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Antitrust, Multi-Dimensional Competition, and Innovation: Do We Have An Antitrust-Relevant Theory of Competition Now?

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Abstract

Harold Demsetz once claimed that “economics has no anti-trust relevant theory of competition.” Demsetz offered this provocative statement as an introduction to an economic concept with critical implications for the anti-trust enterprise: the multi-dimensional nature of competition. Competition does not take place upon a single margin, such as price competition, but several dimensions that are often inversely correlated such that a liability rule deterring one form of competition will result in more of another. This insight has important implications for the current policy debate concerning how to design anti-trust liability standards for conduct involving both static product market competition and dynamic innovative activity. The primary purpose of this essay is to revisit Demsetz’s broader challenge to anti-trust regulation in the context of the frequently discussed tradeoffs between innovation and price competition. I summarize recent developments in our knowledge of the relationship between competition and innovation, highlighting the deficiencies that significantly constrain anti-trust enforcers’ abilities to confidently calculate inevitable welfare tradeoffs. I conclude by discussing policy implications that follow from these limitations.

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I. INTRODUCTION

Understanding the complex relationship between competition and innovation is essential to the execution of the antitrust enterprise in our modern economy. The relationship has posed a significant challenge to antitrust economists at least since Joseph Schumpeter's suggestion that dynamic competition would result in "creative destruction" leading to a competitive process where one monopolist would replace another sequentially as new entrants developed a superior product.¹ Schumpeter's argument is often relied upon in support of the proposition that antitrust enforcers should be reluctant to intervene in product markets because short run welfare gains are likely to be swamped by a reduction in dynamic efficiencies associated with less innovation.² Of course, the Schumpeter argument can be pushed too far. In theory, it need not be the case that all welfare tradeoffs between static product market competition and dynamic efficiencies tilt in favor of the latter.

The well known and oft-discussed tensions between monopoly, innovation, and product market competition have generated a substantial literature concerning the appropriate role of antitrust enforcement in innovation.³ This debate has prompted numerous proposals from commentators concerning the best way to incorporate innovation into antitrust analysis, including the development of the "innovation market" concept⁴ as well as other frameworks for addressing innovation concerns in merger analysis.⁵

¹ Joseph Schumpeter, *CAPITALISM, SOCIALISM, AND DEMOCRACY* (1942).

² For an economic analysis of antitrust analysis in innovative industries focusing on single firm conduct, see David S. Evans & Richard Schmalensee, *Some Economic Aspects of Antitrust Analysis in Dynamically Competitive Industries*, in 2 *INNOVATION POLICY AND THE ECONOMY* 1-49 (Josh Lerner & Scott Sterns eds., 2002); Richard Schmalensee, *Antitrust Industries in Schumpeterian Industries*, 90 *AM. ECON. REV.* 192 (Papers and Proceedings, 2000).

³ Jonathan Baker, *Beyond Schumpeter vs. Arrow: How Antitrust Fosters Innovation* (unpublished working paper, 2007). For an excellent survey of the literature discussing the relationships between competition and innovation, see Richard Gilbert, *Looking for Mr. Schumpeter: Where Are We in the Competition-Innovation Debate?*, in 6 *INNOVATION POLICY AND THE ECONOMY* 159 (Adam B. Jaffe, Josh Lerner & Scott Stern eds., 2006).

⁴ Richard Gilbert & Steven Sunshine, *Incorporating Dynamic Efficiency Concerns in Merger Analysis: The Use of Innovation Markets*, 63 *ANTITRUST L.J.* 569 (1995).

⁵ Michael L. Katz & Howard A. Shelanski, *Mergers and Innovation*, 74 *ANTITRUST L.J.* 1 (2007).

Federal agency officials have also demonstrated a concern for antitrust policy that overreaches by attempting to increase short run product market competition at the expense of dynamic efficiencies created by innovation.⁶

There have also been discussions concerning whether reform of the antitrust laws is necessary in industries where innovation, intellectual property, and technological change are essential components of the competitive process. The emerging consensus appears to be that economic analysis and learning are a sufficient basis to conclude that antitrust *should* incorporate dynamic efficiencies into the current framework by accounting for the impact of competition to engage in research and development for new or improved goods, services, or processes. For example, the Antitrust Modernization Committee recommendations and findings conclude that:

“[C]urrent antitrust analysis has a sufficient grounding in economics and is sufficiently flexible to reach appropriate conclusions in matters involving industries in which innovation, intellectual property, and technological change are central features.”⁷

The debate thus appears to be moving beyond a discussion of “whether” antitrust should account for innovation and towards a fruitful discussion regarding the appropriate methodology for doing so. These developments have the potential to improve antitrust analysis and benefit consumers. An antitrust regime that ignores dynamic efficiencies and innovation and focuses solely on static product market competition is unlikely to improve consumer or total welfare. A regime paralyzed by the fear of deterring innovation such that it fails

⁶ See, e.g., Thomas O. Barnett, Assistant Attorney General, Antitrust Division, *The Gales of Creative Destruction: The Need for Clear and Objective Standards in Enforcing Section 2 of the Sherman Act* (June 20, 2006), available at <http://www.ftc.gov/os/sectiontwohearings/docs/Barnett-statement.pdf>; Gerald F. Masoudi, Deputy Assistant Attorney General, Antitrust Division, *Intellectual Property and Competition: Four Principles for Encouraging Innovation* (April 11, 2006), available at <http://www.usdoj.gov/atr/public/speeches/215645.htm>; Todd J. Zywicki, Director, Office of Policy Planning, Federal Trade Commission, *How Should Competition Policy Transform Itself* (Nov. 20, 2003), available at <http://www.ftc.gov/speeches/other031120zywickijapanspeech.pdf>.

⁷ Antitrust Modernization Committee Recommendations and Findings 38 (2007).

to intervene in product markets where consumers are threatened by anticompetitive conduct would not fare any better. Accounting for dynamic efficiencies in antitrust analysis is consistent with current antitrust law and policy objectives and would be a desirable goal if such an accounting can be carried out in a manner that the benefits outweigh the sum of administrative and error costs.

The condition in the last sentence is not trivial. Our economic knowledge regarding innovation itself, conduct affecting innovation, and how to assess competitive outcomes involving tradeoffs between product market competition and innovation are far less impressive than our knowledge in a purely static setting. The costs of false positives leading to a chilling of pro-competitive innovation are significant. It is therefore critical to assess the state of our economic learning related to antitrust analysis of competitive effects in markets where innovation is an important component of the competitive process. Can economic theory and empirical knowledge provide a sufficient basis for identifying those instances innovation or conduct impacting innovation will harm consumers?

