

The Durapolist Puzzle: Monopoly Power in Durable-Goods Markets

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This Article studies the durapolist, the durable-goods monopolist. Durapolists have long argued that, unlike perishable-goods monopolists, they face difficulties in exercising market power despite their monopolistic position. During the past thirty years, economists have extensively studied the individual arguments durapolists deploy regarding their inability to exert market power. While economists have confirmed some of these arguments, a general framework for analyzing durapolists as a distinct group of monopolists has not emerged. This Article offers such a framework. It first presents the problems of durapolists in exercising market power and explains how courts have treated these problems. It then analyzes the strategies durapolists have devised to overcome difficulties in acquiring and maintaining monopoly power and the legal implications of these strategies. This Article's major contributions are (a) expanding the conceptual scope of the durapolist problem, (b) presenting the durapolist problem as an explanation for many common business practices employed by durapolists, and (c) analyzing the legal implications of strategies employed to overcome the durapolist problem.

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Introduction

A distinguished member of the monopolist family, the *durapolist*, or durable-goods monopolist, is a frequent guest in the courtroom and became a favorite subject of study among economists following a seven-

page note by Professor Ronald Coase.¹ In that short note, Professor Coase convincingly explained why a durapolist might not be able to exercise market power² even if it held a market share of 100 percent.

The essence of Coase's argument lies in the nature of durable goods. A *durable good* (or *durable*) is a long-lasting good that can be used repeatedly. A non-durable good, otherwise known as a *perishable good* (or *perishable*), cannot be used more than once even if it has a long shelf life. Traditionally, monopolies over durable-goods and perishable-goods markets were believed to be equally attractive for profit seekers. Professor Coase challenged this common view. The underlying intuition behind Coase's argument is fairly straightforward. The demand for perishables is more or less stable over time, since the consumer returns to the market to buy a replacement for the perishable after consuming it. In contrast, the demand for durables shrinks over time because the consumer can reuse the good and has little, if any, need to return to the market.

Economists quickly endorsed Coase's theory, commonly known today as the *Coase Conjecture*,³ and produced a rich literature on market power in durable-goods markets.⁴ The antitrust agencies followed this trend, incorporating the general intuition of the Coase Conjecture into the Merger Guidelines.⁵ Nevertheless, a general framework for analyzing market power in durable-goods markets has not been developed. In particular, the general antitrust literature on monopolization and often-controversial business practices employed by durapolists has not integrated the economic literature on market power in durable-goods markets. This

1 Ronald H. Coase, *Durability and Monopoly*, 15 J.L. & ECON. 143 (1972). Professor Coase was not the first to identify the durapolist problem. The study of durapolists goes back as early as 1923. See Knut Wicksell, *Real Capital and Interest*, in 1 LECTURES OF POLITICAL ECONOMY 258 app. 2 (Lionel Robbins ed., 1934).

2 Market power is defined as "the power to control prices or exclude competition." *United States v. E.I. du Pont de Nemours & Co.*, 351 U.S. 377, 391-92 (1956). More recently, the Supreme Court defined market power as "the ability of a single seller to raise price and restrict output." *Eastman Kodak Co. v. Image Technical Servs., Inc.*, 504 U.S. 451, 464 (1992). For the purpose of this Article, the terms "market power" and "monopoly power" are synonyms. For a general discussion regarding the interchangeability of these terms in antitrust law, see Thomas G. Krattenmaker et al., *Monopoly Power and Market Power in Antitrust Law*, 76 GEO. L.J. 241 (1987).

3 For mathematical proofs of the Coase Conjecture, see Faruk Gul et al., *Foundations of Dynamic Monopoly and the Coase Conjecture*, 39 J. ECON. THEORY 155 (1986); Jacques Thépot, *A Direct Proof of the Coase Conjecture*, 29 J. MATHEMATICAL ECON. 57 (1998).

4 For an updated survey of the economic literature on durable goods, see Michael Waldman, *Durable Goods Theory for Real World Markets*, 17 J. ECON. PERSP. 131 (2003).

5 The 1992 Merger Guidelines recognize that it may be more difficult to exercise market power in durable-goods markets. U.S. DEP'T OF JUSTICE & FEDERAL TRADE COMM'N, HORIZONTAL MERGER GUIDELINES § 3.2 (1992) ("Where the relevant product is a durable good, consumers, in response to a significant commitment to entry, may defer purchases by making additional investments to extend the useful life of previously purchased goods and in this way deter or counteract for a time the competitive effects of concern."); see also U.S. DEP'T OF JUSTICE & FEDERAL TRADE COMM'N, HORIZONTAL MERGER GUIDELINES § 2.22 (1984); U.S. DEP'T OF JUSTICE, MERGER GUIDELINES § II.B.2 (1982).

Article offers such a framework, analyzing strategies that maintain high prices and exclude competitors.

The plan of the Article is as follows. Parts I and II are the substantive parts of the Article. Part I studies impediments to market power in durable-goods markets, which are collectively referred to herein as the *durapolist problem*,⁶ and illustrates how it has been presented in the courtroom and treated by the courts. Part I demonstrates that the Coase Conjecture, which has been the focus of scholars' attention, constitutes only one facet of the durapolist problem; often it is not the primary impediment to market power in durable-goods markets. Part II presents the major strategies employed to overcome the durapolist problem and analyzes their legal implications. Part III concludes. The Appendix, Part IV, supplements Part I by offering an economic model that supports Part I's fundamental conclusions and arguments. The Appendix also presents several welfare implications of the durapolist problem.

I. The Durapolist Problem: Extracting Rent for Future Consumption

Durapolists are arguably weak compared to perishable-goods monopolists. This Part of the Article analyzes the causes of durapolists' alleged inability to charge monopoly prices and provides illustrations from leading antitrust cases. The analysis indicates that durability has detrimental effects on durapolists' profits and, therefore, creates incentives for them to shorten the durability of their products or otherwise neutralize its effects.

A. *Durables vs. Perishables*

The starting point for the analysis is to understand that fundamentally different considerations underlie a consumer's decisions when buying perishables versus durables. Because of these considerations, it is more difficult to sell durables than perishables, let alone charge monopoly prices for durables.

The most salient difference between buying decisions for perishables and durables is the relevant time horizon. For a perishable, the consumer chooses between buying only for present consumption and buying also for future consumption. Her decision whether to invest in future consumption

6 This Article does not address the computation of market shares in durable-goods markets, which focuses on the question of whether used goods should be included in the relevant market. This matter is fairly clear and has been addressed by courts numerous times. *See, e.g.*, *Allen-Myland, Inc. v. Int'l Bus. Machs. Corp.*, 33 F.3d 194 (3d Cir. 1994); *United States v. Aluminum Co. of Am.*, 148 F.2d 416 (2d Cir. 1945); *Pac. Mailing Equip. Corp. v. Pitney Bowes, Inc.*, 499 F. Supp. 108 (N.D. Cal. 1980); *see also infra* Subsections I.C.3.a and I.C.3.b (discussing the legal implications of the *Alcoa* and *Allen-Myland* decisions).

is influenced by her wish to save the transaction costs generated by repeated transactions and to eliminate the risks of price increases and expected shortage.⁷ In contrast, in buying a durable, the consumer has no choice: Present and future products are bundled together in one package. Investments in future consumption, however, may not be affordable, since the consumer's income accrues over time and paying at present for future consumption may be beyond her means. When the necessary funds are available, the consumer may still be concerned that prices might fall and that she would be better off waiting to purchase the durable. Consequently, she may find the investment too risky and refrain from buying the durable. In short, the decision whether to buy a durable is adversely affected by factors that do not apply to purchases of perishables.

The foregoing analysis means that the durapolist must take into account financial realities and convince consumers that their investments in its merchandise are not at risk. On top of that, the optimization of durable-goods sales is rather complex. By selling products today, a durapolist shrinks the number of consumers that will need new products in the future and creates future competition against itself, since the products will return to the market as used goods. Thus, a durapolist must consider the effects of today's sales on the demand for its merchandise tomorrow. These complexities are not easy to resolve and, therefore, present durapolists with difficulties in charging monopoly prices. This Part of the Article studies these problems in detail.

B. *Commitment to Future Prices and the Light-Bulb Durapolist*

To study the commitment problem, consider a hypothetical light-bulb durapolist. The light-bulb durapolist chooses between two technologies: bulbs that last one year and bulbs that last ten years. These technologies represent short- and long-lived durables, respectively. The durapolist's marginal production cost is constant and equal for both technologies.⁸ For a ten-year bulb, one would expect a consumer to be willing to pay the present value of the cost of ten one-year bulbs purchased over nine years or even somewhat more, since the consumer avoids the inconvenience of

⁷ See generally Michael J. Brennan, *The Supply of Storage*, 48 AM. ECON. REV. 50, 72 (1958) (presenting a theory "explain[ing] the degree of hedging as well as intra- and inter-year storage behavior").

⁸ Relaxing the assumption of constant marginal cost may change the results of the analysis below but not necessarily. See Subramanian Balachander & Kannan Srinivasan, *Modifying Customer Expectations of Price Decreases for a Durable Product*, 44 MGMT. SCI. 776 (1998); Robert Driskill, *Durable-Goods Monopoly, Increasing Marginal Cost and Depreciation*, 64 ECONOMICA 137 (1997); Charles Kahn, *The Durable Goods Monopolist and Consistency with Increasing Costs*, 54 ECONOMETRICA 275 (1986); Trod E. Olsen, *Durable Goods Monopoly, Learning by Doing and the Coase Conjecture*, 36 EUR. ECON. REV. 157 (1992); Nancy L. Stokey, *Intertemporal Price Discrimination*, 93 Q.J. ECON. 355 (1979).

frequent replacements. If that intuition holds, the durapolist will produce only ten-year bulbs, since it will incur lower production and transaction costs for approximately the same revenues. Moreover, the durapolist will be motivated to increase the durability of its bulbs.⁹ The Coase conjecture, however, suggests that the contrary is true: Durapolists may prefer low levels of durability.

1. The Market for Ten-Year Bulbs

When introducing the long-lived technology of ten-year light bulbs, the durapolist adopts an optimal plan of charging the monopoly price in order to maximize profits. Under this optimal plan, only consumers who are willing to pay the monopoly price (“*high-valuation consumers*”) purchase bulbs, while other potential consumers continue to use substitutes, such as candles and oil lamps. Consumers, however, are not easily fooled. They realize that if the durapolist maintains the monopoly price, it will exhaust the market of high-valuation consumers and will seek ways to secure a flow of income. They anticipate, therefore, that upon satisfying the demand of high-valuation consumers, the durapolist will offer its merchandise to consumers who cannot afford, or are not willing to pay, the monopoly price (“*low-valuation consumers*”). For a small discount, some of these consumers would purchase bulbs.¹⁰ The durapolist, consumers believe, will set a new price according to the demand of the low-valuation consumers, such that its profits will be maximized. Again, not all consumers will buy bulbs, and, after saturating the market, the durapolist will continually readjust its price to expand its business to consumers with even lower valuations.

