

## Preface

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When we are looking for the determinants of innovation and growth, it is not appropriate to focus on the firm in isolation. Economic growth is not only a matter of productivity gains and hence of institutions and rules that create incentives to R&D expenditures by firms. It is, also and mainly, a matter of co-ordination between supply and demand decisions both at each moment and over time, and hence of relations which prevail among firms that interact with each other during innovation processes. Thus, in an echo of Adam Smith, it is worth drawing attention to the articulation between the division of labour and the extent of market as the real source of wealth creation. As should be well known, without an expansion of market size, there is no possibility for firms to capture the productivity or the variety gains associated with a deeper division of labour. And hence, there is no real opportunity for firms to invest in specific physical assets and to boost the growth process.

In exploring the main implication of increasing returns, which are at the heart of industrial life, for economic growth, we can see that markets stand at the core of economic processes insofar as they are considered as 'instruments to transmitting impulses to economic change' (Kaldor 1972, p. 1240).<sup>1</sup> Every re-organization or restructuring of productive activities is the source of further changes which can be characterized by permanent differences between supply and demand. As a matter of fact, supply does not automatically generate a demand of an equal amount. Market disequilibria are unavoidable as a consequence of imperfect information. The market process is then a dynamic process of selection. But competition, provided it is well oriented, is presumed to be a process of co-ordination that prevents any disequilibrium to be cumulative. It is not only aimed at equalizing demand and supply in a given market and technological environment. It 'has also to adapt structure and technology to the fresh opportunities created by expanding markets' (Richardson 1975, p. 353).<sup>2</sup> This evokes the creative function of the market. Innovation is inseparable from the competitive process. The relation is two-way and mutually reinforcing between free competition and, notably business experimentation.

Dealing with a process of change, which implies learning, requires establishing market relationships over successive periods as well as a wide range of co-operative relationships over time (not only internally but also

between different firms, between firms and banks, and so on). This different image of the firm implies a different relationship with its environment. As long as we keep looking at a firm, the boundaries of which are defined by a given technology and which must operate in a given market to carry out its allocation task, we stick to the idea of environment as an exogenous constraint. But the technology and the market are precisely specific expressions of this environment. On the other hand when we move the attention to a process of change that the firm itself must organize, a process that most often involves learning and structuring anew, then the environment necessarily becomes a strategic variable, to be moulded according to and as a functional part of the strategy pursued (Amendola and Bruno 1990).<sup>3</sup>

We thus come to an image of the firm that overcomes both the distinction between a micro and macro definition and that between the firm itself and its environment. Organizing and implementing the process by which new productive options (and technologies) are brought about also entails simultaneously redefining intra- and inter-relationships which make the firm change its configuration and articulation within a context that itself becomes modified and redefined together with the firm. Business experimentation and entrepreneurship both explain firm differentiation and firm dynamics and appear as an endogenous response to change in the environment. Therefore, markets and firms are not substitutes but complements. Entrepreneurial activity exists and is stimulated because the market creates opportunities, and promotes growth enhancing activities. On the other hand entrepreneurial activity serves an important source of economic growth by creating competition and conducting knowledge spillovers.

In this perspective, firm differentiation or heterogeneity, market selection and firm survival, networks of firms, relations between small and large firms, firm's specialization or diversity and flexibility are always phenomena that contribute decisively to growth and development.

This book addresses the foundations of economic growth at the firm level combining both theoretical and econometric contributions by established scholars. Challenging ideas revisit Marshall's view on the management of innovation, investigate the decision of firms to venture into entrepreneurship and clarify some misunderstanding about Schumpeter's views. The book goes on to shed light on the classical specialization–flexibility trade-off and provides a vision on the role of the knowledge-based economy and firm networks on technology development. Firm survival and performance, price–cost margins and the determinants of research intensity are also investigated econometrically. Our objective is notably to cover these topics through theoretical and state of the art econometric analyses by authors who participated to the 2006 Schumpeter conference. Besides, we offer a comprehensive view by assembling evolutionary with orthodox approaches

