

Dynamic Competition and Public Policy

Technology, Innovation, and Antitrust Issues

Edited by

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CAMBRIDGE
UNIVERSITY PRESS

PUBLISHED BY THE PRESS SYNDICATE OF THE UNIVERSITY OF CAMBRIDGE
The Pitt Building, Trumpington Street, Cambridge, United Kingdom

CAMBRIDGE UNIVERSITY PRESS
The Edinburgh Building, Cambridge CB2 2RU, UK
40 West 20th Street, New York, NY 10011-4211, USA
10 Stamford Road, Oakleigh, VIC 3166, Australia
Ruiz de Alarcón 13, 28014 Madrid, Spain
Dock House, The Waterfront, Cape Town 8001, South Africa

<http://www.cambridge.org>

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First published 2001

Printed in the United States of America

Typeface Times New Roman 10/12 pt. *System* QuarkXPress [BTS]

A catalog record for this book is available from the British Library.

Library of Congress Cataloging in Publication data

Dynamic competition and public policy : technology, innovation, and antitrust issues /
edited by Jerry Ellig.

p. cm.

A collection of papers by the editor and other researchers.

Includes bibliographical references.

ISBN 0-521-78250-3

1. Industrial policy – United States. 2. Antitrust law – United States.
3. Competition – Government policy – United States. 4. Restraint of trade –
Government policy – United States. 5. Technological innovations – Government
policy – United States. 6. Information technology – Government policy –
United States. 7. Computer software industry – Government policy – United States.
8. Microsoft Corporation. I. Ellig, Jerome, 1962–

HD2795.D95 2001

338.973 – dc21

00-041419

ISBN 0 521 78250 3 hardback

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Introduction

When sweeping economic change occurs, new technologies and business methods rapidly replace old ones. Previously unheard-of firms dominate their markets by successfully pioneering new ways of doing things. But a dominant firm also raises fears of monopoly. At what point does a successful competitor cross the line separating proconsumer innovation from anticonsumer monopolization?

During the past decade, scholars and government officials have asked that question more frequently as a “postindustrial” revolution, fueled by information technology and globalization, produces new winners and losers. Conceptually, the answer is simple and stated succinctly in U.S. antitrust law. A firm is engaged in monopolization if it employs “exclusionary” practices, but not if it dominates its market due to “superior skill, foresight, and industry,” or “as a consequence of a superior product, business acumen, or historical accident” (*United States v. Alcoa*, *United States v. Grinnell*). Congressional debate surrounding the Sherman Act reveals that the legislation’s sponsors never intended antitrust enforcement to apply to a company that “merely by superior skill and intelligence get the whole business because nobody could do it as well” (*Congressional Record* 1890: 3146–52). This kind of distinction attempts to categorize firms with market power into those which succeed by harming consumers, and those which acquire their market power innocently through superior service to consumers or perhaps dumb luck. Surely, one would think, a highly innovative firm belongs in the second category.

ANALYSIS IN A DYNAMIC ECONOMY

In actual cases, it is much harder to categorize firms. Does Microsoft help or harm consumers when it combines a computer operating system and an Internet browser that were formerly separate products? Does Intel promote or stunt innovation by withholding advance product

information from firms with which it has intellectual property disputes? When banks join both the Visa and Mastercard systems, are they expanding competition by offering multiple credit cards or stifling competition by allowing the same member companies to control both card networks? When Pfizer charges a premium price for Viagra, is it exploiting monopoly power or reaping a well-deserved reward on a risky investment in intellectual property?

Market Power

If a firm lacks market power and has no prospect of obtaining it, then its conduct is of little antitrust concern. Competition from numerous other substitutes ensures that seemingly “exclusionary” practices survive only if they allow the firm to produce greater value or reduce costs. Value-destroying business practices are self-penalizing, because they harm the firm’s bottom line as well as harming consumers.

But how do we know whether a firm in an innovative industry faces competition? In textbook economic theory, numerous competitors with access to the same technology and resources compete on price. In a growing number of real industries, competitors with different technologies and resources compete on the basis of product attributes and performance as well as price. Indeed, product performance may be much more important to many customers than price. In the medical marketplace, for example, the prices of human, animal, and man-made replacements for arteries and veins are much less important than the performance of the material in a specific application (Pleatsikas and Teece, Chapter 4, in this volume). Declaring that a firm has market power if it can sustain a “significant but nontransitory price increase” completely misses the performance dimension of competition.