Consumers, therefore, anticipate that “the [durapolist’s] optimal plan of the present moment is generally one which will *not* be obeyed” and that the durapolist’s “future behavior will be inconsistent with [its] optimal plan.”¹¹ Such anticipated time inconsistency, in turn, instructs consumers

9 This argument was popularized among economists in the 1970s by Peter Swan. See, e.g., Peter L. Swan, *Optimum Durability, Second-Hand Markets, and Planned Obsolescence*, 80 J. POL. ECON. 575, 576 (1972) (“[A] profit-maximizing firm will wish to minimize the cost of any given service flow from a stock of the durable goods. Durability is determined by technical considerations, and price is the variable which is used to reflect the monopoly power of firms.”).

10 Note that the members of consumer group—the high-valuation and the low-valuation consumers—are not homogeneous. Members of each group have various levels of demand elasticities and, therefore, their willingness to pay a given price is not uniform. For example, if the durapolist sets a price higher than the optimal monopoly price, some high-valuation consumers will still buy bulbs. Similarly, when the durapolist lowers its prices, some low-valuation consumers will buy bulbs, while others may still be reluctant to pay the new price.

11 R. H. Strotz, *Myopia and Inconsistency in Dynamic Utility Maximization*, 23 REV. ECON. STUD. 165 (1955). Strotz was the first to formalize the problem of time inconsistency. For various implications of time inconsistency, see George Loewenstein & Richard H. Thaler, *Intertemporal Choice*, 3 J. ECON. PERSP. 181 (1989); Thomas C. Schelling, *Self-Command in Practice, in Policy and*

to hold purchases until prices are close to the competitive level. As a result, despite the durapolist's hold on the market, durability creates expectations that prices will fall and predisposes consumers to postpone purchases until prices are close to the competitive level.¹² This problem is referred to herein as the *commitment problem*.

2. The Market for One-Year Bulbs

Relative to ten-year light bulbs, one-year bulbs represent short-lived durables. Further analysis of the light-bulb durapolist shows that the choice of low levels of durability may remove some constraints on the durapolist's pricing, enabling it to exploit its monopolistic position better.

The discussion of the durapolist that sells ten-year bulbs implicitly assumed that such a durapolist could sell its goods and modify prices "in the twinkling of an eye,"¹³ so that equilibrium is reached immediately at any level of prices. This assumption is unrealistic: Such a process of price decline takes time and may entail certain costs for the durapolist. In the case of long-lived durables, the time and costs of this process are relatively negligible, but in the case of short-lived durables these costs become significant because of short-run price rigidities, profitability optimization, and the costs of price changes.¹⁴

Short-run price rigidities often constrain the feasibility of a price change, preventing businesses from altering prices to the optimal level "in the twinkling of an eye" and even for significant periods of time.¹⁵ Optimizing profits in the face of declining pricing requires that at each

in a *Theory of Traditional Choice*, 74 AM. ECON. REV. 1 (1984); Richard H. Thaler & H. M. Shefrin, *An Economic Theory of Self-Control*, 89 J. POL. ECON. 392 (1981).

¹² See Stokey, *supra* note 8 (analyzing why schemes of downscaling pricing are often unprofitable for durapolists).

¹³ Coase, *supra* note 1, at 143.

¹⁴ See Robert J. Barro, *A Theory of Monopolistic Price Adjustment*, 39 REV. ECON. STUD. 17 (1972); Dennis W. Carlton, *The Rigidity of Prices*, 76 AM. ECON. REV. 637 (1986); see also Coase, *supra* note 1, at 147.

What a consumer has to fear is an increase in supply during the period [in] which he (or someone to whom he transfers the good) is deriving services from the good. The less durable the good, the shorter is this period. But the shorter the period that the supplier has in which to increase supply, the greater will be the additional costs of increasing supply.

Id.

¹⁵ Although explaining short-run price rigidities is beyond the scope of this Article, abundant empirical evidence documents the phenomenon, particularly the downward stickiness of prices. See, e.g., GARDINER C. MEANS, *INDUSTRIAL PRICES AND THEIR RELATIVE INFLEXIBILITY*, S. DOC. NO. 13 (1935); Dennis W. Carlton, *The Rigidity of Prices*, 76 AM. ECON. REV. 637 (1986); Stephen G. Cecchetti, *Staggered Contracts and the Frequency of Price Adjustment*, 100 Q.J. ECON. 935 (1985); Anil K. Kashyap, *Sticky Prices: New Evidence from Retail Catalogs*, 110 Q.J. ECON. 245 (1995); Sam Peltzman, *Prices Rise Faster Than They Fall*, 108 J. POL. ECON. 466 (2000); GEORGE J. STIGLER & JAMES K. KINDAHL, *THE BEHAVIOR OF INDUSTRIAL PRICES* (Nat'l Bureau of Econ. Research, General Series Working Paper No. 90, 1970).

price level a durapolist saturate the demand of the group of consumers who are willing to pay that price. Such a declining price trajectory maximizes profits through intertemporal price discrimination.¹⁶ However, saturating the demand of large sets of consumers takes time: An inventory of goods cannot be sold to consumers instantaneously because of the time needed to disseminate information regarding the product and its price, queuing, necessary time to complete a transaction, and so forth. Thus, profitability considerations, like the feasibility constraint, create delays in the decline in the durapolist's prices, linking profitability and durability: The shorter the lifetime of a product, the fewer the profitable opportunities, if any, to cut its price. At the extreme, when the product lifetime is very short, the durapolist has no opportunities to cut prices, as early shoppers return to the market before the demand of their high-valuation peers is saturated. In contrast, when the product lifetime is long, the durapolist may saturate the market of high-valuation consumers, cut prices, sell its merchandise to some of the low-valuation consumers, cut prices again, sell more goods to consumers with lower valuations,¹⁷ and the cycle continues.¹⁸

The costs of price changes constitute another factor that links the level of durability to the incentives to cut prices. These costs are generally fixed and not related to durability. For example, the costs of communicating a new price to consumers through advertising, catalogs, and labels are unlikely to change with the level of durability. As a result, the impact of the costs of price changes on profits is negatively related to the product price. To illustrate, assume that the monopoly prices of bulbs are one dollar for a one-year bulb and eight dollars for a ten-year bulb¹⁹ and that the average price-adjustment cost per bulb is two cents. For a price cut of ten percent, the price-adjustment costs would constitute 2.22% of the durapolist's expected revenues from sales of one-year bulbs and 0.28% of its expected revenues from sales of ten-year bulbs. Correspondingly, the durapolist's incentives to cut prices are greater for ten-year bulbs than for one-year bulbs, since lowering prices of one-year bulbs is more likely to be unprofitable than lowering prices of ten-year bulbs.

A general corollary of the discussion above is that a durapolist that produces goods of low-level durability binds itself against deviating from

16 See *infra* Section II.B.

17 Levels of valuations in this context inversely correspond to demand elasticities of consumers: The demand elasticity goes up when the valuation decreases.

18 See Nancy L. Stokey, *Rational Expectations and Durable Goods Pricing*, 12 BELL J. ECON. 112 (1981) (proving that as the length of the intervals between price cuts become smaller, a durapolist's price approaches marginal cost and vice versa).

19 The present value of ten annual payments of one dollar discounted at a five percent interest rate is approximately eight dollars.

its optimal pricing plan and prevents expectations of price cuts.²⁰ Put simply, low durability may strengthen market power and boost profits.²¹ Another conclusion is that the Coase Conjecture's applicability diminishes with the level of a product's durability.

3. Learning by Doing and Market Contestability

The commitment problem may take various forms and is not restricted to the case of a durapolist motivated to cut prices because it has saturated demand at the current price. Two additional motivations create or enhance the commitment problem: (a) learning-curve effects and (b) low barriers to entry.

Learning-curve, or learning-by-doing, effects are efficiency improvements that repetitious performance of production tasks brings about and typically take the form of reductions in the number of errors and the time needed to complete a task.²² In the presence of learning-curve effects, the price that maximizes the profits of the moment—the static monopoly price—follows production costs and declines over time. This means that, unless the durapolist's initial price is equal to the monopoly price when the learning process is complete,²³ price will diminish over time. Consumers are aware of this inclination because the nature of learning-curve effects is intuitive to them.²⁴ Thus, when a new durable is

20 See Coase, *supra* note 1, at 147 (“[Some durapolists have the alternative] to make the good less durable. . . . If a less durable good is produced, a higher price can be charged because consumers do not have to fear an increase in supply if they buy at the monopoly price.”).

21 See *infra* Section III.C; see also Kaushik Basu, *Why Monopolists Prefer To Make Their Goods Less Durable*, 55 *ECONOMICA* 541 (1988); Edward H. Chamberlin, *The Product as an Economic Variable*, 67 *Q.J. ECON.* 1, 23-24 (1953).

Since [durability] is variable, the producer has to face the question of how durable to make his product. Evidently if he makes it too durable, as soon as people have bought one unit they will not need another for a substantial period during which there will be no “repeat demand” for his product. He has an interest then in making it less durable so that people will come back that much sooner to buy another unit.

Id. (citations omitted).

22 See generally Armen Alchian, *Reliability of Progress Curves in Airframe Production*, 31 *ECONOMETRICA* 679 (1963); Werner Z. Hirsch, *Manufacturing Progress Functions*, 34 *REV. ECON. & STAT.* 143 (1952); Leonard Rapping, *Learning and World War II Production Functions*, 47 *REV. ECON. & STAT.* 81 (1965); T.P. Wright, *Factors Affecting the Cost of Airplanes*, 3 *J. AERONAUTICAL SCI.* 122 (1936).

23 In addition to preventing time inconsistency, fixing the price at the optimal level of the learning process enables durapolists to convert learning-curve effects to entry barriers. For the advantages of such a pricing policy, see, for example, Luis B. Cabral & Michael H. Riordan, *The Learning Curve, Market Dominance, and Predatory Pricing*, 62 *ECONOMETRICA* 1115 (1994); Robert H. Smiley & S. Abraham Ravid, *The Importance of Being First: Learning Price and Strategy*, 98 *Q.J. ECON.* 353 (1983); Michael Spence, *The Learning Curve and Competition*, 12 *BELL J. ECON.* 49, 50-53 (1980). For the antitrust implications, see Luis B. Cabral & Michael H. Riordan, *The Learning Curve, Predation, Antitrust, and Welfare*, 45 *J. INDUS. ECON.* 155 (1997).

