

BOOK REVIEWS

Innovation, intellectual property, and economic growth, by Christine Greenhalgh and Mark Rogers, Princeton, NJ, Princeton University Press, 2010, xvi + 366 pp., US\$45.00, ISBN 978-0-691-13798-8; 13799-5-5

Greenhalgh and Rogers set themselves an extremely challenging task in this ambitious new textbook. Designed for both graduate and undergraduate students of innovation, economic growth and intellectual property, the book is firmly based in the economics discipline. Unusually, however, it covers both micro-economic aspects of industrial innovation and the role of innovation in macro-economic models of growth. It also attempts to deal with both patents and trademarks – the latter a much-neglected issue within economics. It has a strong policy orientation, implicit in the coverage of intellectual property, a major policy intervention in the market for inventions.

Overall, the book succeeds in its ambitious task very well, provided that one accepts that it is an economics text, expounding, but not significantly challenging, the limitations of conventional economic frameworks in addressing innovation. It does include a number of caveats and warnings about assumptions embedded in the mainstream economics approach, such as the micro-economic assumptions that everything occurs at seamless margins, without lumpiness or time, or the strong assumptions required in various growth models. These warnings might be missed by new students of the economics discipline, but for graduate students they should provide useful alerts.

The text commences by discussing the economic nature and importance of innovation, covering the micro-economics of innovation, intellectual property and the challenges in measuring innovation, productivity and economic growth. The text launches straight into a micro-economic analysis of product and process innovation, noting the tension between possible market failures where knowledge is a public good, and the importance of the positive externalities widely known as spillover benefits. It quickly moves on to point out that much of what is measured in national innovation surveys is, in fact, innovation diffusion not innovation creation – an important distinction and critical in policy assessment. However, while the notion of diffusion is introduced early, and discussed in detail in a later chapter, in general the text focuses firmly on innovation generation.

The introductory chapter usefully contrasts the likely social and economic impacts of product innovation compared with process innovation, a comparison that supports the later analysis of the relationship among technology, wages and jobs. Though case studies caveats are introduced, such as whether industrial innovation is more like a private good with externalities than a pure public good, the book does not address the issue of whether copying is fast and cheap. This could be a useful addition to a later edition, given the evidence that in many industries copying incurs real outlays of time and resources. Attention is, however, given to the important caveat of assuming immediate marginal cost pricing – an assumption critical to the argument that there is

little incentive to invest in innovation without legislated monopolies. As those familiar with management studies and teaching know, business people have great difficulty with the concept of marginal cost pricing, except in very narrow circumstances.

The chapter on intellectual property commences with the conventional justification for legislating monopolies for inventions and creations on the grounds that easy imitation will lead to under-investment in invention or creation. Because 'intellectual property rights' covers very diverse monopolies, the broad-ranging consideration of patents, trademarks, designs, petty patents and copyright shows that the phrase 'intellectual property rights' is in fact a disparate collection of monopoly mechanisms. Time and space limitations do not allow real depth to the discussion of the different monopoly mechanisms. The presentation on trademarks is unusual – it is suggested that they are an incentive to innovate. Trademarks are more usually described as signalling product quality to consumers, and encouraging firms to maintain high quality standards. If a product is not protected by a registered design or a patent, anyone may produce it, but they may not claim to be the company which originally marketed the product. As trademark law covers only copying of the mark or brand, it is hard to see how it goes beyond this to product innovation, except through the reputation mechanism. This query aside, the chapter provides a useful introduction to some of the more widely known legislated monopolies, and the brief consideration of who owns most patents is a useful inclusion not normally provided in texts on intellectual property.

The final chapter in the introductory section provides extremely useful warnings about the substantial difficulty of measuring innovation, productivity or economic growth, the three critical concepts with which the text is concerned. This is presented as a useful combination of practical information; for example, of what is covered in innovation surveys, and important underlying concepts, such as innovation inputs and innovation outputs. Coverage of frequently used summary measures, such as innovation indices and innovation scoreboards is practical, rather than critical. Difficulties in measuring productivity, whether expressed as total factor productivity or as partial measures, contain stronger warnings about their limitations.

