

Book Review:

Innovative Insights About Innovation and Their Implications for Antitrust Policy

William J. Baumol

**The Free-Market Innovation Machine:
Analyzing the Growth Miracle of Capitalism**

Princeton University Press ■ 2002

Reviewed by Jeffery B. Fromm and Robert A. Skitol

Introduction

A recent *Business Week* commentary notes that “for more than a decade, technology companies in Silicon Valley and elsewhere have trumpeted employee stock options as the prime driver for innovation, entrepreneurship, and wealth creation.”¹ Now that stock options have lost much of their allure, the high-tech community needs a new “belief system” about what drives the innovation process. Professor William Baumol’s new book, *The Free-Market Innovation Machine: Analyzing the Growth Miracle of Capitalism*, provides many fresh perspectives on this issue.

In a year of considerable hand-wringing over the darker sides of U.S.-style capitalism, Professor Baumol provides a distinctively upbeat message: the free-market system has demonstrated an ability “to produce a stream of applied innovations and a rate of growth in living standards far beyond anything that any other type of economy has ever been able to achieve for any protracted period” (p.viii). The fact that “[p]er capita income in the leading capitalist economies is growing at a rate that apparently permits something like an eightfold multiplication in a century” stands in stark contrast to a “wealthy eighteenth-century England” where “real per capita income had just about retained the level it had reached in third-century Rome” (p.20).

Professor Baumol paints a picture of the innovation process in markets driven by “innovative oligopolists” that challenges some longstanding antitrust doctrines and their application to oligopoly markets in the high-tech sector. Lawyers and economists alike will find the book stimulating and perceptive. It presents both microeconomic and macroeconomic insights of importance to many issues confronting antitrust policymakers.

Baumol’s Themes

Baumol identifies three features of our economy that account for its extraordinary innovation output: the “fierce competition among many of the economy’s enterprises seeking to come up with the better new mousetrap or the better way to produce the old mousetrap,” the “routinization of

■ **Jeffery Fromm** retired in August 2002 as Senior Managing Counsel for Intellectual Property at Hewlett-Packard Company. **Robert Skitol** is a partner in the Washington, D.C. office of Drinker Biddle & Reath LLP.

¹ Robert Hof, *This Reform Won’t Kill Silicon Valley*, *Bus. Wk.*, July 29, 2002, at 48.

the innovation process that reduces the firm's dependence upon fortunate happenstance," and the "competitive pressures to disseminate proprietary technology voluntarily . . . even to direct competitors" (p.20).

Baumol describes a present-day innovation paradigm that is quite different from the Schumpeterian model of extraordinary profit from innovation by lone entrepreneurs. While independent innovators continue to offer what may be considered the most revolutionary of new ideas, Baumol's focus is on "systematized, bureaucratized, and highly efficient sets of parallel activities" carried out within "innovative oligopolistic corporations" (p.ix). As he tells the story, these firms have transformed the innovation process from one "beset by fortuitous elements" into a "domain of memorandums, rigid cost controls, and standardized procedures which are the hallmarks of trained management" (p.36). The overall picture, in his view, is a "serendipitous relationship" between entrepreneurial and routinized innovation activity whose "results are arguably super-additive" (p.22).

*In Baumol's model,
it is the intensity of
competition among
innovative oligopolists
that determines both
the level of innovation
expenditure and its
upward trajectory
over time.*

In Baumol's model, it is the intensity of competition among innovative oligopolists that determines both the level of innovation expenditure and its upward trajectory over time. Much like "an arms race among mutually suspicious nations," this model contains a "ratchet mechanism" causing periodic escalation, during which it becomes "necessary to run as rapidly as possible in order just to stand still" (p.43). Oligopoly is the necessary and natural market structure for this purpose. Monopoly will not do because, by definition, it is immune from competition; at the other extreme, small firms in unconcentrated markets lack not only the requisite resources but also "the stimulation of observed interdependence with their rivals," and "the spillover problem may well prove particularly severe in such an environment" (p.45).

