

ANTITRUST IN HIGH-TECHNOLOGY INDUSTRIES: A SYMPOSIUM INTRODUCTION

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One of the most interesting and challenging phenomena of our information age is the rapid and significant change that takes place in high-technology industries. This change is shaking some of our assumptions regarding the role of technology (for example, endogenous or exogenous), production methods (for example, commercial entities versus social communities), markets (for example, product or innovation markets), market characteristics (for example, network industries, faster information transfer to market players and consumers), and non-market management systems.¹ It requires us to recognize the effects of such changes on the economic environment and to ensure that our regulatory tools secure the positive welfare effects that such changes can bring about. The articles in this special issue attempt to meet this two-pronged challenge and shed light on the implications of changes in the marketplace for both the market's invisible hand and the government's visible one. In particular, they address the over-arching concerns expressed by some commentators that competition law may not be sufficiently nimble or accurate to detect and remedy competition violations in more innovative industries.²

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¹ See, e.g., BRETT M. FRISCHMANN, *INFRASTRUCTURE: THE SOCIAL VALUE OF SHARED RESOURCES* (Oxford Univ. Press 2012).

² See, e.g., Thomas O. Barnett, *Section 2 Remedies: What to Do After Catching the Tiger by the Tail*, 76 ANTITRUST L.J. 31 (2009). There is a vast literature on this subject, which has burgeoned since the 1990s. For representative arguments on both sides see, for example, Joshua Wright, *Does Antitrust Enforcement in High Tech Markets Benefit Consumers? Stock Price Evidence From FTC v. Intel*, 38 REV. INDUS. ORG. 87 (2011); WILLIAM H. PAGE & JOHN E. LOPATKA, *THE MICROSOFT CASE: ANTITRUST, HIGH TECHNOLOGY, AND CONSUMER WELFARE* 33–83 (2007); Christian Ahlborn, David S Evans & A. Jorge Padilla, *Competition Policy in the New Economy: Is European Competition Law Up to the Challenge?*, 2001 EUR. COMP. L. REV. 156 (2001); David S. Evans & Richard Schmalensee, *Some Economic Aspects of Antitrust Analysis in Dynamically Competitive Industries* (Nat'l Bureau of Econ. Research, Working Paper No. 8268, 2001). But see Jonathan M. Jacobson, *Do We Need A "New Economy" Exception For Antitrust?*, 16 ANTITRUST A.B.A. 89 (Fall 2001) (arguing against any "new economy" exception in monopolization cases); William A. Baer & David A. Balto, *Antitrust Enforcement and High Technology Markets*, 5 MICH. TELECOMM. L. REV. 73, 75 (1998).

To be sure, questions regarding technological change have always been with us. Accordingly, to some extent this is old wine in new bottles.³ Indeed, the high-technology firms of yesterday are often the smoke stack-industries of today. Over time, the frontier issues of competition law have a way of becoming the settled doctrine of future eras. This is as true for *Standard Oil*⁴ as it is for *Microsoft*.⁵

At the same time, however, the high-technology industries of today present legal and economic challenges that go far beyond the issues raised in the past. For one, the pace of technological change appears to be ever increasing. Moreover, some of the characteristics of high-technology industries have changed: high-tech industries of today often are virtual, are characterized by strong network effects, and present complicated issues at the intersection of antitrust and intellectual property. More industries, particularly those based on software platforms, exhibit signs of two-sided and multi-sided markets.⁶ New theories of harm and remedies have thus emerged and are debated at the very time when multiple jurisdictions are examining, litigating, and applying different remedies to firms operating in diverse technology markets.

Furthermore, the social challenge of unleashing the forces of dynamic efficiency while ensuring that welfare is not harmed is more pronounced. This results from the fact that in our information age, technological change is one of the key drivers of competition and development, for both developed and developing economies.

The importance of technological change has been recognized for some time: Schumpeter is well known for arguing that “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”—competition based on what he called “creative destruction” is the most important form of competition.⁷ Innovation may lead to technological improvements in production processes or in existing products. A large part of such innovation is based on learning-by-doing—that is, innovation at the basis of operational production. But—often more importantly—innovation may lead to leap-frog technological

³ See, e.g., Robert Pitofsky, Remarks at the Manufacturing Institute (Oct. 13, 2000) (discussing business-to-business (B2B) websites).