While the emerging consensus appears to answer this question in the affirmative, this paper argues that the incorporation of innovation considerations into antitrust analysis is a more difficult enterprise than has generally been appreciated if one is faithful to the theoretical and empirical underpinnings of antitrust analysis. The primary reason for this difficulty is that antitrust enforcers must predict competitive outcomes in the context of rivalry on multiple dimensions which are negatively correlated. The concept that rivalry between firms occurs on a multitude of margins, and not just price or innovation, is generally well understood. Firms compete on price, output, reputation, quality, innovation, and cost. In many cases, though not all, these forms of rivalry are negatively correlated. This inverse correlation implies that regulators or judges must determine which bundle of competitive forms maximizes efficiency (or consumer welfare) in the face of welfare tradeoffs between these activities. The motivation of this article is to reexamine the policy implications of the multi-dimensional nature of competition in light of the current focus on innovation in antitrust analysis.

This article is a *reexamination* of the implications of multi-dimensional competition for antitrust analysis because the problem was long ago recognized and discussed in greater detail by Harold Demsetz. Demsetz began an address in honor of the 100th anniversary of the Sherman Act with the provocative claim: “*We do not yet possess an antitrust-relevant understanding of competition.*”⁸ Demsetz argued that the ubiquity of multiple and negatively correlated forms of competitive rivalry, such as price and innovation, had important implications for the antitrust enterprise. Specifically, antitrust intervention would result in a substitution of a different mix of competitive forms. The ability of antitrust intervention to improve consumer welfare depends on our knowledge of these technical rates of substitution between various competitive forms. Economic theory, Demsetz argued, provided no such basis.

Part II begins with a more detailed articulation of Demsetz’s claim that economics offers no theory upon which antitrust regulators and judges could confidently determine which business practices maximizes “competition,” efficiency, or consumer welfare. Part III summarizes some recent proposals for incorporating innovation effects into antitrust analysis in light of the Demsetz critique explored in Part II. Part IV discusses recent developments in economic theory and empirical learning concerning the relationship between competition and innovation. Part V explores the policy implications of the analysis.

II. THE MULTI-DIMENSIONAL NATURE OF COMPETITION

⁸ Harold Demsetz, *100 Years of Antitrust: Should We Celebrate?*, Brent T. Upson Memorial Lecture, George Mason University School of Law, Law and Economics Center (1991) (including comments by Robert Pitofsky, Richard Schmalensee, Robert H. Bork, and Ernest S. Gellhorn) [hereinafter “*100 Years*”]. Demsetz closed the speech with the following assessment of the antitrust enterprise: “I see little cause to rejoice greatly or to be remorseful over the 100-year history of the Sherman Act.” *Id.* at 12. Former Federal Trade Commission Commissioner Thomas Leary described the reaction of the audience as: “stunned when one of the vocal proponents of what came to be known as Chicago-School antitrust – a school of thought that was popularly supposed to believe in the supremacy of simple, straightforward theories – opened his lecture with [this] shocking statement.” Thomas B. Leary, *Antitrust Economics: Three Cheers and Two Challenges* (paper based on earlier speeches), available at <http://ftc.gov/speeches/leary/learythreecheers.htm>. Commissioner Leary has noted that the antitrust community “did not pay enough attention to the arguments on which [Demsetz] based his ultimate conclusions.” *Id.*

That competition takes place on many different margins is not or should not be controversial.⁹ Firms devote resources to any number of activities in the pursuit of profit-maximization. Firms might reduce prices, innovate by improving existing products or creating new ones, invest in their reputation, lower costs by increasing firm size and exploiting scale economies, or attempt to influence consumer tastes. Antitrust commentators would characterize these activities as “*competition on the merits*.”¹⁰ But not all forms of competitive rivalry are or should be considered “meritorious” from an antitrust perspective. Consider, for example, the well-worn example of the firm that blows up a rival’s factory. These forms of competition are beyond the scope of this analysis as it suffices to point out that consumer welfare-enhancing forms of rivalry are numerous and go well beyond price competition.

A description of the multiplicity of competition is merely the jumping off point for Demsetz’s critique of the antitrust enterprise. A proper understanding of the competitive process identifies the error in an antitrust policy that favors maximizing one dimension of competition, such as price competition, which merely encourages substitution towards some other form of competition. Whether this substitution represents an improvement in antitrust policy cannot be determined without knowledge of the technical substitutabilities involved between these forms. Our lack of knowledge regarding these technical rates of substitution between forms of competition is the key premise of Demsetz’s argument.

Demsetz claimed both that the appropriate policy goal for antitrust regulation cannot be to *increase* competition in the absolute but “*to select the ‘best’ mix of competitive forms,*”¹¹ and that economics had been incorrectly presumed

⁹ Acceptance of this proposition, however, illustrates the folly in reliance upon the model of perfect competition for antitrust policy. Demsetz notes that the model of perfect competition is only “incidentally” related to price competition and explicitly ignores innovation in the form of technological change, competition by size of firm to exploit scale economies, and reputational competition. *100 Years, supra* note 8, at 3.

¹⁰ The D.C. Circuit in *Microsoft* defined “competition on the merits” as conduct that results in “greater efficiency or enhanced consumer appeal.” See *United States v. Microsoft Corp.*, 87 F. Supp. 2d 30 (D.D.C. 2000), *rev’d in part, aff’d in part*, 253 F.3d 34 (D.C. Cir. 2001), *cert. denied*, 534 U.S. 952 (2001).

¹¹ *100 Years, supra* note 8, at 4.

capable of moving regulators toward that goal in large part because of a heavy and misplaced reliance on the model of perfect competition.¹² These claims rest on three economic propositions.

The first is that competition may, and usually does, take place on multiple dimensions. The multi-dimensional nature of competition has already been mentioned and is easily verified through casual empiricism with a walk through the supermarket. This proposition is the least controversial of the three and requires little elaboration.¹³

The second is that the degree of competition associated with one activity is often *negatively correlated* with the degree of competition associated with others and that this negative correlation means that a policy selecting the optimal mix of competitive forms *requires* knowledge of the technical rates of substitution between these forms.