With this as background, the text then moves on to a more detailed consideration of the micro-economics of industrial innovation, covering national innovation systems, firm behaviour, how firms use patents (and trademarks), innovation diffusion and the social returns from industrial innovation. As might be anticipated, the chapter on national innovation systems shows the complex interplay between actors in different sectors and at different parts of the invention/innovation/development process and thus suggests the difficulty that might be experienced in intervention in this environment. The chapter on firm behaviour is rooted in the notion of entrepreneurial activity, and social concerns about the role and sufficiency of entrepreneurial activity. As might be expected from an economics text, there is considerable attention to issues of competitive versus monopolistic markets. While the authors are clearly aware of the importance of imperfect competition, the widespread reality of imperfectly competitive markets for most industrial and service products does not come through as clearly as it might. This could leave the student with the false impression that theories based on competitive models provide a good guide for policy analysis. The authors do cover the literature on econometric models of market structure and innovation, but these of course have all the limitations of the measurement challenges pointed out earlier. Nonetheless, the chapter provides a good brief summary of the wide range of econometric work, looking at the relationship between innovation and

firm value, productivity, profitability, firm size and market structure, and so on. This discussion includes useful practical information – for example, that a rule of thumb in assessing hurdle rates of return is around 12%, suggesting high private returns to industrial research and development.

In considering how firms benefit from monopolies, such as patents and trademarks, the authors usefully return to the distinction between process and product innovation, and the different economic impacts of these different forms of innovation. The text covers conventional intellectual property rights models of behaviour as well as open innovation models. Attention is drawn to the very skewed nature of returns to patents, with low average returns, and a tiny proportion of patents generating very high private returns. Brief attention is paid to licensing, compulsory licensing, and strategic manipulation of multiple patents, as well as to practical issues of enforcement. The discussion concludes with a consideration of the few empirical studies of returns to patents and trademarks.

The final chapter of this section is critical for policy analysis. Here the authors return to the issue of innovation diffusion, noting that widespread adoption is essential if the full economic benefits of an innovation are to be realised. This is another area where the authors show an innovative and ambitious approach. It is surprisingly rare for texts that consider intellectual property to cover models of diffusion of innovation in such depth. Indeed, while the divorce between macro- and micro-economics is widely noted, the divorce between consideration of innovation generation and innovation diffusion has been equally prevalent. It is encouraging to see the attention paid here to innovation diffusion. A fuller integration of these two lines of thinking into the policy analysis would be welcome in the next edition. Further, the discussion focuses on formal models rather than the more informative empirical literature on the ‘two faces of R&D’ and the importance of investment in innovation in order to absorb and adopt new technologies. The second part of this chapter reviews the evidence on social returns to innovation, discussing the form such benefits take and reviewing the evidence for their existence.

In the third part of the text, the authors turn to macro-economic models of economic growth, reviewing models of economic growth, innovation and trade and, unusually, devoting a full chapter to issues of the relationship between technology, wages and jobs. As in the case of the chapter on the micro-economics of the firm, the authors point to the wide range of assumptions and knowledge gaps embedded in the various models of economic growth they present. The chapter on trade perhaps goes closest to bringing together the literature on the diffusion and generation of new technological knowledge. The discussion of the role of foreign direct investment (FDI) in economic growth and the relationship of FDI and intellectual property policy is less critical of conventional wisdom than some other sections of the book. This contrasts with the excellent chapter on wages and jobs, which provides a brief but valuable guide to the developments in thinking on this rather neglected topic in academic treatments of innovation and economic growth.

The final section of the text turns to policy. Here the effort to combine macro and micro analysis disintegrates, with consideration separately given to micro issues of firm-level innovation and macro issues of the relationship between innovation monopolies, trade and economic growth. The micro chapter touches briefly on a range of important topics, though it does not directly address the proportion of innovations induced by patents. It briefly reviews some of the concerns about the rapid growth of patent applications and grants and some of the policy issues discussed in the literature.

The discussion of copyright is extremely brief, and contains at least one error of fact – the TRIPS requirement for standard copyright is life plus 50 years not life plus 70 years (p.306). The discussion of trademarks is disappointing, not least because it avoids consideration of the role of branding in marketing, advertising and product differentiation, and the effect of combining trademarks and patents to extend the power to price above marginal cost. The coverage of other policies and programmes to promote industrial innovation is broad, but equally brief. It does include consideration of competition policy, standard setting, networks and government purchasing – all important topics for innovation markets.