⁴ *Standard Oil Co. v. United States*, 221 U.S. 1 (1911). See generally *Symposium: 100 Years of Standard Oil*, 85 S. CAL. L. REV. (2012) (forthcoming).

⁵ *United States v. Microsoft Corp.*, 253 F.3d 34 (D.C. Cir. 2001) (en banc per curiam). See generally *Symposium: The End of the Microsoft Case?*, 75 ANTITRUST L.J. 691 (2009).

⁶ David S. Evans, *The Antitrust Economics of Two-Sided Markets* (2002), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=332022.

⁷ JOSEPH S. SCHUMPETER, *CAPITALISM, SOCIALISM AND DEMOCRACY* 84 (3d. ed., Harper Perennial 1950).

changes that overturn the existing markets and create completely new products that increase consumer welfare and create new demand curves. In such cases, markets no longer simply respond to consumer demand but create demand for products that consumers have not dreamt about. To give but one example, refrigeration technologies destroyed the ice-harvesting industry but brought massive cost savings and convenience to consumers.⁸ The importance of such innovation is apparent in the observation by Joseph Stiglitz that the dynamic properties of capitalism constitute the basis of our confidence in its superiority to other forms of economic organization.⁹

This theoretical observation is backed by empirical studies. One of the most known studies is by Robert Solow, who has shown that most of the economic growth in the United States in the first half of the 20th century resulted from technological changes growing out of research and development (R&D) efforts.¹⁰ Studies show that the social return on investment in R&D is often higher than the private return, which suggests that policies that promote innovation can pay large dividends to society.¹¹ Accordingly, technological innovations serve as an important driving force in many developed, as well as developing, economies; and thus the promotion of technological improvements—through investments in R&D, technology transfer and diffusion, or by other means—often serves as an important industrial policy goal. As a result, questions of innovation and dynamic competition sometimes predominate over those of static price competition and concerns over deadweight loss.

The challenge is thus to harness this dynamic driving force to social welfare.¹² The challenges are not only legal—as innovation is affected by a multiplicity of interacting factors, such as culture, corporate governance, educational and infrastructure platforms, business methods, and organizational structures.¹³ Yet, law is an important piece of the puzzle not only due to its ability to create a platform that facilitates exchange and cooperation, which are often building blocks of innovation, but oftentimes due to its ability to create artificial and costly barriers to innovation. Competition law plays a major role in structuring the creative environment since it affects the ways in which firms can compete and cooperate. If structured incorrectly, it might stifle growth by creating obstacles to innovation.

⁸ J. Gregory Sidak & David J. Teece, *Dynamic Competition in Antitrust Law*, 5 J. COMPETITION L. & ECON. 581, 603 (2009).

⁹ Joseph E. Stiglitz, *Technological Change, Sunk Costs and Competition*, 3 BROOKINGS PAPERS ON ECON. ACTIVITY 884 (1987).

¹⁰ Robert M. Solow, *Technical Change and the Aggregate Production Function*, 39 REV. ECON. & STAT. 312 (1957).

¹¹ Richard Gilbert, *Looking for Mr. Schumpeter: Where Are We in the Competition - Innovation Debate?* 6 INNOVATION POL'Y & ECON. 159 (2006).

¹² Michael L. Katz & Howard A. Shelanski, *Mergers and Innovation*, 74 ANTITRUST L.J. 1, 4 (2007).

¹³ Eli M. Salzberger, *Introduction*, in *LAW AND ECONOMICS OF INNOVATION* x (Eli M. Salzberger ed., Edward Elgar Publishing 2012).