The third proposition is that economic theory does not provide an analytically coherent method to equalize measures of intensity, efficiency, or consumer welfare. The third proposition entails both a theoretical and empirical component. On one hand, economic theory does not tell us enough about these technical rates of substitution between competitive forms to contribute to policy analysis. On the other, empirical knowledge might substitute where theory falls short. Therefore, the claim also depends, at least to some degree, on a level of empirical knowledge regarding the rates of technical substitution between competitive forms insufficient to determine which competitive mix maximizes consumer welfare in a given setting.

The combination of these three propositions led Demsetz to the following *antitrust impossibility theorem*:

“If we agree that many relevant forms of competition relate inversely to each other and that no plausible method exists for converting intensities of different forms of competition into a common unit of intensity, then, it would seem, we also must

¹² Harold Demsetz, *The Intensity and Dimensionality of Competition*, in *THE ECONOMICS OF THE BUSINESS FIRM: SEVEN CRITICAL COMMENTARIES* 137, 142 (1995) [hereinafter “*Intensity and Dimensionality*”].

¹³ *Id.*

*agree that the Sherman Antitrust Act is logically impossible to carry out if its goal is interpreted as increasing the overall intensity of competition (or to reducing the overall intensity of monopoly)."*¹⁴

In Demsetz's view, ignorance regarding these policy-relevant technical rates of substitution across competitive activities would lead to the substitution of political whims and an antitrust policy that can only be described as an expression of tastes.¹⁵ Demsetz concluded that the satisfaction of these subjective preferences rather than any objective measure of competitive intensity was the only "conceptually feasible" goal.¹⁶

Of course, modern antitrust commentators will probably agree with Demsetz on this claim, but point out that there is now consensus that antitrust analysis proceeds by asking whether the challenged business practice harms consumers or reduces total welfare.¹⁷ At least one commentator responded to Demsetz's address by pointing out that these welfare standards were likely to provide a more fruitful avenue for antitrust policy:

*"I would argue that antitrust, to the extent that it's driven by economics, is not about the process of competition, but about welfare-enhancing or consumer-welfare-enhancing outcomes. It does not follow from accepting these points that Professor Demsetz's conclusions are wrong, however. Indeed, the framework to which they lead supports his basic point: we don't have an antitrust-relevant understanding of competition; not necessarily the process of competition, but the consequences it produces."*¹⁸

¹⁴ *Id.* at 144.

¹⁵ *100 Years*, *supra* note 8, at 4-5.

¹⁶ *Id.*

¹⁷ See Ken Heyer, *Welfare Standards and Merger Analysis: Why Not the Best*, 2 COMPETITION POLICY INT'L 29 (2006) (advocating the total welfare standard); Steven C. Salop, *Exclusionary Conduct, Effect on Consumers, and the Flawed Profit-Sacrifice Standard*, 73 ANTITRUST L.J. 311 (2006) (advocating the consumer welfare standard).

¹⁸ *100 Years*, *supra* note 8, at 18-19. Schmalensee also noted that the modern industrial organization literature produced results "only slightly less nihilistic than the results that emerge from Professor Demsetz's framework." *Id.* at 19. Professor Muris has made a similar point in discussing the economic literature on bundling. Timothy J. Muris, *Comments on Antitrust Law, Economics, and Bundled Discounts*, submitted to the Antitrust Modernization

However, the improvement offered by objective standards is not that it resolves the need to understand the technical rates of substitution between competitive forms when multi-dimensional competition is at issue, but rather imposes a mode of analysis that would generate substantial agreement over a larger set of antitrust cases.¹⁹ Demsetz had the foresight to anticipate this objection and noted without much elaboration that the underlying logic of his critique applied equally to efficiency.²⁰

Antitrust enforcement will generally result in a substitution from one bundle of competitive forms to another where post-intervention we observe more of some types of competition and less of others. This complicates consumer welfare calculations because it requires some knowledge of the magnitude of this substitution effect and how to make welfare tradeoffs in this setting. A primary theme of this essay is that neither economic theory nor empirical evidence, at this stage, provides a sufficient basis for confident predictions regarding antitrust enforcement in this context.

III. ACCOUNTING FOR INNOVATION IN ANTITRUST

There is general agreement that antitrust enforcement should account for innovation, that is, ensure that antitrust is neither an obstacle to technological progress that results in desirable innovation nor permits the exercise of monopoly power to impede innovation. The interesting policy question is not whether, but how antitrust analysis should incorporate innovation concerns into its framework.²¹

Commission (July 15, 2005), *available at* http://www.amc.gov/commission_hearings/pdf/Muris.pdf.

¹⁹ *100 Years*, *supra* note 8, at 19 (“Professor Demsetz and I – and indeed this whole panel – would undoubtedly agree about a large set of antitrust cases, that is, we would agree that certain outcomes were or were not likely to enhance consumer welfare or overall economic efficiency”).

²⁰ *Id.* at n.1 (“[V]ery little of the discussion to follow needs to be changed if the promotion of efficiency were to be substituted for [competitive intensity]. We also do not yet possess an antitrust-relevant understanding of efficiency.”).

²¹ *See* Katz & Shelanski, *supra* note 5, at 4 (2007) (“there is little consensus among scholars, policy makers, or practitioners about ... the appropriate degree of governmental intervention in markets with significant actual or potential innovation”).

At least two approaches to incorporating dynamic efficiencies into antitrust analysis have been considered. The first approach involves expanding the existing standard framework for analyzing product markets to consider dynamic efficiencies. For example, the Antitrust Modernization Committee appears to endorse this approach with its recommendation that the antitrust laws not be changed to apply different rules to industries where innovation is important and that antitrust enforcers “carefully consider market dynamics in assessing competitive effects.”²² A second approach, which has stimulated much debate in the antitrust literature, involves the “innovation market” concept,²³ which would shift the focus of antitrust analysis from potential product market competition to innovative rivalry as the unit of analysis.

The choice of framework is critically important to antitrust analysis, as are the details regarding what evidence will be sufficient to shift plaintiffs prima facie burden and what presumptions will apply, if any, in the innovation context. One important concern regarding how dynamic efficiencies and innovation-related welfare gains and losses are incorporated into either mode of antitrust analysis is that the presumptions of the conventional analysis, such as those associated with industry concentration or firm size, need not carry over to innovation as a theoretical or empirical matter. I briefly summarize the two competing approaches.

A. Innovation Effects in Conventional Product Markets

The prevailing approach to dynamic efficiencies has been to incorporate the potential consequences of innovative activity into conventional product market analysis. While some have argued that this approach does not sufficiently account for the significance of innovative rivalry, there is no doubt that antitrust analysis of both mergers and single firm conduct is generally not limited to solely static concerns.