Potential competition can curb market power, but its impact is also more difficult to assess in a dynamic economy. Contestable market theory demonstrates that potential entrants can make even a monopolist behave as if it faces competition – as long as entrants have access to the same technology and there are no barriers to entry in the form of sunk costs (Baumol, Panzar, and Willig 1982). However, dynamism changes the nature of potential competition.¹ Intellectual property laws,

¹ As two of the developers of contestable market theory (Baumol and Ordover 1992: 85) note, “By entailing the complete absence of barriers to entry, perfect contestability, again like perfect competition, threatens to rule out entirely the reward mechanism that elicits the Schumpeterian innovative process. This mechanism, as we have seen, rests on the innovator’s supernormal profits, which are permitted by the temporary possession of monopoly power flowing from priority in innovation. Since perfect contestability rules out all market power . . . the market mechanism’s main reward for innovation is destroyed by that market form.”

trade secrets, and tacit knowledge all combine to make it difficult for potential entrants to possess the same technology as the incumbent. Developing capabilities equivalent to the incumbent's may involve substantial sunk costs. These factors suggest that potential competition may operate less effectively in a dynamic economy.

At the same time, potential competition could be a much more vigorous force in a dynamic economy. Contestable market theory postulates a world in which technology and resources are fixed and given, not a world in which technology continually changes and new resources can be discovered. When innovation and discovery are possible, potential entrants can leapfrog an incumbent by offering superior products and services. Sunk costs depreciate more rapidly – and more unpredictably – because of ceaseless change. Potential competition, in the form of Schumpeterian “creative destruction,” could be much more vigorous in spite of sunk costs.

How these two opposing effects net out can vary from case to case. But even this brief discussion illustrates how a seemingly simple task like identifying market power becomes much more complicated in a rapidly advancing economy.

Exclusionary Practices

Thirty years ago, Ronald Coase (1972: 67) complained that “if an economist finds something – a business practice of one sort or another – that he does not understand, he looks for a monopoly explanation.” Since then, the economics profession has come a long way in improving its understanding of restrictive business practices. Nevertheless, courts still sometimes condemn as exclusionary dominant-firm business practices that are later revealed to be efficient. A principal reason is that competition and exclusionary conduct can be hard to distinguish:

Aggressive, competitive conduct by a monopolist is highly beneficial to consumers. Courts should prize and encourage it under the antitrust laws. Aggressive, exclusionary conduct by a monopolist is deleterious to consumers. Courts should condemn it under the antitrust laws. There is only one problem. Competitive and exclusionary conduct look alike. The dominant firm is an aggressor and expands its market share at the expense of its smaller rival. The rival yelps and sues. (Easterbrook 1986: 982)

Dynamism makes the analysis of exclusionary practices even more complicated. When an exclusionary practice creates both consumer benefits and consumer harms, the benefits should be weighed against the harms to determine whether the firm is engaged in monopolization. The logic of this tradeoff was rigorously expounded by Williamson (1968) and subsequently incorporated into the U.S. government's *Horizontal Merger*

Guidelines (United States 1997, sec. 4). The most common application occurs when a merger creates market power but also produces economies of scale or scope. The merger is economically efficient if the cost savings outweigh the loss to consumers created by the market power. Similar logic can be applied to various types of exclusionary business practices.

There is, however, a critical difference between the nature of such tradeoffs in a dynamic and a static world. The classic tradeoff analysis assesses the effect of corporate conduct *given* the products, sources of supply, production technologies, marketing practices, and management methods that are currently possible. But innovative competition by its very nature involves a continuous stream of new products, sources of supply, production technologies, marketing practices, and management methods. The critical antitrust issue is not just whether a particular exclusionary practice produces some identifiable consumer benefit in the present, but also how that practice will affect the path of innovation in the future. Firm strategies and public policies determine which companies will have superior incentives to produce which types of innovations.