Yet meeting this challenge is not an easy task. For one, innovation's uncertain nature requires us to give up the comfort of simple-to-model neoclassical microeconomic equilibriums, which treat technology as an exogenous factor and focus mainly on price and quantity, for less stylized and less rigid evolutionary models, which often do not allow good predictions of success. Indeed, despite the way our thinking has evolved since Schumpeter boldly put innovation at the core of the positive welfare effects of competition, the debate over the effect of market structure and market power on dynamic efficiency is still ongoing. As Gregory Sidak and David Teece have noted, uncertainty and complexity are hallmarks of dynamic market environments.¹⁴ Second, as noted above, dynamic efficiency is affected by a multiplicity of factors that are usually disregarded in competition law analysis, such as tax incentives to innovate or the existing business culture. Third, the analysis often involves difficult tradeoffs between price and quality effects that may even differ among some dimensions such as geographic and product markets or short-term and long-term effects. Fourth, as Eli Salzberger notes, the borderless nature of informational goods raises questions not only about whose wealth we would like to maximize (national, regional, global), but also about which level of regulatory system should regulate the innovative activity.¹⁵ Fifth, the pace of innovation creates institutional challenges that affect both procedural and substantive aspects of the legal environment. These changes require new conceptual thinking and implementation.

Both law and economic research have made important progress in identifying the ways that law affects innovation processes and how it should be structured.¹⁶ One major change is that, at least in theory, the assertion that dynamic efficiency should be part of our normative goal, if we wish to increase welfare, seems to be no longer in dispute. The debate now centers on the ways to allow dynamic efficiency to take its best course. The Schumpeter-Arrow debate exemplifies the difficulties. Schumpeter argued that large, monopolistic firms are best placed to further dynamic efficiency because they can spend more resources on R&D, and once an innovation is introduced, they are better placed to diffuse it and profit from it, thereby increasing incentives to innovate.¹⁷ Yet numerous empirical studies have questioned the connection between concentration and innovation. Arrow's

¹⁴ Sidak & Teece, *supra* note 8, at 611.

¹⁵ Salzberger, *supra* note 13.

¹⁶ See, e.g., Richard J. Gilbert & Steven Sunshine, *Incorporating Dynamic Efficiency Concerns in Merger Analysis: The Use of Innovation Markets*, 63 ANTITRUST L.J. 569 (1995); Sidak & Teece, *supra* note 8; *Are Innovation Markets Useful?*, in INNOVATION AND COMPETITION POLICY 132 (Report prepared for the Office of Fair Trading (U.K.), Econ. Discussion Paper 2002), available at http://www.of.t.gov.uk/shared_of.t/reports/comp_policy/of.t377part1.pdf.

¹⁷ SCHUMPETER, *supra* note 7.

opposition is probably the best known.¹⁸ Arrow argued that given monopolists' sunk costs, and the fact that they already enjoy supracompetitive profits over their products, their incentive to innovate is generally limited, and their incentive to stifle innovations of rivals is great. It is noteworthy that Schumpeter's early writings also recognized the role of small entrepreneurs in dynamic efficiency.¹⁹ Empirical studies have shown that the world is more complicated than these two extreme views suggest, and a more nuanced analysis of specific market conditions is needed in order to estimate motivations for innovation.²⁰ In a review of the literature, Wesley Cohen and Richard Levin found that, in most cases, a strong linkage does not exist between market concentration and innovation.²¹ Yet much depends on barriers to entry and innovation, including the ability of firms to receive funding from external sources, and the scales of investments needed for R&D in specific industries. Studies have also shown that regulation—in its wide sense, including a policy of non-intervention in the market—plays an important role.

Accordingly, this special issue aims at contributing to the exploration of these important questions, in particular to reexamining the normative and positive analyses of competition law in the light of the aforementioned challenges. The articles join a growing line of quite recent literature that has focused on competition law challenges.²² The main issue is whether and

¹⁸ 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 (Nat'l Bureau of Econ. Research 1962).

¹⁹ JOSEPH S. SCHUMPETER, *THE THEORY OF ECONOMIC DEVELOPMENT* (Transaction Publishers 1911).

²⁰ See, e.g., Jonathan B. Baker, *Beyond Schumpeter vs. Arrow: How Antitrust Fosters Innovation*, 74 ANTITRUST L.J. 575, 578 (2007).

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., North Holland 1989).

²² See, e.g., FRISCHMANN, *supra* note 1; ANTITRUST, INNOVATION, AND COMPETITIVENESS (Thomas M. Jorde & David J. Teece eds., Oxford Univ. Press 1992); 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); Michael L. Katz & Howard A. Shelanski, "Schumpeterian" Competition and Antitrust Policy in High-Tech Markets, 14 COMPETITION 47 (2005); Ilya Segal & Michael D. Whinston, *Antitrust in Innovative Industries*, 97 AM. ECON. REV. 1703 (2007); 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); 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); Douglas H. Ginsburg & Joshua D. Wright, *Dynamic Analysis and the Limits of Antitrust Institutions*, 78 ANTITRUST L.J. 1 (2012).

how changes in the technological and economic environment should be incorporated into the competition law analysis.