²² Antitrust Modernization Commission Report 38-46 (2007). For the purposes of discussion here, the use of “technology markets” is a subset of conventional product market analysis.

²³ DOJ/ FTC ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY § 3.2.3 (“an innovation market consists of the research and development directed to a particular new or improved goods or processes, and the close substitutes for that research and development”). See Gilbert & Sunshine, *supra* note 4.

Conventional merger review, for example, is necessarily forward-looking. Pursuant to the analytical approach set forth by the Horizontal Merger Guidelines,²⁴ agencies challenge mergers which they believe will result in the post-merger firm gaining the power to control market output and prices and thereby reduce consumer welfare. The presence of significant innovative activity by merging firms introduces complications at both the market definition and competitive effects stages of the analysis.

The market definition stage, where economists evaluate which goods and services are sufficiently close substitutes to those produced by the merging firms, is complicated by innovation considerations.²⁵ Innovation blurs the boundaries at the heart of product market definition because the Merger Guidelines' framework requires prediction of future substitution possibilities in the context of a rapidly changing competitive landscape. Such concerns have led some to argue that market definition will systematically lead to overly narrow markets in the context of rapid innovation.²⁶

Innovation considerations also complicate the competitive effects analysis.²⁷ For example, a merger which may impact the incentive of the post-merger firm to innovate might have both static price effects as well as impact innovation in a manner that will be felt by consumers in terms of increasing competition in a product market. The central challenge for merger analysis in this setting is to determine how changes in post-merger incentives to innovate and increased control over research and development assets which might impact

²⁴ U.S. DEP'T OF JUSTICE & FEDERAL TRADE COMM'N, HORIZONTAL MERGER GUIDELINES (1992, revised 1997), available at <http://www.ftc.gov/bc/docs/hoizmer.htm> [hereinafter "Merger Guidelines"].

²⁵ For a discussion of these complications, see Katz and Shelanski, *supra* note 5, at 32-38 (describing these complications and advocating that merger analysis relax its requirement that "bright-line boundaries" be drawn between products separately from competitive effects analysis).

²⁶ See, e.g., 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, 671 (2001); David J. Teece & Mary Coleman, *The Meaning of Monopoly: Antitrust Analysis in High Technology Industries*, 43 ANTITRUST BULL. 801 (1998).

²⁷ See Katz & Shelanski, *supra* note 5, at 38-49.

future product market competition will be addressed under the Merger Guidelines.²⁸

Monopolization analysis also incorporates dynamic considerations at both the market power and competitive effects stages. For instance, Schumpeterian competition in dynamic industries makes it more difficult to ascertain whether a firm has antitrust market power.²⁹ Part of this difficulty stems from the relatively weaker inferences about antitrust market power that can be drawn from large market shares in dynamic settings. Conventional monopolization analysis also deals with dynamic considerations when assessing whether single firm conduct has or is likely to generate anticompetitive effects. For example, assessment of competitive effects in dynamic industries includes understanding whether emerging technologies will arise in the near future and understanding industry conditions at a detailed level in order to make sensible predictions about the dominant firm's incentives to innovate.

B. Innovation Markets

While conventional antitrust analysis incorporates dynamic considerations at some level, some commentators have encouraged an approach that would focus on future product market competition by examining current research and development efforts as a proxy for the future competition itself. These commentators often point to arbitrary cutoffs in the Merger Guidelines, such as the two-year time horizon for consideration of entry,³⁰ arguing that the conventional approach places too much emphasis on the short-run without justification.

Richard Gilbert and Steve Sunshine describe the innovation market procedure as follows: (1) identify the overlapping research and development activities of the merging firms; (2) identify the alternative sources of research and

²⁸ For a defense of conventional product market analysis in mergers implicating innovation concerns see Richard T. Rapp, *The Misapplication of the Innovation Market Approach to Merger Analysis*, 64 ANTITRUST L.J. 19 (1995) (critiquing innovation markets and arguing that potential product market competition and conventional merger analysis is sufficient to address these concerns).

²⁹ This is a reference to market power in the sense that the term is used in antitrust law rather than the ability of nearly every firm in the modern economy to price above marginal cost.

³⁰ *Merger Guidelines*, *supra* note 24, at § 3.

development; (3) evaluate actual and potential competition from downstream products; (4) assess the increase in concentration in research and development and competitive effects on investment in research and development; and (5) assess research and development efficiencies.³¹

The innovation market concept has been subjected to a considerable amount of criticism on both economic and legal grounds,³² although most favor the notion that innovation considerations should be incorporated into antitrust analysis.³³ Much of the criticism, and particularly the critique offered by Richard Rapp,³⁴ emphasized that innovation markets were built upon empirical foundations that were unreliable and too weak to provide the basis for the presumptions applied in conventional merger analysis and thus threaten to decrease the reliability of antitrust enforcement. In the next Part, I offer a related critique of antitrust analysis, not limited to innovation markets, favoring shortcuts for assessing whether some mixture of competitive conduct involving innovation would harm consumers on the grounds that insufficient theoretical or empirical basis exists in favor of such presumptions.

IV. DO WE HAVE AN ANTITRUST-RELEVANT THEORY OF INNOVATION?

Many scholars have recognized that our empirical knowledge of the relationship between market structure and innovation, as well between market structure and consumer welfare, is limited relative to our understanding of static price effects in conventional product markets. The limits of our empirical knowledge are just one important constraint on the ability of regulators to confidently prosecute “innovation” cases on behalf of consumers. While

³¹ See generally Gilbert & Sunshine, *supra* note 4.

³² Katz & Shelanski, *supra* note 5, at 42-43 (summarizing the criticisms while endorsing the “underlying idea of the innovation markets approach”).

³³ See, e.g., Ronald W. Davis, *Innovation Markets and Merger Enforcement: Current Practice in Perspective*, 71 ANTITRUST L.J. 677 (2003).

³⁴ Richard T. Rapp, *The Misapplication of the Innovation Market Approach to Merger Analysis*, 64 ANTITRUST L.J. 19 (1995); see also Dennis W. Carlton, Testimony Before the Federal Trade Commission Hearings on Global and Innovation-Based Competition: Antitrust Policy Towards Mergers When Firms Innovate: Should Antitrust Recognize the Doctrine of Innovation Markets (Oct. 25, 1995), available at <http://www.ftc.gov/opp/global/carlton.htm> (noting that adoption of the innovation market concept would decrease predictability and reliability in terms of improving welfare).

highlighting our empirical deficiencies in this arena, I also argue that there is an additional, and underappreciated, challenge to incorporating innovation effects into antitrust analysis.