The Microsoft case provides a good example. Standard tradeoff analysis proceeds something like this. If Microsoft is permitted to integrate its Internet browser with the Windows operating system, there might be harms to competition as well as benefits to consumers. Microsoft could acquire market power in the browser market, but it could also offer consumers a superior product at a lower price. Integration should be prohibited if the harms associated with the extension of market power exceed the consumer benefits of integration. Integration should be permitted if the consumer benefits of integration outweigh the harms.

Dynamic analysis suggests a different set of cost and benefits, based on different paths that innovation might take. If Microsoft is permitted to integrate the browser with Windows, it has greater incentives to proceed with similar types of innovations in the future. Such integration may reinforce the position of Windows as the dominant computer operating system, and so firms that want to compete with Microsoft might have to develop an operating system that can displace Windows. If Microsoft is not permitted to integrate the browser with Windows, then browsers and other software applications will compete as freestanding products. Microsoft's competitors will have much stronger incentives to develop software applications on the Windows platform.²

² For an argument that focuses on the importance of multiple sources of innovation in the context of intellectual property, see Merges and Nelson (1992).

Clearly, the direction of innovation is different under the two scenarios. The first scenario is more likely to produce competition among operating systems and suites of associated applications, whereas the second creates more competition among individual software applications within the Windows standard. Simply stating the tradeoff reveals the difficulty of determining the efficient answer. The answer requires not just an evaluation of the immediate consequences of Microsoft's business practices but also accurate predictions of alternative futures.

A rule-based approach lessens the burden on courts in individual cases. Perhaps the court need not assess whether consumers will be better off if Microsoft or its competitors receive superior incentives to innovate. All that is necessary is a more general understanding of typical results in cases of this type. If market dominance fostered by product bundling tends to produce superior innovations, then Microsoft should be left alone. If superior innovations come from markets where there is more competition in the production of individual components, then Microsoft should be prosecuted. Or perhaps bundled systems and unbundled, more open systems each tend to produce better results under different, objectively identifiable circumstances.

Although such an approach makes court decisions easier, it offers no shortcuts for academic researchers. If courts are to develop general rules, how are they to know which rules tend to produce the best results, if not by accessing research on past situations where different approaches were tried?

In a dynamic economy, antitrust policy implicitly involves a choice among alternative innovative paths. Implicitly or explicitly, enforcers are betting that their intervention will give consumers a better stream of price, product, and service improvements in the future.

RESEARCH ON DYNAMIC COMPETITION

To understand competition and monopolization in this environment, we need additional theoretical tools and empirical research. Fortunately, multiple and eclectic groups of scholars in economics and business strategy are now developing theories of competition that place innovation and change at the heart of the competitive process.³ This volume brings together a heterogeneous group of dynamic approaches and associated implications for antitrust and regulatory policy.

³ In addition to Chapter 1 of this book, extensive discussions of dynamic competition theories, along with extensive lists of references, can be found in Hunt (2000) and Machovec (1995).

The first chapter, by Jerry Ellig and Daniel Lin, sets the stage by outlining different theories of dynamic competition. It describes four key aspects of each theory: the theory's assumptions, the fundamental nature of competition, indicators of competition, and policy implications. Principal strands of dynamic competition scholarship include:

- Schumpeterian. Firms compete not on the margins of price and output, but by offering new products, new technologies, new sources of supply, and new forms of organization. Possession of market power is consistent with vigorous competition, and many seemingly anticompetitive practices actually facilitate innovation.
- Evolutionary. Firms develop different “routines” for doing things, and competition among firms selects for survival the bundles of routines that best allow the firm to grow and prosper in its environment. Policy interventions should focus on improving the ability of the competitive process to produce and reward innovation, rather than penalizing seemingly anticompetitive market structures.
- Austrian. The future is unknowable, information about production methods and consumer desires is seriously incomplete, and much economically relevant knowledge is highly specific and difficult to communicate. In this kind of world, competition is a process by which firms discover new resources and better ways of satisfying consumers. Especially alert innovators may acquire market power, but the resulting profits are a reward for discovering things that would otherwise go undiscovered.
- Path dependence. Increasing returns and network effects magnify the results of small, seemingly unimportant events that give one competitor an advantage over others. “Winner take all” competition can produce monopoly. Consumers could get “locked in” to a product or technology that turns out to be inferior in the long run, or a market with “insufficient friction” could generate costly and suboptimal changes among technologies.
- Resource-based. Firms compete by assembling heterogeneous combinations of resources to meet consumer desires. Key determinants of a firm's competitiveness are its capabilities to transform resources into valuable outputs. Capabilities that are rare and difficult to imitate lead to superior profitability. Empirical research suggests that firms' unique capabilities, rather than market power, account for most of the supranormal profits that firms earn.

