

Preface

Creation and discovery are mysterious processes. But whatever else is required, economists are reasonably certain that incentives matter. In this book I discuss some of the incentive systems that our societies have created, and their potential for spurring technological or scientific advance.

This book is written for nonspecialists, at the level of upper division undergraduates and beginning graduate students studying economics. It supposes that the reader is grounded in intermediate-level microeconomics, although most of the book can be understood without it. My own teaching materials, as well as useful links, can be found at <http://socrates.berkeley.edu/~scotch/innovation>. If used for a graduate course, the book should be supplemented with readings from the extensive bibliographies at the ends of the chapters. A course based on this book might have as its goal the task of explaining how the creation of knowledge fits into a competitive, capitalist economy, and how institutions create incentives to encourage research. It has a largely normative focus: What should those institutions look like?

Although I have cited a large number of works, the book is not organized as a review of the economics literature. I have given short shrift to topics for which other authors have given accessible, integrated treatments (see the footnotes and references), and I have emphasized certain areas because I hope to nudge readers in that direction. Areas that I have not emphasized include how investments play out in patent races, how market structure affects incentives to innovate, the open-source movement, and the details of how patent law might be reformed in the face of growing discontent. Areas that I emphasize include the role of public funding, the hybridization of public and private incentive mechanisms, the necessary link between incentive mechanisms and the scarcity of research “ideas,” the cumulative nature of research, and globalization.

My treatment departs from other treatments in its premise that ideas for R&D investments are scarce, and the scarcity of ideas constrains progress, just as a reluctance to invest resources can. An innovation requires both an idea and an incentive to invest in it.

Government funding of almost anything, including R&D, can be vilified as ineffective, too costly, and likely to produce bad outcomes. However, patents and other intellectual property mechanisms are often vilified in exactly the same way. This book does not add to the many lamentations that have been written about both the public and private systems, but instead tries to give a systematic treatment of what our choice among such mechanisms should depend on. The analysis begins with an articulation of the problem to be solved and tries to discover which incentive mechanism is most suited to the problem. For many creative environments, intellectual property in any of its forms may be inferior to some form of procurement or public sponsorship. One of the main questions is when that is likely to be so.

For teaching purposes, the book uses the tools of economics. I have tried to use those tools to shed light on current controversies, such as the patenting of genetic sequences, business methods, and computer software; the difficulty in enforcing copyrights in the digital age; the role of technical protection systems; and the antitrust and innovation issues that surround network industries. I have also tried to give students a non-technical overview of current legal rules, especially those legislated in the last ten years.

The book reflects my collaborations in teaching and writing at Berkeley and elsewhere. Among the coteachers, collaborators, friends, and previous students who have indirectly contributed to this book are Pamela Samuelson, Mark Schankerman, Jerry Green, Nancy Gallini, Ted O'Donoghue, Deborah Minehart, Richard Gilbert, Jacques Thisse, Peter Menell, and Rob Merges. I have been surrounded at Berkeley by a large community of scholars in the Economics Department, Boalt School of Law, the Goldman School of Public Policy, the Haas Business School, and the Department of Agricultural Economics, who have collectively supported and informed this work. I hope I have thanked them in the way they like best, by citing their works. Parts of this book were read and improved by Bronwyn Hall, John Covell, Mark Schankerman, Manuel Trajtenberg, Neil Gandal, Thomas Coupé, Joseph Farrell, and Jean Lanjouw. My largest debt is to Stephen Maurer, who coauthored three chapters, but also read and improved the others. As the reader can see from the references, I have also read widely in the works of my colleagues elsewhere. This has been a great pleasure.

Institutions that have hosted me during the preparation of this manuscript include the Court of Appeals for the Federal Circuit, University of Auckland, Institute of Economics at the University of Copenhagen, UCLA, Universitat Autònoma de Barcelona, and of course UC Berkeley, where the students have seen several drafts. Students who assisted in this work include Yooki Park, Kevin Schubert, Taehee Woo, and Stylianos Tellis.