

DYNAMIC COMPETITION IN ANTITRUST LAW

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ABSTRACT

How would competition policy be shaped if it were explicitly to favor Schumpeterian (dynamic) competition over neoclassical (static) competition? Schumpeterian competition is the kind of competition that is engendered by product and process innovation. Such competition does not merely bring price competition. It tends to overturn the existing order. A “neo-Schumpeterian” framework for antitrust analysis that favors dynamic competition over static competition would put less weight on market share and concentration in the assessment of market power and more weight on assessing potential competition and enterprise-level capabilities. By embedding recent developments in evolutionary economics, the behavioral theory of the firm, and strategic management into antitrust analysis, one can develop a more robust framework for antitrust economics. Such a framework is likely to ease remaining tensions between antitrust and intellectual property. It is also likely to reduce confidence in the standard tools of antitrust economics when the business environment manifests rapid technological change. It appears that the Antitrust Division of the U.S. Department of Justice has attempted to incorporate more dynamic analysis, but the result has been inconsistent across different mergers and different doctrinal areas of antitrust law. Moreover, a complicating factor in the transformation of the law is the fact that the federal courts have, by embracing the reasoning in the Merger Guidelines promulgated several decades ago by the Antitrust Division and the Federal Trade Commission, caused antitrust case law to ossify around a decidedly static view of antitrust. Put differently, in the years since 1980, the Division and the FTC have successfully persuaded the courts to adopt a more explicitly economic approach to merger analysis, yet one that has a static view of competition. The result is not a mere policy preference. It is law. To change that law to have a more dynamic view of competition will therefore require a sustained intellectual effort by the enforcement agencies (as well as by scholars and

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practitioners) that, once more, engages the courts to reexamine antitrust law, as they did in the late 1970s during the ascendancy of the Chicago School, when antitrust law became infused with its current, static understanding of competition. A necessary but not sufficient condition for that effort is a public process by which the Division and the FTC revisit and restate the Merger Guidelines in a manner that clarifies and defends the role of dynamic competition in antitrust analysis. We therefore applaud the announcement of the antitrust agencies in September 2009 to solicit public comment on the possibility of updating the Merger Guidelines. Assuming that the Division and the FTC decide to revise the existing Merger Guidelines, those revised guidelines (and useful complementary undertakings, such as generalized guidelines on market power and remedies) then will require leadership by the enforcement agencies to persuade the courts that antitrust doctrine should evolve accordingly. That neo-Schumpeterian process may take a decade or longer to accomplish, but it is a path that we believe the Roberts Court is willing to travel.

JEL: K20, K21, L40, L41, L50, O34

I. INTRODUCTION

In 1988, in anticipation of the centennial of the Sherman Act, David J. Teece and his Berkeley colleagues held a conference that led to the 1992 volume *Antitrust, Innovation, and Competitiveness*, with contributions from many of the day's leading scholars in antitrust law and economics.¹ The conference was designed to alert the law and economics community to a set of emerging issues on antitrust and innovation. In hindsight, we believe that the conference was a watershed event. A slow and reluctant awakening to antitrust and innovation issues is now well underway.

In the introduction to the proceedings of the conference, Thomas Jorde and David Teece, as editors, endeavored to reframe antitrust questions. The issue, they asserted, was that scholars and practitioners needed to take a more dynamic approach to competition in the spirit of Joseph Schumpeter:

As Schumpeter (1942) suggested . . . , the kind of competition embedded in standard microeconomic analysis may not be the kind of competition that really matters if enhancing economic welfare is the goal of antitrust. Rather, it is dynamic competition propelled by the introduction of new products and new processes that really counts. If the antitrust laws were more concerned with promoting dynamic rather than static competition, which we believe they

¹ ANTITRUST, INNOVATION, AND COMPETITIVENESS (Thomas M. Jorde & David J. Teece eds., Oxford University Press 1992).

should, we expect that they would look somewhat different from the laws we have today.²

Jorde and Teece posed the provocative hypothesis that “antitrust laws may be at odds with technological progress and economic welfare.”³ In three subsequent articles, Teece and his co-authors made efforts to advance the Schumpeterian agenda.⁴

The Horizontal Merger Guidelines⁵ are the intellectual cornerstone of modern antitrust law, yet they contain little discussion of innovation or dynamic competition. Since the mid-1990s, however, the intellectual winds have slowly begun to change. A milestone in that progression was the publication of an article by Michael L. Katz and Howard A. Shelanski in 2005 entitled, “‘Schumpeterian’ Competition and Antitrust Policy in High-Tech Markets.”⁶ Antitrust scholars now actively debate the merits of replacing static competition with dynamic competition in antitrust analysis.⁷ Moreover, the Federal Trade

² *Id.* at 5.

³ *Id.* at 3.

⁴ See Raymond S. Hartman, Will Mitchell, Thomas M. Jorde & David J. Teece, *Assessing Market Power in Regimes of Rapid Technological Change*, 2 *INDUS. & CORP. CHANGE* 317 (1993); David J. Teece & Mary Coleman, *The Meaning of Monopoly: Antitrust Analysis in High-Technology Industries*, 43 *ANTITRUST BULL.* 801 (1998); Christopher Pleatsikas & David J. Teece, *The Analysis of Market Definition and Market Power in the Context of Rapid Innovation*, 19 *INT’L J. INDUS. ORG.* 665 (2001).

⁵ U.S. DEPARTMENT OF JUSTICE & FEDERAL TRADE COMMISSION, *HORIZONTAL MERGER GUIDELINES* (revised Apr. 8, 1997), available at http://www.usdoj.gov/atr/public/guidelines/horiz_book/hmgl.html.

⁶ See Michael L. Katz & Howard A. Shelanski, “Schumpeterian” Competition and Antitrust Policy in High-Tech Markets, 14 *COMPETITION* 47 (2005), available at http://www.law.berkeley.edu/institutes/bclt/pubs/shelanski/katz_Shelanski_Schumpeter__30Nov2006_final.pdf [hereinafter “Schumpeterian” Competition].

⁷ See, e.g., David S. Evans & Keith N. Hylton, *The Lawful Acquisition and Exercise of Monopoly Power and Its Implications for the Objectives of Antitrust*, 4 *COMPETITION POL’Y INT’L* 203 (2008); Jonathan Baker, “Dynamic Competition” Does Not Excuse Monopolization, 4 *COMPETITION POL’Y INT’L* 243 (2008); Christian Ewald, *Competition and Innovation: Dangerous “Myopia” of Economists in Antitrust?* 4 *COMPETITION POL’Y INT’L* 253 (2008); Richard Gilbert, *Injecting Innovation into The Rule of Reason: A Comment on Evans and Hylton*, 4 *COMPETITION POL’Y INT’L* 263 (2008); Herbert Hovenkamp, *Schumpeterian Competition and Antitrust*, 4 *COMPETITION POL’Y INT’L* 273 (2008); Thomas K. McCraw, *Joseph Schumpeter on Competition*, 4 *COMPETITION POL’Y INT’L* 309 (2008); Ilya Segal & Michael D. Whinston, *Antitrust in Innovative Industries*, 97 *AM. ECON. REV.* 1703 (2007). For an earlier Schumpeterian perspective on the *Microsoft* antitrust case, see Howard A. Shelanski & J. Gregory Sidak, *Antitrust Divestiture in Network Industries*, 68 *U. CHI. L. REV.* 1 (2001); J. Gregory Sidak, *An Antitrust Rule for Software Integration*, 18 *YALE J. ON REG.* 1 (2001). For a discussion of the role of dynamic competition in the antitrust analysis of patent royalties and standard-setting, see Richard

Commission (FTC) and Department of Justice (DOJ) staff and FTC commissioners also now profess that innovation is important to competition. The agencies promulgated the Intellectual Property Guidelines in 1995 to allow firms more confidence in exercising their intellectual property rights,⁸ and the Joint Venture Guidelines⁹ in 2000 to outline acceptable forms of cooperation among competitors.

Although the guidelines of the antitrust enforcement agencies do not constitute law merely by virtue of their promulgation by the agencies, the courts previously have accepted the revised principles that the agencies have advocated. By embracing the reasoning in the Merger Guidelines promulgated several decades ago by the Antitrust Division and the Federal Trade Commission, the federal courts have caused antitrust case law to ossify around a decidedly static view of antitrust. Put differently, in the years since 1980 the Division and the FTC have successfully persuaded the courts to adopt a more explicitly economic approach to merger analysis, yet one that has a static view of competition. The result is not a mere policy preference. It is law. To change that law to have a more dynamic view of competition will therefore require a sustained intellectual effort by the enforcement agencies (as well as by scholars and practitioners) that, once more, engages the courts to reexamine antitrust law as they did in the late 1970s during the ascendancy of the Chicago School, when antitrust law became infused with its current, static understanding of competition. It appears that, before the Obama Administration took office, the Antitrust Division was attempting to incorporate more dynamic analysis, but the result was inconsistent across different mergers and different doctrinal areas of antitrust law. A necessary but not sufficient condition for infusing antitrust analysis with a dynamic competition perspective is a public process by which the Division and the FTC revisit and restate the Merger Guidelines in a manner that explicitly clarifies and defends the role of dynamic competition. We therefore applaud the announcement of the antitrust agencies in September 2009 to solicit public comment on the possibility of updating the Merger Guidelines.¹⁰

Schmalensee, *Standard-Setting, Innovation Specialists, and Competition Policy*, 57 J. INDUS. ECON. 526 (2009).

⁸ See U.S. DEP'T OF JUSTICE & FEDERAL TRADE COMM'N, ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY § 1 (1995), available at <http://www.usdoj.gov/atr/public/guidelines/0558.pdf> [hereinafter ANTITRUST-IP GUIDELINES].

⁹ See U.S. DEP'T OF JUSTICE & FEDERAL TRADE COMM'N, ANTITRUST GUIDELINES FOR COLLABORATION AMONG COMPETITORS (Apr. 2000), available at <http://www.ftc.gov/os/2000/04/ftcdojguidelines.pdf>.

¹⁰ FEDERAL TRADE COMM'N & U.S. DEPARTMENT OF JUSTICE, HORIZONTAL MERGER GUIDELINES: QUESTIONS FOR PUBLIC COMMENT (Sept. 22, 2009), available at

Assuming that the Division and the FTC decide to revise the existing Merger Guidelines, those revised guidelines (and useful complementary undertakings, such as generalized guidelines on market power and remedies) then will require leadership by the enforcement agencies to persuade the courts that antitrust doctrine should evolve accordingly. That neo-Schumpeterian process may take a decade or longer to accomplish, but it is a path that we believe the Roberts Court is willing to travel.

II. ECONOMIC THEORY AND THE STRUCTURALIST TRADITION

Economists have long debated the significance of market structure on various indicia of economic performance, including innovation. As recently as September 2009, for example, the FTC and the Antitrust Division asked whether the Merger Guidelines should “be updated to address more explicitly . . . the effects of mergers on innovation.”¹¹ This assertion of the direction of causation seems to presuppose the relationship between market structure and innovation. Does market structure—and, thus, a merger that contributes to a particular change in market structure from the status quo—determine the level and nature of innovation in a market? Why might we doubt, as a matter of economic theory, that market structure determines innovation? Does a firm’s market share provide a reliable proxy for the firm’s ability to capture the returns to innovation? Does causation run in the opposite direction, such that innovation determines market structure? Does a failure to evaluate market share and market power in this dynamic context help to explain why evidence of the efficacy of antitrust intervention (in terms of advancing consumer welfare) is both hard to document and a source of bitter dispute among antitrust economists?

A. Static Efficiency and the Disputed Efficacy of Antitrust Intervention

We remain bereft of evidence that antitrust intervention has benefited the consumer. Robert W. Crandall and Clifford M. Winston of the Brookings Institution “find little empirical evidence that past interventions have provided much direct benefit to consumers.”¹² They cite, as one of the causes of this unfortunate state of affairs, the “substantial and growing challenges of formulating and implementing effective antitrust policies in a new economy

<http://www.ftc.gov/bc/workshops/hmg/hmg-questions.pdf> [hereinafter QUESTIONS FOR PUBLIC COMMENT].

¹¹ *Id.* at 5, question 15.

¹² See Robert W. Crandall & Clifford M. Winston, *Does Antitrust Policy Improve Consumer Welfare? Assessing the Evidence*, 17 J. ECON. PERSP., No. 4, 3, at 4 (2003).

characterized by dynamic competition, rapid technological change, and important intellectual property.”¹³

The lack of compelling evidence indicating that antitrust has benefited consumers is a matter of concern and motivates our inquiry here. Our working hypothesis is that using static analysis to address antitrust issues in a dynamic economy is unlikely to improve consumer welfare and that a more dynamic analytical framework increases the likelihood of helping rather than hurting consumers. The problem may be that (1) static analysis still permeates much of economic theory; (2) the community of antitrust practitioners seems unaware of a substantial literature, much of it now quite robust, on evolutionary theory and the economic, organizational, behavioral, and strategic management foundations of innovation; or (3) although this new literature has generated useful general descriptions of market and organizational behavior, those descriptions have only recently caught the attention of antitrust scholars. Because of this recent awareness, (4) the enforcement agencies are not confident about discarding conventional wisdom, despite that fact that many within the agencies know that much of that conventional wisdom is deeply discredited. Consequently, (5) the agencies sometimes strike the pose, not very convincingly, that existing statements of enforcement policy are living documents—sufficiently supple and far-sighted that they already embody dynamic analysis. Some at the enforcement agencies may subscribe to a hagiographic reverence toward the Merger Guidelines; others may see this position as an expedient justification for the maximization of agency discretion. Alternatively, (6) one hears that the antitrust analysis of dynamic industries (formerly called the “new economy,” before that label became cliché) is no different from the antitrust analysis of less dynamic, “smokestack” industries undergoing slower rates of technological innovation.¹⁴

This article explains why static analysis appears to dominate, even though thoughtful policymakers are aware of dynamic competition. Unfortunately, policymakers are left wielding static analysis in part because of an incorrect perception that scholars have not yet filled the intellectual void. Indeed, until that perception changes, antitrust analysis is not likely to improve. Indeed, Judge Richard A. Posner has observed that “antitrust doctrine has changed more or less in tandem with changes in economic theory, albeit with a lag.”¹⁵ If scholars do not embrace the now-robust behavioral and evolutionary approaches, antitrust economists will miss an opportunity to analyze dynamic considerations properly. They also risk doing consumers more harm than good.

¹³ *Id.* at 23.

¹⁴ See Richard A. Posner, *Antitrust in the New Economy*, 68 ANTITRUST L.J. 925 (2001).

¹⁵ *Id.* at 942.

B. Market Structure as a Determinant of Innovation

Unfortunately, many economists are stuck in a well-traveled and largely irrelevant debate, now a half century old, as to what form of market structure favors innovation. They label this topic the “Schumpeterian” debate. Regrettably, this nomenclature is all that many have absorbed from the rich work of Joseph Schumpeter, the Austrian School, and the extensive developments in behavioral and evolutionary economics. This so-called Schumpeterian debate casts Schumpeter excessively narrowly and is not of much interest anymore. That debate, however, can still bog down discussions about competition policy and innovation.