To Baumol, the spillover factor is a major source of imperfection in the capitalist economic growth engine because a considerable share of the benefits of any given innovation will inevitably go to parties making no contribution to discovery or invention. However, spillover is a two-sided coin: it enables parties other than the innovator to appropriate value from the innovator's investments and thereby provides an important benefit to society in general. In Baumol's picture, an essential attribute to an innovation process that maximally advances societal welfare is the rapid dissemination of innovative output throughout the economy. It is oligopolists, he explains, that have strong incentives to facilitate dissemination through widespread licensing for profit, cross-licensing arrangements, joint R&D, technology consortia, and other forms of technology exchange. Just as competitive pressures have led to the routinization of innovation, competitive mechanisms drive the dissemination process as "part of the regular portion of the firm's *voluntary* activities" (p.75). While rapid dissemination can sometimes be "the enemy" of innovation by diminishing the returns from innovation investment, licensing and other forms of exchange can also enhance incentives for innovation by helping "to internalize the externalities of innovation activity, thereby reducing the spillover problem" (p.79). Thus, it is no longer necessary to view invention and technology transfer as activities that impede one another; rather, they may be seen as "mutually compatible" (p.83). In short, market mechanisms "make it profitable to engage simultaneously in the innovation 'arms race' and in the licensing of any new inventions obtained in the process" (p.83).

Baumol also discusses in some detail the implications of routinized innovation and the continuous sunk cost investments that it requires for pricing the products resulting from the innovation process. Cost-sinking is a "repeat game," and all of it must be regularly recouped. According to Baumol, competitors in technology-driven markets cannot compete on price alone and must compete primarily on innovation. In contrast to Adam Smith's world of atomistic markets and

marginal cost pricing, today's "innovation assembly line economy" drives firms to great size and drives markets into oligopoly structures. In these markets, sunk costs compelled by innovation arms races are "substantial, mandatory, and constantly repeated" (pp.162–63). Pricing well above marginal costs, and a considerable degree of price discrimination, become the norm because innovation outlays cannot be recouped without them. Finally, these markets tend to be "contestable" with firms as "price-takers" unable to impose prices that yield supracompetitive profits (*id.*).

In Baumol's model, price and cost pressures determine firm size and market concentration. No firm that is to survive can operate inefficiently. Therefore, the scale of operations cannot fall short of cost-minimizing levels. Each firm is forced to produce close to its cost-minimizing volume of output, the number of firms in the market becomes the number required to meet total demand at minimum cost, and contestability drives prices to levels that just permit competitive returns. In short, innovation drives concentration to cost-minimization levels—and to firm sizes larger than was previously the case—but innovation does not create monopoly power. Baumol's focus is on the "inter-temporal pattern of final product prices that returns [the continuous investment in innovation] in a manner compatible with economic efficiency" (p.183).

Baumol offers several comments on the policy implications of his model. First, he states that "innovation is an activity in which inter-firm coordination, even among horizontal competitors, can bring substantial welfare benefits" (p.119). For this reason, the antitrust authorities should ordinarily refrain from challenging such collaborations and minimize uncertainty about their legality by "indicating as specifically as possible what types of coordination and of what degree" will not raise antitrust concerns (*id.*). Second, the inherent tradeoff between welfare contribution of spillover effects from dissemination and welfare gain forgone because of the resulting limitation of innovators' payoffs may be modified by, for example, increasing or decreasing patent protection. With his comments on the Japanese system, Baumol invites controversial thinking about some possible welfare-enhancing U.S. patent law reforms (p.144):

[I]nnovation drives concentration to cost-minimization levels—and to firm sizes larger than was previously the case—but innovation does not create monopoly power.