There is, of course, considerable overlap among the dynamic literatures. For example, most dynamic theories include some notion of path dependence, but not all reach the same conclusions about market efficiency as does “the” path dependence theory. Similarly, Schumpeterian

Table I.1. Dynamic Theories Employed in Subsequent Chapters

Chapter	Author(s)	Dynamic Theory(ies)
2	Jay Barney	Resource-based
3	Daniel Rubinfeld and John Hoven	Schumpeterian, path dependence, resource-based, evolutionary
4	Chris Pleatsikas and David Teece	Schumpeterian, resource-based
5	Franklin Fisher	Path dependence
6	Stan Liebowitz and Stephen Margolis	Path dependence, Austrian, Schumpeterian
7	Richard Langlois	Evolutionary, path dependence
8	Michele Burtis and Bruce Kobayashi	Schumpeterian, Austrian

themes can be found also in evolutionary and Austrian competition theories. Resource-based theory can be viewed as the application of Schumpeterian, evolutionary, and Austrian insights to strategic management, just as Porter's (1985) work developed management strategy implications from structure-conduct-performance microeconomics. Perhaps the greatest similarity shared by all of the theories is their focus on innovation, broadly defined, as a key component of the competitive process.

Contributors to this volume were invited to write chapters that reflected one or more of these dynamic approaches. Table I.1 illustrates the principal dynamic approaches illustrated in each chapter.

Chapter 2, by Jay Barney, provides a more detailed exposition of strategic management theories that offer unconventional insights on competition issues. Mainstream research in strategic management views corporate capabilities as a principal source of economic profit. Successful firms possess capabilities to use their resources to create value for customers. Different firms possess different packages of tangible and intangible assets, and many of these assets (particularly intangible ones) are difficult to imitate or transfer across firms. As a result, even firms with access to the same physical resources may have large differences in marketplace success. Although capabilities theory was largely developed to aid strategic management, Barney suggests a number of policy implications:

- A seemingly competitive product market may in fact be hampered by firms' anticompetitive activities not just in physical resource markets but also in markets where firms acquire intangible capa-

bilities. Conversely, a highly competitive market for intangible capabilities can significantly constrain anticompetitive activity in product markets.

- Mergers can create significant value by bringing together complementary corporate capabilities that are difficult to duplicate or sell across firms. Such intangibles are harder to document than traditional economies of scale and scope, but they are no less real, and so policy makers ignore them at their peril.
- A firm's resources and capabilities are often path dependent, causally ambiguous, and socially complex. In such situations, patent protection is likely to be superfluous, because the firm's profits are already protected by advantages that are difficult or impossible for rivals to imitate. Patents take on greater importance in industries like chemicals and pharmaceuticals, where innovation stems from objectively observable changes in chemical formulas.
- When new competitors enter an industry where entry was previously barred, they will have advantages over the incumbent firms if the incumbents did not themselves compete, but will likely suffer disadvantages if competition within the regulated industry was already vigorous.

Both the economic and the management theories have influenced the way economists think about antitrust enforcement at the U.S. Department of Justice (DoJ). In Chapter 3, Daniel Rubinfeld and John Hoven offer insider accounts of the rationales behind several recent and prominent antitrust cases. Schumpeterian and evolutionary competition, network effects, and heterogeneous corporate capabilities have all played a role in the department's approach:

- DoJ filed a complaint against Visa and Mastercard, because the two credit card systems are owned by substantially the same banks. This common ownership is alleged to diminish either network's incentives to introduce innovations, and DoJ maintains that entry by new competitors is extremely costly due to network effects.
- Conditions attached to the Halliburton-Dresser merger reflected the department's conclusion that difficult-to-duplicate know-how is a significant barrier that prevents new competitors from developing cutting-edge innovations in certain types of oil drilling tools. Thus, heterogeneous capabilities can become barriers to entry.
- The *Microsoft* case is heavily influenced by the theory of network effects, along with concerns that suppression of competing Internet browsers will suppress innovation that could lead to the development of different and better software. This latter factor reflects an

evolutionary focus on maintaining multiple sources of variation and innovation.