A more careful reading of Schumpeter reveals at least three Schumpeterian propositions relevant to antitrust policy. (The first two are discussed in this section, the third in the next.) The first proposition relates to the impact of market structure on innovation. On this topic, Schumpeter himself articulated conflicting and inconsistent perspectives. In *The Theory of Economic Development*, first published when Schumpeter was only 28 years old, he spoke in 1911 of the virtues of competition fueled by entrepreneurs and small enterprises.¹⁶ By the time Schumpeter, at the age of 59, published *Capitalism, Socialism, and Democracy* in 1942, his revised (second) proposition was that large firms with monopoly power are necessary to support innovation.¹⁷ That transformation no doubt partly reflected the dramatic change that had occurred with respect to the principal sources of innovation in the American economy. So, with respect to the impact of market structure on innovation, Schumpeter seems to have maintained two almost diametrically opposite positions. We call his first position Schumpeter I and the second position Schumpeter II. If the popular celebration of new products coming from Silicon Valley is any indicator of informed opinion, Schumpeter I is perhaps more appealing today than Schumpeter II. Indeed, we believe that the debate over whether to favor competition over monopoly (as the market structure most likely to advance innovation) was won long ago in favor of some form of rivalry or competition.

Schumpeter was among the first to declare that perfect competition was incompatible with innovation. He noted that “[t]he introduction of new methods of production and new commodities is hardly conceivable with perfect—and perfectly prompt—competition from the start. And this means that the bulk of what we call economic progress is incompatible with it.”¹⁸ However, the later

¹⁶ See JOSEPH A. SCHUMPETER, *THE THEORY OF ECONOMIC DEVELOPMENT: AN INQUIRY INTO PROFITS, CAPITAL, CREDIT, INTEREST, AND THE BUSINESS CYCLE* (1911).

¹⁷ See JOSEPH A. SCHUMPETER, *CAPITALISM, SOCIALISM AND DEMOCRACY* (1942).

¹⁸ *Id.* at 105.

Schumpeterian notion that small entrepreneurial firms lack financial resources also seems at odds with his earlier views and seems archaic in today's circumstances where the funding of enterprises through venture capital plays such a large role in innovation. The new issues (stock) market has itself funded early stage biotech and Internet companies with minimal revenues and negative earnings.

The fact that perfect competition is inconsistent with innovation does not necessarily mean that monopoly is a requirement. Schumpeter himself recognized, as we do, the importance of pluralism and rivalry in the economic system. However, one need not define rivalry as occurring inside some tightly circumscribed "antitrust market" containing only existing competitors, with their capabilities proxied by existing market shares. Moreover, numerous variables complicate any simple relationship between the generation of monopolistic rents and the allocation of resources to develop new products and processes. We examine some of those variables below. The line of causation that is most commonly discussed in the industrial organization literature runs only from competition to innovation. Reflecting this, the FTC said on the opening page of its report on innovation in 2003, "competition can stimulate innovation."¹⁹ "Competition amongst firms," the agency reasoned, "can spur the invention of new or better products or more efficient processes."²⁰ Although these statements are undoubtedly correct, they do not recognize that innovation may affect competition and market structure. Nor do they suggest what type of market structure is desirable. These statements suggest only that competition can drive innovation.

Despite fifty years of research, economists do not appear to have found much evidence that market concentration has a statistically significant impact on innovation. This relationship probably is not a useful framing of the problem, because market concentration alone is neither theoretically nor empirically a major determinant of innovation. In short, framing competition issues in terms of monopoly versus competition appears to have been unhelpful. At a minimum, doing so has been inconclusive. Rivalry matters, but market concentration does not necessarily determine rivalry. The empirical evidence is still murky. In a review of the literature published in 1989, Wesley M. Cohen and Richard C. Levin found that a strong linkage does not exist between market concentration

¹⁹ FEDERAL TRADE COMMISSION, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY 1 (2003), available at <http://www.ftc.gov/os/2003/10/innovationrpt.pdf>.

²⁰ *Id.*

and innovation.²¹ The endogeneity of market structure is perhaps one reason that we have yet to find a robust statistical relationship between concentration and innovation. In addition, no significant relationship exists between market concentration and profitability. Paul L. Joskow argued, in 1975, that “we have spent too much time calculating too many kinds of concentration ratios and running too many regressions of these against profit figures of questionable validity.”²²

Some industrial organization theories suggest that innovation is bound to decline with increasing competition, because the monopoly rents for new entrants will decline with increasing competition.²³ In contrast, Kenneth J. Arrow has hypothesized a positive relationship between competition and innovation.²⁴ But Arrow sets aside the appropriability problem (that is, how to capture value from innovation) and posits a perfect property right in the information underlying a specific production technique. One can perhaps interpret Arrow’s posited property right as a clearly specified and costlessly enforceable patent of infinite duration. His principal focus is on how the (preinvention) structure of the output market affects the gain from invention. Competition prevails because output is greater under competition than monopoly. Hence, a given amount of reduction in unit costs is more valuable if the market is initially competitive. Protected by a perfect patent, the inventor simply licenses the invention at a price slightly below the cost saving that the invention makes possible. Put differently, competition will prevail and advance innovation when the business environment is characterized by what Teece elsewhere has called a strong appropriability regime.²⁵ Absent strong appropriability, the presumption that perfect competition is superior to alternative arrangements cannot be built on Arrow’s analysis. In fact, it is important to note that despite how Arrow’s article is usually interpreted (to claim that competition spurs innovation), his general position in his writings is,

²¹ Wesley M. Cohen & Richard C. Levin, *Empirical Studies of Innovation and Market Structures*, in 2 HANDBOOK OF INDUSTRIAL ORGANIZATION 1059 (Richard L. Schmalensee & Robert D. Willig eds., 1989).

²² Paul L. Joskow, *Firm Decision-Making Processes and Oligopoly Theory*, 65 AM. ECON. REV. 270, 278 (1975).

²³ See MORTON KAMIEN & NANCY SCHWARZ, MARKET STRUCTURE AND INNOVATION (1982); Partha Dasgupta & Joseph E. Stiglitz, *Industrial Structure and the Nature of Innovation Activity*, 90 ECON. J. 26 (1980).

²⁴ See Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, in THE RATE AND DIRECTION OF INVENTIVE ACTIVITY, 104 (Richard R. Nelson ed., 1962).

²⁵ See David J. Teece, *Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy*, 15 RES. POL’Y 285 (1986).

much like Schumpeter's, that competitive markets provide inadequate incentives for firms to innovate.

As Sidney G. Winter observes, Arrow's analysis also sidesteps business model choices.²⁶ The producer and the inventor are the same. Of course, one must also recognize that business model innovation is important to economic welfare, just as technological innovation is. But neither the theoretical nor the empirical literature in economics seems to address whether market structure is important to business model innovation.

Historical and comparative evidence suggests that competition and rivalry are important for innovation; but few believe that the world of perfect competition (in which firms compete in highly fragmented markets using identical non-proprietary technologies) is an organizational arrangement that any advanced economy would aspire to create. Nevertheless, many policy debates proceed on the assumption that highly fragmented markets assist innovation. Although rivalry and competition are important to innovation, belief in the virtues of perfectly competitive systems reflects casual empiricism and prejudice rather than careful theorizing and empirical study. One can say the same for belief in the virtues of monopoly.

To summarize, the basic framework employed in discussions about innovation, technology policy, and competition policy is often remarkably naïve, highly incomplete, and burdened by a myopic focus on market structure as the key determinant of innovation. Indeed, it is common to find a debate about innovation policy amongst economists collapsing into a rather narrow discussion of the relative virtues of competition and monopoly, as if they were the main determinants of innovation. Clearly, much more is at work. In subsequent sections, we identify various dimensions of internal firm structure and management that influence the rate and direction of innovation

C. Why Is a Nexus Between Market Structure and Innovation Unlikely to Exist?

Why might no nexus exist between market structure and innovation? Consider, first, single-product firms. The notion that the funding of innovation requires the cash flows generated by the exercise of monopoly power assumes both that (1) capital markets are inefficient, and (2) the difference between competitive and monopolistic levels of internal cash flows are sufficient to justify R&D programs that would otherwise lie fallow. However, if capital markets are

²⁶ Sidney G. Winter, *The Logic of Appropriability: From Schumpeter to Arrow to Teece*, 35 RES. POL'Y 1100 (2006).

operating according to what Eugene Fama has called strong-form efficiency,²⁷ then actual cash flows need not be the source of funding. Firms with high-yield projects will be able to signal their profit opportunities to the capital market, and the requisite financial resources should be drawn forth on competitive terms. Thus, if there is strong-form efficiency and zero transaction costs (its corollary), cash should get matched to projects whether or not the cash is internally generated. Even if one were not to assume strong-form market efficiency, cash can be generated by mechanisms other than the sale of current products. Any source of cash flow can be used to invest in R&D in established enterprises, if management decides to do so. Put differently, cash is fungible inside the corporation.

Of course, the world is not properly characterized by zero transaction costs and strong-form capital market efficiency; but the absence of those stylized conditions does not imply that the availability of internal cash flows from monopoly (as compared to competitive) product market positions is what makes the difference between a firm's being able to fund and not being able to fund development projects for new products or processes. Significant innovative efforts almost always involve expenditures in a particular year that may be many multiples of available cash flows. So the availability of marginally higher cash flows occasioned by monopoly power is unlikely to change the sources of funds very much, except in unusual circumstances. Furthermore, even in the absence of adequate internal cash flow, firms may access the capital markets to obtain the requisite financing.

It is also the case that product development goals can be accomplished by a myriad of collaborative organizational arrangements, including research joint ventures, co-production, and co-marketing agreements. With such arrangements, there is the possibility that the innovator's capital requirements for a new project could be drastically reduced.²⁸ This possibility suggests that interfirm arrangements can harness economies of scale and scope.²⁹

Any link between market power and innovation in specific markets is further unshackled if the multidivisional multiproduct firm (rather than the single-product firm) is admitted onto the economic landscape. The multiproduct structure allows the allocation of cash generated everywhere to be directed to

²⁷ See Eugene F. Fama, *Efficient Capital Markets: A Review of Theory and Empirical Work*, 25 J. FIN. 383 (1970).

²⁸ See Kyle J. Mayer & David J. Teece, *Unpacking Strategic Alliances: The Structure and Purpose of Alliance Versus Supplier Relationships*, 66 J. ECON. BEHAVIOR & ORG. 106 (2008).

²⁹ For a managerially oriented analysis of the limits of outsourcing in the context of innovation, see Henry W. Chesbrough & David J. Teece, *When Is Virtual Virtuous: Organizing for Innovation*, 74 HARV. BUS. REV., No. 1, 65 (1996).

high-yield purposes anywhere inside the firm. If a multidivisional multiproduct firm actually operates this way, then the link between market power in a particular market and the funding of innovation in that market collapses.

Put differently, if a multiproduct firm sells products in markets *A* to *Z*, then the cash generated by virtue of any market power in market *A* can fund innovation relevant to market *A*; but that cash can equally well fund innovative activity for products in market *Z*. The fungibility of cash inside the multiproduct firm thus unlocks any causal relationship between market structure and innovation. Clearly, Schumpeter's hypothesis is not robust in the presence of multiproduct firms.

Another stream of research implicitly attacks the foundations of the Schumpeterian hypothesis. Since the late 1980s, Michael C. Jensen has initiated a provocative body of scholarship in corporate finance that argues that, for firms to operate efficiently, free cash flow ought be distributed to shareholders rather than be invested internally in discretionary projects.³⁰ Jensen's basic insight is that the discipline of debt is needed to cause capital to be channeled to high-yield uses in the economy, as well as in the firm. The implicit assumption is that the principal-agent problem is so great that managers will fritter away shareholders' money on unprofitable new projects and products. Accordingly, leveraging the corporation with debt will benefit shareholders—not only because of the tax deductibility of interest, but also because of avoidance of the principle-agent problem that Jensen believes exists if managers are left with cash to reinvest.

There are severe problems with Jensen's thesis, not least of which is that debt holders are generally loss averse and not opportunity-driven. Although it may indeed be the case that free cash flows do sometimes get misallocated by managers, to restrict management access to free cash flow by burdening the enterprise with high debt levels will suffocate R&D, force the firm into equity markets to finance innovation, or both. This effect is not always desirable because the new issues markets, both public and private, are relatively expensive sources of new capital and may not be "open" when needed to develop products to hit particular market "windows." However, as a positive rather than normative matter, to the extent that Jensen's thesis is correct and boards do encourage firms to load up with debt, then Schumpeterian mechanisms will be blunted by financial structure.

To summarize, innovation is risky and costly, and it clearly requires access to capital. On this point we agree with Schumpeter. The necessary capital can

³⁰ See Michael C. Jensen, *Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers*, 76 AM. ECON. ASS'N PAPERS & PROC. 323 (1986).

come from cash flows or from equity (private or public) or from debt financing. However, at least with respect to early-stage activity, debt financing is unlikely to be viable, unless the firm has other assets to pledge.³¹ Nevertheless, certain downstream investments needed to commercialize innovation can be debt financed if they are redeployable. Alternatively, the firm can enter into alliances that reduce the need for new investment in complementary assets.

In short, many factors besides firm size and the presence or absence of market power affect an innovator's capacity to access capital.³² The firm's financial structure and its multiproduct scope break any simple ex ante nexus between market structure and innovation. Hence, at least in today's world of reasonably well developed venture capital and financial markets, we see no a priori reason to expect that circumstances will validate the Schumpeterian hypothesis.

D. Why Market Share Is a Poor Proxy for Appropriability

As we discussed above, Schumpeter also developed the thesis that large firms were necessary for innovation. In his view, large firms not only routinized the innovation process, but also developed market power, which generated the high profits necessary for innovators to appropriate sufficient returns to justify the risks associated with investing in R&D.

In the preceding sections we explained why no a priori basis exists to expect there to be a nexus between R&D investment and market share—at least with respect to the large multiproduct firm and firms that have access to venture capital and other sources of cash flow not internally generated. In this section, we elaborate why Schumpeter's appropriability theory, in which high market share is necessary to enable the innovator to appropriate (capture) value from innovation, is misguided. We examine the key elements of appropriability and show that market share and market power are not the key to appropriability and stimulating R&D. In fact, high market share may have the opposite effect. The fear of cannibalizing one's own market share (which might be called "anticannibalism") might actually dampen or thwart innovation if the new

³¹ Oliver E. Williamson explains that the decision by firms to use debt or equity to support individual investment projects is likely to be linked to the redeployability of the underlying investment. See OLIVER E. WILLIAMSON, *THE MECHANISMS OF GOVERNANCE* (Oxford Univ. Press 1996). Because new product development programs commonly involve investment in assets that are substantially irreversible (like R&D) or non-redeployable (like specialized equipment), or both, debt has only limited value in financing innovation, unless a firm has collateral and is under-leveraged to begin with. Accordingly, the funding sources generally available to support new product development are internal cash flow and new equity.

³² For an expanded discussion, see RICHARD H. DAY, GUNNAR ELIASSON & CLAS G. WIHLBORG, *THE MARKETS FOR INNOVATION, OWNERSHIP AND CONTROL* (North-Holland 1993).

product or innovation displaces sales and profits at a higher rate for the incumbent than for competitors and new entrants.

As already noted, the Schumpeterian thesis is implicitly an appropriability thesis, at least in part. Schumpeter argued that a firm needs market power to enable it to capture sufficient profit to justify the costs and risks of investment in innovative activity. We agree that investors need an adequate return for their investment in risky R&D. But capturing high market share in a product market and pricing above some hypothetical competitive level is not the only business model available for profiting from innovation.

Elsewhere, Teece has suggested that the two most important factors conditioning appropriability (of the returns from innovation) are not high market share but the efficacy of legal mechanisms of protection (that is, intellectual property) and the nature of the new knowledge that has been created.³³ The ownership of complementary assets also helps govern returns from innovation. Market power is likely to be a second-order factor relative to these considerations. It is as much a result as a cause of innovative activity.

Winter observes that Teece's profiting-from-innovation thesis represents a logical progression from the Schumpeterian thesis.³⁴ We now outline the elements of this post-Schumpeterian approach.