Specifically, the multi-dimensional nature of competition implies that antitrust analysis seeking to maximize consumer or total welfare must inevitably calculate welfare tradeoffs when innovation and price effects run in opposite directions. I argue that such welfare tradeoffs are highly likely to be at issue in antitrust cases where innovation is at issue and contend that, at this point, neither economic theory nor our empirical knowledge of competition and innovation provides a reliable basis to confidently answer the relevant policy question: which *mixture* of competitive activities will produce greater welfare?

A. *Antitrust Analysis of Innovation Will Generally Require Welfare Tradeoffs Between Inversely Correlated Forms of Competition*

Competition involves a remarkably heterogeneous set of activities. The competitive process requires various forms of rivalry that occur on multiple dimensions: output, price, quality, and innovation. The key point for antitrust policy, highlighted by Demsetz, is that these forms of competition are frequently inversely correlated.³⁵ Consider the classic Schumpeterian tradeoff between innovative and price competition. Innovative competition, which generally increases consumer welfare, is encouraged by limiting output and price competition on already invented goods.

The negative correlation between various forms of competition necessitates that, as a general matter, an antitrust policy that increases one form of rivalry relative to others must also decrease others. The question is whether we can identify the conditions under which a policy that encourages innovative rivalry by limiting output and price competition can be said to make consumers better off. Demsetz argued that the answer was no. He claimed that the multiplicity of competitive activities undermines the ability of “scholars, lawyers, judges, and politicians” to “agree that a policy has increased (or decreased) the general level of competitive intensity.”³⁶ He further asserted that the

³⁵ *Intensity and Dimensionality*, *supra* note 12, at 142-44.

³⁶ *Id.* at 142.

proposition that consensus can be reached regarding which mixture of competitive activities increased competition was “plain wrong,” and the product of “our heavy reliance on perfect competition, monopoly, and oligopoly models, all of which focus only on imitative output competition.”³⁷

These welfare tradeoffs are also a substantial obstacle to creating an antitrust policy which can be said to unambiguously increase consumer welfare in the context of multiple forms of competition.³⁸ This is not to say that antitrust policy has no sensible basis from which to proceed. The tradeoffs between innovative activity, competition, and efficiency have led to a substantial theoretical and empirical literature.³⁹ In the next section, I argue that neither economic theory nor the state of our empirical knowledge provides a sufficient basis for confidence that antitrust policy can be used to promote consumer welfare where multiple, inversely correlated forms of competition are involved.

B. *What Do Economists Know About Dynamic Welfare Tradeoffs?*

The central problem in applying an antitrust standard to innovative activity in terms of the inverse correlation between multiple forms of competition is that one must know something about the marginal rates of technical substitution between forms in order to answer the question sensibly. Take, for example, an antitrust liability rule that makes certain business conduct illegal on the theory that it will reduce consumer welfare by depressing future innovation. Will the policy increase consumer welfare? The answer turns on a comparison of how two different bundles of “competition” -- combinations of price, innovation, quality, and cost competition -- translate to consumer welfare.

³⁷ *Id.*

³⁸ Demsetz himself argued that the combination of inversely correlated forms of competition and the absence of a “plausible method ... for converting intensities of different forms of competition into a common unit of intensity” would render it impossible to justify “competitive intensity” as a logical guide to antitrust policy. *Id.* at 144. In *Intensity and Dimensionality*, Demsetz concedes that “efficiency is at least a conceptually feasible goal,” though “not an easy one to pursue.” *Id.* He further notes in *100 Years* that “we also do not yet possess an antitrust-relevant understanding of efficiency.” *100 Years*, *supra* note 8.

³⁹ The literature has its roots in the seminal analyses of Schumpeter, *supra* note 1, and Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, in *THE RATE AND DIRECTION OF ECONOMIC ACTIVITIES: ECONOMIC AND SOCIAL FACTORS* 609 (Richard Nelson ed., 1962). Jonathan Baker summarizes the economics literature linking industry structures to incentives to innovate in a recent paper. See Baker, *supra* note 3.

Where these forms of competitive rivalry are negatively correlated, evaluating the benefits of these alternative bundles in terms of consumer welfare requires knowing the marginal rates of technical substitution between competitive forms in order to convert different forms into common units of consumer welfare. I briefly survey below our existing theoretical and empirical knowledge of the relationship between product market competition, consumer welfare, innovation, and market structure.

1. *Economic Theory and Incentives to Innovate*

While others have documented this extensive literature in greater detail than is required for our purposes,⁴⁰ I offer a brief survey. Recent surveys have usefully summarized four principles of competition and innovation that have emerged from this literature.⁴¹ The first principle is that competition in innovation is a form of competition itself. In other words, competition encourages innovation by providing an incentive for each competitor to win the “prize” associated with appropriating the gains from the innovation.

The second principle is that product market competition encourages competitors to innovate to face less competition and earn greater profits. The converse can also hold: a firm which does not face substantial product market competition may have less incentive to innovate. This effect is at the heart of John Hicks’s observation that the “best of all monopoly profits is a quiet life,”⁴² and has been referred to as the “escape-the-competition” effect.⁴³ The third principle is related to the second and posits that firms that face greater product market competition post-innovation will have less incentive to engage in research and development.

⁴⁰ See, e.g., Gilbert, *supra* note 3, at 159; Katz & Shelanski, *supra* note 5, at 16-31 (discussing the relationship between concentration, research and development, and consumer welfare in the merger context).

⁴¹ See Richard J. Gilbert, *Competition and Innovation*, in *ISSUES IN COMPETITION LAW AND POLICY* (W. Dale Collins, ed., forthcoming 2007); Baker, *supra* note 3.

⁴² John R. Hicks, *Annual Survey of Economic Theory: The Theory of Monopoly*, 3 *ECONOMETRICA* 1, 8 (1955).

⁴³ See, e.g., Philippe Aghion, et al., *Competition, Imitation and Growth with Step-by-Step Innovation*, 68 *REV. ECON. STUD.* 467, 468 n.4 (2001).

The fourth principle is often referred to as the “preemption effect,” which illustrates that a firm may have an additional marginal incentive to innovate if the innovation will discourage rivals and potential entrants from investing in research and development themselves.