24 For a general presentation of the durapolist problem in the presence of learning-curve effects, see Balachander & Srinivasan, *supra* note 8; Olsen, *supra* note 8.

introduced, especially a complex one, consumers expect its production costs and price to decline over time.²⁵

A similar consumer bias occurs when the durapolist's market has low barriers to entry.²⁶ Such a durapolist maintains the monopoly price as long as it enjoys the first-mover advantage, and then its price gradually declines as competitive pressures from fringe firms and entrants increase.²⁷ Even if potential competitors stay out of the market, their existence alone may influence durapolists to lower their prices to deter entry. Such circumstances create expectations of declining prices, which predispose consumers to hold off purchases, thereby limiting the durapolist's ability to charge the monopoly price.

C. *Dynamic Planning and Timing*

1. The Dynamic Planning Problem and Secondhand Markets

Thus far, this Article has assumed that durapolists can devise optimal plans and has explicated the reasons why economists often believe that such plans fail in practice. In actuality, a bigger threat to durapolists may be secondhand markets that make the planning of optimal pricing schemes almost impossible. Many durables outlast the needs of the initial consumer, return to the market as used goods, and create competition for the durapolist's new merchandise. Under such conditions, in order to mitigate the effects of the secondhand market, the durapolist must incorporate into its durables' initial price their future prices as used goods. This pricing technique, however, is speculative. It is difficult, or even impossible, to foresee the performance of future secondhand markets and the efficiency of recycling and refurbishing activities. This complexity, which hinders the durapolist's ability to convert its monopolistic market position to market power, is referred to herein as the *dynamic planning problem*.

25 See Balachander & Srinivasan, *supra* note 8.

26 A durapolist whose market is not protected at all by barriers to entry would not charge the monopoly price in the first place. See WILLIAM J. BAUMOL ET AL., *CONTESTABLE MARKETS AND THE THEORY OF INDUSTRY STRUCTURE* (rev. ed. 1988).

27 Empirical evidence indicates that the average first-mover advantage has sharply declined since the turn of the nineteenth century. Since consumers observe general trends in the speed of competitive entry, their expectations of price declines are adjusted. For an empirical study of the decline in the first-mover advantage, see Rajshree Agarwal & Michael Gort, *First Mover Advantage and the Speed of Competitive Entry, 1887-1986*, 44 J.L. & ECON. 161 (2001).

2. The Timing Problem, Liquidity Constraints, and Future Discounting

Even when optimization of production and sales is possible, durapolists may still be tempted to deviate from their optimal plans for immediate profits, significantly undercutting future profits by creating competition from secondhand markets.²⁸ This temptation stems from liquidity constraints and future discounting. Liquidity constraints mean that, at present, the durapolist faces difficulties in financing its operations. For example, loans required to complete the research and development (“R&D”) stage and to build production lines may impose a financial burden in the short run. Liquidity constraints may induce, and sometimes even force, a durapolist to increase present profits at the expense of its total discounted profits. Future discounting means that a durapolist prefers smaller profits today to greater profits tomorrow. In general, a durapolist that discounts the future steeply is so anxious to sell its goods for cash today that it is willing to forgo even large future profits.²⁹

Both factors—liquidity constraints and future discounting—may cause durapolists to produce more durables than would maximize long-run profits. This inducement to maximize the profits of the moment at the expense of total discounted profits is referred to herein as the *timing problem*.

The timing problem is similar but not identical to the commitment problem. The similarity is the durapolists’ myopia, which causes actual or expected behavior that undercuts total discounted profits. The difference between the problems is that the commitment problem highlights present difficulties in extracting the monopolistic rent, whereas the timing problem results from maximizing present profits at the expense of total discounted profits.

3. The Dynamic Planning and Timing Problems in the Courtroom

The foregoing arguments regarding the constraints on durapolists’ market power are not limited to economic scholarship. They are also raised by durapolists in monopolization and merger cases.³⁰ In *Alcoa*³¹ and *Allen-Myland*,³² two leading antitrust cases brought against durapolists, the

28 Note that the problem discussed in this Section refers to the inducement to deviate from the optimal plan at present, as opposed to the case of the commitment problem in which such inducement is anticipated by consumers to occur in the future.

29 Further discussion of this type of time preference appears *infra* Subsection I.D.2.

30 See, e.g., Dennis W. Carlton & Robert H. Gertner, *Market Power and Mergers in Durable-Goods Industries*, 32 J.L. & ECON. S203 (1989).

31 *United States v. Aluminum Co. of Am.*, 148 F.2d 416 (2d Cir. 1945) (“Alcoa”).

32 *Allen-Myland, Inc. v. Int’l Bus. Machs. Corp.*, 33 F.3d 194 (3d Cir. 1994).

courts addressed the dynamic planning and timing problems. In each case, the court accepted the theory behind the arguments but rejected their applicability to the challenged durapolist.

a. *Aluminum Company of America (Alcoa)*

During the first half of the twentieth century, Alcoa produced over ninety percent of “virgin” (new) aluminum sold in the United States.³³ In *Alcoa*, the defendant, Alcoa, argued that its high market share did not indicate market power because it was subject to competition from “secondary” (recycled) aluminum.

Judge Hand acknowledged that “limitations [on market power] . . . exist when a single producer [of durable goods] occupies the whole market: even then, his hold will depend upon his moderation in exerting his immediate power.”³⁴ Nevertheless, Judge Hand ruled that if a durapolist is aware of its interests, it will take into account that a certain portion of its production will return to the market.³⁵ Judge Hand was convinced that Alcoa had always been aware of that consideration, which had influenced its decisions about how much to produce.³⁶ As to the accuracy of forecasting the effects of competition from secondary aluminum, Judge Hand held that

[e]xperience, no doubt, would help; but it makes no difference that [Alcoa] had to guess; it is enough that it had an inducement to make the best guess it could, and that it would regulate that part of the future supply, so far as it should turn out to have guessed right.³⁷

Put simply, according to Judge Hand, Alcoa exercised self-discipline in determining how much aluminum to produce, and its dynamic planning problem was irrelevant because it acted to prevent competition from recycled aluminum.

The practical implication of this ruling was that, in computing Alcoa’s market share, the court disregarded competition from the secondary market. This holding is probably no longer good law or at least does not reflect the current policy of the antitrust agencies. Today, to the extent that analysis of the product market indicates that used,

33 For the history of Alcoa, see GEORGE DAVID SMITH, FROM MONOPOLY TO COMPETITION: THE TRANSFORMATION OF ALCOA, 1888-1986 (1988). For good surveys of the antitrust intervention in the aluminum industry in the United States and its consequences, see Robert Crandall, *The Failure of Structural Remedies in Sherman Act Monopolization Cases*, 80 OR. L. REV. 109, 141-54 (2001).

34 *Alcoa*, 148 F.2d at 426.

35 *Id.* at 425.

36 *Id.*

37 *Id.*

reconditioned, or recycled goods compete with new goods, the agencies include firms that produce or sell such goods in the relevant market.³⁸

Economists have studied the plausibility of the strategic behavior Judge Hand attributed to Alcoa. Early studies supported Hand's reasoning and focused on the economic conditions under which Alcoa could have maintained market power despite the potential competitive effects of secondary aluminum.³⁹ More recent studies have concluded that Alcoa's market power should be attributed to the fact that over half of the aluminum sold by Alcoa was never recycled and to the fact that Alcoa engaged in price discrimination among its customers according to their likelihood to recycle.⁴⁰ In short, the court and economists have rejected the argument that Alcoa lacked monopoly power because of competition from secondhand markets. Yet, neither the court nor economists have denied the interrelations among the timing problem, secondary markets, and durapolists' market power.

b. *International Business Machines (IBM)*

In *Allen-Myland*, the defendant, IBM, used Alcoa's line of defense and argued that its market share in the market for mainframes did not convey monopoly power due to competition from the secondhand market. IBM, perhaps to a greater extent than Alcoa, was subject to competition from used mainframes that were traded and leased on the market.

The Court of Appeals for the Third Circuit rejected IBM's argument and held that control over secondhand markets is related to the effective lifetime of the durable in question. The court distinguished between durapolists of long-lived durables, like aluminum, that can be recycled repeatedly and durapolists of relatively short-lived durables, like mainframes, that become obsolete when new technologies are introduced.⁴¹ A durapolist of long-lived durables may face practical "difficult[ies in] estimat[ing] future supply and demand . . . over a long period of time with sufficient accuracy to maximize its profits by

38 U.S. DEP'T OF JUSTICE & FEDERAL TRADE COMM'N, *supra* note 5, § 1.31.

39 See, e.g., Darius W. Gaskins, *Alcoa Revisited: The Welfare Implications of a Secondhand Market*, 7 J. ECON. THEORY 254 (1974) (arguing that because the demand for aluminum was growing over time, Alcoa enjoyed market power despite competition from secondary aluminum); Robert E. Martin, *Monopoly Power and Recycling of Raw Materials*, 30 J. INDUS. ECON. 405 (1982) (supporting Judge Hand's ruling with a formal model); Peter L. Swan, *ALCOA: The Influence of Recycling on Monopoly Power*, 88 J. POL. ECON. 76 (1980) (arguing that Alcoa had indirect control over secondary aluminum and incorporated in its pricing the value for consumers from subsequent transactions).

40 Darren Grant, *Recycling and Market Power: A More General Model and Re-evaluation of the Evidence*, 17 INT'L J. INDUS. ORG. 59 (1999) (presenting an empirical analysis of the aluminum market); see also Valerie Y. Suslow, *Estimating Monopoly Behavior with Competitive Recycling: An Application to Alcoa*, 17 RAND J. ECON. 389 (1986) (concluding that the pro-competitive effect of recycling was not significant).

41 *Allen-Myland, Inc. v. Int'l Bus. Machs. Corp.*, 33 F.3d 194, 203 (3d Cir. 1994).

manipulating the supply of [the goods it] produce[s].”⁴² In contrast, a durapolist of short-lived durables may control quantities in secondhand markets, as its optimization problem is simpler. Consistent with this logic, secondhand mainframes were excluded from the relevant market, and IBM was held to have monopoly power.

The *Allen-Myland* decision, therefore, went one step beyond *Alcoa* by acknowledging that there are real difficulties in optimizing sales of durables. While in *Alcoa* Judge Hand dismissed the relevance of the durapolist’s actual ability to forecast future competition from secondhand markets, the *Allen-Myland* court considered this factor and set a general standard for deciding its pertinence to the definition of the relevant market.

D. *Inability and Unwillingness To Pay for Durability*

We saw that consumers’ beliefs regarding durapolists’ inconsistent pricing behavior explain durapolists’ difficulties in charging the monopoly price. A different set of explanations relates to consumer ability and willingness to pay for durability. In many instances, the consumer is interested in purchasing a product only for immediate consumption, not for future consumption. Alternatively, the consumer may not be able to pay for future consumption in advance. The purchase of a durable, however, entails an investment in future consumption, as today’s and tomorrow’s products are bundled together in one package. This Section presents the effects of consumers’ inability and unwillingness to pay for future consumption on the durapolist’s ability to acquire and maintain market power.