Consider intellectual property, particularly patents. Patents can be used to exclude competitors and generate profits, even if the firm has low market share. Patents work through technology markets; dominance in a technology market may or may not lead to exclusion from a product market. This distinction provides yet another reason why the Schumpeterian thesis connecting market concentration and market power to innovation is flawed.

Moreover, it is well known that patents do not work in practice as they do in theory. Rarely, if ever, do patents confer perfect appropriability, although they do afford considerable protection in some instances, such as with new chemical products and rather simple mechanical inventions.³⁵ It is often the case that rivals can "invent around" many patents at modest costs.³⁶ In fact, one experienced patent law practitioner we know claims that he can "invent on demand" by writing a patent application for a client that can invent around *any* existing patent. Even if our friend is mildly boasting, his comment underscores

³³ Teece, *Profiting from Technological Innovation*, *supra* note 25.

³⁴ See Winter, *The Logic of Appropriability*, *supra* note 26.

³⁵ See Richard C. Levin, Alvin K. Klevorick, Richard R. Nelson & Sidney G. Winter, *Appropriating the Returns from Industrial Research and Development*, 1987 BROOKINGS PAPERS ON ECONOMIC ACTIVITY: MICROECONOMICS 783.

³⁶ See Edwin Mansfield, Marc Schwartz & Samuel Wagner, *Imitation Costs and Patents: An Empirical Study*, 91 J. ECON. 907 (1981).

that patents are often ineffective at protecting innovation. Often patents provide little protection because the legal and financial requirements for upholding their validity or for proving their infringement are high, and they are narrow because prior art is substantial in fields where there is rich innovation.

One must also recognize that the degree of legal protection that a firm enjoys is not necessarily an exogenous attribute. The inventor's own intellectual property strategy itself enters the equation. So does the fundamental nature (or lack thereof) of the invention. The inventor of core technology not only can seek to patent the invention, but also can seek complementary patents on new features or manufacturing processes (or both) and possibly on designs. The way that patent counsel write the claims in the patent application also matters. Of course, the more fundamental the invention, the higher the probability that a broad patent will be granted, and granted in multiple jurisdictions around the world.

Exclusionary rights are not fully secured by the mere issuance of a patent, of course. Although a patent is presumed to be valid in many jurisdictions, validity is never firmly established until a patent has been upheld in court. A patent is merely a passport to another journey down the road to enforcement and possible licensing fees. The best patents are broad in scope, have already been upheld in court, and cover a technology essential to the manufacture and sale of products in high demand.

In some industries, particularly where the innovation is embedded in processes, trade secrets are a viable alternative to patents. Trade secret protection is possible, however, only if a firm can put its product before the public and still keep the underlying technology secret. Usually only chemical formulas and industrial-commercial processes can be protected as trade secrets after the products embodying them are released to the public. And, of course, the filing of a patent application constitutes public disclosure of the trade secret and consequently forfeits protection under state trade secret law regardless of whether a valid patent subsequently issues under federal law.

The degree to which knowledge about an innovation is tacit or easily codified also affects the ease of imitation, and hence appropriability. Tacit knowledge is, by definition, difficult to articulate. Consequently, it is hard to transfer to others unless those who possess the know-how can demonstrate it to others. It is also hard to protect tacit knowledge using intellectual property law. Codified knowledge is easier to transmit and receive, and it is more exposed to industrial espionage. On the other hand, codified knowledge is often easier to protect using the instruments of intellectual property law.

At the risk of grave oversimplifications one can divide appropriability regimes into "weak" regimes (innovations are difficult to protect because they can be

easily codified and legal protection of intellectual property is ineffective) and “strong” regimes (the profits from invention/innovation can be protected because knowledge about the invention/innovation is tacit or they are well protected legally, or both). Despite recent efforts to strengthen the protection of intellectual property, strong appropriability is the exception rather than the rule. This state of affairs has been so for centuries, and it will never be substantially different in democratic societies, where individuals and ideas move with little governmental interference, and where intellectual property protection is inherently limited.

Implicitly, then, appropriability need not depend on market share or market power in product markets. In this article, we do not endeavor to analyze technology markets, but we do note that the “Schumpeterian thesis,” as it has come to be known, references product markets, not technology markets. Because overlaps between technology markets and product technology markets are loose, it is easy to see that the Schumpeterian thesis is flawed on this account alone. Clearly, appropriability for a particular innovation depends on more microanalytic factors than Schumpeter and the subsequent mainstream industrial economics literature have recognized.

Besides the appropriability regime itself, there is yet another class of factors that determines the returns to the innovator. Those factors are complementary assets. Ownership of complementary assets affects returns to innovation even though they are outside the appropriability regime that we define here.³⁷

Notably, Schumpeter overlooked complements and complementary assets. He stressed how “gales of creative destruction” could *overturn* the existing order.³⁸ The new would drive out the old. Substitution was the primary consequence of Schumpeterian innovation. Schumpeter’s single-minded emphasis on substitution is too narrow, as it ignores complements. Innovation can enhance the value of complements. There are several reasons for this result.

First, as stressed by Teece,³⁹ innovation is rarely sold (licensed) in disembodied form. To be useful, and to generate a revenue stream, inventions must become embedded in products. To produce and sell products, one usually needs to employ complements. At the most general level, the importance of complementary technologies and complementary assets has been recognized by historians for a long time.⁴⁰ The complementarity of factor inputs has been part of the theory of production since the writings of Adam Smith, Augustin

³⁷ Teece, *Profiting from Technological Innovation*, *supra* note 25.

³⁸ SCHUMPETER, CAPITALISM, SOCIALISM AND DEMOCRACY, *supra* note 17, at 83.

³⁹ See Teece, *Profiting from Technological Innovation*, *supra* note 25; David J. Teece, *Reflections on “Profiting from Innovation,”* 35 RES. POL’Y 1131 (2006).

⁴⁰ See Nathan Rosenberg, *On Technological Expectations*, 86 ECON. J. 523 (1976).

Cournot, and David Ricardo. But it is only relatively recently, after the topic has been embedded in a contracting framework,⁴¹ that the nature and role of complementary assets in the theory of innovation has become better understood.

Once a contracting framework is adopted, it is a small step to recognize that (1) the asset value of complements may rise if the overall demand for complements is enhanced by innovation and (2) if in fact the innovation and the complement are cospecialized to each other, and if the cospecialized asset is not under the control of the innovator, then rents (profits) can be extracted from the innovator by the owner of the cospecialized asset.⁴² Complementors are especially important in a multi-sided market, which we will discuss later in the context of antitrust intervention.

E. Innovation as a Determinant of Market Structure

Despite evident theoretical flaws in the Schumpeterian market structure-innovation hypothesis, the received wisdom and dominant logic in industrial organization studies remain that market structure is the main determinant of innovation. A less familiar logic—but in our view, a far more convincing and empirically supportable logic—runs the other way: innovation shapes market structure. At a general level, the argument was first articulated by Almarin Phillips in his study of the evolution of the civilian aircraft industry.⁴³

Phillips' field research led him to conclude that developments in jet engine technology available in the United Kingdom and Germany immediately after World War II were largely exogenous to the development activity in U.S. industry. Boeing and Douglas and other companies in the United States successfully used these technologies to develop the civilian jet aircraft. Domestic market structure did not drive these decisions and developments. Market outcomes in the United States were then very much affected by how and when Boeing, McDonnell, Douglas, Lockheed, and others decided to tap into a largely external reservoir of technological know-how available in the United States, United Kingdom, and Germany.

Boeing did so quickly and successfully. It leveraged its success with the KC-130 jet tanker that it built for the U.S. Air Force into a civilian version, the Boeing 707. Boeing captured the lead in market share globally with this airplane. It maintained its lead until the emergence and growth of Airbus. Phillips' historical analysis led him to conclude that “an important influence on

⁴¹ See Winter, *supra* note 26.

⁴² Teece, *Profiting from Technological Innovation*, *supra* note 25.

⁴³ See ALMARIN PHILLIPS, *TECHNOLOGY AND MARKET STRUCTURE: A STUDY OF THE AIRCRAFT INDUSTRY* (Heath Lexington 1971).

market structures and on research and development programs and innovative behavior of firms stems from the presence or absence of related technological and scientific changes which occur for reasons generally exogenous to market phenomena and the goals of the particular firm.”⁴⁴

Studies find that various types of externally shaped and externally funded technological regimes exist.⁴⁵ For example, university-funded and government-funded research in science and technology have created vibrant technological environments that fuel venture-funded new businesses. Biotech is a case where U.S. government funds distributed through the National Institutes of Health have helped to create technological opportunities that are then seized upon and developed further by new venture-funded startups.⁴⁶ Although most of these companies fail, enough survive to influence the structure of the pharmaceutical industry.

The concept of technological opportunity, although poorly developed in economics, has been used as a surrogate for issues associated with an industry’s external reservoir of know-how and ferment in the underlying technological base. However, technological opportunity is a remarkably passive concept that needs further explication. Nelson and Winter claim that knowledge and opportunity are determined by the underlying “technological regime,” and that regimes differ from industry to industry.⁴⁷ How and why some firms tap into technological opportunities remains enigmatic. Economic theory—or any other theory, for that matter—poorly explains the microanalytics of these decisions.

The importance of new entrants to innovation is consistent with the importance of “exogenous factors”—factors outside the market or even the industry. It is well established that new entrants have been responsible for a

⁴⁴ *Id.* at 3.

⁴⁵ See Keith Pavitt, Michael Robson & Joe Townsend, *The Size Distribution of Innovating Firms in the U.K.*, 35 J. INDUS. ECON. 297 (1987); David B. Audretsch & Zoltan J. Acs, *Innovation, Market Share, and Firm Size*, 69 REV. ECON. & STAT. 567 (1988); David B. Audretsch & Zoltan J. Acs, *Innovation in Large and Small Firms: An Empirical Analysis*, 78 AM. ECON. REV. 678 (1998).

⁴⁶ Audretsch’s empirical work on innovation rates shows that, “whereas the large-firm innovation rates are relatively high in rubber, instruments, and chemicals, the small firm innovation rates are relatively high in instruments, chemicals, non-electrical machinery, and electrical equipment.” DAVID B. AUDRETSCH, *INNOVATION AND INDUSTRY EVOLUTION* 36 (MIT Press 1995). Relatedly, Audretsch finds that “[t]he small firm innovation rate exceeds the large firm innovation rate in fourteen of the industrial sectors, but the large firm innovation rate exceeds the small-firm innovation rate in four of the sectors . . . [T]he relative innovative advantage of large firms tends to be promoted in industries that are capital intensive, advertising intensive, concentrated, and highly unionized.” *Id.* at 38.

⁴⁷ RICHARD R. NELSON & SIDNEY G. WINTER, *AN EVOLUTIONARY THEORY OF ECONOMIC CHANGE* (Belknap Press 1982).

substantial share of revolutionary new products and processes. They include the jet engine (Whittle in England, Henkel and Junkers in Germany), catalytic cracking in petroleum refining (Houdry), the electric typewriter (IBM), electronic computing (IBM), electrostatic copying (Haloid), PTFE vascular grafts (W.L. Gore), the microwave oven (Raytheon), and diet cola (RC Cola). These anecdotes and other evidence further erode any connection between market structure and innovation, which further suggests that (1) incumbency and market share or market power is by no means a prerequisite for innovation and (2) no particular firm size is conducive to technological progress.

In summary, with exogenous factors including technological opportunity playing such a large role, one can readily understand and agree with John Sutton's characterization that "there appears to be no consensus as to the form of relationship, if any, between R&D intensity and concentration."⁴⁸ As already noted, Wesley Cohen's and Richard Levin's authoritative study in the *Handbook of Industrial Organization* likewise concluded that the evidence on the market structure-innovation nexus was mixed.⁴⁹ Once one includes control variables, the partial correlation between R&D intensity and concentration is extremely weak.

Sutton speculates that a "bounds issue"⁵⁰ may exist—that is, the relationship between market structure and innovation might well exist in some narrowly circumscribed set of bounds. But, even if Sutton's conjecture is true, it suggests that market concentration may not be particularly helpful in understanding innovation and its determinants. Furthermore, game-theoretic models are unlikely to provide much insight and, to the contrary, may in fact prove empirically empty.⁵¹

F. Summary and Recapitulation

For almost three-quarters of a century, economists have devoted much effort (we would say too much effort) to exploring relationships between market structure and innovation. One hypothesis, often attributed to Schumpeter,⁵² is that profits accumulated through the exercise of monopoly power (assumed to be correlated

⁴⁸ JOHN SUTTON, *TECHNOLOGY AND MARKET STRUCTURE: THEORY AND HISTORY* 4 (MIT Press 1998).

⁴⁹ See Cohen & Levin, *supra* note 21.

⁵⁰ SUTTON, *supra* note 48, at 5.

⁵¹ See Franklin Fisher, *Games Economists Play: A Noncooperative View*, 20 *RAND J. ECON.* 113 (1989); John Sutton, *Explaining Everything, Explaining Nothing? Game Theoretic Models in Industrial Organization*, 34 *EUR. ECON. REV.* 505 (1990); Sam Peltzman, *The Handbook of Industrial Organization: A Review Article*, 99 *J. POL. ECON.* 201 (1991).

⁵² See SCHUMPETER, *CAPITALISM, SOCIALISM AND DEMOCRACY*, *supra* note 17, ch. 8.

with large firms) are a key source of funds to support risky and costly innovative activity. As discussed, these predictions as a matter of economic theory are not well grounded in the nature of the (modern) firm.⁵³

Nor is there good theory to suggest, alternatively, that perfect competition is the ideal regime. As discussed later, many other factors are at work, particularly factors that are internal to firms. So on a priori grounds one would not expect any relationships between market structure and innovation to be strong. Indeed, the evidence indicates at best a weak effect. Also, as already discussed, causation is more likely to run in the opposite direction, from innovation to market structure.⁵⁴

More formal theoretical modeling on market structure has likewise provided little insight. The industrial organization textbook by Frederick M. Scherer and David Ross has noted that “through astute choice of assumptions, virtually any market structure can be shown to have superior innovative qualities” and “to avoid biased inferences, it is necessary to take into account variables other than market structure that affect the pace of innovation.”⁵⁵ Interestingly, the main independent variable to which many scholars, including Scherer and Ross, gravitate is technological opportunity—“the rate at which more or less exogenous and cumulative advances in science and technology generate profitable new innovative possibilities.”⁵⁶ Scherer and Ross further note that “the structure-to-innovation linkage probably operated over a much shorter time span than the innovation-to-structure linkage.”⁵⁷ This second linkage is expected to be stronger in industries with rich technological opportunities. The idea is that concentration is more conducive to innovation in slow-moving fields. That is, technological opportunity, often manifested by radical breakthroughs, favors newcomers, not incumbents. These refinements seem plausible. But perhaps the biggest reason why three-quarters of a century of scholarly work has failed is that the various economic theories of innovation pay very little attention to factors inside the firm. We commence an effort to remedy that situation in subsequent sections. Accordingly, we find ourselves not in agreement with Schumpeter, that monopoly power is necessary for innovation. So long as

⁵³ See Morton I. Kamien. & Nancy L. Schwartz, *Self Financing of an R&D Project*, 68 AM. ECON. REV. 252 (1978).

⁵⁴ There is also considerable empirical evidence that augmented R&D activity follows increases in profitability with short lags. See Ben Branch, *Research and Development Activity and Profitability: Distributed Lag Analysis*, 82 J. POL. ECON. 999 (1974); Ariel Pakes, *On Patents, R&D, and the Stock Market Rate of Return*, 93 J. POL. ECON. 390 (1985).

