Preface

The purpose of this book is to investigate the relationship between corporate governance, market structure and research and development (R&D) performance. The motivation for our attempt is the observation that a number of radical mutations are occurring in industries that have played a crucial role in sustaining and fostering the pace of technological progress. Specifically, we refer to three classes of institutional discontinuities: privatization processes, the increase of mergers and acquisitions (M&As) and market liberalization.

In different countries, under different political regimes and governments, several state-owned activities in numerous manufacturing and service industries have recently been restructured and offered to private investors. Between 1977 and 1997, privatizations worldwide generated \$520 billion revenues, from a total of 1 013 operations promoted largely in Europe and in South America. According to recent estimates, the number of firms to be privatized in the future is still around 1 500 and likely to generate revenues of \$750 billion (Siniscalco et al., 1999). Governments' divestment of state-owned enterprises is usually accompanied by regulatory reforms of internal markets, aimed at both promoting widespread competition and attracting potential foreign and domestic investments in the companies to be sold.

In 1993 the mergers and acquisition activity gained new momentum, starting the so-called 'fifth wave'; by the end of the 1990s, the corporate combination process resulted in a yearly number of deals that more than doubled the 1993 level. Such a wave showed a strongly rising trend in high-value crossborder mergers, with a significant participation of European firms in the global M&A market. It can therefore be considered as the first truly international takeover wave. The most striking example was Vodafone's \$180 billion acquisition of Mannesman in telecommunications, while the Daimler-Chrysler merger created one of the largest automotive groups in the world. At the same time, a number of acquisitions have targeted smaller domestic and foreign technology-based firms, especially in information and communication technologies and in bio-technologies.

Finally, over the last decade, many public utilities markets in the European Union have started their processes of liberalization. The old monopolies have been replaced by liberalized markets, where domestic and foreign investors are striving hard to establish and consolidate their market positions. The magnitude of the institutional change was particularly great in the telecom

and energy markets; the most visible consequence of regulatory reforms induced by European directives is a striking downward trend of retail service prices. From 1997 to 2000, across the European Union countries, household prices for national calls, electricity, and natural gas experienced a yearly decrease rate equal to, respectively, 12 per cent, 15 per cent and 23 per cent (net of gas import prices).

It should be noted that the three processes are intimately intertwined. On the one hand, in most countries and in many sectors, governments wishing to expose industries to market discipline have jointly pursued privatization and liberalization programmes. On the other hand, the liberalization of final markets has in several cases spurred a phase of horizontal M&As and upward acquisitions through the *filière*, with privatized companies actively involved in corporate restructuring strategies.

Such institutional changes, both at the corporate and the industry levels, are usually deemed to produce virtuous effects in terms of static efficiency. Privatization processes, for example, allow governments to access new capital sources to structurally reduce operating deficits and to increase the independence of industry, to promote entrepreneurship and efficiency, and thereby enhance competitiveness and growth.

In contrast, the effects exerted on dynamic efficiency, and in particular on the incentives of the firms and of industry as a whole to sustaining an appropriate rate of innovative activity are largely unexplored by academics, and rarely acknowledged by institutional decision makers. Yet, numerous studies on R&D investments show that tomorrow's growth will strongly depend on today's innovation strategies.

Our goal is to show that an array of specific and new typologies of market failures may arise as a consequence of these discontinuities in corporate and product markets, along with the well-documented beneficial effects as far as allocative and productive efficiency are concerned. Such market failures may seriously affect the market value of the firm in the short run, and the performance of the national system of innovation as a whole in the medium/long run. For this reason, we argue that this issue should occupy a high position not only in managers' agenda but also in policy makers' lists of priorities.

We shall discuss and summarize the predictions made by theoretical studies about the likely implications of the institutional changes mentioned above on firms' innovation activities. However, our research programme stems from the view that these effects can be better understood through a set of coordinated yet specific empirical investigations. The privatization programme, regulatory reform and M&A wave that took place through the 1990s shaped a highly differentiated industrial landscape, by sectors and countries. More importantly, the three processes triggered a number of patterns of change that overlap and interact within individual companies.