1. Liquidity Constraints

There are two types of liquidity constraints that affect consumers’ ability and willingness to invest in durables: presently available means and ability to liquidate purchased durables. The first type relates to the limited access most consumers have to capital. In purchasing durables, consumers pay up front for present and future consumption while their income accrues over time. Since borrowing is costly and not always possible, some consumers cannot realize future income at present in order to pay for durables.⁴³ In other situations, consumers have to decide whether

42 *Id.*

43 For empirical evidence on the adverse effects of liquidity constraints on the demand for durables, see, for example, Eun Young Chah et al., *Liquidity Constraints and Intertemporal Consumer Optimization: Theory and Evidence from Durable Goods*, 27 J. MONEY, CREDIT & BANKING 272 (1995); Marjorie Flavin, *Excess Sensitivity of Consumption to Current Income: Liquidity Constraints or Myopia?*, 18 CANADIAN J. ECON. 117 (1985); Jerry Hausman, *Individual Discount Rates and the Purchase and Utilization of Energy-Using Durables*, 10 BELL J. ECON. 33, 50-54 (1979) (finding a

investment in a durable is a good form of savings,⁴⁴ as the liquidity of durables is lower than that of conventional saving instruments.

Although liquidity constraints exist, they are relaxed to some extent by credit financing that durable-goods sellers and third parties provide to purchasers of durables. The installment selling that appeared in the United States in the 1920s has shifted consumers' preferences away from traditional savings instruments toward purchases of durables.⁴⁵ Differences in the costs of capital for the parties explain much of the interaction between credit providers and durable-goods buyers. Other explanations include behavioral patterns of consumers' intertemporal choices; discounting functions of desirable and undesirable activities have different shapes,⁴⁶ which may lead to a lower discounting of a purchased durable than the discounting of the payments for the durable.

Applied to the light-bulb example, liquidity constraints *may* explain a consumer's reluctance to pay the present value of the cost of ten one-year bulbs purchased over nine years for a ten-year bulb. However, durable-goods sellers and third parties, such as credit providers, may enhance the consumer's willingness to pay for durables. Thus, the exact effects of liquidity constraints depend on the extent of the budget problem, the nature of the product, and available means to finance the product.

2. Consumers' Discount Rates

Virtually all human beings discount the future: The present is generally more important than the future, and the near future is more important than the distant future.⁴⁷ Future discounting implies that

negative relation between income level and consumers' discount rates).

44 Several empirical studies have indicated that consumer durable expenditures are part of private savings. See, e.g., Paul A. David & John L. Scadding, *Private Savings: Ultrarationality, Aggregation, and "Denison's Law"*, 82 J. POL. ECON. 225 (1974); Martha L. Olney, *Demand for Consumer Durable Goods in 20th Century America*, 27 EXPLORATIONS IN ECON. HIST. 322 (1990).

45 See generally MARTHA L. OLNEY, BUY NOW, PAY LATER: ADVERTISING, CREDIT, AND CONSUMER DURABLES IN THE 1920S 47-56, 86-134 (1991) (concluding that consumers' increased purchases of durables during the 1920s was accomplished mostly through credit programs that enabled a shift from traditional savings to savings in the form of purchases of durables); Olney, *supra* note 44. See also *Phonograph Industry Shows Phenomenal Development*, WALL ST. J., Mar. 9, 1922, at 11 (estimating that 95% of all phonographs were sold on installment plans).

46 See George Loewenstein, *Anticipation and the Valuation of Delayed Consumption*, 97 ECON. J. 666 (1987).

47 See Tjalling C. Koopmans, *Stationary Ordinal Utility and Impatience*, 28 ECONOMETRICA 287 (1960) (providing an axiomatization of the discounted-utility model); Paul Samuelson, *A Note on Measurement of Utility*, 4 REV. ECON. STUD. 155 (1937) (offering the first discounted-utility model). See generally Shane Frederick et al., *Time Discounting and Time Preference: A Critical Review*, 40 J. ECON. LIT. 351 (2002) (surveying the empirical and theoretical research on intertemporal choice). For the reasons for discounting the future, see ARTHUR PIGOU, *THE ECONOMICS OF WELFARE* 25 (1920) ("[O]ur telescopic faculty is defective, and we, therefore, see future pleasures, as it were, on a diminished scale."); JOHN RAE, *THE SOCIOLOGICAL THEORY OF CAPITAL* 57-58, 120 (1834) (emphasizing the effects of uncertainty on future discounting); Owen D.

consumers tend to prefer to pay for goods that are consumed all at once (perishables) over goods that are consumed over time (durables). Two major types of empirical evidence establish the connection between consumers' discount rates and willingness to pay for durability. The first type ties the demand for durable goods to the real interest rate and consumer confidence in the economy.⁴⁸ Generally speaking, both factors mirror consumers' preference for the present over the future: Consumers are more reluctant to pay for future consumption when the real interest rate soars or when their confidence in the economy deteriorates. The second type of evidence includes empirical studies about consumers' discount rates, which are implied by consumers' choices between durables and substitutes. These studies compare consumers' willingness to pay for durables with their willingness to pay for perishables and short-lived durables that serve the same function.⁴⁹ The durables and the substitutes in these studies provide similar utility, so one would expect that the consumer would choose the cheaper option. That is, she would pick the durable exactly when it costs less than buying perishables or short-lived durables over the life of the durable, taking budget constraints and discounting into effect. The evidence, however, indicates that in many cases, although durables are significantly cheaper than their substitutes, consumers still buy the substitutes. This means that consumers might be reluctant to buy ten-year bulbs even if they are affordable and their price is significantly lower than the present value of ten one-year bulbs bought over nine

Jones, *Time-Shifted Rationality and the Law of Law's Leverage: Behavioral Economics Meets Behavioral Biology*, 95 NW. U. L. REV. 1141 (2001).

48 See, e.g., Susan W. Burch & Stephen E. Gordon, *The Michigan Surveys and the Demand for Consumer Durables*, 19 BUS. ECON. 40 (1984); Michael J. Hamburger, *Interest Rates and the Demand for Consumer Durable Goods*, 57 AM. ECON. REV. 1131 (1967) ("[M]onetary variables have a significant effect on consumer purchases of durable goods[,] and . . . the most appropriate measures of these variables are interest rates."); Sauk H. Hymans, *Consumer Durable Spending: Explanation and Prediction*, BROOKINGS PAPERS ON ECON. ACTIVITY 173 (1970); Jean Kinsey & Michael I. Collins, *Index of Consumer Expectations: Food Price Effects and Durable Goods Expenditures*, 28 J. CONSUMER AFF. 255 (1994); N. Gregory Mankiw, *Consumer Durables and the Real Interest Rate*, 67 REV. ECON. & STAT. 353 (1985); NICHOLAS S. SOULELES, CONSUMER SENTIMENT: ITS RATIONALITY AND USEFULNESS IN FORECASTING EXPENDITURE—EVIDENCE FROM THE MICHIGAN MICRO DATA (Nat'l Bureau of Econ. Research, Working Paper No. 8410, 2001).

49 Many of these studies estimated discount rates by examining consumers' choices among different models of durable electrical appliances, which presented purchasers with a tradeoff between the immediate purchase price and the long-term costs of running the appliance (as determined by its energy efficiency). See, e.g., Dermot Gately, *Individual Discount Rates and the Purchase and Utilization of Energy-Using Durables: Comment*, 11 BELL J. ECON. 373, 374 (1980) (finding an implicit discount rate of 45 to 300 percent for refrigerators, depending on assumptions made about the cost of electricity); Hausman, *supra* note 43, at 50-54 (finding an implicit discount rate of 15 to 25 percent for air conditioners); Henry Ruderman et al., *The Behavior of the Market for Energy Efficiency in Residential Appliances Including Heating and Cooling Equipment*, 8 ENERGY J. 101, 114 (1987) (finding an implicit discount rate of 19 to 22 percent for room air conditioners, 18 to 25 percent for central air conditioners, 78 to 105 percent for refrigerators, 270 to 379 percent for freezers, 91 to 166 percent for gas water heaters, and 587 to 825 percent for electric water heaters).

years.⁵⁰ These results imply that, in considering the purchase of durables, consumers may employ steep discount rates that are inconsistent with their other revealed preferences. This short-sighted behavior creates another important impediment to the sale of durables.⁵¹

It follows that, when two products are identical in all properties but durability, the less durable product is more profitable for a durapolist. To illustrate this point, consider a consumer who values future consumption at zero and a durapolist that values future income, albeit less than present income. Such a consumer is willing to pay for a ten-year bulb no more than she is willing to pay for a one-year bulb, and, therefore, the durapolist maximizes profits by selling only one-year bulbs.⁵²

3. The Willingness-To-Pay Argument in the Courtroom

United Shoe Machinery, once a formidable durapolist that supplied more than seventy-five percent of the shoe manufacturing machinery in the United States, was known for its lease-only practices. Over half of United Shoe's machines, including certain models that were necessary for shoe production and produced only by United Shoe, were offered to consumers on a lease-only basis. When attacked in court for the allegedly anticompetitive nature of its lease-only practices, United Shoe raised the willingness-to-pay argument.⁵³ United Shoe's experts and lawyers argued that leases mitigated the financing difficulties of consumers, as they spread over time the costs of attaining access to United Shoe's machines. United Shoe convinced the courts that consumers had difficulties in financing its machines, while United Shoe could do so through leasing because capital costs were lower for itself than for its customers. Leasing was a financial device United Shoe designed to enable customers to obtain machinery they

50 It is noteworthy that the studies listed examined markets for large appliances. It is reasonable to assume that consumers are more conservative in buying large appliances than small ones, such as light bulbs.

51 For a thorough analysis of the effects of discount rates on durability and profitability, see Wolfhard Ramm, *On the Durability of Capital Goods Under Imperfect Market Conditions*, 64 AM. ECON. REV. 787 (1974).

52 Robert Barro proved this argument in a simple model and argued that the incentives to reduce durability exist *only* when the durapolist values the future more than the consumer does. See Robert J. Barro, *Monopoly and Contrived Depreciation*, 80 J. POL. ECON. 598 (1972).