By themselves, these economic principles do not tell us what role antitrust should play in innovative industries. The first principle, that innovation is a form of competition, offers little guidance for antitrust policy. All agree that innovative activity is an essential part of the competitive process. But the antitrust relevant question is if we can confidently predict whether antitrust policy might increase or decrease innovative activity in a way that makes consumers better off. If firms are engaging in an endogenously determined mixture of competitive activities and an antitrust policy designed to encourage innovation is successfully introduced, we can expect the new mixture of competitive forms to involve more innovation and less of other forms of competition. But it is unclear that the first principle tells us anything more about the likely consumer welfare effects of the policy.

The second and third principles do not offer better policy guidance on their own. Leaving aside the methodological issue of how one measures competition in these models, these principles teach that product market competition might increase or decrease the incentive to innovate under different conditions.

Finally, the fourth principle, the “preemption effect,” teaches that dominant firms may have a greater incentive to innovate in order to reduce the innovation incentives of rivals and potential entrants. The “preemption effect” applies not only to “sham” innovations, but innovations that offer consumers immediate and tangible benefits such as offering a new product or increasing product quality.

While the current state of the theoretical literature relating to competition and innovation is alone insufficient to instill any great confidence in our ability to determine what antitrust policies will encourage innovation and result in net consumer welfare gains. Specifically, our ability to apply antitrust standards depends on our ability to predict how a rule will impact the *mixture* of competitive forms that will exist after the policy is implemented and to rank

these mixtures on consumer welfare or efficiency criteria. At this point, economic theory does not appear to provide a reliable method of making such a determination.⁴⁴ First, as discussed above, our theoretical knowledge cannot yet confidently predict the direction of the impact of additional product market competition on innovation, much less the magnitude. A second reason is that the multi-dimensional nature of competition implies that the magnitudes will be important as innovation and other forms of competition will frequently be inversely correlated as they relate to consumer welfare. Thus, weighing the magnitudes of opposing effects will be essential to most antitrust policy decisions relating to innovation. Again, at this stage, economic theory does not provide a reliable basis for predicting the conditions under which consumer welfare gains associated with greater product market competition resulting from some antitrust intervention will outweigh losses associated with reduced innovation.⁴⁵

2. *The Evidence: What Do We Know about Competition and Innovation?*

Regulators, policymakers, and judges need not rely only on this developing branch of economic theory that has heretofore not produced results sufficient to guide policy on its own. Rather, one expects policymakers to turn to our empirical knowledge of the relationship between competition, innovation, and consumer welfare. There are at least two empirical relationships that are relevant to policymaking in this area. The first is the relationship between product market competition and innovative activity, and the second is the link between firm size and research and development. I argue that the state of the

⁴⁴ Accord Gilbert, *supra* note 41, at 8 (“economic theory supports neither the view that market power generally threatens innovation by lowering the return to innovative efforts nor the Schumpeterian view that concentrated markets generally promote innovation”). Katz and Shelanski, *supra* note 5, at 19, conclude that “although economic intuition suggests an overarching presumption that innovation will be greatest for firms facing competitive pressures and the prospects of supracompetitive returns to innovation, it is also clear that, depending on assumptions, the theoretical balance could swing toward either a greater number of competitors or toward monopoly in a given case.” See also Wesley M. Cohen & Richard C. Levin, *Empirical Studies of Innovation and Market Structure*, in 2 HANDBOOK OF INDUSTRIAL ORGANIZATION 1074-79 (Richard Schmalensee & Robert D. Willig eds., 1989).

⁴⁵ This assertion echoes Demsetz’s claim that economics does not yet have an “antitrust relevant understanding of efficiency.” *100 Years*, *supra* note 8.

empirical literature is also indeterminate at this stage and an insufficient basis upon which to ground policy decisions.

Early studies of the link between product market competition and innovation supported the Schumpeterian hypothesis by finding an inverted-U relationship: innovative activity is at its maximum at intermediate levels of market concentration and decreases as concentration approaches monopoly or more atomistic structures.⁴⁶ But the failure of these early studies to account for differences between industries, and the endogeneity in the relationship between market structure and innovation, undermines their value.⁴⁷ A recent study by Philippe Aghion, et al., suggests that the link between market structure and markups of price over average costs may indeed have an inverted-U shape,⁴⁸ though commentators have noted that the study does not provide a basis for policy decisions regarding the role of innovation in antitrust analysis.⁴⁹ Other studies have examined the impact of changes in market structure within a single industry over time to analyze the relationship between product market competition and productivity or innovation with mixed results.⁵⁰ Others have examined whether competition policy enforcement is associated with greater competition or productivity, again, with mixed results.⁵¹ Another strand of

⁴⁶ There are several excellent discussions of the empirical literature linking product market competition and innovation. See, e.g., Baker, *supra* note 3 (draft at 11-16); Katz & Shelanski, *supra* note 5, at 19-31; Gilbert, *supra* note 3.

⁴⁷ Katz and Shelanski, *supra* note 5, at 22, conclude that “the literature addressing how market structure affects innovation (and vice versa) in the end reveals an ambiguous relationship in which factors unrelated to competition play an important role”).

⁴⁸ Philippe Aghion, et al., *Competition and Innovation: An Inverted U Relationship*, 120 Q.J. ECON. 701 (2005).

⁴⁹ This is largely because the Aghion, et al., analysis control for industry effects at the two-digit SIC code level which is not likely to meaningfully control for cross-industry differences and certainly do not correspond with antitrust markets. This point is addressed by both Baker, *supra* note 3, and Katz and Shelanski, *supra* note 5, at 23.

⁵⁰ Many of these studies are discussed by Baker, *supra* note 3, at 14-15 (and accompanying citations).

⁵¹ See, e.g., Keith N. Hylton & Fei Deng, *Antitrust Around the World: An Empirical Analysis of the Scope of Competition Laws and Their Effects* (unpublished working paper, 2006) (finding no significant causal relationship between the scope of a nation’s competition laws “on the books” and competitive intensity”).

empirical literature examines the relationship between firm size and research and development. Richard Gilbert summarizes the findings in this literature as consistent with the theory that the effects of firm size and competition on innovation should be greater for process than product innovations.⁵²

Gilbert's careful examination of the empirical record concludes that the existing body of theoretical and empirical literature on the relationship between competition and innovation "fails to provide general support for the Schumpeterian hypothesis that monopoly promotes either investment in research and development or the output of innovation" and that "the theoretical and empirical evidence also does not support a strong conclusion that competition is uniformly a stimulus to innovation."⁵³

C. Making Welfare Tradeoffs When Competition Is Multi-Dimensional

The theoretical and empirical literature reveals an undeniably complex interaction between product market competition, innovation, and consumer welfare. While these complexities are well understood, this essay emphasizes that recognition of the multi-dimensional nature of competition adds another degree of difficulty to this problem.