The articles are the fruits of a workshop that examined different aspects of the role of antitrust in high-technology industries.²³ The workshop was the second in an ongoing series of workshops co-organized by the Forum for Law and Markets of the University of Haifa Faculty of Law²⁴ and the Institute for Consumer Antitrust Studies of Loyola University Chicago School of Law.²⁵ The workshops are intensive, two-day events where a select group of legal and economic experts meet to present, discuss, and critique cutting edge work in competition law and policy. The first workshop focused on comparative monopolization law, and most of its articles were published in a special issue of the *Antitrust Law Journal*.²⁶

Some of the articles in this special issue focus on the technological changes that create new forms of market failures or give more weight to already recognized ones, and which require us to change some of our assumptions, thereby leading to a different balancing in the regulatory environment. Other articles focus on new modes of analysis, such as behavioral law and economics. The articles span industries from pharmaceuticals to open source software to Internet search.

An important aspect of the information age involves the growing role of the Internet in our daily and business activities, *inter alia* as an important source of information. It is thus of no surprise that the role of firms, such as Google, that serve as intermediaries of information, has entered the spotlight. Accordingly, in “Search Neutrality and Referral Dominance,” Dan Crane raises two principal objections against a general principle of search neutrality in online searches. First, he questions the assumption that search dominance is equivalent to referral dominance. A company could be dominant in organic Internet search—meaning that it commands a large share of organic searches and perhaps can charge a premium price to advertisers—but not be dominant in referring users to websites. This is because users find out about and access websites in many ways other than through organic search. Second, and more importantly for innovation, a wide principle of search neutrality would stifle innovation in Internet search and a host of related services. A legal rule that froze search engines into information indexes would gravely frustrate user experiences and stymie the evolution of search engines into integrated information platforms.

²³ The full program of articles and participants is available at University of Haifa, Antitrust in Hi-Tech Industries, <http://weblaw.haifa.ac.il/en/Events/AntitrustHighTech/Pages/Program.aspx>.

²⁴ University of Haifa, Behavioral Analysis of Law: Markets, Institutions, and Contracts, <http://law.haifa.ac.il/LawAndMarkets/>.

²⁵ Loyola University Chicago School of Law, Centers, Institutes & Programs, <http://www.luc.edu/antitrust>.

²⁶ 76 ANTITRUST L.J. 653 (2010).

One of the most fascinating new changes in recent years involves new modes of production. Social production and distribution of content and innovations facilitated by mega-platforms, such as Open Source, Creative Commons, and Wikipedia, have become a significant part of the informational landscape. Social production challenges some of our basic assumptions about how markets work and raises new issues for regulation to adapt to the new creative and innovative environment. In her article, “Viral Open Source: Competition vs. Synergy,” Michal Gal analyzes the effects of the main legal platform selected for facilitating this collaborative production—the GNU General Public License (GPL)—on innovation and competition. Software released under the GPL enables anyone to use, modify, and distribute the code. Yet, these rights are contingent upon virality: every copy or work based on the original code must also be subject to such terms and conditions. The article analyzes the interesting and intricate effects of virality on welfare and innovation: virality increases motivations for parallel innovation, both in open source and in commercial code, *inter alia* by facilitating competition among networks and by preventing the appropriability of free and open source software (FOSS) by commercial firms. At the same time, by almost closing the door on synergies between FOSS and commercial technologies, it limits cumulative innovation based on synergy and interoperability. The article then analyzes market and legal responses to the GPL’s virality.