Japanese patenting laws are far less favorable to inventors than are those in the United States and probably increase greatly the "spillovers" from Japanese innovation. No obvious and substantial decline in Japanese innovative activity appears to have resulted from this less protective atmosphere. Even more important, the paucity of protection appears to have strengthened the incentive to enter technology-sharing agreements with competitors and others. That, in turn, has insured that inventions are rapidly disseminated and put to use throughout the Japanese economy, enhancing Japanese productivity growth

Finally, Baumol's analysis of the interaction between sunk costs of innovation investments and final product pricing imperatives leads him to a "drastically revised view of the nature of monopoly power and the kinds of evidence that can legitimately be used to support or refute an accusation that a firm possesses monopoly power" (p.182). He explains, for example, that price discrimination, or the selling of a product at different prices to different customers based on their different demand elasticities, "can be expected to occur [and to occur frequently] in the pricing of products of innovation—not *despite* relative ease of entry [or other competitive forces] but *because of it*" (p.167). One must, therefore, be wary of precedents that would make innovating oligopolists targets for antitrust prosecution "simply because their prices are discriminatory, or are not close to marginal costs" (p.182). In short, pricing practices of the sort he describes should not be used as a basis for attack: "[S]uch a course can easily constitute a major handicap to the steadily growing expenditure on innovation by private industry, which is arguably the mainstay of the U.S. economy's unprecedented growth record" (p.182).

Antitrust Implications

Joint Venture and Merger Standards. Baumol's analysis of both the intensity of innovation rivalry between oligopolists and the desirability of collaborations between them invites fresh thinking about joint venture and merger enforcement policies now in place. Under the 2000 FTC/DOJ Antitrust Guidelines for Collaborations Among Competitors,² collaborations affecting competition in an "innovation market" are ordinarily "safe" from antitrust concern only if "three or more independently controlled research efforts, in addition to those of the collaboration, possess the required specialized assets or characteristics and the incentive to engage in R&D that is a close substitute for the R&D activity of the collaboration" (§ 4.3). Thus, as is now generally understood by the antitrust community, a joint venture or merger reducing the number of innovation rivals in a given field from five to four is generally acceptable, while one that reduces the number from four to three (or less) raises red flags. Are three competing innovative oligopolists insufficient for the kind of arms race that Baumol describes? If oligopoly is the natural and desirable market structure for efficient innovation rivalry and maximum societal welfare, then what is the basis for drawing the line at a four-firm structure and applying presumptions against three-firm or even two-firm scenarios?

If oligopoly is the natural and desirable market structure for efficient innovation rivalry and maximum societal welfare, then what is the basis for drawing the line at a four-firm structure and applying presumptions against three-firm or even two-firm scenarios?

Even more questionable under the Baumol model is the negative signal regarding consideration of innovation efficiencies in merger enforcement policy under the current version of the agencies' Merger Guidelines.³ Under the Merger Guidelines, the agencies assert that the only efficiencies to be considered as offsets to potential anticompetitive effects are efficiencies "that have been verified and do not arise from anticompetitive reductions in output or service" (§ 4). Moreover, efficiencies that enable the merging firms to reduce marginal costs of production are "more likely" than others to warrant attention, and efficiencies "relating to research and development" are "generally less susceptible to verification and may be the result of anticompetitive output reductions" (*id.*). Is this thumb on the scale against innovation efficiency considerations consistent with the picture Baumol has drawn of innovation rivalry driving oligopolists to cost minimization, large size and scale required for efficient "sunk cost" investments? Indeed, if innovation rivalry and associated efficiency imperatives are now driving increased market concentration, then what is the basis for less receptivity to R&D efficiency arguments than to marginal-cost-of-production efficiency arguments in merger enforcement policy?

The agencies have, in practice, considered innovation efficiencies in the course of many high-technology merger investigations in recent years. They have, however, much more prominently focused on concerns over the loss of "diversity" in innovation strategies, the loss of smaller challengers with incentives to disrupt the technology status quo by concentrating on breakthrough developments, and other ways in which the reduction in the number of pre-merger rivals may adversely affect innovation output.⁴ The Baumol analysis does not challenge the desirability of considering these potential negative effects in any given merger transaction. It does, however, provide support for those who believe the agencies should be more open to potential offsetting positive effects from greater scale in R&D activity.