The critical implication of multi-dimensional competition is that such welfare tradeoffs are ubiquitous. Acknowledgement that the optimal bundle of competitive forms is endogenous to antitrust policy implies that any enforcement policy or action will likely reduce one form of competition and increase another. Therefore, any analysis of whether such a policy will make consumers better off requires information concerning both the marginal rates of substitution between competitive forms and a method available for courts, judges, and regulators to calculate these welfare tradeoffs.

The critical antitrust question is how policymakers will deal with the problem of welfare tradeoffs in the antitrust analysis of innovation. A number

⁵² Gilbert, *supra* note 41, at 20-21.

⁵³ *Id.* at 24. It should be noted that Gilbert concludes from this mixed evidence that a presumption that competition promotes innovation is warranted under certain conditions and justifies a fact-intensive, case-by-case approach. *Id.*

of approaches have been suggested. For example, Jonathan Baker proposes that the theoretical and empirical literature is sufficient to allow regulators to use enforcement efforts to increase competition and consumer welfare by selecting the appropriate industries at which to target enforcement.⁵⁴ Baker's "prosecutorial selection" approach posits that antitrust enforcement can systematically benefit innovation by focusing on competition in "winner-take-all" markets and by "threading the needle" between the second and third principles discussed above, because post-innovation competition will not be affected in such markets.⁵⁵ Baker also identifies a second type of industry where antitrust enforcement in product markets will systematically increase innovation: markets where future product market competition is unaffected by current product market competition because of pending technological or regulatory developments or growing demand.⁵⁶

A second approach avoids the welfare tradeoff problem altogether by finding the rare case where competition is truly one-dimensional. The "no tradeoff" approach requires identification of cases where the benefits from enforcement on innovation are not offset by a reduction of some other competitive form now or in the future. This approach is consistent with Baker's suggestion that enforcement efforts be focused, at least in part, on industries where future product market competition is unlikely to be altered by enforcement actions in today's product market. Some applications of the "innovation market" concept might be viewed as consistent with this approach,

⁵⁴ Baker, *supra* note 3, at 17 ("through such selection, anti-trust intervention can systematically promote pre-innovation product market competition, which will encourage innovation, without markedly increasing post-innovation product market competition, and thus without detracting from the pro-innovation benefits").

⁵⁵ Baker, *supra* note 3, at 22-23. Baker cites to *United States v. Microsoft*, 253 F.3d 34 (D.C. Cir. 2004), as an example of intervention benefiting consumers. *Id.* at 23 n.41. Cf. Benjamin Klein, *The Microsoft Case: What Can A Dominant Firm Do to Defend Its Market Position*, 15 J. ECON. PERSP. 45 (2001); David S. Evans, Albert L. Nichols & Richard Schmalensee, *United States v. Microsoft: Did Consumers Win?*, 1 J. COMPETITION L. & ECON. 497 (2005).

⁵⁶ Baker, *supra* note 3, at 25. Baker also notes that antitrust enforcement will increase innovation in cases such as naked price-fixing or "naked exclusion" without any plausible efficiency justification. *Id.* at 28-29.

such as an analysis of the consolidation of research and development assets by merger where no product market competition exists. A third potential set of “no tradeoff” cases involve so-called “sham innovations.”⁵⁷

Michael Katz and Howard Shelanski’s recent and insightful proposal advocating a more sophisticated method for incorporating innovation effects and uncertainty over future events into antitrust analysis may offer a third approach to these welfare tradeoffs.⁵⁸ Recognizing the complexity of predicting the effects of a merger on innovation, Katz and Shelanski offer a number of concrete and practical suggestions to improve merger review in this regard. For example, they suggest developing a set of agency guidelines for incorporating analysis of innovation, moving away from formal market definition where feasible, and incorporating decision theory into policy-making decisions so that true expected welfare payoffs are the basis of policy decisions rather than imposition of arbitrary cutoffs and probability thresholds.⁵⁹ Each of these recommendations is desirable in principle, though it is unclear whether such standards can be adopted without substantial administrative costs.

In their proposal to modify merger review where innovation concerns are implicated, Katz and Shelanski also recognize that the predicted competitive effects in product markets and from innovation might run in opposite directions and thus necessitate a welfare tradeoff, noting that such a case calls for “a more careful analysis of the comparative benefits of price effects and innovation effects.”⁶⁰ But how does one go about carrying out this tradeoff in practice? For example, how does an agency or court assess what post-merger competition looks like when firms compete on both price, innovation, and other measures? The authors do not propose a specific answer to this problem, but in the spirit of their general approach to account for the “true” consumer welfare impact of the

⁵⁷ See, e.g., Richard Gilbert, *Holding Innovation to an Antitrust Standard*, 3(1) Competition Policy International (Spring 2007) (discussing the problems associated with application of various antitrust standards innovation in the form of new products or design changes).

⁵⁸ Katz & Shelanski, *supra* note 5.

⁵⁹ *Id.* at 77-79.

⁶⁰ *Id.* at 49.

merger over time, with uncertainty, and in both current and future product markets, they agree it is a significant issue and call for agency guidance on how they would make these tradeoffs.⁶¹

Katz and Shelanski's suggestion that a more sophisticated, more realistic, and less arbitrary and subjective approach to uncertainty and welfare tradeoffs would improve merger analysis is well-taken and almost certainly correct in principle. This essay highlights that accounting for the multi-dimensional nature of competition and substitution between competitive forms is consistent with an approach based on consumer welfare measures and calls attention to the shortcomings in our current technology for applying this type of framework.

I am not suggesting that the multi-dimensional nature of competition renders sensible antitrust analysis impossible. To the contrary, economists are developing tools, though primarily in the merger context, to generate more precise and reliable predictions of post-merger outcomes when firms engage in multi-dimensional competition.⁶² Moreover, the proposition that appropriate antitrust analysis should both account for innovation and deal with uncertainty more seriously, rather than imposing arbitrary time horizons, is quite sensible. For example, truncating merger analysis at a two year time horizon invokes an arbitrary subjective preference in our consumer welfare calculation for consumers who are purchasing today rather than those purchasing in the future.