to those issues. Leading specialists contribute to this book. Among them, some have already edited best sellers. Other contributors have good research tracks with publications in international academic journals. There are two major new features in this book. First, Stanley Metcalfe provides a key contribution to industrial dynamics through the lenses of evolutionary economics. Second, the book may reach a large audience as it combines papers on theories of entrepreneurship and firm behaviour with papers relying on econometric evidences on these issues dealing with firm-level data. The authors analyse firm performance, price-cost margins, investments and expenditures in research and development. Several sectors are covered in the domestic and foreign markets. The book should be of relevance to the academic profession involved in research projects that address issues on firm growth and performance from theoretical and econometric perspectives. It should also have an appeal to practitioners seeking tangible results on the relationship between key economic variables at the level of firms and to policy-makers who must be aware of the impact on firms' performance of changes in the organization of industries such as markets liberalization, exchange rate policies or laws promoting the entry of small and medium enterprises. We also think that doctorate and postgraduate students might use the book as a supplementary reading for the understanding of firms' behaviour.

Part I contains contributions to the history of economic thought. It starts with an ambitious methodological paper (Chapter 1 by Stanley J. Metcalfe) that offers a more general theory of evolutionary economics by bringing Alfred Marshall back to the centre. Metcalfe draws attention to Marshall's open systems approach to economic development and its intimate connection to his evolutionary perspective on the development of knowledge and organization. He also shows evidence that Marshall's writing is not out of place in regard to much of the modern literature on corporate strategy and innovation. In addressing issues such as Marshall and Schumpeter's reservations about the continuation of the innovation process and the implied limits to economic progress, Stan Metcalfe grasps the point that there are two evolutionary Marshalls, one devoted to the organic system development view of economic change, and the other, the adaptive, variation, selection view of industrial competition and development. Metcalfe's paper also clearly emphasizes the importance of historical research into firms and industries and the complementary importance of history friendly modelling.

In Chapter 2, Mario Amendola, Sergio Bruno and Jean-Luc Gaffard show the complementarity between Richardson's and Hicks' contributions as regards the sketching out of a proper analytical framework for dynamic analysis that depends on dealing with issues that are in the nature of dynamic problems. They call for co-ordination over time of economic activity, to

render viable the process of change in the productive structure due to innovation. According to the authors, this can only come about through a process which is in the nature of an out-of-equilibrium process. The analytical framework sketched out by the authors helps to understand the methodological flaws of the traditional theories of economic policy, be then of the Paretian or of the Tinbergen type. Mario Amendola et al. argue that the out-of-equilibrium process admits instead a plurality of dynamic paths which regarding economic policy implication suggests that there is a wide room for policy action.

The two remaining parts of the book each contain two theoretical contributions followed by two empirical contributions. In Part II, David Audretsch, Taylor Aldridge and Adam Lederer (Chapter 3) question the link between small and medium enterprises (SMEs), industry dynamics and economic growth. In this chapter, the authors utilize the lens provided by the new knowledge spillover theory of entrepreneurship to understand how (SMEs) can influence industry dynamics and ultimately economic growth. The knowledge spillover theory of entrepreneurship inverts the traditional approach to SMEs. Rather than taking the context to be given and then asking how variations across individual attributes shape the cognitive process underlying the decision to become an entrepreneur, the authors instead assume the individual characteristics to be constant and then analyse how the cognitive process inducing the entrepreneurial decision is influenced by placing that same individual in different contexts. In particular, high knowledge contexts are compared with impoverished knowledge contexts. This leads to a very different view of entrepreneurship. Instead of being a phenomenon that is exogenously determined by pre-conditioned personal attributes and family history, entrepreneurship instead emerges as an endogenous response to opportunities generated by investments in new knowledge made by incumbent firms and organizations, combined with their inability to fully and completely exhaust the ensuing opportunities to commercialize that knowledge. Thus, the knowledge spillover theory of entrepreneurship shows how entrepreneurship can be an endogenous response to investments in new knowledge where commercialization of that knowledge is constrained by the existence of a formidable knowledge filter.