- The federal challenge to the Lockheed-Northrup merger was based on a large number of concerns rooted in theories of corporate capabilities, including the importance of difficult-to-duplicate capabilities, the value of information interchange among diverse firms, and the contribution that firm diversity and outside challengers make when the path of innovation is difficult to predict.

Of course, as several subsequent chapters dealing with the *Microsoft* case demonstrate, reasonable people employing dynamic reasoning could also conclude that federal antitrust action is unwarranted in some or all of these cases. Nevertheless, Rubinfeld and Hoven's chapter illustrates how the world's leading antitrust enforcement agency has grappled with the economics of innovation.

How will policy makers know dynamic competition when they see it? Chris Pleatsikas and David Teece take up this foundational issue in Chapter 4. In their view, the type of analysis presented in the Department of Justice *Horizontal Merger Guidelines* and courtroom antitrust practices systematically overestimates the threat of market power in high-technology industries. In such industries, much competition takes place along nonprice dimensions, and new breakthroughs continually threaten the position of dominant firms. Static analysis that focuses on market-share measures and the effects of price changes over one or two years overstates the danger of monopoly because it defines markets too narrowly and tends to find market power where none exists.

Pleatsikas and Teece offer several insights that could improve the way enforcement officials define markets and test for the existence of market power:

- If related technologies that could be used in similar applications are advancing, the market is broad and competition is vigorous.
- Examining customer perceptions of and responses to product innovation may aid in defining the relevant market.
- Repeated changes in market share are a good sign that a market is competitive, and such shifts should be examined over a period of four to five years to take product life cycles into account.
- A high level of innovation, perhaps measured as a high ratio of research and development (R&D) spending to sales, is a good sign that a market is competitive, because it shows that firms are competing on performance.

- Even if a firm earns high profits on some products, it lacks market power if it is earning a competitive rate of return on its entire R&D portfolio.

The leveraging of monopoly is a perennial hotbed of contention, and dynamic concerns introduce new wrinkles. In Chapter 5, Franklin Fisher examines how innovation affects monopoly leveraging, and how monopoly leveraging affects innovation. A firm with monopoly power may seek to bundle another product with a monopolized product for three reasons: to increase the monopoly rents from the monopolized product, to extend monopoly power into a second market, or to shut off avenues for innovation that may threaten the original monopoly. The last two explanations are most relevant to the three cases Fisher analyzes: airline computerized reservation systems, the *IBM* case, and the *Microsoft* case.

- In the airline industry, American and United developed computerized reservation systems for use by travel agents. Several other airlines followed suit, but most did not develop their own systems. Until regulators outlawed the practice, the displays on these systems were biased so that agents were more prone to select flights offered by the airlines owning the systems. Hence, Fisher argues, the airlines used their market power in reservation systems to create opportunities to charge higher prices in the market for airplane tickets.
- The *IBM* case was alleged to involve extension of IBM's monopoly power into new markets, but the facts of the case show that IBM lacked market power to begin with. IBM faced competition from other firms offering their own bundles of products and services, as well as firms offering stand-alone products and services. With no monopoly to exploit or defend, IBM's bundling could not constrain competition. Customers would only buy its bundles if they offered a better value than competitive alternatives.
- Microsoft, on the other hand, possesses market power in computer operating systems due to economies of scale and network effects in the software market. Most of the costs of writing software are fixed. There is also a tendency for one operating system to dominate the market, because most buyers want to use the system for which the most software applications are available. In Fisher's view, Microsoft's bundling of its Internet browser with the Windows operating system is a predatory attempt to protect its operating system monopoly. Competitors' Internet browsers could undermine this monopoly because the availability of Internet-based computing applications would eliminate the network effects that have made Windows the dominant operating system.