² Reprinted in 4 Trade Reg. Rep. (CCH) ¶ 13,160 (2000), available at <http://www.ftc.gov/os/2000/04/ftcdoguidelines.pdf>.

³ Reprinted in 4 Trade Reg. Rep. (CCH) ¶ 13,104 (revised 1997), available at <http://www.ftc.gov/bc/docs/horizmer.htm>.

⁴ See generally Constance Robinson, Leap-Frog and Other Forms of Innovation: Protecting the Future for Tech-Tech in Emerging Industries Through Merger Enforcement, Address Before ABA (June 10, 1999), available at <http://www.usdoj.gov/atr/public/speeches/2482.pdf>.

Standard Setting and Patent Pools. Baumol's analysis of the tradeoff between innovators' rewards and spillover benefits, in conjunction with his emphasis on the critical importance of "rapid dissemination" of innovation output through licensing and other technology exchange vehicles, bears directly on some of the most contentious issues that were aired at the FTC/DOJ Hearings on Competition and Intellectual Property Law and Policy in the Knowledge-Based Economy in April 2002. Of particular relevance are (a) the debate over appropriate policies with regard to the licensing of patents required to implement technology standards, and (b) the debate over the patent pool rules necessary to create a proper balance between pool insiders and pool outsiders.

The FTC's *Dell Computer*⁵ action six years ago, its now-pending *Rambus*⁶ proceeding, and a growing array of similar private litigation,⁷ highlight the manner in which anticompetitive "patent hold-up" or "patent ambush" situations can arise when standard-setting bodies vote on proposed standards without knowledge that patents may be infringed by the use of the standards they adopt. These actions open a virtual Pandora's Box of related issues regarding how to address and minimize exposure to post-adoption opportunistic conduct by holders of patents required for a standard's use. Standards organizations today typically go no further than to require a patent holder, promoting incorporation of its patent into a proposed standard, to make a generalized commitment to "reasonable" licensing availability to all interested parties. Actual license provisions are disclosed only after the standard is adopted, enabling the patent holder, at that point in time, to demand terms that can place rivals at considerable competitive disadvantage.

At the April 2002 IP Hearings, the suggestion was made that standards organizations consider new policies requiring or encouraging the disclosure of intended license terms prior to a vote on a proposed standard. Many parties, however, resist that course on the ground that it would expose the standards participants to a charge of per se illegal price-fixing. That is not, however, a credible objection either as a matter of existing law or sound policy.⁸ Indeed, policies aimed at meaningfully ensuring reasonable licensing terms to all rivals—known in advance of adopting a standard critical to a new market—can only be innovation-enhancing and procompetitive in light of Baumol's analysis of societal benefits from dissemination activity. Consistent with his recommendation that the agencies should indicate "as specifically as possible what types of coordination" will not be challenged, the agencies should confirm their comfort with policies of this sort in their final report on the hearings. Baumol's analysis would, at a minimum, support the desirability of requiring the disclosure of intended licensing terms prior to voting on a proposed standard which would require a license for its implementation.

Patent pools are among the most important technology exchange mechanisms that effectuate rapid technology dissemination and spillover effects of the sort Baumol applauds. They were also the subject of spirited debate at one session of the FTC/DOJ hearings in April 2002. Before discussing the debated issues, however, one must note the broad common ground among all speakers in their acceptance of certain basic antitrust rules with respect to pooling operations that emanate from three DOJ Business Review Letters issued over the course of the past five years. These principles include limiting aggregations to patents determined through objective means to

... ensuring reasonable licensing terms to all rivals—known in advance of adopting a standard critical to a new market—can only be innovation-enhancing and procompetitive . . .

⁵ *Dell Computer Corp.*, 121 F.T.C. 616 (1996).