⁵⁵ FREDERICK M. SCHERER & DAVID ROSS, *INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE* 642, 644 (Houghton Mifflin Co. 3d ed. 1990).

⁵⁶ *Id.* at 645.

⁵⁷ *Id.*

rivalry is maintained, it may help; but other factors are likely to be more important. However, as we explain in the next section, there is a third Schumpeterian hypothesis with which we agree.

III. STATIC COMPETITION AND DYNAMIC COMPETITION

As we discussed above, a third proposition is embedded in Schumpeter. Usually overlooked, but very important, and one with which we agree, it is that dynamic competition should be favored over its weaker cousin, static competition. Schumpeter observed that “[t]his kind of competition is as much more effective than the other as a bombardment is in comparison with forcing a door, and so much more important that it becomes a matter of comparative indifference whether competition in the ordinary sense functions more or less promptly; the powerful lever that in the long run expands output and brings down prices is in any case made of other stuff.”⁵⁸ We will describe both static competition and dynamic competition in turn. In doing so, we recognize that these styles of competition sometimes do not have bright lines separating them. Certainly, Schumpeter did not provide any crisp delineation.

We attempt to give some substance to Schumpeter’s intuition. Unfortunately, antitrust economists often unwittingly favor static competition. They are often unaware that there are many ways to conceptualize competition. Dynamic competition is a style of competition that relies on innovation to produce new products and processes and concomitant price reductions of substantial magnitude. Such competition improves productivity, the availability of new goods and services, and, more generally, consumer welfare. Promoting dynamic competition may well mean recognizing that competitive conduct may involve holding short-run price competition in abeyance. For example, the argument against generic “me-too” drugs may be of this kind; generics may lower prices for existing drugs, but they may slow the development of new drugs, yielding a classic tradeoff between static efficiency and dynamic efficiency.

Put succinctly, competition policy rooted in static economic analysis sees the policy goal as minimizing the Harberger (deadweight loss) triangles from monopoly. A new competition policy, recognizing the special power of dynamic competition, would advance the availability of new products and the co-creation of new markets that allows latent demand (and hence new amounts of consumer surplus associated with new demand curves) to be realized by consumers. It would also recognize cost savings flowing from innovation as an indicator of likely future consumer welfare gains. Put differently, the focus of a revised

⁵⁸ SCHUMPETER, CAPITALISM, SOCIALISM AND DEMOCRACY, *supra* note 17, at 83.

competition policy and merger-guideline framework would still very much be on the consumer, but it would be future-oriented and would recognize that certain business practices might lead to market creation (or at least co-creation) that would yield new demand curves with large gains in consumer surplus (because demand for new products could be satisfied). The minimization of Harberger deadweight loss triangles would be a secondary focus. Where minimizing Harberger triangles today stands in the way of creating new and significant future demand curves, a new competition policy would likely favor the future and recognize the welfare benefits associated with creating or cocreating new markets.

Economists do not embrace these concept of dynamic competition as widely or as wisely as they should, partly because the overwhelming focus in economic research is implicitly inside the marginalist paradigm of static competition. Indeed, a major contribution can come from simply revealing to judges, juries, the enforcement agencies, and legislators that most economic analysis is static—when it should be dynamic—and that, consequently, superficial answers derived from implicitly held static notions about desirable forms of competition may well harm innovation and, in the long run, consumers. This bias stems merely from the analytical tools that economists use for their convenience. Although most economists recognize the importance of innovation, they usually proceed to apply analytical approaches that ignore it or are ill-suited to studying it. Recognizing that this state of affairs exists should deflate the hubris with which many antitrust scholars approach alleged restraints of trade. To the extent that they wield analytical tools of static competitive analysis, antitrust analysts are likely to make prescriptions that harm both innovation and competition and thus sap productivity. Needless to say, such prescriptions are likely to harm consumer welfare as well.

To develop policy prescriptions that do more good than harm, economists and antitrust scholars and practitioners need to inquire into the determinants of innovation and the impact of antitrust activity (including merger policy) on innovation. Rapid technological change advances dynamic competition. The problem is that the analytical framework that economists most commonly embrace adheres stubbornly to the view that market structure—and little else—determines the rate of technological change. As already discussed, that framework is grossly inadequate and cannot be supported.

For instance, in merger analysis, as in many forms of antitrust analysis under the rule of reason, one is required to define a market and examine market shares. If a merger would raise concentration above an accepted threshold, the government may block it. Merger analysis usually proceeds this way, even though a growing number of economists are beginning to think otherwise,

particularly in the context of differentiated products. In such cases, that emerging consensus seems to be that the particular firms that one is examining are what matters.

More often than not, however, avid antitrust economists allow the concept of static competition to guide their analysis. Because of its familiarity and simplicity, they inappropriately use the apparatus of static microeconomics to analyze contexts where innovation is important. Innovation is at best an afterthought in static microeconomic theory. The presence of innovation complicates economic analysis. It destroys equilibrium, thereby debasing the value and usefulness of the familiar toolkit that most economists carry. It leads to indivisibilities, rendering marginal analysis of limited value. It generates spillovers and raises “appropriability” and “public good” issues. For these and other reasons, the profession tends to resist abandoning the old tools of neoclassical economics. Economists shun dynamic analysis either because they do not understand that framework or because they fear that recognizing it will be excessively hostile to well-accepted and well-practiced analytical frameworks. We contend that advocates of competition policy should not accept this state of affairs any longer. We therefore applaud the FTC and the Antitrust Division for asking whether the Merger Guidelines “[s]hould . . . be revised to explain more fully than in the current [version] how market shares and market concentration are measured and interpreted in dynamic markets, including markets experiencing significant technological change.”⁵⁹

Dynamic competition is powered by the creation and commercialization of new products, new processes, and new business models. As Schumpeter said, competition fueled by the introduction of new products and processes is the more powerful form of competition: “competition from the new commodity, the new technology, the new source of supply, the new type of organization—competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the output of existing firms, but at their foundations and their very lives.”⁶⁰ Advocates of strong competition policy must surely favor dynamic competition, for static competition is anemic in comparison. However, by unwittingly using static microeconomic theory, advocates of strong competition policy end up settling for less competition and lower consumer welfare than they would get if they developed policies to favor the dynamic genre. In what follows, we elaborate in more detail upon some of the differences between these modes of competition.

⁵⁹ QUESTIONS FOR PUBLIC COMMENT, *supra* note 10, at 4, question 8.

⁶⁰ SCHUMPETER, CAPITALISM, SOCIALISM AND DEMOCRACY, *supra* note 17, at 8.

A. Static Competition

Static competition reflects an intellectual framework, less so a state of the world. Static competition manifests itself in the form of multiple providers of existing products offered at low prices, offering an unchanging menu of unimproved products at very good prices. When firms introduce no new products, rapid price reductions driven by innovation do not occur. The constant churn of customers will be commonplace, and profits will be thin. However, fierce competition associated with the introduction of new products, or new features, or new pricing approaches does not exist. Without innovation, all firms have the same technology and the same business models. Markets are in a comfortable but bland equilibrium.

Prices are drawn down to the floor of long-run marginal cost; but that floor becomes their resting place. Firms earn only their cost of capital and cover long-run marginal costs, and consumers are bereft of new products and true bargains. Firms never overcharge customers, but firms offer customers no exciting new products. Agents are nevertheless rational and well informed. Although this static framework has a simple theoretical simplicity and elegance, the industrial dynamics are overlooked. Absent innovation, new entry is unlikely. If incumbents can satisfy demand, new entrants are not needed. Absent scale economies, no firm is likely to become dominant, and the ecology of firms does not change.

The static economics paradigm infuses at least the undergraduate economics textbooks. Unfortunately, that paradigm tends to spill over into antitrust economics as both an analytical and a normative paradigm. But that paradigm is not, and has never been, a good abstraction of the economy. Nor has that paradigm ever been a state to which we should aspire.

B. Dynamic Competition

Innovation drives dynamic competition—but not exclusively. The adjective “dynamic” is a shorthand descriptor for a variety of rigorously competitive activities such as significant product differentiation and rapid response to change, whether from innovation or simply from new market opportunities ensuing from changes in taste or other forces of disequilibrium. Dynamic competition is in fact more intuitive and much closer to today’s everyday view of competition than is the stylized notion of static competition routinely depicted in textbooks.

Many times innovation-driven competition has modified, if not overturned, the established order in an industry and has brought forth great price and

nonprice benefits to consumers. The steamship brought enhanced competition to the sailing ship and to ocean transportation. Steam and sail competed side by side for decades. The great days of sail—the era of the clipper ships—occurred partly in response to competitive pressures from steam ships. Likewise, vacuum tubes got better with competition from the transistor. Competition from refrigeration destroyed the ice-harvesting industry but brought massive cost savings and convenience to consumers. Technological innovation in aircraft jet engines marginalized internal combustion engines and destroyed many of the traditional aircraft manufacturers that were wedded to internal combustion engines. Electronics destroyed the typewriter. Industry after industry can demonstrate gains from dynamic (innovation-driven) competition that overshadow the gains when competition is present but innovation is absent.

Schumpeter's perspective on innovation-driven competition owes its intellectual origins to the economic framework of the Austrian School, founded by Carl Menger in the nineteenth century.⁶¹ The Austrian School's treatment of competition differs significantly from that of neoclassical economics, the focus of which is on a static equilibrium with a minimum number of known exogenous variables. Austrian economics does not purport to compute any equilibrium, because the essence of competition is taken to be the dynamic pattern by which such competition arises, not the equilibrium itself. Friedrich A. Hayek, a later leader of the Austrian School and eventual Nobel laureate, argued that "competition is by its nature a dynamic process whose essential characteristics are assumed away by the assumptions underlying static analysis."⁶² The implication that Hayek recognized is that one cannot regard the wishes and desires of consumers as information given to producers; instead, one must view the task of identifying consumers' preferences as a problem that the process of competition can solve.

With dynamic competition, new entrants and incumbents alike engage in new product and process development and other adjustments to change. Frequent new product introductions followed by rapid price declines are commonplace. Innovations stem from investment in R&D or from the improvement and combination of older technologies. Firms continuously introduce product innovations, and from time to time dominant designs emerge. With innovation, the number of new entrants explodes, but once dominant designs emerge, implosions are likely, and markets become more concentrated. With dynamic competition, innovation and competition are tightly linked.

⁶¹ See CARL MENGER, *GRUNDSATZE DER VOLKWIRTSCHAFTSLEHRE (PRINCIPLES OF ECONOMICS)* (1871).

⁶² FRIEDRICH A. HAYEK, *The Meaning of Competition*, in *INDIVIDUALISM AND ECONOMIC ORDER* 94 (1948).

The model of dynamic competition recognizes that competition is a process in which entrepreneurs and entrepreneurial managers are important actors. Unyielding competitive forces defeat stagnation. Maintaining innovation depends upon the existence of entrepreneurs and the institutional structures and public funding that support innovation. Technological innovation comes in waves created by different technologies. These waves cause what Schumpeter famously called, in the most evocative phrase penned by an economist, “perennial gales of creative destruction.”⁶³ Entrants introduce a large fraction of radical technologies into an industry. Incumbents do, however, sometimes pioneer, and if they do not innovate, they are often able to imitate or improve on the entrants’ products. The benefits of creative destruction may not come immediately; change takes time. Innovation drives competition, and competition in turn drives innovation.

Building on work by Burton H. Klein,⁶⁴ William J. Abernathy and James M. Utterback refined this paradigm of industrial change, and postulated an innovation cycle.⁶⁵ Considerable evidence now supports this paradigm over a wide range of technologies.⁶⁶ That evidence implicitly recognizes inflection points in technological and market evolution. The advent of new technological ensembles or paradigms is usually marked by a wave of new competitors entering an industry to sustain success. Incumbents must master discontinuities as well as incremental change and improvement.

Many other complementary “models” of innovation exist. At their core, most accept some version of an evolutionary theory of economic change and a behavioral theory of the firm. The methodological imperative of behavioral theory is that internal firm structure (not market structure) and internal processes such as learning, diffusion, sensing, seizing, and reconfiguring affect the firm’s behavior. Some understand evolutionary theory in economics to be economic Darwinism, but the logical structure of an evolutionary theory is much broader than its biological versions.⁶⁷ Evolutionary theory draws attention to what went

⁶³ SCHUMPETER, CAPITALISM, SOCIALISM AND DEMOCRACY, *supra* note 17, at 83.

⁶⁴ See BURTON H. KLEIN, DYNAMIC ECONOMICS (1977).

⁶⁵ See William J. Abernathy & James M. Utterback, *Patterns of Industrial Innovation*, 80 TECH. REV. 40 (1978).

⁶⁶ See, e.g., Steven Klepper & Elizabeth Grady, *The Evolution of New Industries and the Determinants of Market Structure*, 21 RAND. J. ECON. 27 (1990); James M. Utterback & Fernando Suarez, *Innovation, Competition, and Industry Structure*, 22 RES. POL’Y 1 (1993); Franco Malerba & Luigi Orsenigo, *The Dynamics and Evolution of Industries*, 5 INDUS. & CORP. CHANGE 51 (1996).

⁶⁷ Hayek argued that evolutionary theory in economics did not borrow from Darwin. To the contrary, Hayek argued, evolutionary concepts about markets contained in Adam Smith’s writings influenced Darwin’s theory of natural selection. See FRIEDRICH A. HAYEK, THE FATAL CONCEIT: THE ERRORS OF SOCIALISM 24 (W.W. Bartley III ed., 1988).

before. As a general principle, novelty arises from changing and combining existing artifacts and structure. “Descent with modification” crystallizes this key point.⁶⁸ Selection leaves behind variants that are unfit according to the selection criterion at work. Selection processes include not only births and deaths of individual firms,⁶⁹ but also the ability of firms to adapt to the changing environment by modifying strategies and structures.⁷⁰

Scholars disagree about the amount of adaptation that is possible within the firm. Some evolutionary economists see firms as strongly constrained. Strategic management scholars disagree. They claim that firms have much greater capacity for change than what managers actually undertake. All scholars recognize that a failure by the firm to change in the face of changing markets and technologies will diminish prospects for the enterprise.

Another common thread to behavioral or evolutionary mechanisms is that they are probabilistic rather than determinative.⁷¹ Rigorous evolutionary theories will make a probabilistic assertion such as, “There is a Z probability that individual Y will not replicate (die when the entity has a limited life span) under the selection environment X .”⁷²

Because routines that interact in highly complex ways guide business enterprises, managers find it difficult to identify what makes the enterprise successful. This ambiguity surrounding causation becomes a problem when the environment changes, as causal ambiguity makes it difficult for managers or directors to determine what the enterprise should do differently. When Japanese auto manufacturers started to capture market share from the U.S. manufacturers in the 1980s, the U.S. auto industry offered a string of rationales to explain the phenomenon, including a view that the cost of capital was lower in Japan, that unfair trade barriers in Japan prevented exports from the United States, that U.S. firms were falling behind in the use of robotics, and so forth. The U.S. auto industry took nearly two decades to discover for itself that labor-management issues, and management itself, were key causal factors associated with the

⁶⁸ See WILLIAM H. DURHAM, *COEVOLUTION: GENES, CULTURE, AND HUMAN DIVERSITY* 22 (1991). Durham identifies five requirements for an economic theory of change: units of transmission (for example, ideas and values); sources of variation (for example, invention); mechanisms of transmission; processes of transformation; and sources of isolation.

⁶⁹ See MICHAEL T. HANNAN & JOHN H. FREEMAN, *ORGANIZATIONAL ECOLOGY* (1989).