Even if alleged leveraging strategies of the airlines and Microsoft create monopoly power, they might ultimately benefit consumers if the resulting profits serve as a reward that spurs greater innovation. This is the nature of the Schumpeterian tradeoff; a greater degree of monopoly power may be worth tolerating if it generates greater cost reductions or a larger stream of new products and services. Fisher considers this trade-off but believes that it is not sufficient to spare these firms from antitrust prosecution, because their leveraging actions were accompanied by additional alleged anticompetitive initiatives. For example, in the currently most controversial case – *Microsoft* – he argues that product bundling was accompanied by the predatory act of pricing the browser below cost (and in some cases even paying customers to adopt it). He suggests that a less restrictive means of making the bundle available would have been for Microsoft to offer Windows and the browser separately or bundled, with the stand-alone browser sold at a positive price. If the bundle really is more valuable to customers, then they would voluntarily choose it.

Stan Liebowitz and Stephen Margolis offer a different perspective on the *Microsoft* case in their empirical examination of network effects in Chapter 6. Network effects occur when a particular product or service becomes more attractive to consumers if more people are already using it. Some network effect theories predict that consumers will be locked into using inferior products as a result of small, even random, events that give one product a larger market share in the early stages of competition between different versions of substitutable products.

This theory has frequently been discussed in the context of the *Microsoft* case, because many observers have suggested that network effects in computer software give rise to path dependence and lock-in. Liebowitz and Margolis’s research, however, suggests that such broad claims are mistaken. Data on product quality (as measured by product reviews) and market share show that the software companies offering the best products consistently earn large market shares – even at the expense of an established firm that already dominates the market. Moreover, Microsoft’s dominance of various software markets has often been accompanied by price reductions, whereas network effects theory predicts that such dominance should lead to price increases as growth in the user base raises the value of the software to individual customers. Liebowitz and Margolis conclude that Microsoft achieved its market position by offering superior products at attractive prices.

Their analysis does suggest that software markets are often “winner-take-all”; the leading firm captures most of the market share. However, network effects do not seem to pose a significant barrier to entry. There

is no inefficient lock-in. A firm offering an identifiably better product quickly captures market share from the previous leader.

These findings could be read to imply that software markets are highly contestable, and any market power is short-lived. But Liebowitz and Margolis tell a richer empirical story than that. Recall that the introduction of new and improved products is a form of dynamic efficiency that contestable market theory does not predict, because the theory assumes that all firms have access to the same capabilities and technology (Baumol and Ordover 1992). When Microsoft offered a better spreadsheet than Lotus 1-2-3, and when Quicken offered better personal finance software than Microsoft, they were engaged in prototypical acts of entrepreneurship that both Joseph Schumpeter (1942) and Israel Kirzner (1973, 1997) would recognize as the essence of the competitive process. Viewed in this light, the Liebowitz and Margolis research illustrates how alert and creative entrepreneurs can overcome lock-in problems by offering products sufficiently better to make switching worthwhile.

Richard Langlois joins the network effects discussion in Chapter 7. Langlois suggests that technological standards and specifications can be analogous to essential facilities, like the only bridge over a river or the only pipeline leading to a particular location. Not all standards have this characteristic, but if one standard dominates due to network effects, the owner of the standard can find itself a monopolist. By this reasoning, a company like Microsoft or Intel could have an obligation to make standards for its software or hardware available to competitors who want to design complementary products.

Although Langlois suggests applying something like antitrust's "essential facilities" doctrine to technological standards, his reasoning is somewhat different from the reasoning that justifies application of this doctrine to bridges or utility wires. The essential facilities doctrine traditionally sought to prevent the static exercise of market power by forcing the owner of the facility to offer nondiscriminatory access at a reasonable charge. Langlois is concerned not with monopoly pricing but with other, dynamic problems inherent in technological standards.

Whoever controls the standard has the ability to foreclose future avenues of innovation proposed by producers of complementary products by controlling access to the standard. This creates problems in a dynamically competitive market because firms possess heterogeneous knowledge and visions of future innovative possibilities. When multiple competitors have access to the information underlying a standard, then multiple knowledge sets and innovative visions can build on the same platform. A standard owner who denies access to others implicitly

ensures that only his set of knowledge and vision of the future will be tried. For this reason, antitrust or regulation might enhance economic welfare by compelling access to the standard, even if the price of such access remains unregulated.