⁶ *Rambus Inc.*, FTC Docket No. 9302 (complaint issued June 19, 2002).

⁷ See, e.g., *Intersil Corp. v. Proxim, Inc.*, Civil Action No. 01-266 (D. Del. filed Apr. 24, 2001).

⁸ See Statement of Scott K. Peterson, FTC/DOJ Hearings, Apr. 18, 2002, at pp. 7–12, <http://www.ftc.gov/opp/intellect/020418scottkpeterson.pdf>; see also Gail F. Levine, *B2Bs, E-Commerce and the All-or-Nothing Deal*, 28 *RUTGERS COMPUTER & TECH. L.J.* 305–51 (2002).

be “essential” to employing the technology in question; assuring access to the assembled package to all interested parties on reasonable nondiscriminatory license terms; preserving opportunities for each licensor to negotiate licenses to its patents outside of the pool; protecting against dissemination of competitively sensitive proprietary information among the participants; and avoiding license conditions that impair future innovation incentives, such as unduly broad grant-back requirements and constraints on assertions of patent rights against licensors.⁹

Debate ensued over whether these rules suffice for antitrust purposes or whether refinements and additional protections for some affected interests would be desirable. One of the authors of this review suggested that pools should be encouraged to operate under policies and procedures that would create a more meaningful balance between the conflicting interests of insiders (the pool’s founding members owning the patents initially assembled) and outsiders (diverse groups of applicants for pool licenses including existing competitors of the insiders, later new entrants into the market that the insiders dominate, as well as universities and other parties that do not directly compete in that market). Among the suggestions were mechanisms for ensuring consideration of outsiders’ perspectives on appropriate adjustments to license terms and patent essentiality as a result of changing market conditions in the years after pool formation, availability of “partial” licenses for parties that do not need the entirety of the pool’s package license (thus “unbundling” needed from unneeded patents), and pool governance arrangements that ensure input into decision-making processes from individuals without financial interests in the pool’s revenue stream.¹⁰

Again, ironically, some of the resistance to those suggestions has come in the form of expressed concern over antitrust risk in any departure from (or addition to) rules already established in compliance with the existing DOJ Business Review Letters in this area. The fact is, however, that additional safeguards for outsiders’ interests (of the sort mentioned above) could only bolster the innovation-enhancing and competition-enhancing potential of these pools in ways consistent with the Baumol analysis of dissemination and spillover benefits. Thus, even if the failure to include provisions of this sort does not rise to the level of creating cognizable antitrust liability in and of itself, the agencies could appropriately encourage pools to consider employment of them by recognizing their potential to enhance procompetitive effects that offset acknowledged anticompetitive risks under the applicable antitrust rule of reason. Again, consistent with Baumol’s recommendation that the agencies should indicate “as specifically as possible what types of coordination” will not be challenged, the agencies could constructively address these proposals in their final report on the hearings.

Exclusionary Conduct Standards. Baumol makes a compelling case against any presumption that innovative oligopolists’ pricing above marginal cost levels and associated patterns of discriminatory pricing signify noncompetitive or market power conditions that enable or threaten exclusionary conduct. He does not, however, specifically address what have recently become far more contentious issues with regard to aggressive strategies of innovative monopolists or firms that plainly dominate their sectors in contrast to battling oligopolists: allegations that such firms are engaged in both price and non-price predation aimed at either raising entry barriers in the technology spaces they already dominate or extending their control into other complementary technology

Baumol makes a compelling case against any presumption that innovative oligopolists’ pricing above marginal cost levels and associated patterns of discriminatory pricing signify noncompetitive or market power conditions . . .

⁹ DOJ Business Review Letter of June 26, 1997 (MPEG-2), <http://www.usdoj.gov/aatr/public/busreview/1170.htm>; DOJ Business Review Letter of Dec. 16, 1998 (DVD-ROM), <http://www.usdoj.gov/aatr/public/busreview/2121.htm>; DOJ Business Review Letter of June 10, 1999 (DVD-Video), <http://www.usdoj.gov/aatr/public/busreview/2485.htm>.