53 United Shoe Machinery was attacked in courts for its lease-only practices throughout the first three quarters of the twentieth century. In the first case, the defendant, a former employee of United Shoe, entered into an agreement to assign United Shoe all inventions, improvements, and patents conceived during his employment and for 10 years thereafter and, for a like period, not to engage in any similar business. The defendant argued, among other things, that United Shoe's lease-only practices perpetuated its monopoly in the market and left him with no employment opportunities. *Cilley v. United Shoe Mach. Co.*, 202 F. 598 (D. Mass. 1913). In 1968, a shoe manufacturer sued United Shoe for treble damages under the Clayton Act for its refusal to sell shoe machinery. *Hanover Shoe, Inc. v. United Shoe Mach. Corp.*, 392 U.S. 481 (1968).

could not buy outright.⁵⁴ In other words, leases of shoe machinery were to sales of shoe machinery what sales of one-year bulbs are to sales of ten-year bulbs: The transaction designed by the durapolist provides the consumer with durables that behave like perishables, returning to the lessor when the lease expires. This version of the willingness-to-pay argument successfully blocked antitrust attacks against United Shoe's lease-only policies for a few decades.⁵⁵ In a landmark 1953 case, however, Judge Wyzanski rejected United Shoe's argument⁵⁶ and ruled that its lease-only policies were exclusionary.⁵⁷ United Shoe was forced to give consumers the option to purchase its machines. Although United Shoe ultimately lost its legal battles, the facts of the case further demonstrate that available financial schemes, including optional leases, may mitigate the problems of consumers' inability and unwillingness to pay for durability.⁵⁸

II. Strategies To Overcome the Durapolist Problem

Thus far, we have seen that certain impediments may hinder durapolists' ability to exert market power. This Part of the Article explores the major generic strategies employed to overcome the durapolist problem and their legal implications, starting with strategies aimed at the commitment problem and continuing with more comprehensive solutions to the durapolist problem.

A. *The Committed Durapolist: Commitments to Future Prices*

A commitment to future prices may be credible when total production output is limited contractually or otherwise. For example, high prices for collectible items may be sustained if they are produced in limited editions. With no defined limitations on production output, only a few durapolists have managed to commit credibly to future prices. The most prominent

54 See *United States v. United Shoe Mach. Corp.*, 266 F. Supp. 328, 330 (D. Mass. 1967) ("If United were allowed to continue leasing, even on a basis that gave shoe factories an alternative to purchase the leased machine at an equivalent price, almost all shoe factories would prefer to lease their new and more complicated machines.").

55 See, e.g., *United States v. United Shoe Mach. Co.*, 247 U.S. 32, 63 (1918).

[T]he testimony . . . shows that the advantage of the leases was and is that manufacturers of not large means were able to obtain machinery which they were without capital to buy. They helped, indeed, the big and the little. One manufacturer, whose output was 5,000 pairs of shoes a day, testified that if his company had been compelled to buy outright the machinery necessary to equip its factory, it could not have developed as it had.

Id.

56 *United States v. United Shoe Mach. Corp.*, 110 F. Supp. 295, 344 (D. Mass. 1953).

57 See *infra* Section II.F.

58 See *infra* Part II.

example is probably De Beers, the worldwide diamond durapolist, which for almost one hundred years never lowered its price.⁵⁹ Indeed, overcoming the durapolist problem by convincing consumers that prices are not going to decline over time is difficult.⁶⁰ The question here is whether promises, commitments, and other binding mechanisms used to convince consumers that prices are not going to decrease over time are (or should be) lawful.

The most effective means of committing to future prices is destroying production lines, which assures buyers that no further goods will be sold. For example, a lithographer can commit to future prices by smashing her plates. In general, such a strategy is lawful under antitrust laws, in light of the principle that market participants are free to exit from the market. Less extreme practices aimed at creating capacity constraints are also likely to survive antitrust scrutiny for the same reason.⁶¹ However, it seems unlikely that practices that might be observed in artistic industries would occur elsewhere because of the strong incentive not to destroy a source of income.

Commitments in the form of a “promise” to charge the monopoly price usually do not constitute an antitrust violation.⁶² Antitrust laws do not condemn a market participant for the mere possession of monopoly power,⁶³ and a promise to charge the monopoly price consistently merely reflects a firm’s belief that it will continue to dominate its market in the future. In fact, such promises tend to have competitive effects because they

59 De Beers stabilized its hold on the diamond market through a system aimed at keeping the nominal prices of diamonds from going down. See generally THE ECONOMIST INTELLIGENCE UNIT, DIAMONDS 1988 (Special Report No. 1126, Dec. 1987); THE ECONOMIST INTELLIGENCE UNIT, DIAMONDS: A CARTEL AND ITS FUTURE (Special Report No. M702, Aug. 1992); GODEHARD LENZEN, THE HISTORY OF DIAMOND PRODUCTION AND THE DIAMOND TRADE (F. Bradley trans., 1970); DEBORA L. SPAR, THE COOPERATIVE EDGE: THE INTERNAL POLITICS OF INTERNATIONAL CARTELS 39-87 (1994). For an analysis of the practices of Central Selling Organisation, De Beers’ distributor, see Roy W. Kenney & Benjamin Klein, *The Economics of Block Booking*, 26 J.L. & ECON. 497, 500-16 (1983).

60 Economic models have focused on the conditions under which a committed durapolist could maintain market power. See, e.g., Lawrence Ausubel & Raymond Deneckere, *Reputation in Bargaining and Durable Goods Monopoly*, 57 ECONOMETRICA 511 (1989) (showing that, when reputation formation is possible and marginal cost is equal to or above the value the lowest-valuation consumer places on the durable, then equilibria exist in which the durapolist maintains market power).

61 With certain exceptions relating to essential facilities and market power in aftermarkets, a monopolist is entitled to refuse to cooperate with others, even where the effect of that refusal is to entrench the monopoly. See, e.g., *Image Technical Servs., Inc. v. Eastman Kodak Co.*, 125 F.3d 1195 (9th Cir. 1997). Several economists have noted that capacity constraints might solve the durapolist’s commitment problem. See, e.g., Jeremy I. Bulow, *Durable-Goods Monopolists*, 90 J. POL. ECON. 314 (1982); Kahn, *supra* note 8; Larry S. Karp, *Monopoly Extraction of a Durable Non-Renewable Resource: Failure of the Coase Conjecture*, 60 ECONOMICA 1 (1993); Stokey, *supra* note 8.

62 *Kartell v. Blue Shield, Inc.*, 749 F.2d 922, 929 (1st Cir. 1984); *Berkey Photo, Inc. v. Eastman Kodak Co.*, 603 F.2d 263, 294 (2d Cir. 1979) (“Setting a high price may be a use of monopoly power, but it is not in itself anticompetitive.”).

63 See, e.g., *United States v. Grinnell Corp.*, 384 U.S. 563, 570-71 (1966); *Berkey Photo*, 603 F.2d at 271-76.

invite entry into the market. Yet, where such a commitment excludes competition in the downstream markets by facilitating collusion among downstream competitors or by eliminating the number of downstream competitors, it should be condemned under antitrust laws.⁶⁴

This Section presents two types of contractual mechanisms that may assist in overcoming durapolists' commitment problem: (1) most-favored-nation guarantees and (2) buybacks and returns. The discussion illustrates the availability of contractual mechanisms and explains why some of the mechanisms suggested in the literature are not employed in practice as devices to overcome the durapolist problem.

1. Most-Favored-Nation Guarantees

A simple trick, which is likely to pass the courts' scrutiny, is the practice of *most-favored-nation guarantees*, which shield durapolists from their propensity to cut prices. A most-favored-nation guarantee, sometimes referred to as a *price-protection* or an *anti-discrimination guarantee*, binds a seller to give consumer *X* the most favorable terms and conditions offered to any other consumer. A simple form of such practice is a durapolist's commitment to refund the difference between the price a consumer paid and the lowest price charged to any other consumer. Most-favored-nation guarantees make discounts expensive to sellers and, therefore, undermine their incentives to cut prices.⁶⁵

Indeed, most scholars agree that most-favored-nation guarantees given by monopolists *may* have anticompetitive effects in the dominated and downstream markets.⁶⁶ Fortunately for monopolists, however, courts typically dismiss allegations that most-favored-nation guarantees are anticompetitive and even stress their competitiveness.⁶⁷ Nevertheless, in

64 See Jonathan B. Baker, *Vertical Restraints with Horizontal Consequences: Competitive Effects of "Most-Favored-Customer" Clauses*, 64 ANTITRUST L.J. 517 (1996).

65 See generally Thomas E. Cooper & Timothy L. Fries, *The Most-Favored-Nation Pricing Policy and Negotiated Prices*, 9 INT'L J. INDUS. ORG. 209 (1991).

66 See, e.g., HERBERT HOVENKAMP, *FEDERAL ANTITRUST POLICY: THE LAW OF COMPETITION AND ITS PRACTICE* § 4.6d (2d ed. 1999)

Buyers may think price protection clauses protect *them* from subsequent price reductions that might be given to other [buyers]. If A buys today at a price of \$50, and tomorrow the seller sells to B at a price of \$45, A will be entitled to a refund of \$5. Nonetheless, such clauses are often a sign not of hard customer bargaining. . . . The clauses effectively make discriminatory price reductions very expensive

Id.; Baker, *supra* note 64; David A. Butz, *Durable-Good Monopoly and Best-Price Provisions*, 80 AM. ECON. REV. 1062 (1990) (analyzing most-favored-nation guarantees as a strategy to overcome the durapolist's commitment problem); Daniel P. O'Brien & Greg Shaffer, *Vertical Control with Bilateral Contracts*, 23 RAND J. ECON. 299 (1992).

67 See, e.g., *Blue Cross & Blue Shield United v. Marshfield Clinic*, 65 F.3d 1406, 1415 (7th Cir. 1995) (Posner, C.J.) ("This is an ingenious but perverse argument. 'Most favored nations' clauses are standard devices by which buyers try to bargain for low prices, by getting the seller to agree to treat

reality it is difficult to find examples of durapolists that used most-favored-nation guarantees to overcome their commitment problems.⁶⁸ The practice is observed primarily in competitive and oligopolistic markets.⁶⁹

An example of the practice in oligopolistic markets is the “price protection plans” of General Electric and Westinghouse in the market for electric-turbine generators.⁷⁰ After an antitrust prosecution that broke up a century-old price fixing scheme, the two companies found themselves in a price war.⁷¹ The price war was halted in May 1963, when General Electric launched its price protection plan, which contained three major elements: (1) simplification of the pricing structure; (2) elimination of discounts and publication of a price book; and (3) a broad anti-discrimination clause that, in the event General Electric offered a discount to a customer, obligated it to give the same discount retroactively to all other customers who had bought the same product within the previous six months. To increase consumers’ confidence in its commitment, General Electric hired the services of an accounting firm to audit its pricing policy and, in particular, equal treatment of all customers. Westinghouse quickly copied General Electric’s price-protection plan and price book. The price protection plans survived for almost fifteen years until General Electric and Westinghouse were forced to terminate them in 1977 to settle antitrust charges.⁷²

The important point of the foregoing discussion is that, in oligopolistic environments, most-favored-nation guarantees may function as a means to overcome the commitment problem and not just to facilitate a cartel (although the outcome is similar).⁷³ Indeed, the longevity of the

them as favorably as any of [its] other customers.”).