⁷⁰ See David J. Teece, *Explicating Dynamic Capabilities: The Nature and Microfoundations of (Sustainable) Enterprise Performance*, 28 *STRATEGIC MGMT. J.* 1319 (2007); Mie Augier & David J. Teece, *Strategy as Evolution with Design: The Foundations of Dynamic Capabilities and the Role of Managers in the Economic System*, 29 *ORG. STUD.* 1255 (2008).

⁷¹ See HOWARD ALDRICH, *ORGANIZATIONS EVOLVING* 33-50 (1999).

⁷² See JOHANN P. MURMANN, *KNOWLEDGE AND COMPETITION ADVANTAGE: THE COEVOLUTION OF FIRMS, TECHNOLOGY, AND NATIONAL INSTITUTIONS* 15 (2003).

industry's decline. Once the industry more accurately diagnosed causation, manufacturers made management and organizational changes that began to make a difference. But it was too late. The deep recession of 2008-09 drove General Motors and Chrysler into bankruptcy. As Teece explained,⁷³ often firms must create a breakout structure to unshackle the new from the old. If they fail, the alternative is extinction.

This evolutionary assessment of the extinction of firms requires qualification to take account of the political economy of failure. The recession that began in 2008 introduced a new genre of government regulation in the United States in the automobile and financial services industries. Such regulation replaces extinction with quasi nationalization. Clearly, an important topic of future research for industrial organization economists will be what a firm's being "too big to fail" implies for the evolutionary process by which the firm diagnoses and responds to change. A conscious policy decision to interrupt the evolutionary process that weeds out failing firms and strategies may have short-term appeal because it may appear to be an onramp to a turnpike that promises to speed one past market failure. But policy makers need to be mindful of two caveats. First, the protection of failed entities will influence the future formulation of strategy, most likely introducing over the intermediate term a new variety of moral hazard. Second, over the longer term, evolutionary processes will continue to operate, such that it would be naïve to suppose that the industrial planning inherent in nationalization necessarily can insulate the firm from the imperative to evolve in response to new exogenous forces or face new threats of extinction.

In sum, a number of assumptions and propositions characterize dynamic competition. Many are rooted in an evolutionary theory of economic change. As Schumpeter said, "in dealing with capitalism, you are dealing with an evolutionary process."⁷⁴ Government intervention to regulate failure will not arrest that evolutionary process. Part IV outlines features of evolutionary theory.

IV. RELEVANT ASPECTS OF EVOLUTIONARY AND BEHAVIORAL ECONOMICS

Evolutionary economics and the behavioral theory of the firm are separate but related frameworks. Both have existed for a half-century or longer. Both embrace firms and markets as we see them. Both recognize a capability to discover new technologies and business models in the economic system.

⁷³ See Teece, *supra* note 70, at 1335.

⁷⁴ See SCHUMPETER, *THE THEORY OF ECONOMIC DEVELOPMENT*, *supra* note 13, at 82.

Entrepreneurial activity by individuals and enterprises is critical to that capability.

Some endogenous generation of innovative opportunities is accepted in evolutionary theory. Evolutionary theories recognize processes of imperfect learning and discovery on the one hand and selection on the other. Whereas neoclassical theory can recognize unfavorable outcomes caused by bad luck and uncertainty, evolutionary theory also accepts the systematic mistakes associated with ignorance or misunderstanding. Clearly, the canons of rational choice theory and equilibrium economics provide only a very limited basis for the study of innovation.

Neoclassical theory almost completely neglects the specificities of competencies and skills that each firm possesses. The theory especially neglects the relatively tacit and organizational capabilities that cannot be imputed to individuals. This neglect impedes any satisfactory analysis of the innovative capabilities of firms. Neoclassical theory assumes bounded rationality because agents have an imperfect understanding of the environment in which they live and of what the future will deliver. Because of limits to rationality, rules often guide or determine enterprise behavior. The learning history of the enterprise shapes relatively invariant routines.

Adaptation and learning generate diversity. Managerial action inside firms (at headquarters) and competition among firms in product markets and factor markets act as selection mechanisms that lead to the disappearance of some firms and the rapid growth of others. Managers, for example, act as the proximate agent of selection when they pull resources from underperforming units and reallocate them to growing units. Knowledge of specific technologies determines how technology will advance. Technologies develop along relatively ordered paths shaped by specific technical properties, search rules, technical “imperatives,” and cumulative expertise. Consequently, diversity among firms is a fundamental and permanent characteristic of environments undergoing technical change.

Firms differ because of different technological capabilities with respect to innovation, different degrees of success in adapting to technologies developed externally, and different cost structures. They may also differ because of differing search or sensory procedures and capabilities and differing strategic behaviors. One should expect path dependencies when increasing returns to scale or scope exist. This expectation will especially hold for information goods and for cumulative technological advances. How strong path dependencies will be is mainly an empirical question.

Market concentration is a function of two opposing forces: (1) selection mechanisms that tend to increase the standing of innovating firms, and (2)

learning and imitation mechanisms that spread innovations or new knowledge throughout the potential adapters, thereby reinforcing existing disparities through cumulative mechanisms internal to the firm. Abilities to innovate and imitate are firm-specific and depend on a firm's past innovative record. In other words, the firm's learning is cumulative. Chance matters, but it favors firms that are prepared to innovate.

Although innovators themselves can appropriate some of the economic benefits from innovation and the adaptation of new products and processes, learning externalities exist. The ease of imitation depends on the intellectual property regime (strong or weak) and the nature of the relevant knowledge (codified or tacit). Skills and know-how almost always spill over from individual path breakers to the whole industry. Innovation in products and processes is nevertheless to a fair degree endogenous—through in-house R&D and technological acquisition (that is, in licensing), as well as through learning mechanisms.

Firms within an industry face considerable dispersion in costs, profitability, and growth rates. Asymmetries in capabilities are a direct consequence of the cumulative, idiosyncratic, and appropriable nature of technological advances. The more that technological advances accumulate at the firm level, the higher is the likelihood that success breeds success. Moreover, the higher the opportunity that exists for technological progress, the higher is the possibility of differentials between innovators and laggards. High technological opportunity associated with a high degree of appropriability provides high incentives for firms on or near the frontier to innovate, but possibly low incentives for firms with relatively lower technological capabilities to do so.

“Normal” technical progress proceeds along trajectories defined by an established paradigm, and extraordinary technical advance is associated with the emergence of new paradigms. As others have shown,⁷⁵ market processes are generally weak in directing the emergence and selection of radical technological discontinuities. Put differently, when the process of innovation is highly exploratory, its direct response to economic signals is weaker and its linkage with scientific knowledge is greater. In those circumstances, institutional and scientific contexts are more important than the market.

Institutions and markets coevolve. Industrial, technological, and institutional factors interact. In particular, research and training bodies and the intellectual property system help shape industrial outcomes. The competitive strengths of individual enterprises, as well as the competitive strength of the industry of which they are part, depend on such factors. For instance, according to Johann

⁷⁵ See, e.g., GIOVANNI DOSI, TECHNICAL CHANGE AND INDUSTRIAL TRANSFORMATION (1984).

P. Murmann, German firms achieved global superiority in dyestuffs by 1914, not because they had superior strategies and organization, but because large numbers of new entrants and exits gave the German dye industry more room to experiment with different firm strategies and structures.⁷⁶ By 1900, the leading dye firms all had developed in-house R&D capabilities and could match new product introductions by competitors in the United Kingdom and the United States, as well as in Germany. The German firms also patented heavily in the United Kingdom, and their innovative efforts at home drew upon an extremely strong university system in chemistry. Murmann argues that “Germany had it easier than Britain in bringing forth competitive firms.”⁷⁷ The British government also hindered its domestic industry by imposing higher tariffs on industrial alcohol, an important input in dye making. Strong organizational capabilities in R&D, manufacturing, marketing, management, and strong patent portfolios allowed the German dye industry to capture 70 to 90 percent of world market share.⁷⁸ Strength in the supplier industry and in supporting institutions aids innovation. The German firms actively shaped their selection environment—particularly through education and training, tariffs, and patents.

Indicators of dynamic competition include heterogeneous firms engaging in experimentation and innovation. They develop and introduce new products and processes, and they rework and adjust internal processes. Firms constantly battle unanticipated events. Rivalrous behavior is the norm. An evolutionary approach underscores the importance of maintaining diversity in the economic system. Competition policy authorities as well as other agencies must be concerned with protecting economic diversity and meaningful variety in organizational forms. Policymakers need not focus on a particular market; their focus should be broader because some of the best candidates for new entry and radical innovation exist *outside* the market. The propositions derived from behavioral and evolutionary theories of firms and markets promise to expand our understanding of firm behavior, particularly in domains of rapid innovation. Following Joskow, we believe that the field of industrial organization, to which antitrust economics owes so much, can “play an important leadership role in the extension and revision of the conventional theory of the firm rather than be its prisoner.”⁷⁹ Extensions of and revisions to the theory of the firm, if they recognize the firm as having the potential to create innovation and act as an engine of innovation, will assist in the development of new approaches to antitrust theory that will pave the way for the improvement of actual policy.

⁷⁶ See MURMANN, *supra* note 72.

⁷⁷ *Id.* at 51.

⁷⁸ *Id.* at 92.

⁷⁹ Joskow, *supra* note 22, at 278.

V. IMPLICATIONS FOR ANTITRUST LAW AND MERGER POLICY

Adopting a dynamic view of competition would require significant changes to current antitrust law and merger policy.

A. Framing Dynamic Competition's Animating Force in the Law

Static and dynamic views of competition have elements in common. Current law embraces both. Indeed, Katz and Shelanski observe that “Judge Learned Hand wrote as early as 1916 that ‘the consumer’s interest in the long run is quite different from an immediate fall in prices’ and spoke of competition as a ‘proper stimulus to maintenance of industrial advance.’”⁸⁰ In our view, however, when the courts rely on economic theory to inform antitrust law, the law gets a larger injection of static analysis than dynamic analysis.

As discussed, traditional static analysis focuses on detecting market power in product markets. Dynamic analysis views competition through a broader lens and focuses less on outcomes and more on process. Dynamic analysis favors maintaining rivalry but also protects property, including intellectual property. The working assumption in dynamic competition analysis is that intellectual property rights are desirable institutional or legal arrangements providing necessary appropriability mechanisms to advance and reward innovation. Dynamic analysis also recognizes that the benefits of dynamic competition do not arrive immediately; firms may need to tolerate some short-run (static) inefficiencies to support innovation. Wooden antitrust policies that fixate on short-run efficiencies are likely to hurt innovation and thereby hurt competition.

If antitrust policy is to favor dynamic competition over static competition, a role for vigorous enforcement still remains, but it proceeds less self-confidently. Uncertainty and complexity are hallmarks of dynamic market environments. In particular, policymakers should use the tools of static analysis sparingly, if at all. Simple rules based on static analysis may well produce policy actions and judicial decisions that impede competition. In particular, policymakers should deemphasize concentration analysis. To prohibit mergers merely to manage concentration is unlikely to help consumers. More generally, policy should overturn the presumption that more competitors are always better—the goal is not merely lowering price, but also protecting innovation.

⁸⁰ Katz & Shelanski, “*Schumpeterian*” *Competition*, *supra* note 6, at 50 (quoting *United States v. Corn Prods. Ref. Co.*, 234 F. 964, 1012 (S.D.N.Y. 1916)).

Policymakers may need to examine barriers to entry over a longer time period and must do so at the firm level. (The strategy literature refers to the firm-level analog to barriers to entry as “isolating mechanisms.”⁸¹) Supporting structures and government funding for research also affect entry conditions. Those factors may reflect the capabilities that incumbents have developed that newcomers should not expect to possess. Capabilities are likely to reflect the search for unique advantages. Their possession drives competition.

In stark contrast to the neoclassical assumption of the structure-conduct-performance paradigm, in dynamic contexts conduct in this framework is not a function of market structure. Market conduct is driven more by *internal* organizational factors: standard operating procedures, investment strategies, and improvement routines. Performance depends on the (relative) organizational capabilities and behavioral traits of the enterprise. Enhanced industrial performance also stems from improvement in individual technologies and expanded use of more productive technologies.

As discussed above, one can observe some typical evolutionary patterns in industry dynamics—perhaps one can call it an industry life cycle. In the early stages of an industry’s evolution, firms tend to be small, and entry relatively easy, because of the diversity of technologies that firms are using. As the dominant design emerges, however, costs of entry rise as an established scale for competitive activity becomes apparent. Learning becomes cumulative, and established firms experience some advantage over subsequent entrants. After an industry shakeout, established firms settle into a more stable industry structure. But a new technology with the promise of being superior may soon overturn that stability. With entry and exit, the life of many firms tends to be short.⁸²

New technologies can enhance or destroy a firm’s competency. The essence of the dynamic competition approach is that technological change itself shapes industry structure. Also, path dependencies and dynamic increasing returns may exist. Put differently, the rate and direction of innovation at the level of the firm do not depend on market structure but on the firm’s competencies, the internal and external knowledge upon which the firm can draw, the intellectual property regime, and the firm’s complementary assets. Entry conditions are a function of appropriability and “cumulativeness.” Learning and innovation will also shape the firm’s boundaries.

⁸¹ See, e.g., Mehmet Oktengil, Gordon E. Greenley & Amanda J. Broderick, *An Empirical Study of Isolating Mechanisms in UK Companies*, 122 *EURO. J. OPERATIONS RES.* 638 (2000).

⁸² See ENTRY AND MARKET CONTESTABILITY: AN INTERNATIONAL COMPARISON (Paul A. Geroski & Joachim Schwalbach eds., 1991); Paul A. Geroski, *What Do We Know about Entry?*, 13 *INT’L J. INDUS. ORG.* 421 (1995).

Market concentration is likely to be an outcome of market selection, which in turn depends on the uneven exploitation of learning opportunities. Thus, concentration has little to do with market power. As Giovanni Dosi and his colleagues observe, “if the degrees of selection are interpreted as a proxy for how well markets work—in the sense that they quickly reward winners and weed out losers—then more efficient markets tend to yield, in evolutionary environments, more concentrated market structures, rather than more ‘perfect’ ones in the standard sense.”⁸³

The possibility of innovation rests on the permanent existence of unexploited technological opportunities. A significant body of evidence from the microeconomics of innovation indicates that unexploited opportunities do permanently exist and that firms actually explore only a small subset of what is available.⁸⁴ Firms are constrained not by nature, but by their own capabilities. Firms therefore almost always have opportunities to sense and seize. This persistence of unexploited opportunities raises the question of why antitrust law would threaten to penalize successful exploitation of opportunities in the first place.

B. Market Definition

Antitrust analysis, particularly with respect to section 2 of the Sherman Act and section 7 of the Clayton Act,⁸⁵ typically focuses on market definition. Defining the boundaries of a market is the first step under the Horizontal Merger Guidelines promulgated by the Antitrust Division and the FTC.⁸⁶ Economists recognize that market definition is merely an analytical tool. We agree with Janusz Ordover and Daniel Wall that “[a]rguments for and against a merger that turn upon distinctions between broad and narrow markets definitions are, to an economic purist, an inadequate substitute for, and a diversion from, sound direct assessment of a merger’s effect.”⁸⁷ Indeed, the seminal article on market power, published by William Landes and Judge Richard Posner in 1981, demonstrated analytically why the gaming of market definition in an antitrust case would,

⁸³ Giovanni Dosi, Orietta Marsili, Luigi Orsenigo & Roberta Salvatore, *Learning, Market Selection and the Evolution of Industrial Structures*, 7 SMALL BUS. ECON. 411 (1995).