When analysed empirically, the innovation process turns out to be affected by each of the considered institutional changes along different lines of argument. In particular, we investigate the effects of such events along three main dimensions: the change in R&D efforts (input), the R&D performance (output), and the organizational setting of the firm. The analysis of the first two dimensions (input and output) will be decomposed in order to allow us to account for two different characteristics of the firm's R&D portfolio, namely the intensity and the composition of its investments. In fact, both these characteristics are crucial in determining the performance of the single firm and of the national system of innovation as a whole. An articulated picture emerges from the comparison between theoretical predictions and empirical evidence, where corporate and product markets are shown to succeed in stimulating certain innovation activities and to fail in supporting others. Despite such a diversity, we believe that our empirical findings will eventually help to set out a coherent representation of the changes occurring in R&D activities at firm, industry and country levels, to validate a few theoretical hypotheses, and to raise new research questions.

From a methodological perspective, the reader will find in the different chapters a variety of research designs, analytical techniques and empirical approaches. We understand that such variance could lead to several negative comments. It could be disconcerting, as the book is not clearly following a specific discipline-based expected path. It could read as confusing, when different chapters are compared. It could weaken the final conclusions by building on different research perspectives that too often pursue similar interests without turning aside from the well-worn track.

We believe that these very same weaknesses are the strengths of our collective efforts, for several reasons. First, as showed at the beginning of the book, the research agenda we are interested in lies at the intersection of several disciplines. A multidisciplinary-multimethod approach is therefore necessary if we do not want to oversimplify a fairly complex picture. Second, the specific problems we are discussing are hardly modelled in simple terms, and necessarily require a systemic perspective, which could not fruitfully be applied within a single study, though it could benefit tremendously by coordinating the efforts of several studies sharing several important commonalities. Finally, while there are many differences, there are also many similarities, and these similarities are related to what we believe is fundamental, from a methodological perspective.

The most important point shared by all the different studies presented in the book is our view of the economic actors as boundedly rational and operating in a world of imperfect information, be they firms, managers or policy makers. Second, rather than applying more normative cause-and-effect models, or phenomenological approaches, we all share the belief that the nature of our

research problem can best be understood and investigated by relying on the Weberian notion of adequate causation, where the focus is not only on the issue of interest, but also in the simultaneous occurrences of different conditions in the external environment. While this approach is highly considered and applied in other disciplines, such as macro-sociology or political science, we believe that it is particularly appropriate to consider a problem so complex and articulated as the one characterizing the relationships among corporate governance, market structure and innovation. Finally, all studies used the same unit of analysis, namely the firm. This is not a research book about countries, technological and innovation systems, groups of individuals or individual behaviour. This is a book about firm behaviours and their relationships with the related institutions, product markets and financial markets, always carefully analysed and taken into consideration, but never taking any primacy. We hope that we shall convince the reader throughout the book that our intuitions are not a sign of arrogance, but rather an attempt to practice a multidisciplinary approach coherently.

The book is structured in three parts, followed by a concluding chapter. Each chapter, in its conclusions, together with the merits of the single study also presents the specific limitations and some suggestions on how to go beyond such limitations. The first part of the book outlines the theoretical setting, which constitutes the background for the empirical analyses developed and illustrated in the second and third parts. In Chapter 1, Munari and Sobrero analyse several aspects of corporate governance structuring decisions and their effects on innovation activities. They examine to what extent the tension between ownership and control, the role and characteristics of the shareholders, and the role and the characteristics of the board influence the decision to invest in innovation. Building on the most recent results presented by research in economics, strategy and organization theory, the chapter offers the reader a systematic rationalization of usually dispersed evidence and introduces formally the research questions which will be further elaborated in the rest of the book. In Chapter 2, Calderini and Garrone present a selective review of the literature on market structure and innovation; they survey the most recent contributions from a particular viewpoint, the so-called 'short-termism' debate. The main insights of this stream of studies are mediated from the traditional context of financial markets into the field of end-product markets, in order to analyse the relationship between a changing market structure and the composition of R&D portfolios (in terms of basic/long-term and applied/short-term activities). Finally, in Chapter 3 Calderini and Garrone survey the predicted effects of acquisitions on the post-acquisition innovation performance of the acquired firm. The review considers four major drivers, which are deemed to affect the innovation performance of the acquired company: the change in the ownership and financial structure; the change in corporate structure, the change in size, and the change in organization.