68 The health-insurance industry accounts for most of the case law on monopolization through most-favored-nation clauses. For surveys of the leading cases, see Arnold Celnicker, *A Competitive Analysis of Most Favored Nations Clauses in Contracts Between Health Care Providers and Insurers*, 69 N.C. L. REV. 863 (1991); Anthony J. Dennis, *Most Favored Nation Contract Clauses Under the Antitrust Laws*, 20 U. DAYTON L. REV. 821 (1995).

69 The contrast between scholarship and case law also applies to the question of whether most-favored-nation guarantees are a device to facilitate collusion among competitors. See E.I. du Pont de Nemours & Co. v. FTC, 729 F.2d 128 (2d Cir. 1984); Thomas E. Cooper, *Most-Favored-Customer Pricing and Tacit Collusion*, 17 RAND J. ECON. 377 (1986); George A. Hay, *Facilitating Practices: The Ethyl Case (1984)*, in THE ANTITRUST REVOLUTION: ECONOMICS, COMPETITION AND POLICY 182 (John E. Kwoka, Jr. & Lawrence J. White eds., 3d ed. 1999); Mark T.L. Sargent, *Economics Upside-Down: Low-Price Guarantees as Mechanisms for Facilitating Tacit Collusion*, 141 U. PA. L. REV. 2055 (1993); Joseph J. Simons, *Fixing Price with Your Victim: Efficiency and Collusion with Competitor-Based Formula Pricing Clauses*, 17 HOFSTRA L. REV. 599 (1989).

70 A thorough analysis of the industry can be found in 1 RALPH G.M. SULTAN, PRICING IN THE ELECTRICAL OLIGOPOLY (1974).

71 For documentation of the price-fixing conspiracy, see JOHN HERLING, THE GREAT PRICE CONSPIRACY: THE STORY OF THE ANTITRUST VIOLATIONS IN THE ELECTRICAL INDUSTRY (1962).

72 United States v. Gen. Elec. Co., 1977-2 Trade Cas. (CCH) ¶ 61,660 (E.D. Pa. Sept. 19, 1977). Interestingly enough, the settlements of the civil suits that followed the 1960 price-fixing prosecution contained most-favored-nation clauses, pursuant to which General Electric, Westinghouse, and Allis-Chalmers committed to make the most beneficial out-of-court settlements available to all plaintiffs, regardless of when they settled. SULTAN, *supra* note 70, at 84-124.

73 See, e.g., Hay, *supra* note 69.

most-favored-nation guarantees in the market for electric generators illustrates their effectiveness in establishing and maintaining consumers' confidence that prices will not fall. This type of credibility is presumably what durapolists aspire to attain. However, in the real world we seldom observe durapolists employing most-favored-nation guarantees, perhaps because such a binding practice may leave durapolists unable to respond with aggressive price cuts to fringe firms' attempts to enter the market. Because of its scarcity among durapolists, most-favored-nation guarantees seem less favored than other strategies that enable durapolists to acquire more market power.⁷⁴

2. Buybacks and Returns

Professor Coase noted that a durapolist can avoid the commitment problem by committing to "buy back any [of its goods] that [will be] offered to [it] in the future at a price just under [the monopoly price], thus making it against [its] interest" to release into the market quantities that would lower the price of its durables below the monopoly price.⁷⁵ Buybacks and returns are similar to most-favored-nation guarantees in that they penalize inconsistent durapolists. However, while most-favored-nation guarantees penalize the durapolist for cutting prices by the discount given to any consumer multiplied by the number of consumers who have not received the discount, buybacks and returns presumably impose a more severe penalty on inconsistent durapolists: cancellation of past transactions.⁷⁶

In practice, buybacks and returns are not very effective in creating a credible commitment to future prices. From a consumer's point of view, returning or selling back a durable may cause too much trouble and involve too high transaction costs. If the consumer needs the durable, she will have to repurchase it or buy a substitute. In the process, time is lost, and the consumer incurs transaction costs that may be significant. From the durapolist's point of view, a returned good represents a loss because the consumer will purchase a substitute for a price lower than the original price paid for the returned durable. For a durapolist, buybacks and returns also impose certain costs associated with the management of inventory of

74 For a comparison between most-favored-nation guarantees and price discrimination, see I.P.L. Png, *Most-Favored-Customer Protection Versus Price Discrimination over Time*, 99 J. POL. ECON. 1010 (1991) (showing that uncertain demand is a major reason for durapolists to prefer price discrimination and arguing that both regimes may be inferior to other strategies).

75 Coase, *supra* note 1, at 145.

76 For an analysis of the potential anticompetitive effect of returns policies, see Howard P. Marvel & James Peck, *Demand Uncertainty and Returns Policies*, 36 INT'L ECON. REV. 691 (1995); V. Padmanabhan & I.P.L. Png, *Manufacturer's Returns Policies and Retail Competition*, 16 MARKETING SCI. 81 (1997); see also Drew Fudenberg & Jean Tirole, *Upgrades, Tradeins and Buybacks*, 29 RAND J. ECON. 235 (1998).

used goods.

It follows that buybacks and returns cannot be explained as strategies for overcoming the commitment problem. Other interpretations of these practices are more persuasive: They serve as important instruments to expand businesses beyond brick and mortar forms, provide insurance and warranties to consumers,⁷⁷ create motivations to upgrade durables, and so forth.

Nevertheless, buybacks may be used as a device to eliminate secondhand markets⁷⁸ that, as already discussed, threaten durapolists' ability to exercise market power. In a buyback of a used durable, the lifetime of which outlasts the consumer's needs, both the consumer and the durapolist benefit. The consumer avoids searching for a buyer and haggling over the price, and the durapolist prevents competition with its new goods by used goods. Such transactions, however, are unlikely to be motivated by the commitment problem, because the consumer is not refunded for discounts given later shoppers but rather is paid for a valuable asset that can be traded on the market.⁷⁹

B. *The "Discriminating" Durapolist: A Profitable Declining Price Path*

As discussed above, the economic literature explains the durapolist problem with a declining price path. In the real world, however, a declining price trajectory is a profitable and extremely ordinary strategy among durapolists. Many new products, like books and consumer electronics, are very expensive when they first appear on the market; over time, their prices decline.⁸⁰ In many cases, prices go down with the appearance of newer products that undermine the appeal of older products. In other cases, the decline constitutes intertemporal price discrimination:⁸¹ Early shoppers are charged more than late shoppers.

Indeed, a declining price path may be a well-crafted strategy of durapolists rather than time-inconsistent behavior. When such a strategy is properly devised, the durapolist's profits are higher than under a regime of

77 Professor Coase noted that "the supplier of a durable good may agree to buy it back at some specified price in the future because consumers are willing to pay for this reduction in risk." Coase, *supra* note 1, at 149. For other aspects of buybacks and returns, see Fudenberg & Tirole, *supra* note 76.

78 See, e.g., *Allen-Myland, Inc. v. Int'l Bus. Machs. Corp.*, 33 F.3d 194 (3d Cir. 1994); *Pac. Mailing Equip. Corp. v. Pitney Bowes, Inc.*, 499 F. Supp. 108 (N.D. Cal. 1980).

79 Section II.E analyzes the strategy of eliminating secondhand markets and its legal implications.

80 See, e.g., Sofronis K. Clerides, *Book Value: Intertemporal Pricing and Quality Discrimination in the U.S. Market for Books*, 20 INT'L J. INDUS. ORG. 1385 (2002).

81 For a general economic review of price discrimination, see Hal Varian, *Price Discrimination*, in 1 HANDBOOK OF INDUSTRIAL ORGANIZATION 599 (Richard Schmalensee & Robert D. Willig eds., 1989).

a constant monopoly price.⁸² A planned declining price trajectory, often referred to as *price skimming*, is based on price discrimination among consumers according to their price-time sensitivity. Time-sensitive consumers are willing to pay premia to receive products immediately. Such consumers know that prices will decline but, nevertheless, are too impatient to postpone purchases. In contrast, price-sensitive consumers are unwilling to pay the premia charged early shoppers, so they delay purchases until prices are low. Recognizing the existence of different sets of consumers, a durapolist can maximize profits by pursuing a declining price path.

A necessary condition for a profitable, declining price path is that the durapolist be more patient than its customers. If the durapolist is too anxious to sell its goods, it will lower prices too rapidly, and then even time-sensitive consumers will be better off delaying purchases. In contrast, when the durapolist is patient, it maximizes profits by squeezing consumer surplus through intertemporal price discrimination.

A declining price trajectory is not only economically viable and profitable but is also likely to survive attacks on antitrust grounds. A business strategy of a declining price trajectory is unlikely to be held unlawful and, indeed, should not be found as such.⁸³

To summarize, the commitment and timing problems pose a threat to the durapolist's monopoly power only in a limited set of circumstances: When the durapolist's eagerness to generate revenues exceeds consumers' impatience to purchase the durapolist's goods,⁸⁴ prices decline too quickly, and the durapolist faces a commitment problem.

C. *The Manipulative Durapolist: Contrived Durability and Planned Obsolescence*

With the exception of a passionate debate during the 1970s,⁸⁵ economists have long argued that the durability of durapolists' goods is

82 Nancy Stokey was the first to derive the conditions to profitable intertemporal price discrimination by durapolists. See Stokey, *supra* note 8; see also Ruqu Wang, *Optimal Pricing Strategy for Durable-Goods Monopoly*, 25 J. ECON. DYNAMICS & CONTROL 789 (2001).

83 See, e.g., *Valley Plymouth v. Studebaker-Packard Corp.*, 219 F. Supp. 608 (S.D. Cal. 1963); Robert C. Brooks, Jr., *Injury to Competition Under the Robinson-Patman Act*, 109 U. PA. L. REV. 777, 804 (1961) ("It is not only much more workable to limit the legal scope of injury as to time, but it is also advisable on economic grounds.").

84 A durapolist also may face the commitment problem when all consumers are homogeneous in price-time sensitivity, but this situation is farfetched.

85 The 1970s debate was ignited by a series of papers by Peter Swan, who argued that durability is independent of market structure. His theory is commonly known as Swan's independence result. See E. Sieper & Peter L. Swan, *Monopoly and Competition in the Market for Durable Goods*, 40 REV. ECON. STUD. 333 (1973); Peter L. Swan, *Durability of Consumer Goods*, 60 AM. ECON. REV. 884 (1970); Peter L. Swan, *The Durability of Goods and the Regulation of Monopoly*, 2 BELL J. ECON. & MGMT. SCI. 347 (1971).

lower than the durability of such goods produced by competitive firms.⁸⁶ Indeed, the standard premise today is that product lifetime and quality⁸⁷ are likely to be suboptimal in markets dominated by durapolists.⁸⁸ The question, addressed in this Section, is whether intentional choices of low levels of durability and quality or other strategies that render products obsolete constitute legitimate business acumen or unlawful monopolization under Section 2 of the Sherman Act.