The caveats in regard to innovation policy at the macro level are strongly emphasised – without reliable models of economic growth, it is difficult to provide sound advice on intellectual property policy at the national and international level. Again, in reviewing this topic the authors are attracted more to formal models than to other, more nuanced, empirical studies, though they do refer to Moser's very useful work on international trade fairs. As a consequence of this focus on theoretical models, the authors are perhaps overly kind in their assessment of the TRIPS Treaty. Despite including relevant references in the bibliography, they do not discuss the practical issues involved in the negotiation of that treaty – particularly the role played by a small number of multi-national companies who stood to gain considerably from this change in policy. On the other hand, the discussion of exhaustion and parallel importing is useful, as is the consideration given to whether R&D spillovers flow between nations. The inclusion of a mention of the role of international labour flows in encouraging innovation is also brief, but a good reminder. It is unfortunate that the discussion of counterfeiting and enforcement is presented in the loaded language used by monopoly rights holders rather than in more dispassionate academic language.

It is perhaps harsh to suggest that authors who have achieved such a great deal in drawing together a wide range of material not usually considered jointly, should go further to include a discussion on the political economy of legislated monopolies and the considerable space these policies create for rent-seeking behaviours. This literature might perhaps allow a more substantial bridging of the micro/macro gap in policy analysis. There is substantial evidence as to the behaviour of particular firms in shaping public policy on patents and copyright. In this context, it would also be useful to eliminate the use of loaded language often used to frame the intellectual property debate. In the context of a move to require sovereign nations to grant monopolies, the term 'free-riding' may be less appropriate than the term 'rent-seeking'. 'Piracy' evokes images that the more dispassionate term 'counterfeit' does not.

Doubtless the authors had to make some very hard choices as to what material to include and what to eliminate. They have certainly succeeded in presenting the student with a wider than usual range of material on innovation. A major candidate for elimination in a future edition would be trademarks. In the context of this book, the treatment of trademarks is distracting and unconvincing. As remarked earlier, the authors claim an innovation space for trademarks that is not well supported by the evidence. Nor does the omission of broader issues of branding, marketing and advertising allow a full appreciation of the economic role of trademarks. The authors have both done very useful earlier work in their analysis of trademarks, and one can understand their desire to go beyond patents. Perhaps this might usefully become a separate work considering the use of trademarks to extend time-limited monopolies; for example, for pharmaceutical products. In the context of this text, it would be more useful to restrict attention to patent monopolies rather than to attempt the rather unsuccessful broader

coverage of intellectual property. This could create space for more discussion of the information economics school of thought and the highly relevant work on public choice and rent-seeking behaviour. The strength of the patent monopoly right – that it prevents independent invention – does not come out as clearly as it might, and it is this characteristic of the patent system which leads to the well-known result that ‘patents beget patents’, leading to very different outcomes from all the other intellectual property rights.

Despite these minor criticisms, this textbook clearly will fill a gap in the market and is well designed to raise important questions in a student’s mind. The bringing together of both micro- and macro-economic considerations, the strong treatment of statistical difficulties in analysing these topics, and the consideration of the impact of innovation on wages and jobs are all major advances. The authors are to be congratulated.

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Don’t be misled by the title. This is not a tome about the pressure on academics to publish, or current issues in the scholarly communication process. It is a book, published by the author herself, about a piece of software she has developed called *Publish or Perish*. This software, which is free of charge to download and use, is intended to be used to carry out citation analyses on scholars based upon records held in Google Scholar of publications by that scholar. And this represents the fundamental problem with the book; despite the author’s protestations, Google Scholar is an unreliable way of assessing scholarly outputs – but more of that later.

The book provides a well-written step-by-step description of how to use the *Publish or Perish* software on Google Scholar to obtain sophisticated citation statistics and analyses about individuals, and provides worked examples of the uses to which such statistics can be put. The author does warn about exercising caution in calculating and interpreting the results, which is wise.

The book considers the question of the best databases to use for citation analysis. She is dismissive of ISI’s Web of Science, quoting a number of valid reasons why the service is not totally reliable, and some invalid ones. She hardly considers Web of Science’s major competitor (Scopus) at all, but is full of praise for Google Scholar, which is far more comprehensive than either of the other services. This raises a fundamental point. It is true that both Web of Science and Scopus are selective in the number of journals they take as the basis of their citation counting, but this does not matter at all as long as the order of results is the same as with a more comprehensive service, such as Google Scholar. Thus, for example, if Professor A got 100 citations and Professor B got 50 citations according to Web of Science, but Professor A got 200 citations and Professor B got 100 citations according to Google Scholar, Professor A is consistently scoring better than Professor B. The *order* is the important matter, not