⁸⁴ See, e.g., NATHAN ROSENBERG, *INSIDE THE BLACK BOX* (1982); CHRISTOPHER FREEMAN, *THE ECONOMICS OF INDUSTRIAL INNOVATION* (2d ed. 1982); Giovanni Dosi, *Sources, Procedures and Microeconomic Effects of Innovation*, 26 J. ECON. LIT. 1120 (1988).

⁸⁵ 15 U.S.C. §§ 2, 18.

⁸⁶ See U.S. DEPARTMENT OF JUSTICE & FEDERAL TRADE COMM’N, *HORIZONTAL MERGER GUIDELINE*, *supra* note 5.

⁸⁷ Janusz A. Ordover & Daniel M. Wall, *Understanding Econometric Methods of Market Definition*, 3 ANTITRUST 20, 20-21 (1989).

under correct economic analysis, be precisely offset by compensating adjustments in the pertinent elasticities of demand and competitor supply.⁸⁸ Nonetheless, in practice the courts and agencies have tended to require market definition. Analyzing competition in an evolutionary or dynamic manner would appear to support Ordover's and Wall's position, as market share or concentration is unlikely to have much power in explaining conduct decisions, including those concerning pricing. No general theorem establishes that higher concentration leads to higher prices or less output. Static models may, however, offer some theoretical support to the notion that equilibrium output falls and equilibrium prices rise as the number of firms declines.

A modicum of empirical work in such markets as telecommunications and airlines supports the structure-conduct-performance paradigm. But the evidence supporting it is weak, and when innovation is significant, theoretical connections and empirical correlations become even weaker. Fortunately, the Merger Guidelines are clear that, at least in the merger context, market share is only a starting point and market definition is merely a tool. But even these caveats are too timid in an industry characterized by rapid technological change. As discussed earlier, high market share may simply indicate that selection or competition processes are working well. And, of course, if the firm is subject to maximum price regulation or an obligation to serve, its high market share is endogenous to the regulatory regime.⁸⁹

Also, in practice, the hypothetical monopolist test is hard to apply in the context of innovation. When innovation is present, products are likely differentiated in quality, and price is not the main or only competitive weapon.⁹⁰ Furthermore, innovation can make defining relevant product markets difficult because business executives and government officials alike may not yet know what the future products will be. The use of the hypothetical monopolist test to establish relevant markets may be better suited for commodity products than the products of high-tech companies. With innovation, value disparities are likely to exist among substitute products. Before the dominant design emerges, competition occurs with respect to features and functionalities, not price. Hence, the hypothetical monopolist test might be uninformative or inadministrable before the dominant design emerges. In the case of automobiles, an application of the test circa 1910 might have placed steam cars, electric cars, and internal

⁸⁸ William E. Landes & Richard A. Posner, *Market Power in Antitrust Cases*, 94 HARV. L. REV. 937 (1981).

⁸⁹ J. GREGORY SIDAK & DANIEL F. SPULBER, *DEREGULATORY TAKINGS AND THE REGULATORY CONTRACT: THE COMPETITIVE TRANSFORMATION OF NETWORK INDUSTRIES IN THE UNITED STATES* 355-56 (Cambridge Univ. Press 1997).

⁹⁰ See Hartman, Mitchell, Jorde & Teece, *supra* note 4.

combustion engine cars in separate markets, despite the fact that competition among these technologies was already fierce and led over the next few years to the obliteration of firms that could not make the transition to designing and producing automobiles propelled by the internal combustion engine.

More important, if one is to adopt a forward-looking antitrust analysis, then neither the enforcement agencies nor the courts will likely know which products will be good substitutes in the future. Because innovation produces new products and lowers the cost of existing products, policymakers must include such future products when defining the market, but doing so is quite difficult in many instances, as our discussion of the XM-Sirius satellite radio merger will illustrate.

C. Market Share and Actual versus Potential Competitors

Using the neoclassical framework, antitrust analysts first define a relevant market, identify actual competitors within it, and allocate market shares. That analysis includes actual but not potential competitors in the market. Potential competitors are recognized only when certain conditions of probability and immediacy of entry are met.

In dynamic contexts, potential competitors can have much greater importance. What today appears merely to be a potential competitor can obliterate incumbents tomorrow in acts of Schumpeterian creative destruction. To exclude such a competitor from the boundaries of the market would clearly be a mistake. Yet that is what the Merger Guidelines still do as of late 2009.

Proper analysis requires an assessment of capabilities. Existing approaches implicitly proxy capabilities by current market share. In dynamic environments, this method is likely to be highly inadequate. Although capabilities are difficult to quantify, a large literature now exists in the field of strategic management that provides many clues to assessing the capabilities of both actual and potential competitors.⁹¹

Snapshots of market shares, whether present or forward-looking, reveal little if markets are in turmoil, as they frequently are in dynamic contexts. As noted earlier, a distinguishing feature of the Austrian school of economics is its emphasis on disequilibrium. Moreover, a high market share by no means implies market power. Not only is today's market share a poor indicator of the future,

⁹¹ See, e.g., Teece, *Explicating Dynamic Capabilities*, *supra* note 70; David J. Teece, Gary Pisano & Amy Shuen, *Dynamic Capabilities and Strategic Management*, 18 STRATEGIC MGMT. J. 509 (1997).

but a high market share may indicate not only superior performance, but also strong selection (which is to say competition) at work in the industry.⁹²

Accordingly, in both merger analysis and in section 2 cases, when dynamic competition is at work, one must look beyond market share data. Serious consideration of potential competitors and their capabilities is essential, for studies show that new entrants almost always drive innovation in established industries. A focus on capabilities and on potential competition will help to ensure that market analysis is forward-looking.

Furthermore, market share is likely to be irrelevant in regimes of rapid change, because competition *for* the market is likely to be as significant as competition within it.⁹³ Market share may be altogether irrelevant in some cases because markets may exist in which innovation is so characteristic and sustained that firms compete not merely for market share, but for markets as a whole. A firm's monopoly today may say little about the firm's prospects one, two, or five years in the future.

One should note that analysts have already begun to develop new approaches to defining markets in recognition of the fact that doing so at the level of the product is difficult when one cannot predict successful future products with any degree of certainty. Richard J. Gilbert and Steven Sunshine, for example, have put potential competition to one side and have focused instead on what they call "innovation markets,"⁹⁴ by which they seem to mean R&D markets. Although General Motors used the concept in *United States v. General Motors Corp.*,⁹⁵ the enforcement agencies and the courts seem to have forgotten it, and further development of these ideas has stalled.

⁹² Katz and Shelanski argue:

Even absent innovation, there are reasons to be cautious about the interpretation of market share data. In order to generate sensible predictions of the effects of a merger, the measurement and analysis of market shares should always be tied to a coherent theory of competitive effects that fits the facts of the industry under consideration. Put another way, the analysis of market shares can most confidently be used to predict adverse competitive effects of a merger when one has an empirically supported theory that market shares are informative of competitive conditions and that an increase in concentration will harm competition and consumers.

Michael L. Katz & Howard A. Shelanski, *Merger Policy and Innovation: Must Enforcement Change to Account for Technological Change?* 29 (Nat'l Bureau of Econ. Research, Working Paper No. 10710, 2004), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=583708.

⁹³ See Teece & Coleman, *supra* note 4; Pleatsikas & Teece, *supra* note 4; Shelanski & Sidak, *supra* note 7.

⁹⁴ See Richard J. Gilbert & Steven Sunshine, *Incorporating Dynamic Efficiency Concerns in Merger Analysis: The Use of Innovation Markets*, 63 ANTITRUST L.J. 569 (1995).

⁹⁵ 384 U.S. 127 (1966).

Despite the shortcomings of the “innovation market” approach, which we discuss below, the framework did shift attention from product markets to activity upstream. This shift required antitrust authorities to determine what skills and assets firms need to be able to innovate and which firms possess those skills. Such an inquiry fundamentally differs from examining demand-side substitution, the exercise that is now quite familiar to economists, antitrust lawyers, and courts. The “innovation market” approach might have been pushed to its logical conclusion. If it had been, it may well have led to the analysis of capabilities, a subject that we now examine.

D. Analyzing Capabilities to Assess Competitor Positions and Economic Power

Edith Penrose observed that analysts should define an enterprise not by its current products, but by its (upstream) “resources,” or what some prefer to call capabilities.⁹⁶ She defined the internal resources of the firm as “the productive services available to a firm from its own resources,” particularly those from management experience.⁹⁷ “A firm is more than an administrative unit,” Penrose argued, “it is a collection of productive resources.”⁹⁸ She saw that “many of the productive services created through an increase in knowledge that occurs as a result of experience gained in the operation of the firm as time passes will remain unused if the firm fails to expand.”⁹⁹ Penrose saw the capabilities of management, not the exhaustion of technologically based economies of scale, as determining whether a firm could expand to exploit opportunities. In reality, of course, other assets—such as innovation capabilities—define the firm’s resources or capabilities, but it is important to note that Penrose articulated a model that implicitly eschewed market shares as a measure of how well a firm is “positioned” to compete.

Subsequent research has established that firms exhibit more stability in their capabilities than in their products. In this respect, one can analyze capabilities more easily than products. Capabilities are proxies for the firm’s interrelated and interdependent attributes that govern its competitive significance. These capabilities are arguably a better proxy for the firm’s competitive position than is its downstream market share.

Strategy refers to the broad set of the firm’s commitments that define and rationalize its objectives and the way that the firm intends to pursue them. These

⁹⁶ See EDITH PENROSE, *THE THEORY OF THE GROWTH OF THE FIRM* (1959).

⁹⁷ *Id.* at 149-50.

⁹⁸ *Id.* at 24.

⁹⁹ *Id.* at 54.

commitments may be explicit or implicit in the firm's culture and values. Strategy is often more a matter of faith and determination, not one of calculation. Structure refers to how a firm is organized and governed and how decisions are made and implemented. Although strategy and structure shape capabilities, what an organization can do well is likely to be partly a function of what it has done well in the past. A firm's R&D activities and success in acquiring external technologies can mold its future capabilities. However, strategy helps determine what capabilities a firm should own and protect. The world is too complicated for a firm to have "an optimal strategy," and although the firm's capabilities are always in a state of flux, existing capabilities are a good guide to what a company can do in the future.

The capabilities approach would depart markedly from standard antitrust analysis. It would calibrate a firm's competitive standing not by reference to products but by reference to more enduring traits. In a dynamic context, a firm will have a kaleidoscope of products, yet the underlying capabilities are likely to be more stable. For instance, rather than analyzing Honda's market share in outboard motors, lawnmowers, and small electric generators, one might shed more light on the antitrust analysis by examining a capability profile or "market." Here the relevant capability might center on small, four-stroke internal combustion engines. A capabilities approach might lead to "markets" defined more narrowly or broadly than how the current Merger Guidelines define product markets. Potential competition (or its absence) would receive more attention.

The tools for assessing capabilities may not be well developed yet, but they are developed enough to allow tentative application. Clearly, product market analysis can be unhelpful and misleading in dynamic contexts. Using the right concepts imperfectly is better than precisely applying the wrong ones. The question arises whether simply doing a better job of analyzing potential competition would help. Clearly, doing so might help. In the end, however, one would be forced to examine the capabilities of potential competitors—so one probably could not avoid developing the analytics of a capabilities approach.

The innovation-market approach introduced by Gilbert and Sunshine implicitly recognizes that focusing on product-market analysis is inadequate.¹⁰⁰ But the innovation-market approach focuses too narrowly on R&D as the arena for measuring innovation competition. Even if R&D is defined broadly, it is usually only one element of the resources and problem solving that go into innovation. The resources that firms must commit and the skills that firms must employ to succeed at innovation usually exceed those needed for merely

¹⁰⁰ See Gilbert & Sunshine, *supra* note 94.

conducting R&D. The resources available in the supporting ecosystem are as important as the firm's capabilities are. Furthermore, R&D concentration has little to do with innovation outcomes, except possibly in industries characterized by cumulative technological change. Even there, we can expect the linkage to be weak. The importance of other institutional players, such as venture capitalists and private equity providers, in the ecosystem needs to be assessed as well. The widespread adoption of elements of an open innovation¹⁰¹ model—in which elements of the innovation process are outsourced—makes these points even more compelling.

E. Merger Analysis

Despite the misgivings of an increasing number of economic scholars, in practice merger policy in the United States, the European Union, and most other jurisdictions having competition law focuses on how the merging parties' combinations will affect concentration in one or more existing product markets. In effect, enforcement agencies take an increase in concentration as a proxy for a decrease in competition that, if sufficiently large, will increase the prices that consumers face.

1. Schumpeterian Competition and Merger Enforcement

We favor revision of the Horizontal Merger Guidelines. A focus on dynamic competition is likely to be especially relevant in high-technology industries. The evolutionary and behavioral economics approaches outlined here would not abandon antitrust enforcement or even necessarily restrict it. But those approaches do lead to a more careful framework that recognizes uncertainty and complexity and relentlessly asks, Does this practice support or discourage innovation? Will this merger assist or burden dynamic competition?

The evolutionary or behavioral economics framework that we advance suggests a number of modifications to how the antitrust enforcement agencies should approach the analysis of a particular merger. First, market structure is not a meaningful concern, at least not until a dominant design has emerged, and the evolutionary paradigm is established and likely to remain for quite some time. Second, if the analysis is to be deflected away from products in the market, the natural phenomena to examine are capabilities. Capabilities transcend products.

¹⁰¹ See OPEN INNOVATION: RESEARCHING A NEW PARADIGM (Henry W. Chesbrough, Wim Vanhaverbeke & Joel West eds., 2006).

Other elements of the ecosystem, such as the availability of venture capital and public support, also need to be taken into account.

Third, only if the merger entities are the sole firms with the necessary capabilities to innovate in a broad area should antitrust concerns arise. Katz and Shelanski suggest that, if new product development efforts are underway to create or improve products and processes, and if those products are not yet in the market, then harm can arise from a merger because it may cripple future product-market competition in a market that does not exist.¹⁰² A capabilities approach would soften such concerns. The question should be framed not in terms of whether product-market competition will be impaired, as that is too much of an immediate concern, but in terms of whether capabilities will be brought under unitary control, thereby possibly thwarting future variety in new product development.

As we have stressed earlier, Schumpeterian competition is engendered by product and process innovation. Such competition does more than bring price competition—it tends to overturn the existing order. A framework for antitrust analysis that favors dynamic over static competition would place less weight on market share and concentration in the assessment of market power and more weight on assessing innovation and enterprise-level capabilities.

2. *The Antitrust Division's Spasmodic Attempt to Embrace Dynamic Competition*

It appears that, during the George W. Bush Administration, the Antitrust Division gravitated toward a more dynamic approach to analysis. In the Oracle-PeopleSoft merger in 2004, the Division advocated a narrow market definition that excluded consideration of dynamic competition. In perhaps the most significant defeat at trial ever experienced by a U.S. antitrust enforcement agency, the Division lost.¹⁰³ By October 2007, the Division had experienced a neo-Schumpeterian makeover under its next Assistant Attorney General, Thomas Barnett, who argued that innovation is the major source of consumer-welfare gains.¹⁰⁴ Barnett's view was expressed more officially in the Division's September 2008 report on monopolization.¹⁰⁵

¹⁰² See Michael L. Katz & Howard A. Shelanski, *Mergers and Innovation*, 74 ANTITRUST L.J. 1, 8 (2007).

¹⁰³ *United States v. Oracle Corp.*, 331 F. Supp. 2d 1098 (N.D. Ca. 2004). Teece testified as an expert witness for Oracle.

¹⁰⁴ Thomas O. Barnett, *Maximizing Welfare Through Technological Innovation*, 15 GEO. MASON L. REV. 1191 (2007) (article based on October 2007 speech).