1. Contrived Durability vs. Planned Obsolescence

The economic literature distinguishes between two generic ways in which manufacturers shorten the lifetime of their products: *contrived durability* and *planned obsolescence*.⁸⁹ *Contrived durability* is a strategy of shortening the product lifetime before it is released onto the market. In

86 Until the 1960s, this argument was mostly based on casual observations and simplistic models. See, e.g., Wicksell, *supra* note 1; Chamberlin, *supra* note 21. The argument was first formalized in the 1960s. See, e.g., E. Kleiman & T. Ophir, *The Durability of Durable Goods*, 33 REV. ECON. STUD. 165 (1966); David Levhari & T.N. Srinivasan, *Durability of Consumption Goods: Competition versus Monopoly*, 59 AM. ECON. REV. 102 (1969); David D. Martin, *Monopoly Power and the Durability of Durable Goods*, 28 S. ECON. J. 271 (1962). The robustness of Swan's independence result has been contested by many economists who relaxed some of the assumptions in Swan's model. See, e.g., Barro, *supra* note 52 (examining the effects of consumers' discount rates on durability levels chosen by durapolists); Richard Schmalensee, *Market Structure, Durability, and Maintenance Effort*, 41 REV. ECON. STUD. 277 (1974) (evaluating the interdependence between available maintenance activities and durability levels). Good surveys of the literature that followed Swan's papers can be found in S.J. Liebowitz, *Durability, Market Structure and New-Used Goods Models*, 72 AM. ECON. REV. 816 (1982); Richard Schmalensee, *Market Structure, Durability and Quality: A Selective Survey*, 17 ECON. INQUIRY 177 (1979); Waldman, *supra* note 4.

87 The literature on market structure and durability is a branch of a broader field that explores the relations between market structure and product quality. Durability in many studies represents quality because of the simplicity and convenience of defining and measuring it. See generally MORTON I. KAMIEN & NANCY LOU SCHWARTZ, *MARKET STRUCTURE AND INNOVATION* (1982); Schmalensee, *Market Structure, Durability, and Maintenance Effort*, *supra* note 86.

88 See, e.g., Nat'l Soc'y of Prof'l Eng'rs v. United States, 435 U.S. 679, 695 (1978) ("The assumption that competition is the best method of allocating resources in a free market recognizes that all elements of a bargain—quality, service, safety and durability—and not just the immediate cost, are favorably affected by the free opportunity to select among alternative offers.") (emphasis added); Jeremy I. Bulow, *An Economic Theory of Planned Obsolescence*, 101 Q.J. ECON. 729 (1986); Gary Fethke & Raj Jagannathan, *Monopoly with Endogenous Durability*, 26 J. ECON. DYNAMICS & CONTROL 1009 (2002); Waldman, *supra* note 4.

89 The term "contrived durability" is not yet a term of art, even though the defined strategy has been studied extensively for over half a century. Very often the term "planned obsolescence" is used in the literature to describe contrived durability. See, e.g., Lawrence M. Ausubel & Raymond Deneckere, *One Is Almost Enough for Monopoly*, 18 RAND J. ECON 255 (1987); Bulow, *supra* note 88, at 747.

Perhaps the greatest weakness of this paper is that it follows in the tradition of using durability as a proxy for obsolescence. . . . But planned obsolescence is much more than a matter of durability; it is also and perhaps primarily about how often a firm will introduce a new product, and how compatible the new product will be with older versions.

Id.; Arthur Fishman et al., *Planned Obsolescence as an Engine of Technological Progress*, 41 J. INDUS. ORG. 361 (1993); Swan, *supra* note 9.

most instances, durability is built into a product by the manufacturer through its choices of inputs and production procedures. When a consumer purchases a durable, she has some information on its durability, and based on this information she makes her buying decisions, such as whether to buy a light bulb at the monopoly price given the bulb's durability. For most durables, though not all, contrived durability is generated by quality deterioration: The product's quality deteriorates gradually, until the product becomes obsolete. "Quality deterioration" may be represented by many factors, including appearance, and at least at early stages of the product's life is not necessarily limited to functionality of the product.

Planned obsolescence is a strategy of shortening the lifetime of a product after it is released onto the market. Under this strategy, the manufacturer "convinces" the consumer to replace an old product with a new one, thereby rendering the lifetime of the old product shorter than its actual useful lifetime. Annual style changes of automobiles and revised editions of textbooks are prime examples of planned obsolescence.⁹⁰

2. Contrived Durability

a. *The Generic Strategy and Its Legal Implications*

The strategy of contrived durability is generally not prohibited by law. No law imposes a duty on durapolists (or others) to offer consumers the highest possible level of durability. Manufacturers are free to set the durability level of their products to maximize profits and to improve their market position. The reason is that durability is a quality factor, typically with no hidden hazards or negative externalities that may warrant legal intervention in the product design. Antitrust laws are designed to foster competition and not to address durability and other quality matters. Hence, even if there are some legal requirements regarding durability, they are unlikely to stem directly from a manufacturer's market position.

The analysis of durapolists' freedom to set durability levels according to their own interests distinguishes between two forms of contrived durability: (a) manufacturing a product less durable than could have been manufactured with that specific technology and (b) manufacturing a product with a specific technology rather than with another readily available technology that would have made the product more durable.

The first type of contrived durability, which involves one technology, is not considered to be illegal under antitrust laws. The rationale relies on the role of durability in competition. An unappealing level of durability,

⁹⁰ See, e.g., CHARLES E. FERGUSON, MICROECONOMIC THEORY vii (rev. ed. 1969) ("Since everyone knows the basic reason for a revised edition is to kill off the existing used book market, it would be idle to suggest otherwise.").

set by a durapolist to maximize its profits, invites rather than hinders competition. Such a level of durability encourages investors to develop competing goods with higher levels of durability. Contrived durability, therefore, cannot be considered an unlawful exclusionary practice under Section 2 of the Sherman Act. Thus, if a durapolist's products gain acceptance in the market, "it is of no importance that a judge or jury may later regard them as inferior, so long as that success was not based on any form of coercion."⁹¹

Similarly lawful in the eyes of antitrust laws is the second type of contrived durability, in which less-durable technologies are employed when more-durable technologies are readily available. The rationale behind this legal rule is derived from the freedom of market participants, including durapolists, to keep their technologies off the market.⁹² The desire to incentivize investments in R&D trumps concerns that durapolists will employ inferior technologies that are more profitable for them.

Several economists have argued that product longevity may be socially disadvantageous. If products are too durable, consumers may not switch to new technologies, and therefore potential innovators may lack incentives to invest in development of such technologies. Contrived durability of either type encourages technological progress through manufacturer investments in R&D that shorten the lifetime of products.⁹³

b. *Quality, Depreciation, and Durability*

Light bulbs and diamonds are different from most durables in that their quality does not deteriorate over time. Light bulbs illuminate with a constant brightness until they burn out, and diamonds are forever. Most durables, however, age, and their quality deteriorates until they go out of service. For such depreciating goods, "durability" is primarily the depreciation rate, rather than the goods' lifetime. The important difference

91 *Berkey Photo, Inc. v. Eastman Kodak Co.*, 603 F.2d 263, 287 (2d Cir. 1979).

92 *Cont'l Paper Bag Co. v. Eastern Paper Bag Co.*, 210 U.S. 405, 429 (1908) ("[T]he very essence of the right conferred by the patent, as it is the privilege of any owner of property[, is] to use or not to use it, without question of motive."); *Data Gen. Corp. v. Grumman Sys. Support Corp.*, 36 F.3d 1147 (1st Cir. 1994) (holding a durapolist's refusal to license his copyright not unlawful under antitrust laws, since the Copyright Act expressly granted copyright owners the exclusive right to distribute their works); *SCM Corp. v. Xerox Corp.*, 645 F.2d 1195, 1204 (2d Cir. 1981) ("No court has ever held that the antitrust laws require a patent holder to forfeit the exclusionary power inherent in his patent the instant his patent monopoly affords him monopoly power over a relevant product market."); *see also* 35 U.S.C. § 271(d) (2000) ("No patent owner . . . shall be denied relief or deemed guilty of misuse or illegal extension of the patent right by reason of his . . . [refusal] to license or use any rights to the patent . . .").

93 Bulow, *supra* note 88 (showing, among other things, that durapolists may extend durability in order to deter entry); Fishman et al., *supra* note 89. *See generally* Michael L. Katz & Carl Shapiro, *Technology Adoption in the Presence of Network Externalities*, 94 J. POL. ECON. 822 (1986); Paul Klemperer, *Entry Deterrence in Markets with Consumer Switching Costs*, 97 ECON. J. 99 (1987).

between non-depreciating and depreciating durables is that, in the case of non-depreciating goods, used and new durables can generally substitute for each other, whereas in the case of depreciating goods this interchangeability diminishes over time, but not uniformly across consumers.

High-valuation consumers are often more sensitive than low-valuation consumers to quality deterioration, especially when it concerns appearance. For such high-valuation consumers, the depreciation of a good, through quality deterioration, determines its useful lifetime. In contrast, low-valuation consumers, such as used-cars buyers, may be less sensitive to some forms of quality deterioration and be willing to buy secondhand durables despite their lower quality. Thus, when old and new durables are imperfect substitutes for high-valuation consumers, such consumers will buy new durables and sell the old ones to low-valuation consumers. Under such conditions, the price that high-valuation consumers are willing to pay for a durable incorporates the anticipated price at which low-valuation consumers will buy the used durable.⁹⁴

This market pattern, in turn, raises durapolists' incentives to lower the quality of their goods because as the goods depreciate the high-valuation consumers return to the market more frequently to buy new goods. The repeated purchases of high-valuation consumers imply that the durapolist is less likely to saturate the demand for new products and, therefore, would not lower its prices. In other words, low quality that results in depreciation helps durapolists to overcome the commitment and timing problems.⁹⁵

The legal implications of contrived durability in the form of depreciation are the same as those of the generic strategy. In the eyes of the law, durability in the strict sense of product lifetime is a factor of quality, and antitrust law generally does not intervene in technology choices that are related to quality.

94 Used durables markets are plagued with adverse selection: Low-valuation consumers cannot verify the exact quality of the purchased used good. As a result, a social loss is likely to occur in the trade of used durables. See generally George Akerlof, *The Market for "Lemons": Quality Uncertainty and the Market Mechanism*, 84 Q.J. ECON. 488 (1970). For an analysis in the context of durable goods, see Igal Hendel & Alessandro Lizzeri, *Adverse Selection in Durable Goods Markets*, 89 AM. ECON. REV. 1097 (1999).