When should government compel access to technological standards? Langlois suggests that the decision should depend on the extent of the system the standard affects. The more components of a system the standard affects, the greater is the potential for the owner to close off others' innovation. Therefore, standards with a broader scope provide a potentially greater justification for government intervention.

A final discussion of dynamic competition and software markets occurs in Chapter 8. Michelle Burtis and Bruce Kobayashi take up time-tested Schumpeterian and Austrian themes in analyzing the role of copyrights and contracts in the protection of intellectual property. Different constraints impair enforcement of contracts for intellectual property, including uncertainty surrounding the intellectual property laws themselves, general contract principles, and antitrust laws. Advocates of restrictions on freedom of contract argue that existing law embodies an optimal tradeoff between providing incentives for creation of intellectual property and securing the benefits of widespread use. Burtis and Kobayashi challenge this notion by distinguishing between the economic effects of copyright and contract.

Copyright laws generate incentives for the creation of new software by penalizing imitators, but they also raise the cost of creating original software by reducing the stock of ideas in the public domain on which original software developers can draw. Contracts, on the other hand, typically prevent imitators from copying software without constraining original creation. The analysis presented by Burtis and Kobayashi suggests that economic welfare is maximized when a moderate degree of copyright protection is combined with the opportunity to write strong contracts. Contracting allows software developers to protect themselves against copying without raising the cost of developing new software.

Contracting is especially important in a world where lawmakers lack detailed knowledge of circumstances faced by different software developers in different markets. Unlike legislation, contracts can adjust in case-by-case fashion to knowledge of "specific circumstances of time and place," which Hayek (1945) emphasized was so important to making sound economic decisions.

These conclusions, Burtis and Kobayashi argue, are at odds with a great deal of current policy and legal doctrine, under which contracts protecting intellectual property are often ruled invalid because they are

viewed as an attempt to gain more protection than the law allows. The received view holds that copyright laws already reflect an optimal trade-off between incentives for creation and the benefits of use. The law itself already provides adequate incentive for the efficient level of innovation. From this perspective, contracts that further limit a licensee's use of copyrighted material are akin to attempts to extend a monopoly. Burtis and Kobayashi charge that enforcement actions often ignore the potential for free riding on intellectual property entirely, simply assuming that the property at issue would have come into existence even if antitrust enforcement seriously attenuated the incentives for its creation.

Perhaps most novel, however, is the application of their reasoning to the federal government's complaints against Microsoft. They view the government's 1994 complaint against Microsoft's contractual provisions with licensees as a threat to incentives for innovation. More intriguing is their analysis of the current antitrust suit. The current case involves a claim that Microsoft practiced predation against Netscape's Internet browser in order to spread a version of the Java programming platform that could not function without Microsoft's operating system. By spreading a Microsoft-dependent version of Java, the company allegedly attempted to prevent "pure" Java from turning into a rival for Microsoft's operating system. Sun Microsystems, Java's inventor, claims that Microsoft's version of Java violated its licensing agreement with Sun. If contractual restrictions on intellectual property were defended more vigorously, this licensing agreement may have been sufficient to prevent any alleged predatory behavior by Microsoft.

These chapters represent a variety of different approaches to dynamic competition, but all demonstrate a similar point: if policy makers want to take innovation, creativity, and change seriously, they need new analytical approaches that treat these phenomena as the main act rather than a sideshow.⁴ This book offers a step in that direction.

⁴ Most of these chapters were originally written for a two-day symposium on Dynamic Competition and Public Policy, sponsored by George Mason University's Mercatus Center and James Buchanan Center for Political Economy. The symposium was held on December 16 and 17, 1998. All but two of the chapters were the subject of a round table discussion by scholars and antitrust and regulatory officials. The survey chapter on dynamic competition was not discussed because of its focus on metatheory rather than specific policy applications. Franklin Fisher's chapter on leveraging was originally on the program but was not discussed due to his involvement as the Department of Justice's economist witness in the Microsoft trial, which was ongoing at the time of the conference.

The interpretation of individual chapters as exemplars of specific theories of dynamic competition represents the judgment of the editor of this volume; individual authors may or may not agree with the way their chapters have been classified in this introduction.

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