Chapter 4 by William Baumol brings us back to Schumpeter's 1911 model which, with good reason, most recent writings on the theory of innovative entrepreneurship start off from. William Baumol points out, however, that a careful rereading of his text indicates that Schumpeter's story entails a number of clear misunderstandings which call for some degree of rectification, none of them trivial and some affecting the logic of his argument and the conclusions to which it leads. Some of those misunderstandings lie close to the heart of the theory, while others are

peripheral, but all of them raise significant issues. Baumol begins with one of the slips that is relatively ancillary because the issue it raises is so clear, namely, Schumpeter's analysis of the work of the entrepreneurs–inventor partnership and their vital role in the growth process. He then insists on some misunderstanding regarding the role of pricing in the Schumpeterian scenario where firms cannot survive if in addition to using innovation as a primary competitive weapon their pricing approach precludes recouping those investments in R&D. According to William Baumol, this is all lurking in the background in Schumpeter, but it never emerges fully and hence it invites the misunderstandings discussed here. Relying on his own micro theory of the entrepreneur, Baumol offers two explanatory mechanisms behind the empirical evidence that the economic profits of innovation are, as a whole, negative, a phenomena overlooked by Schumpeter, thereby leading him to a conclusion about entrepreneurial profit that is supported neither by a fuller theoretical analysis nor by the empirical evidence.

A contribution to the literature on industrial dynamics which relates the firm's decision to exit to the heterogeneity of performance among competing firms is given in Chapter 5 written by Flora Bellone, Patrick Musso, Lionel Nesta, and Michel Quéré. Their article provides a better understanding of the duration of both young and old firms and of their determinants from using a large-scale micro-level dataset on French manufacturing firms over the period 1990 through to 2002. Unlike most of the existing literature, the surveyed unit is the legal (not the production) unit, which means that the authors are dealing with a firm-level (not plant-level) dataset. They document how the determinants of firm duration – in terms of firm performance and industry characteristics – act differently according to the age of the firm. The authors find that conditional on survival, firms experience continuous productivity gains throughout their life cycles. In the first few years of existence, the productivity growth of surviving firms is higher than that of the industry average but then decreases continuously to finally vanish completely. More generally, their findings for French manufacturing industries support the recent theoretical industrial dynamics literature in that, on the whole, exiting firms display below-average productivity levels and are smaller than their surviving counterparts. If age and market opportunities can be considered acceptable proxies for firm size and technological opportunity respectively, this result may be a replication of the Schumpeterian debate on the inverted U-shape relationship between firm size and innovation. In this case, young firms are more flexible and reactive, allowing them to occupy strategic niches, whereas large firms may enjoy some size advantage in terms of higher internal economies of scope.

Evens Salies investigates the Schumpeterian hypothesis in a single industry often discarded in firm-level studies, namely, the electric utilities

industry (Chapter 6). This industry drew the attention of energy economists, following the decline in R&D investment from the early 1980s in the U.S.A. and in the U.K. To understand the drivers of a similar decline for electric utilities in Europe since 2000, Evens Salies considers size as primary variable of interest, but also the effect of deregulation-induced factors likely to be responsible for the decrease in aggregated R&D efforts. Overall, model estimation leads to the result that R&D varies proportionally with size net of R&D. The financial variables (debt and dividends) are negatively related to R&D, which supports the observation that electric utilities spend considerable funds to make domestic and cross-border M&A operations. The result for dividends is more politically sensible as it would suggest that research is an alternative use of funds to paying dividends. Moreover, the non-significance of the cash variable in all our regressions would suggest that electric utilities are not financially constrained. Furthermore the author deduces a negative impact of electricity deregulation on R&D efforts.

Part III starts with a theoretical model by Rodolphé Dos Santos Ferreira and the late Ehud Zuscovitch (Chapter 7) that addresses the specialization–flexibility trade-off of economic agents, or how specialized should an economic agent become? As the price to pay for more and more specialization (with the resulting increase in efficiency) is less and less flexibility (with the consequent loss of adaptability), a basic trade-off shapes technological decisions. Besides, such decisions have often to be taken in a context of strategic interaction, where the choices of our potential rivals condition our own. The author accordingly addresses this trade-off within a symmetric spatial duopoly framework, such that firms sequentially choose technologies, locations and prices. The technological frontier expresses the trade-off, since the cost of producing one unit of output is a decreasing function of the transportation rate allowing moving one unit of output from a location to another. Locations have as usual an abstract interpretation, as points in some one-dimensional characteristics space. Firms compete in prices separately at each instant of time and at each location, so that the corresponding equilibrium prices are Bertrand prices (equal to the higher unit production plus transportation cost). Computation of sub-game perfect Nash equilibriums shows that the trade-off ends up in extreme (not necessarily symmetric) choices whenever there are increasing returns to specialization. By contrast, when returns are significantly decreasing, the trade-off leads to a symmetric compromise solution. In the intermediate case, multiplicity of equilibriums with different degrees of asymmetry may emerge, providing a clue to the diversity and fragility of observed market configurations. In any case, competition between firms enhances flexibility, and fails to provide the socially optimal level of specialization.

