveal positive relationships between R&D activities with volatility and the level of returns. Their major conclusion, however is that Knightian uncertainty is a major ingredient of a Schumpeterian theory of finance.

In the contribution “Building Systems”, Brian Loasby also takes the comprehensive view: He characterizes economic systems as a set of elements which are connected in characteristic ways. The viability of the system stems from its decomposability which allows for sane development. Intentional innovation processes are a strong, even not the only force which spurs the development of economic systems. Referring to the system of selective connections in the Human brain, Brian Loasby disentangles the immanent conflict between structure and dynamics. Both co-ordination (structure) and development (dynamics) are ordered processes and can only meaningful interpreted within this radical process-oriented view.

The last contribution to this special issue by Muhammad Nadeem Javaid and Pier-Paolo Saviotti applies this strong process-orientation by focusing in a fine grained-way on the particular patterns which characterize economic structures, namely on related and unrelated variety with respect to the exports of 97 countries and their changes in a period of more than 10 years. The authors empirically analyze in their paper “Financial System and Technological Catching-up: An Empirical Analysis; Is there a recipe for increasing the export variety of nations?” the interactions between the financial system of an economy and its exports. Like Mazzucato and Tancioni they found a crucial determinant for the explorative activities in an economy to be manifested in the role of stock markets.

The papers of this special issue are all selected from the contributions of the 2010 conference of the International Schumpeter Society and illustrate the scope of Schumpeterian economics today. Confronted with a higher degree of complexity than other scientific disciplines, evolutionary economics strongly contributes to a better understanding of the rich and varied patterns of economic systems and their development.

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