Another line of analysis focuses on the appropriateness of applying traditional regulatory tools and methodologies to dynamic markets. In his article, “Anticompetitive Stumbling Stones on the Way to a Cleaner World: Protecting Competition in Innovation Without a Market,” Josef Drexl questions the suitability of some methodological tools in cases in which R&D efforts are prospective and revolutionary rather than evolutionary, aiming at creating new markets that do not currently exist. In such markets, innovation drives competition as much as competition drives innovation.²⁷ He argues that in such markets, competition law is not well prepared for combating restraints of competition in innovation and critiques the use of the traditional market-oriented approach in competition law for protecting competition in innovation. He makes the case that that the use of market share analysis to test effects on competition may be better suited for commodity products than future leap-frog products of high-tech companies. The article then focuses on each of the three legs of competition law—mergers, restrictive agreements, and abuse of dominance—to exemplify some of the challenges posed when traditional modes of analysis are applied to conduct that is designed to affect a market that does not currently exist. The analysis uses current cases, such as *Rambus* and *AstraZeneca*, to exemplify the arguments.

²⁷ Sidak & Teece, *supra* note 8, at 605.

Behavioral law and economics has a now widely recognized important evolutionary role in our analysis of market interactions. Accordingly, in his article, "Behavioral Antitrust and Monopolization," Maurice Stucke examines two implications of behavioral economics on antitrust monopolization law and exemplifies their implications on some high-tech industries that were recently investigated by antitrust authorities. First, he discusses trial-and-error learning as an entry barrier, an issue that is relevant, for example, to the debate over the entry barriers of the search engine market. The article then discusses behavioral exploitation to maintain a monopoly, such as the sunk cost fallacy and the default bias. Such behavioral biases, it is argued, can help explain the European Commission's abusive tying claims against Microsoft for its media player, why the Commission's original remedy failed, and the benefits and risks of the Commission's remedy involving its subsequent prosecution of Microsoft over Internet browsers.

The question of remedies cuts across most of the themes addressed in these articles. In his article, "Access and Information Remedies in High-Tech Antitrust," Spencer Weber Waller addresses the increasing complexity of remedies in recent litigated and settled cases involving network and industries in both the United States and the European Union. He analyzes the increased use of behavioral remedies in merger and monopolization cases. He focuses on provisions dealing with access and information and the use of third-party compliance monitors as the key to maintaining and restoring competition in a wide variety of high technology industries.

Remedial issues are also the focus of the article by Ariel Ezrachi and Mariateresa Maggolino. Their article, "European Competition Law, Compulsory Licensing, and Innovation," focuses on the European policy of granting compulsory licenses to use intellectual property rights (IPRs) in cases of refusals to deal. After reviewing the line of European cases, they argue that the use of competition law as an external balancing tool has gradually eroded the protection conferred by IPRs, thereby creating a potentially detrimental effect on competition and innovation. Furthermore, they consider the characteristics of the compulsory license remedy and reflect on its adequacy in resolving competitive and innovative injuries caused by the refusal to license.

Another line of articles analyzes specific policies that affect the interface between competition, investments, and innovation. In their article, "Would the *Per Se* Illegal Treatment of Reverse Payment Settlements Inhibit Generic Drug Investment?," Bret Dickey and Daniel Rubinfeld focus on challenges of weak patents by generic drug manufacturers, challenges which are public goods. In particular, the article contributes to the growing literature on reverse payment settlements by analyzing the incentives of generic firms to develop generic drugs and challenge branded patents, which have so far been largely disregarded. Based on such analysis, the conclusion is reached that a rule-of-reason analysis is appropriate in evaluating reverse payment

settlements, even though those settlements can in some cases delay generic entry.

The final article is more general. Adi Ayal, in “Counter-Intuitive Fairness in Antitrust: Protecting the Monopolist and Balancing Among Competing Claims,” argues that antitrust as it is practiced today infringes upon monopolists’ right to property and freedom of contract and should be subject to a balancing test incorporating all affected parties’ rights and interests. In order to examine whether monopolists truly have a recourse to arguments of justice and fairness, the article applies Rawls’ theory of justice and asks what antitrust principles we would have voted for in the Original Position. The conclusion is reached that the prohibition against monopolies should be contextualized, and that the current *a priori* nullification of monopolists’ potential claims is unfounded.

We thank the *Journal of Competition Law and Economics* for the opportunity to share the final version of the articles presented at the symposium with its readers. For the authors, it was a chance to hone our ideas, test them, respond to constructive criticism, reflect, and then finalize the articles. For the readers, we hope this symposium represents a chance to think more deeply about key competition law issues that matter both today and going forward.