The next contribution (Chapter 8) by Patrick Cohendet, Patrick Llerena and Jean-Alain Héraud is an essay on Ehud Zuscovitch's modern theoretical perspectives on division of labour and division of knowledge in firms' innovative networks. According to Ehud Zuscovitch, the conditions of surplus creation associated with innovation have fundamentally changed with the emergence of what he called 'information intensive production systems' (IIPS) – a concept related to the present expression 'knowledge-based economy'. The challenge in the new (post-fordist) regime is to deal with increasing variety while maintaining economic efficiency, and this is the role of networks of firms. The view of the authors here is that, if networks envision firms as ultimate units of knowledge specialization, the system will face severe limitations. Patrick Cohendet et al. suggest that the necessary slack of innovative resources which constitutes the source of 'surplus' in the new regime comes from 'knowing communities'. The latter can exist within hierarchies but often extend across hierarchies, and become the indispensable complement for the survival of firms in a regime of permanent innovation. In IIPS, the firm must be viewed as a nexus of competencies that articulate hierarchical structures and knowing communities. As a consequence, networks should not be seen anymore as networks of firms simply understood as hierarchical structures. With such an extension, Ehud Zuscovitch's vision calls for an in-depth reconsideration of the evolutionary theory of the firm.

In Chapter 9, Jozef Konings, Patrick Van Cayseele and Frédéric Warzynski ask the question whether the European integration process is effective in fostering growth through the benefits of increased competition. The empirical literature has been surprisingly silent about it, while theoreticians and practitioners have been debating about the pro and contra of various aspects of antitrust policy enforcement. In this paper, the authors apply the so-called Roeger's methodology to analyse the dynamics of price–cost margins using a large microeconomic dataset of Belgian and Dutch firms and relate it to the introduction of a new competition law and to the importance of import competition. In addition to examining in details the importance of cyclicality and trade, one of the paper's contribution is to test whether the toughness of competition policy has an effect on the toughness of price competition, where the latter is approximated through a cross country comparison and through a within country dynamic comparison. The authors find that price–cost margins are still estimated higher in the Netherlands than in Belgium; second, however, they have declined in the Dutch manufacturing industry following the introduction of the new competition law and have converged to the level observed in Belgium; third, moreover, trade appears to discipline the industry as the margins are positively linked to import price index.

Finally, Sarah Guillou and Stefano Schiavo (Chapter 10) investigate the pricing behaviour of firms operating in foreign markets by comparing the export price strategies of France, Germany and Italy using a large and common pool of manufacturing products and destination markets. Their results suggest that pricing-to-market (PTM) is not widespread among French and German exporters, whereas Italian ones do adopt more often such a pricing strategy. The standard claim that product specific characteristics play a major role in determining PTM is only weakly supported by their results, which find very limited regularity across products. On the other hand, the hypothesis of an homogeneous behaviour across destination countries (even for the same products) is strongly rejected. This suggests that export price changes are mainly determined by source and destination market characteristics. A similar conclusion applies to profit margins as well: they move rather homogeneously across products but differently across destinations. Within this heterogeneity, Sarah Guillou and Stefano Schiavo find that on average profit margins have either remained stable or augmented in the last three decades, so that increased international integration seems not to have reduced firm market power.

## NOTES

1. Kaldor, N. (1972), 'The irrelevance of equilibrium economics', *Economic Journal*, **82** (328), 1237–55.
2. Richardson, G.B. (1975), 'Adam Smith on competition and increasing returns', in Skinner A. and T. Wilson (eds), *Essays on Adam Smith*, Oxford: Oxford University Press.
3. Amendola, M. and S. Bruno (1990), 'The behaviour of the innovative firm: relations to the environment', *Research Policy*, **19** (5), 419–33