¹⁰⁵ U.S. DEP'T JUSTICE, ANTITRUST DIVISION, *COMPETITION AND MONOPOLY: SINGLE-FIRM CONDUCT UNDER SECTION 2 OF THE SHERMAN ACT* 123 (2008).

Although the implications of Barnett's premise for particular doctrines in the law of monopolization can (and did) engender controversy, there can be no dispute over the correctness of his basic thesis. Innovation entails the creation of new demand curves for new products, which implies the creation of all the consumer surplus and producer surplus beneath those new demand curves. Producers rarely capture all the gains from a new product. Consequently, this net accretion of consumer welfare from product innovation is a bigger prize, probably by an order of magnitude or more, than are the fruits to be gained from haggling over the small Harberger deadweight loss triangles that arise from marginal changes in price along the extant demand curve of an established product.¹⁰⁶ This theme informs the larger debate over Schumpeterian economics—which posits that competition is a dynamic process and that firms can compete for the market and temporarily achieve a position of dominance. This view of competition is distinguished from static competition in which multiple firms compete simultaneously in the market, primarily on the basis of marginal differences in price as opposed to dramatic differences resulting from innovation and quality improvement.

However, the degree to which the Antitrust Division has advocated the neo-Schumpeterian vision of competition has varied over time and across different doctrinal areas of antitrust law. It remains to be seen whether the Division's advocacy, once more under the guidance of Berkeley economists, will change course during the Obama Administration. (Berkeley economists once again dominate the FTC as well.) In May 2009, Assistant Attorney General Christine Varney, presumably relying on concurring input from chief economist Carl Shapiro, repudiated the report on monopolization law released less than a year earlier by her Republican predecessor, Barnett.¹⁰⁷ To the extent that neo-Schumpeterian arguments are considered to favor defendants in monopolization cases, that policy reversal may signal resistance to neo-Schumpeterian arguments.¹⁰⁸ But, as we have stressed, the neo-Schumpeterian approach need

¹⁰⁶The seminal empirical analysis is Jerry A. Hausman, *Valuing the Effect of Regulation on New Services in Telecommunications*, 1997 BROOKINGS PAPERS ON ECON. ACTIVITY: MICROECONOMICS 1 (measuring the forgone consumer welfare from regulatory delay in the introduction of cell phone service and voicemail). See also Jerry A. Hausman & J. Gregory Sidak, *Google and the Proper Antitrust Scrutiny of Orphan Books*, 5 J. COMPETITION L. & ECON. 411 (2009) (applying the new-product framework to Google Book Search).

¹⁰⁷Stephen Labaton, *Administration Plans to Strengthen Antitrust Rules*, N.Y. TIMES, May 11, 2009, at 1.

¹⁰⁸See, e.g., Don Clark & Jessica E. Vascellaro, *Silicon Valley Girds for New Antitrust Regime*, WALL ST. J., May 18, 2009, available at <http://online.wsj.com/article/SB124260263059528447.html>.

not favor defendants or plaintiffs. Rather, it favors dynamic assessments of the consumer-welfare effects of firm behavior and transactions.

3. *Legitimacy versus Authority: Why Do the Courts and Enforcement Agencies Deny That the Merger Guidelines Bind Them?*

A factor complicating the neo-Schumpeterian transformation of antitrust law is the fact that the federal courts have, by thoroughly embracing the economic reasoning of the Horizontal Merger Guidelines as promulgated several decades ago by the Antitrust Division and the FTC, caused antitrust case law to ossify around a static view of competition. After three decades, the result of that intellectual accretion is not a mere policy preference that can be altered by speeches or statements of prosecutorial discretion by enforcement officials. Rather, the static view of competition is, by dint of the imprimatur of the federal judiciary, the law. Curiously, the courts pretend otherwise. While it relies on the Guidelines as authority, the D.C. Circuit continues—as recently as the *Whole Foods* decision—to assert that “the Merger Guidelines . . . ‘are by no means to be considered binding on the court.’”¹⁰⁹ All of us like to keep our options open, but this kind of statement reduces the intellectual prestige of the judiciary. We see no reason why anyone would find this *ipse dixit* to be credible.

To an economist—which is to say, someone attuned to the information revealed through the evolutionary processes of institutions, including law—the legitimacy of the Merger Guidelines comes from their survival in the face of sustained attempts to refute their intellectual coherence.¹¹⁰ Legitimacy does not arise from the fact that the Guidelines originated as expressions of bureaucratic authority. If the Merger Guidelines were perceived to be intellectually comparable to the guidelines of the Internal Revenue Service, we believe that the D.C. Circuit and other federal courts would regard them quite differently.

4. *Self Contradiction and the Consequential Role of the Merger Guidelines in Antitrust Jurisprudence*

Merger analysis implicates a larger series of issues that are relevant across all of antitrust jurisprudence. For the Obama Administration, the unanimous en banc

¹⁰⁹ *FTC v. Whole Foods Market, Inc.*, 548 F.3d 1028, 1046 (D.C. Cir. 2008) (citing *FTC v. PPG Indus., Inc.*, 798 F.2d 1500, 1503 n.4 (D.C. Cir.1986)).

¹¹⁰ We allude here to Karl Popper’s theory that objective knowledge consists of conjectures that have survived empirical attempts to refute them. See KARL POPPER, *OBJECTIVE KNOWLEDGE: AN EVOLUTIONARY APPROACH* (Clarendon Press 1972). As an epistemological matter, we regard the Popperian view of objective knowledge to comport with many of the seminal contributions on the theory of the firm that invoke processes of evolution or survivorship. See J. Gregory Sidak, *Mr. Justice Nemo’s Social Statics*, 79 TEX. L. REV. 737 (2000).

decision by the U.S. Court of Appeals for the D.C. Circuit in the *Microsoft* case is a useful guidepost for charting the evolution of antitrust jurisprudence over the eight years of the George W. Bush Administration.¹¹¹ The D.C. Circuit's per curiam opinion in *Microsoft* contains an introductory section that asks whether antitrust law is up to the challenge of evaluating competition in the "new economy."¹¹² This passage alludes to a debate, which transpired before the Internet bubble burst, over whether high-tech industries could be analyzed under conventional antitrust principles. In *Microsoft* the D.C. Circuit said: "We decide this case against a backdrop of significant debate amongst academics and practitioners over the extent to which 'old economy' § 2 monopolization doctrines should apply to firms competing in dynamic technological markets characterized by network effects."¹¹³ In a well-read essay, Judge Richard Posner argued that traditional antitrust analysis was competent for the task.¹¹⁴ In *Microsoft*, the D.C. Circuit agreed.¹¹⁵ And yet, a few pages later, the court seemed to contradict itself. It announced a new and more permissive liability rule for tying arrangements concerning software integration—a rule that repudiated the Supreme Court's ostensibly regnant rule of per se illegality for tie-ins.¹¹⁶ The D.C. Circuit's rationale for so doing was its concern for the dynamic effects on innovation: "Applying per se analysis to . . . an amalgamation [of software] creates undue risks of error and of deterring welfare-enhancing innovation."¹¹⁷ So troubled was the Supreme Court by the D.C. Circuit's repeal of the per se rule as applied to software integration that the Court denied cert.¹¹⁸

The Antitrust Modernization Commission report from April 2007 provides a second major example of self-contradiction regarding the need to revise antitrust principles to accommodate consideration of dynamic efficiency. In its summary of recommendations, the AMC said that "no substantial changes to merger enforcement policy are necessary to account for industries in which innovation, intellectual property, and technological change are central features."¹¹⁹

¹¹¹ *United States v. Microsoft Corp.*, 253 F.3d 34 (D.C. Cir. 2001).

¹¹² *Id.* at 49.

¹¹³ *Id.*

¹¹⁴ Posner, *Antitrust in the New Economy*, *supra* note 14.

¹¹⁵ *Microsoft*, 253 F.3d at 50 ("As an initial matter, we note that there is no consensus among commentators on the question of whether, and to what extent, current monopolization doctrine should be amended to account for competition in technologically dynamic markets characterized by network effects.")

¹¹⁶ *Id.* at 89-90.

¹¹⁷ *Id.* at 90-91.

¹¹⁸ *United States v. Microsoft Corp.*, 534 U.S. 952 (2001) (denial of certiorari).

¹¹⁹ ANTITRUST MODERNIZATION COMMISSION, REPORT AND RECOMMENDATION 9 (Apr. 2007), available at http://www.amc.gov/report_recommendation/amc_final_report.pdf.

Nevertheless, the same report recommended two pages later that the Antitrust Division and the FTC “update the Merger Guidelines to explain more extensively how they evaluate the potential impact of a merger on innovation.”¹²⁰ So, again, in one breath the AMC said that antitrust as we know it is competent to analyze innovation issues, while in the next breath it said that the Guidelines should be revised, presumably because the manner in which the enforcement agencies evaluate innovation is unclear or unpersuasive, or both.

If a lesson can be generalized, it is that one should approach with considerable skepticism the august pronouncements of the suppleness of existing antitrust doctrine to accommodate consideration of dynamic efficiency. It is time for the antitrust enforcement agencies and the courts to address forthrightly the challenge of developing more dynamically efficient merger guidelines. Achievement of that goal would lay the foundation for an analogous refinement of substantive rules of liability, defenses, and remedies across antitrust law generally.

5. *Intellectual Candor and the Silent Revision of the Merger Guidelines*

Infusing antitrust analysis with principles of Schumpeterian competition is a good thing. But so is intellectual candor and transparency in the decision making of those who make and enforce antitrust policy. So, while we applaud the evolution toward an antitrust jurisprudence predicated on dynamic competition, we prefer that the process be more transparent and explicit. A recent merger during the George W. Bush Administration illustrates the difficulty of trying to revise the Merger Guidelines without announcing that intention.

As we noted earlier, in public remarks in October 2007, former Assistant Attorney General Thomas Barnett strongly endorsed the primacy of innovation over static competition as the engine that produces large gains in consumer welfare.¹²¹ In the Antitrust Division’s official actions, that belief manifested itself most tangibly in the decision not to oppose the merger of XM Satellite Radio Holdings Inc. and Sirius Satellite Radio Inc., the only U.S. licensed providers of satellite digital audio radio services (SDARS). The horizontal combination of the only two SDARS providers would have constituted a merger to monopoly—if the Antitrust Division had deemed SDARS to constitute a relevant antitrust product market. The Division’s press release in March 2008 explaining the basis for not prosecuting the merger accepted dynamic competition arguments concerning market definition, market power, competitive

¹²⁰ *Id.* at 11.

¹²¹ Barnett, *supra* note 104.

effects, and merger-specific efficiencies.¹²² In that respect, the decision not to prosecute may reflect the kind of neo-Schumpeterian analysis that we endorse here.

As we have explained, the Merger Guidelines as of this writing in late-2009 still officially embody a static view of competition. Consequently, it is difficult to find language in the Guidelines consistent with the methodology that the Division employed in reaching its decision not to challenge the XM-Sirius merger in 2008. It is, of course, possible that merger enforcement in practice had already deviated from the written Merger Guidelines, just as practice before many federal agencies rests on unwritten norms as much as the written law. In terms of implementing change, the matter would be simpler if the Division had the discretion to change its guidelines at will to reflect a new prosecutorial agenda. A distinguishing characteristic of the rule of law, however, is that it constrains discretion. The complication arises because of the prior success of the Division and the FTC in persuading the federal courts to embed the economic reasoning of the Merger Guidelines into substantive antitrust doctrine—and not doctrine necessarily confined to the law of mergers. (An illustration of that success is that both the majority and the dissent in the recent *Whole Foods* merger decision in the D.C. Circuit defended its view as consistent with the reasoning of the Guidelines.¹²³)

The difference between static antitrust analysis and dynamic antitrust analysis is evident in how XM and Sirius urged the government to define the relevant product market. The Merger Guidelines specify the kind of evidence that may inform market definition: “Market definition focuses *solely* on demand substitution factors—i.e., possible consumer responses.”¹²⁴ Applied here, to expand the product market beyond satellite radio (the narrowest possible set of products), one must demonstrate that satellite radio subscribers shift their demand between satellite radio and other forms of audio entertainment (for example, terrestrial radio) in response to a relative change in the prices of those services.¹²⁵ XM and Sirius failed to demonstrate any evidence of buyer

¹²² Statement of the Department of Justice Antitrust Division on Its Decision to Close Its Investigation of XM Satellite Radio Holdings Inc.’s Merger with Sirius Satellite Radio Inc. (Mar. 24, 2008) [*Decision to Close Investigation*].

¹²³ Compare *FTC v. Whole Foods Markets, Inc.*, 553 F.3d 869, 878, 886 (D.C. Cir. 2008), with *id.* at 893 (Kavanaugh, J., dissenting).

¹²⁴ U.S. DEPARTMENT OF JUSTICE & FEDERAL TRADE COMM’N, HORIZONTAL MERGER GUIDELINES, *supra* note 5, § 1.0 (emphasis added).

¹²⁵ *Id.* § 1.11 (“In considering the likely reaction of buyers to a price increase, the Agency will take into account all relevant evidence, including, but not limited to, the following: (1) evidence that buyers have shifted or have considered shifting purchases between products in response to relative changes in price or other competitive variables; (2) evidence that sellers base business

substitution in response to changes in relative prices. Through their economists, XM and Sirius argued that such evidence was hard to find because satellite radio prices had not changed between 2005 and 2007. More importantly, they argued that dynamic demand considerations in the satellite radio industry undercut the utility of the demand-side test for market definition contained in the Merger Guidelines. The vast majority of XM's and Sirius's inferences were based on *supply-side* information, which the Merger Guidelines currently exclude when defining product markets, except in rare cases in which decisions by sellers can serve as a proxy for how buyers would react to a change in relative prices.¹²⁶ The fact that entrepreneurs may be designing new audio devices in their garages in Silicon Valley does not inform the ultimate question of whether, over the two years following the announcement of the merger, satellite radio customers would substitute away from satellite radio to another audio device in response to a change in relative prices.

Defining markets and measuring post-merger market power are two sides of the same coin. If outside products constrain the price of the merged entity, then the market should be expanded and the merged firm will be more likely to be found to lack market power. Section 7 of the Clayton Act prohibits any merger, "the effect of [which] may be substantially to lessen competition, or to tend to create a monopoly."¹²⁷ The Division explained that it decided not to challenge the XM-Sirius merger "because the evidence did not show that the merger would enable the parties to profitably increase prices to satellite radio customers for several reasons."¹²⁸ However, two of the four factors that the Division then listed were unrelated to the ability of a merged firm to raise price, such as "a lack of competition between the parties in important segments even without the merger" and "efficiencies likely to flow from the transaction that could benefit consumers."¹²⁹ Thus, the Division's competitive-effects conclusion had to rest on two other factors: "the competitive alternative services available to consumers" and "technological change that is expected to make those alternatives increasingly attractive over time."¹³⁰

decisions on the prospect of buyer substitution between products in response to relative changes in price or other competitive variables; (3) the influence of downstream competition faced by buyers in their output markets; and (4) the timing and costs of switching products.").

¹²⁶ *Id.* § 1.0 ("Supply substitution factors—i.e., possible production responses—are considered elsewhere in the Guidelines in the identification of firms that participate in the relevant market and the analysis of entry.").

¹²⁷ 15 U.S.C. § 18.

¹²⁸ *Decision to Close Investigation*, *supra* note 122.

¹²⁹ *Id.*

¹³⁰ *Id.*

The XM-Sirius satellite radio merger implicated Schumpeterian competition in several respects, the most significant being whether the relevant product market should be defined strictly in terms of consumer-substitution choices. If the market had been defined to consist exclusively of satellite radio, which was being supplied by only two firms, then analysis of the merger would have been trivial. A merger to monopoly would result and drive the Herfindahl-Hirschman Index (HHI) to its limit of 10,000.