This agreement comes with two important caveats. First, if imposing arbitrary preferences in our consumer welfare calculations is antithetical to sound antitrust enforcement when it involves uncertainty of future events and market conditions, arbitrary preferences weighting one form of competition over another or not accounting for substitution between competitive forms resulting from intervention are no better. A policy that weights effects from innovation disproportionately relative to product market effects without justification from economic theory or empirical evidence is likely to harm consumers. Alternatively, a standard applied to innovative activity that measures the competitive effects of innovation including the exclusion of rivals

⁶¹ *Id.* at 78.

⁶² See, e.g., Luke Froeb, et al., *Mergers when Firms Compete on Price and Promotion* (unpublished working paper, 2007).

without understanding that the latter produced an incentive for the innovation itself is equally misguided and likely to harm consumers in the long run. The second caveat is that antitrust liability rules that attempt to engage in more sophisticated analyses of uncertainty and welfare tradeoffs almost necessarily involve higher administrative costs. The selection of the appropriate approach to incorporating innovation concerns into antitrust analysis must be sensitive to the administrative and error costs associated with its implementation.

V. ANTITRUST IMPLICATIONS OF MULTI-DIMENSIONAL COMPETITION

This essay has focused on two central points. The first is that the current state of economic theory and empirical knowledge regarding the relationship between innovation and competition does not yet provide a general and reliable basis for antitrust intervention. The second point is that the economic reality that competition takes place on multiple margins complicates antitrust analysis when innovation concerns are implicated in a particular way. Specifically, antitrust enforcement will generally result in a substitution from one bundle of competitive forms to another where post-intervention we observe more of some types of competition and less of others. This complicates consumer welfare calculations because it requires some knowledge of the magnitude of this substitution effect and how to make welfare tradeoffs in this setting. Again, economic theory and empirical evidence, at this stage, provide little basis for confidence that regulators and judges can carry out these calculations even with perfect knowledge of the literature. But what do these difficulties tell us about optimal antitrust enforcement under these conditions?

Former Federal Trade Commission Chairman Timothy Muris articulates three useful normative propositions for integrating economic analysis into competition policy: (1) reassessment, (2) administrability, and (3) the centrality of empirical testing.⁶³ These normative propositions suggest that the analysis above is relevant to antitrust policy in the following ways: (1) antitrust enforcement could benefit substantially from competition policy research and development efforts to improve our toolkit; and (2) burdens of proof concerning

⁶³ Timothy J. Muris, *Improving the Economic Foundations of Competition Policy*, 12 Geo. Mason L. Rev. 1 (2003).

competitive harm should be clearly allocated to the plaintiff when theoretical and empirical uncertainty renders presumptions inappropriate.

A. *Competition Policy Research and Development*

Economics is at its best when its insights are used to produce administrable rules and techniques for analyzing business conduct. Empirical knowledge of the relationship between competition and innovation is essential to creating the presumptions, grounded firmly in empiricism, required by efficient administration of the antitrust laws. Though the growing body of empirical knowledge linking competition, innovation, and efficiency is too underdeveloped to provide the basis for reliable presumptions, antitrust agencies would be well advised to continue to support this type of research.⁶⁴ The potential for antitrust to systematically promote innovation and improve efficiency depends largely on our ability to increase our understanding of this relationship in order to develop sound and workable antitrust rules.

B. *The Burden of Proving Harm to Competition*

Currently, neither economic theory nor empirical evidence suggest that antitrust agencies or courts have reliable knowledge concerning the types of conduct implicating innovation that are systematically likely to make consumers worse off. Under these conditions, where reliable presumptions concerning harm to consumers are not yet plausible for broad ranges of conduct, it is appropriate to allocate clear burdens of proof and persuasion to those claiming that some conduct reduces consumer welfare in violation of the antitrust laws.

There is a danger that our incomplete understanding of the competition and innovation might lead to a tendency to condemn conduct because it is difficult to understand or might appear to potentially harm innovation without also finding an anticompetitive effect. This dangerous tendency may be most severe when antitrust analysis focuses on how firm conduct might harm a rival's ability to innovate or compete. The competitive process generally disadvantages competitors and benefits consumers. It is critical that antitrust policy not adopt an analytical framework that presumes harm to competition when the pro-

⁶⁴ For examples of such research initiatives at the Federal Trade Commission, see Muris, *supra* note 63, at 24-28.

competitive rationale for the conduct is not facially obvious. The requirement that plaintiffs demonstrate an anticompetitive effect is a sensible safeguard against this danger and especially pertinent in cases involving complex innovative activity.

Even where courts are willing to prematurely apply presumptions concerning harm to competition, our inability to consistently and reliably make the welfare tradeoffs necessitated by antitrust analysis where innovation and product market competition are involved suggests that agencies should carefully select cases to prosecute to avoid chilling the normal competitive process that generates consumer benefits.

VI. CONCLUSION

Sound antitrust policy requires constantly updating our analytical framework to reflect improvements in economic theory and current empirical knowledge. While our understanding of the relationship between competition and innovation has increased markedly over the past several decades, we do not yet possess a sufficient knowledge of the complex interactions to provide a reliable basis for presumptions of harm to competition based on observables such as market structure, firm size, and conduct.

In addition to the conventionally understood difficulties in identifying the relationship between product market competition and dynamic efficiency, this essay revisited an underappreciated source of difficulty for antitrust analysis. Harold Demsetz noted that antitrust analysis, assuming a goal of maximizing efficiency or consumer welfare, requires knowledge of the technical rates of substitution between various competitive forms and a reliable methodology for making welfare tradeoffs between these negatively correlated forms.

The complexity of this problem does not imply that antitrust must never, as some contend, intervene on the grounds that some conduct will reduce innovation and ultimately harm consumers. Intervention in markets with significant innovative activity need not make consumers worse off by chilling innovation or product market competition. It may be the case that future empirical research will justify presumptions of competitive harm in specific circumstances. But this relatively young literature does not yet justify such

presumptions. The normal competitive process entails competition on many dimensions. And it is this process that generates a multitude of benefits for consumers. Where there is little evidence to suggest that we can systematically identify circumstances under which antitrust can be used to stimulate innovation and improve consumer outcomes, humility regarding the current state of knowledge implies that deference to the competitive process is an appropriate guiding principle.