The second part of the book illustrates the results of the empirical analysis. We present four different contributions. In Chapter 4, Munari and Sobrero analyse the effects of privatization processes on R&D investments and productivity. They compare the pre- and post-privatization R&D efforts of 35 companies from nine European countries that were fully or partially privatized through public share offering between 1980 and 1997. Their results show that, after controlling for inter-industry differences, privatization processes negatively affect different measures of R&D commitment. Moreover, they suggest that, the higher is the transfer of control from the state to private shareholders, the higher is the change in the investment horizons of the companies. The R&D output, as measured by overall patenting activity as well as by the value of the patents registered (measured by citation intensity), however, improves after the privatization period.

In Chapter 5, Calderini and Garrone analyse the effect of an exogenous change in market structure (the liberalization process) on the intensity and composition of R&D activities at the firm level. They present an empirical model set to demonstrate that basic and applied activities respond to growing competitive pressure in opposite ways: the former decreases, whereas the latter increases. As a consequence, market turmoil is likely to provide firms with short-term incentives, shifting the allocation of resources towards applied and development activities. The model is tested on an original data set drawn from the telecom sector, including innovation measures from the incumbent national monopolies of 17 European countries between 1980 and 1999. They demonstrate that concurrent with (or in anticipation of) the liberalization date, firms tend to change the composition of their R&D portfolio, allocating more resources to development activities and reducing their efforts towards basic research tasks.

In Chapter 6 Calderini, Garrone and Scellato use data from the US stock market in order to empirically assess the effect of acquisitions on the innovation performance of the acquired companies. They study the companies that went public on one of the US stock markets during the years 1989–92 and belonging to the information and communication technology (ICT) industry. Through the analysis of a sample of 115 firms they show that target companies tend to significantly reduce their patenting activity immediately after the acquisition is completed.

Finally, in Chapter 7 Munari examines the impact of privatization on the R&D internal organizational structures and processes. By using a multiple case-study approach, he examines the evolution of corporate R&D units within privatized companies, focusing on four primary areas of intervention in the management of technology and innovation: the aim of R&D units; the size of R&D units; the composition and funding of the R&D portfolio; and the valorization of research outcomes. The analysis of the experiences of the

corporate R&D units of Telecom Italia, Ilva and Enel in Italy, and of France Télécom, Usinor and Renault in France, documents and discusses how privatization exerts a relevant influence on the way R&D activities are organized along different critical dimensions, consistent with the new role emerging for R&D in a changed institutional and competitive environment.

In the third part of the book we shall be highlighting the impact of innovation and R&D on a firm's market value and finance, and getting a better understanding of how market and corporate governance structure mediate such a relationship.

In Chapter 8 Oriani and Sobrero present a meta-analysis of the empirical literature linking R&D investments and firms' performance and assess the magnitude of the reported coefficients against three potential moderating factors: the time window used in the study, the reliability of the independent variable and the reliability of the dependent variable. Applying Hunter and Schmidt correction procedures on all the published studies using hedonic models to estimate the impact of different corporate assets on the market value of the firm, the relationship is shown to be consistently positive. Significant differences in the size of the effect emerge, however, depending on the period of observation, while the concerns commonly raised on empirical indicators such as Tobin's q or R&D investment measures find no empirical support.

In Chapter 9, Munari and Oriani examine the relationship between privatization, R&D investments and the market value of the firm, using data from a sample of 40 firms – including 19 privatized firms that were matched, at both country and industry levels, with 19 publicly-held firms. Their findings show that, during the first two years after the initial public offering (IPO), firms reduce the level of their R&D investments, while their market valuation, expressed by Tobin's q , rises. Moreover, they show that the first year after IPO there is a gap between the R&D investments of privatized and matched firms, which tends to disappear from year two onward.

In Chapter 10, Giudici and Paleari focus on R&D and innovation financing, and on how small innovative firms may raise capital on stock markets to finance their growth through innovative investments. They focus in particular on stock exchanges designed for technology-based and innovative firms. The analysis, based on a sample of firms recently listed on pan-European stock markets (Easdaq and Euro-NM), allows the authors to determine the value drivers recognized by the market both in the short and long runs.

We conclude by summarizing the results obtained on both the theoretical and the empirical sides, trying to set our conclusions in a comprehensive scenario (Chapter 11) to offer our readers some reflections on the strategy and policy implications arising from the analysis of this crucial set of interrelated topics.