Consequently, the merging parties cast the question as whether consumer considered iPods, streaming audio over wireless Internet, and other kinds of electronic devices to be substitutes for satellite radio. To define the relevant product market, the Horizontal Merger Guidelines evaluate consumer substitution in terms of whether, over a two-year horizon, a five-percent price increase by a hypothetical monopolist of the product in question would be profitable. This exercise is the evaluation of a small but significant nontransitory increase in price (SSNIP). The SSNIP test focuses on consumer substitution. Supply substitution (including entry) is not considered until after market shares are calculated solely on the basis of the static, consumer-oriented market definition. One can dispute whether that approach is good economics; as a matter of law, however, the static approach was the law. The D.C. Circuit in *Microsoft* and the Antitrust Modernization Commission in its report essentially said that the static perspective reflected in the Horizontal Merger Guidelines is adequate to address to technologically dynamic industries, such that a neo-Schumpeterian revision of the Guidelines is unnecessary.

During the review of the XM-Sirius merger by the Antitrust Division and the Federal Communications Commission (FCC), however, it became clear that on multiple issues—relevant market, market power, entry, and merger efficiencies—the enforcement agencies were disinclined to challenge the merger and were, in practice, undertaking a dynamic competition analysis without so characterizing it. Is this dynamic competition gloss bad? It is not bad if one is a Schumpeterian and considers dynamic competition arguments to be valid. But there is a cost to pretending that one is not changing substantive rules when one really is.

We recommend transparency and dialogue, which we hope will result from the review of the Merger Guidelines initiated by the FTC and the Antitrust Division in September 2009. The enforcement agencies should be candid and unambiguous about how and when they intend to depart from the old, static competition version of the Guidelines. The federal courts should be clearer about whether they believe that authority or reason legitimates the Guidelines. It remains to be seen whether the Antitrust Division's analysis in the XM-Sirius merger represented the adoption of an unapologetically dynamic approach to

merger analysis—and to antitrust analysis more generally. As the *Whole Foods* case suggests, however, it is valuable for the antitrust enforcement agencies to revisit the Merger Guidelines explicitly, rather than leave courts, businesses, and the lawyers advising them to speculate on whether—and where—the agencies no longer embrace the explicitly static view of competition articulated in the plain language of the Guidelines.

6. *Symmetric Time Horizons for Merger Analysis*

One manifestation of the difference between static analysis and dynamic analysis is the relevant time horizon for evaluating a number of issues that arise not only in mergers, but also in all big section 1 and section 2 cases. Is a two-year period appropriate for the purpose of defining markets and evaluating market power? Should we evaluate substitution from entrants over the same period of time? A major inconsistency in merger and antitrust cases concerns the proper time horizon for evaluating the feasibility of proposed remedies.¹³¹ In a merger case, the antitrust enforcement agency may evaluate market power over two years yet seek conditions on approval of the merger that extend many more years into the future.

This approach to establishing a time horizon is intellectually inconsistent. It is selectively Schumpeterian. We believe intuitively that symmetry ought to exist between the length of time used to evaluate market power and the period of time over which the enforcement agencies and the courts consider themselves professionally competent to fashion sensible remedies. At the very least, some kind of guideline of the enforcement agencies should squarely address the issue of developing an appropriate time horizon, even if the ultimate policy choice differs from our preference that the two time frames be identical.

In broader terms, we recommend that, in addition to revisiting the Horizontal Merger Guidelines, the Antitrust Division and FTC promulgate guidelines of general applicability for market definition, market power, efficiency defenses, and remedies.

7. *Mergers Involving Multi-Sided Platforms or Markets*

The Horizontal Merger Guidelines look dated in the more nuanced antitrust matters that routinely arise today. For example, a recurring phenomenon in many high-tech mergers is a two-sided market (or, as David Evans prefers to describe it, a multi-sided platform), as in the case of credit cards.¹³² In a multi-

¹³¹ See, e.g., Shelanski & Sidak, *supra* note 7 at 79-80.

¹³² The seminal paper is William F. Baxter, *Bank Exchange of Transactional Paper: Legal and Economic Perspectives*, 26 J.L. & ECON. 541 (1983).

sided market, two or more sets of consumers exist for the product. The aggregate demand is the vertical summation of their demand curves. However, the demand curves are not necessarily equidistant from the origin or sloped in the same way. Consequently, in a multi-sided market there will be a different demand elasticity and a different willingness to pay for each set of consumers. These characteristics of multi-sided markets are central to the network neutrality debate and to antitrust issues in network industries such as telecommunications, financial services, and internet search.¹³³

It is fanciful to suggest, in a paroxysm of antitrust originalism, that the Merger Guidelines are already capable of addressing this subtlety. Only recently, and principally in the academic literature, have economists derived a SSNIP test for a multi-sided platform.¹³⁴ Multi-sided platform interactions are often strong evidence that some important new product has been created—perhaps through innovations in finance or information management or market intermediation. Given the importance and prevalence of multi-sided platforms and markets, and given the potential for multi-sided platforms to create large consumer welfare gains, the Antitrust Division and the FTC should clarify how they will evaluate market definition and market power with respect to multi-sided platforms and markets.

8. *Ancillary Revenue Streams, Bankruptcy, and State Ownership*

An issue related to the phenomenon of a multi-sided platform or market is the strategy of companies “giving away stuff for free”—in essence, Google’s business model for search and other web-based services. We call this phenomenon the “ancillary revenue stream problem.” In a multi-sided market, a company generates revenue from one set of customers and gives away (or subsidizes) products or services demanded by another set of customers. This problem is as old as the newspaper subscriptions and newspaper advertisements that provided separate but complementary revenue streams in *Albrecht v. Herald Co.*¹³⁵

¹³³ See J. Gregory Sidak, *A Consumer-Welfare Approach to Network Neutrality Regulation of the Internet*, 2 J. COMPETITION L. & ECON. 349 (2006).

¹³⁴ See, e.g., David S. Evans & Michael D. Noel, *The Analysis of Mergers that Involve Multisided Platform Businesses*, 4 J. COMPETITION L. & ECON. 663 (2008); Elena Argentesi & Lapo Filistrucchi, *Estimating Market Power in a Two-Sided Market: The Case of Newspapers*, 22 J. APPLIED ECONOMETRICS 1247 (2007); Dennis L. Weisman, *Assessing Market Power: The Trade-Off between Market Concentration and Multi-Market Participation*, 1 J. COMPETITION L. & ECON. 339 (2005).

¹³⁵ 390 U.S. 145 (1968).

How does the business model of providing free or subsidized goods dovetail with traditional antitrust case law on a subject like predatory pricing? How does a court apply a predation rule in a market where one set of firms sells the product for a positive price while another firm (following a different business model entirely) gives away the same product for free because it derives an ancillary revenue stream elsewhere?

Consider the much-scrutinized case of *Aspen Skiing*,¹³⁶ a 1985 Supreme Court decision now experiencing renewed respectability in light of the laudatory comments directed to the opinion by Assistant Attorney General Varney when she rescinded the Antitrust Division's report on monopolization in May 2009.¹³⁷ In *Aspen Skiing*, the Supreme Court was particularly troubled that the vertically integrated firm would not sell wholesale access to its ski slopes even when the competitor offered to pay the full retail price of a lift ticket. When analyzing a case like this one, where the prevailing business practice seems inexplicable when compared with simplistic static models of the firm and its objectives, it is useful to search for an ancillary revenue stream, which may or may not be described in the court's opinion. If an ancillary revenue stream exists, it might provide a simple explanation for firm behavior that, if viewed narrowly either across transactions or over time, might impress a court as being irrational and non-profit-maximizing.

New economic theories of anticompetitive effects tend toward complexity in part because the intellectual payoff to academic economists within the leading research universities increases with the technical complexity of those novel theories. It is important to remember Occam's razor when evaluating these theories as sources of guidance for enforcement agencies and courts. With all due respect to Assistant Attorney General Varney, we believe that *Aspen Skiing* is, and will forever remain, an incoherent decision because the Supreme Court decided the case on a record that suggests a startling lack of curiosity by the trial court and an equally startling lack of sophistication by defense counsel in explaining the economic justifications for the business practices at issue.

9. *Subtler Counterfactuals in Merger Analysis*

The courts and antitrust enforcement agencies should think more precisely about counterfactuals—not only in the context of the Horizontal Merger Guidelines, but in antitrust law more generally. There can be little doubt that, as a positive

¹³⁶ *Aspen Skiing Co. v. Aspen Highlands Skiing Corp.*, 472 U.S. 585 (1985).

¹³⁷ Christine A. Varney, *Vigorous Antitrust Enforcement in This Challenging Era*, Remarks as Prepared for the Center for American Progress (May 11, 2009), *available at* <http://www.usdoj.gov/atr/public/speeches/245711.htm>.

matter, the Antitrust Division and the FTC already contemplate counterfactuals when reviewing a merger. The intentionally political structure of the FTC surely encourages the consideration of counterfactuals at that agency. But the consideration of counterfactuals should be coherent and transparent. To take an example relevant to defining markets under the SSNIP test, it is possible that particular sectors of the U.S. economy will experience deflation in the aftermath of the Panic of 2008. If so, then the counterfactual for a proposed merger may be that prices that would otherwise fall might be stabilized.

This concern over the relevant counterfactual was known to the Antitrust Division and the FCC in the XM-Sirius merger. Prices were not likely to rise after a merger—to the contrary, the merging companies “voluntarily” consented to a temporary price cap.¹³⁸ Instead, the more likely competitive effect of the merger would be an increase in the amount of commercial time inserted into the subscription-based programming. Consequently, the proper counterfactual in the XM-Sirius merger was not a price increase, but rather a degradation in product quality while the subscription price remained constant. Of course, one could simply recast that competitive effect as a quality-adjusted price increase: after the merger, the candy bar would get smaller, even if the price on the wrapper did not change.

In a revised set of Horizontal Merger Guidelines, it would also be useful to examine counterfactuals in another way, particularly in the case of financially distressed firms. If the merger were blocked, would an alternative transaction (or set of transactions) having a lesser risk of reducing competition be likely to occur? In the case of XM and Sirius, for example, was it plausible for another company to acquire one of the merging firms? Could two alternative acquisitions have occurred, such that each of the only satellite radio companies could have merged with a firm other than its closest competitor? It bears emphasis that this kind of counterfactual inquiry is *not* a failing-firm defense. Rather, it is a kind of neo-Schumpeterian inquiry, consistent with the grander scope of this article, to scrutinize mergers in a more dynamic sense that recognizes that the boundaries of the firm evolve as innovations in technology, finance, information management, or other capabilities reveal that the firm’s existing products are more efficiently offered to consumers in combination with other, complementary products.

¹³⁸ See Farrell Malone & J. Gregory Sidak, *Should Antitrust Consent Decrees Regulate Post-Merger Pricing?*, 3 J. COMPETITION L. & ECON. 471 (2007); J. Gregory Sidak & Hal J. Singer, *Evaluating Market Power with Two-Sided Demand and Preemptive Offers to Dissipate Monopoly Rent: Lessons for High-Technology Industries from the Antitrust Division’s Approval of the XM-Sirius Satellite Radio Merger*, 4 J. COMPETITION L. & ECON. 697 (2008).

10. The Adverse Consequences of Inaction

For all the reasons discussed above, the antitrust enforcement agencies should revise the Horizontal Merger Guidelines to take dynamic competition concerns explicitly into account. We conclude our discussion of merger enforcement by adding one cautionary tale. If the antitrust enforcement agencies do not exercise leadership by revising the Horizontal Merger Guidelines, the counterfactual is not necessarily the perpetuation of the status quo. It is more likely that sector-specific regulatory agencies will fiddle with merger policy in pursuit of goals far removed from, or even antithetical to, the maximization of consumer welfare.

The U.S. economy will undoubtedly be more heavily regulated under President Obama than under President George W. Bush. The federal government will play a greater role in ownership and control of business enterprises. Regulatory agencies are more likely to acquire than relinquish powers. To take one regulatory agency, consider how the FCC has conducted merger analysis in comparison with how the Antitrust Division and FTC conduct it. We foresee a risk of sector-specific regulatory bodies performing considerable amounts of bad antitrust analysis. In the XM-Sirius satellite radio case, the FCC came to the same conclusion as the Antitrust Division that the merger should be allowed. But the FCC did so by reasoning that contradicted the Antitrust Division's analysis of market definition. To justify continuation of the structural regulation of terrestrial broadcasting, the FCC needed to explain why the merger was not unlawful without saying that terrestrial radio, iPods, and streaming audio over wireless Internet are all in the same product market as satellite radio.¹³⁹ The FCC, in essence, said that the Antitrust Division reached the correct answer through faulty reason. Such agency conduct diminishes legal clarity and certainty.

Multiply that incident by the number of sector-specific approvals that will be required as the many newly nationalized companies in the United States restructure themselves through mergers or acquisitions. It is unlikely that a coherent merger policy that recognizes the role of dynamic competition will emerge if the Antitrust Division and the FTC fail to act.

F. Intellectual Property Issues

Favoring dynamic competition over static competition does double duty. In addition to stimulating competition and innovation, it softens the tension in the

¹³⁹ In the Matter of Applications for Consent to the Transfer of Control of Licenses XM Satellite Radio Holdings, Inc., Transferor, to Sirius Satellite Radio Inc., Transferee, Memorandum Opinion and Order and Report and Order, 23 F.C.C.R. 12,384 (2008).

patent-antitrust debate. Static analysis views patents with considerable awkwardness and, consequently, fuels tension between the patent system and antitrust.

The DOJ-FTC Intellectual Property Guidelines have endeavored to reconcile the tension between intellectual property and antitrust by declaring that intellectual property is merely another form of property and by noting that patents imply market or monopoly power only if they enable control of a relevant market, which is rarely the case. Still, justifying the exclusivity provided by the patent system is not easy for many competition policy advocates. In practice, neoclassical economists are often hostile to patents because they believe that other mechanisms solve the appropriability problem naturally, a result that is often not the case.

Embracing dynamic competition eases tension between intellectual property and antitrust concerns. The patent system provides some amount of exclusion, and some amount of exclusion is required to foster innovation, particularly in more competitive market environments. Of course, once antitrust doctrine sees the promotion of innovation as its major goal, innovation and competition snap into greater harmony. But the harmony is not perfect, as questions remain with respect to the degree of intellectual property protection needed to foster innovation and competition. The cumulative or sequential nature of innovation means that policymakers need to calibrate intellectual property protection in a careful manner. Almost always the number of users of intellectual property will exceed the number of its generators; so the predictable public choice danger is that the users will try to crimp the scope of intellectual property rights provided to the generators.

VI. CONCLUSION

Antitrust scholars must confront an inconvenient truth: innovation drives competition as much as competition drives innovation. Thus, antitrust analysis must recognize that advancing dynamic competition will benefit consumers most, certainly in the long run if not also in the short run. The law has already begun to move in this direction, as have the enforcement agencies. The pace is glacial, however, in part because antitrust economics has trouble articulating, quantifying, and operationalizing dynamic concepts. The Chicago School in large measure inadvertently ignored dynamic competition by embracing static microeconomic theory. The post-Chicago economists have been almost as reluctant to embrace dynamic competition because their tools are inadequate. Fortunately, there has emerged a large body of research in evolutionary economics, the behavioral theory of the firm, and corporate strategy that

antitrust policymakers can use to mitigate the harmful unintended consequences of static analysis. If nothing else, a wider appreciation of the importance of dynamic competition for innovation and consumer welfare may temper the hubris that the uninformed sometimes bring to antitrust analysis.