¹⁰ See Statement of Jeffery B. Fromm, FTC/DOJ Hearings, Apr. 17, 2002, at pp. 3–8, <http://www.ftc.gov/opp/intellect/020417jefferyfromm.pdf>.

spaces. One has the sense that Baumol's analysis could contribute importantly to this area, but one can only speculate about it since he has not written that chapter.

The Baumol analysis of the importance of innovation dissemination, along with his analysis of strong market incentives to effectuate dissemination on a "voluntary" basis, raises a question as to the stance he would take on the single most controversial issue of our day with respect to the intersection between antitrust and intellectual property law regimes. The issue, in essence, is whether and under what circumstances should an IP owner's refusal to license its IP to smaller rivals be considered exclusionary conduct in violation of Section 2 of the Sherman Act.¹¹ Baumol's model would appear to argue against any rule of "compulsory" licensing, at least in the absence of clear evidence showing market imperfections that foreclose "optimal" dissemination incentives.

Baumol's analysis of continuous sunk-cost recoupment imperatives plainly counsels caution with regard to any judgment that prices of a firm in an innovation-intensive market are "too high," but Baumol does not address the more timely issue of when such a firm's prices may be considered "too low" from an antitrust standpoint. DOJ's Section 2 case against American Airlines,¹² now on appeal from a district court's summary judgment dismissal, presents that issue: a dominant airline stands accused of unlawful predation for sharp price cuts along with aggressive capacity expansion on routes with new entrants, even though the resulting prices were still far above marginal costs and (apparently) above opportunity costs as well. Appearing in that case as an expert witness for American Airlines, Baumol opposed a predation standard that would prohibit competitive pricing responses of the sort at issue. Indeed, any such standard would surely be detrimental to the main characters in his book: innovative oligopolists that need to recoup innovation investments and for that reason need considerable freedom to respond aggressively to competitive attacks on their customer bases.

There is now a mountain of literature, proliferating throughout the 1990s, delineating what has come to be called a "Post-Chicago School" of antitrust thinking with heavy emphasis on "strategic conduct" by dominant incumbents and "raising rivals' costs" (in lieu of below-cost pricing) as an effective predation strategy. This thinking was central to many of the Clinton Administration's antitrust enforcement initiatives,¹³ but the extent to which the agencies during the current administration adhere to it remains to be seen.¹⁴ Baumol's new book provides considerable fodder for both proponents and detractors of the Post-Chicago School.

* * * * *

This book review does nothing more than begin to outline areas where the Baumol model may be relevant to a wide array of difficult and complex antitrust issues confronting high-technology markets as they evolve in the years ahead. Our intent is to instigate deeper commentary by others in future issues of this publication. In the meantime, those eager for more policy prescriptions from Professor Baumol himself will be pleased to know that he is already well underway on his next book (with co-author Daniel Swanson) about antitrust for the new economy. ●

¹¹ Compare *In re Independent Serv. Organization Antitrust Litig.*, 203 F.3d 1322 (Fed. Cir. 2000) with *Image Technical Servs., Inc. v. Eastman Kodak Co.*, 125 F.3d 1195 (9th Cir. 1997); see Robert Pitofsky, *Challenges of the New Economy: Issues at the Intersection of Antitrust and Intellectual Property*, Remarks Before American Antitrust Institute (June 15, 2000).

¹² *United States v. AMR Corp.*, 140 F. Supp. 2d 1141 (D. Kan. 2001).

¹³ See David Balto & Robert Pitofsky, *Antitrust and High-Tech Industries: The New Challenge*, 153 ANTITRUST BULL. 583 (1998).

¹⁴ Note, on the one hand, Mr. James's approval of the appeal in the *American Airlines* case shortly after taking office and, on the other hand, his approval shortly thereafter of a consent decree in the *Microsoft* case.