95 There is a growing interest in studying depreciating goods in the context of durapolists. See, e.g., Simon Anderson & Victor Ginsburgh, *Price Discrimination via Second-Hand Markets*, 38 EUR. ECON. REV. 23 (1994); Eric W. Bond & Larry Samuelson, *Durable Good Monopolies with Rational Expectations and Replacement Sales*, 15 RAND J. ECON. 336 (1984); Eric W. Bond & Larry Samuelson, *The Coase Conjecture Need Not Hold for Durable Good Monopolies with Depreciation*, 24 ECON. LETTERS 93 (1987); Igal Hendel & Alessandro Lizzeri, *Interfering with Secondary Markets*, 30 RAND J. ECON. 1 (1999); Larry Karp, *Depreciation Erodes the Coase Conjecture*, 40 EUR. ECON. REV. 473 (1996); Jae-Cheol Kim, *Trade in Used Goods and Durability Choice*, 3 INT'L ECON. J. 53 (1989); Michael Waldman, *Durable Goods Pricing When Quality Matters*, 69 J. BUS. 489 (1996).

3. Planned Obsolescence

a. *The Economics of Planned Obsolescence*

Contrived durability that expedites the wear and tear of durables makes their purchase less attractive for consumers for whom the constant quality of the good is important. This outcome is, of course, undesirable for durapolists that wish only to adjust products' durability to maintain and enforce their monopoly power. An alternative strategy, which is based on the same principles of contrived durability, is the strategy of planned obsolescence. Under this strategy, the lifetime (or perceived quality) of a durable, already owned by a consumer, is artificially shortened (or depreciated) by releasing onto the market a new model that supersedes the existing one.⁹⁶ Planned obsolescence is particularly common in the textbook and software industries, where authors frequently revise textbooks and software producers excessively upgrade applications.⁹⁷

The major challenge for a durapolist that wishes to engage in planned obsolescence is to convince consumers to replace the durables they purchased not long ago with new ones. Typically, the competitive environment in which consumers operate predisposes them to "upgrade" their durables. The more competitive a consumer's environment, the more likely she will buy a new model of durable when introduced in order to sustain her competitive position. Social status and industry position are alike in this respect. Put simply, it is the consumer's quest for a competitive edge that plays into the hands of durapolists that engage in planned obsolescence. For this reason, at the introduction of new models, durapolists often brag about their accomplishments in offering consumers new ways to enhance their "competitive advantage."⁹⁸

Indeed, no more than minor improvements, style changes, fashions, and fads may be necessary to kill an old model and persuade consumers to switch to a new one. Product killing may be disguised as a stage in technological progress or an answer to consumers' cry for a new fashion.⁹⁹

96 See, e.g., Fudenberg & Tirole, *supra* note 76; Michael Waldman, *A New Perspective on Planned Obsolescence*, 108 Q.J. ECON. 273 (1993) [hereinafter Waldman, *New Perspective*]; Michael Waldman, *Planned Obsolescence and the R&D Decision*, 27 RAND J. ECON. 583 (1996).

97 See Glenn Ellison & Drew Fudenberg, *The Neo-Luddite's Lament: Excessive Upgrades in the Software Industry*, 31 RAND J. ECON. 253 (2000) (studying upgrade practices in the software industry); H. Laurence Miller, Jr., *On Killing Off the Market for Used Textbooks and the Relationship Between Markets for New and Secondhand Goods*, 82 J. POL. ECON. 612 (1974) (studying the practice of frequent revisions of textbooks).

98 In network industries, the pursuit of a competitive edge enables durapolists to leverage network externalities through incompatible versions. See Jay Pil Choi, *Network Externality, Compatibility Choice, and Planned Obsolescence*, 42 J. INDUS. ECON. 167 (1994); Waldman, *New Perspective*, *supra* note 96.

99 See generally Wolfgang Pesendorfer, *Design Innovation and Fashion Cycles*, 85 AM. ECON. REV. 771 (1995) (showing that competition among designers may lead to less frequent changes

The beauty of the trick is that consumers are happy even though they were conned.¹⁰⁰

The strategy of planned obsolescence, however, has certain limits: In markets where new models are frequently introduced, consumers may realize that they are being led astray and choose to stick to their old durables rather than abandon them for new ones. This prediction is a variant of the commitment problem: Consumers may be reluctant to invest in durables because the durapolist's anticipated actions will depreciate their investments.¹⁰¹ A credible way for a durapolist to circumvent this hurdle is to publish its costs of, and difficulties in, developing new models of durables. In general, the higher the R&D costs of, and the more challenges involved in, developing a new model, the longer the time intervals between product generations.¹⁰² Accordingly, by making information on such costs public, durapolists may convince consumers that their new durables will not be soon superseded by newer ones.

Persuading consumers to replace their old durables can also antagonize consumers. For example, a durapolist may cease manufacturing and clear the market of replacement parts and other complementary goods required to maintain and operate a durable.¹⁰³ This manner of persuasion, however, often does not coincide with sound business acumen. First, it is against the interests of any company, including durapolists, to antagonize its customers. Second, clearing the market of complementary goods typically requires an effective means of tying complementary goods to

in fashion and defining conditions under which consumers would be better off by banning the use of fashion); Georg Simmel, *Fashion*, 62 AM. J. SOC. 541, 544 (1957).

Fashion is merely a product of social demands, even though the individual object which it creates or recreates may represent a more or less individual need. This is clearly proved by the fact that very frequently not the slightest reason can be found for the creations of fashion from the standpoint of an objective, aesthetic, or other expediency.

Id.

100 Professors Fisher, Griliches, and Kaysen studied the costs to consumers of changes in private automobile specifications that took place during the 1950s and concluded that in the late 1950s more than twenty-five percent of a car purchase price was attributable to these changes. They further argued that "[t]here is a presumption that consumer purchases are worth the money paid, yet one might argue that the fact that our [findings] . . . will probably seem surprisingly high to consumers is an indication that the costs in question were not fully understood by the consuming public." Franklin M. Fisher et al., *The Costs of Automobile Model Changes Since 1949*, 70 J. POL. ECON. 433, 450 (1962) (citations omitted).

101 For studies of this problem, see Anirudh Dhebar, *Durable-Goods Monopolists, Rational Consumers, and Improving Products*, 13 MARKETING SCI. 100 (1994); Daniel A. Levinthal & Devavrat Purohit, *Durable Goods and Product Obsolescence*, 8 MARKETING SCI. 35, 36 (1989); Waldman, *New Perspective*, *supra* note 96.

102 See B. Peter Pashigian et al., *Fashion, Styling, and the Within-Season Decline in Automobile Prices*, 38 J.L. & ECON. 281 (1995) (offering empirical evidence on the relationship between costs of style changes and declines in price).

103 See, e.g., *Transamerica Computer Co. v. Int'l Bus. Machs. Corp.*, 481 F. Supp. 965, 1002-03 (N.D. Cal. 1979).

durables; otherwise, competitors will offer such goods.¹⁰⁴ However, as discussed in Section II.D, when an effective tie is in place, the profitability of selling the tied goods is a cure to the durapolist problem. Under such circumstances, durapolists have no incentives to invest in product design, retooling, advertising, and other costs of planned obsolescence.¹⁰⁵ Third, as discussed in the next Subsection and in Section II.E, this strategy is likely to be condemned under antitrust laws.

b. *Legal Implications*

The debate over the lawfulness of planned obsolescence strategies focuses on whether they are likely to exclude competition. In theory, planned obsolescence strategies may be exclusionary because durapolists can utilize economies of scale to exclude competition through insubstantial, yet costly, product changes.¹⁰⁶ The basis of this concern is that product changes impose fixed costs, such as the costs of redesigning and retooling manufacturing lines. Fixed costs are advantageous to players with big market shares, such as durapolists, since for them fixed costs are spread over a large-scale production line. In contrast, for small competitors and potential entrants, the costs per unit of redesigning and retooling are high because the total costs are spread over fewer units. The problem with this theory is that its legal and economic foundations are shaky. In most circumstances, competitive actions, including product development, are cheaper and more affordable for incumbent firms than for small competitors and potential entrants. Barring big firms from utilizing their competitive advantage undermines the incentives of firms to obtain such an advantage and, therefore, contradicts the goals of antitrust laws. Incumbents' advantages are an economic reality of many industries and are entirely legal.

Moreover, even if we assume that planned obsolescence practices are exclusionary, the obvious challenge is how to recognize such practices and distinguish them from legitimate product changes. Planned obsolescence

104 Professor Waldman has argued that the leasing practices, which are discussed in Section II.F of this paper, are intended to clear the market of replacement parts. See Michael Waldman, *Eliminating the Market for Secondhand Goods: An Alternative Explanation for Leasing*, 40 J.L. & ECON. 61 (1997).

105 See Kai-Uwe Kühn & A. Jorge Padilla, *Product Line Decisions and the Coase Conjecture*, 27 RAND J. ECON. 391 (1996) (showing that when a durapolist can effectively tie perishables to his durables, the rate of introducing new models to the market goes down).

106 See *Transamerica Computer Co.*, 481 F. Supp. at 1002 ("It is not difficult to imagine situations where a monopolist could utilize the design of its own product to maintain market control or to gain a competitive advantage."); see also John A. Menge, *Style Change Costs as a Market Weapon*, 76 Q.J. ECON. 632 (1962); Janusz A. Ordover & Robert D. Willig, *An Economic Definition of Predation: Pricing and Product Innovation*, 91 YALE L.J. 8 (1981); Note, *Annual Style Change in the Automobile Industry as an Unfair Method of Competition*, 80 YALE L.J. 567 (1971).

may be easily defined theoretically but is difficult to establish in court.¹⁰⁷ Thus, planned obsolescence strategies usually survive antitrust scrutiny.

Where the technique in question is fashion change policed by a durapolist, courts are likely to recognize that it is beyond antitrust challenge.¹⁰⁸ Antitrust laws are not intended to examine the wisdom of consumers' choices, and, therefore, if insubstantial variants are preferred over the competition's products, then "product improvements" cannot be exclusionary practices under Section 2 of the Sherman Act.¹⁰⁹

Professor Hovenkamp has suggested an exception to the foregoing rule.¹¹⁰ An inquiry into an innovator's (or designer's) intent to exclude competition should be permitted when two conditions are met: (a) the product change clearly raises rivals' costs¹¹¹ or excludes rivals from the market, and (b) there is no reason for believing that the new model is or could reasonably have been intended to be an improvement. To support his view, Professor Hovenkamp compared two cases: *Automatic Radio Manufacturing Co. v. Ford Motor Co.*¹¹² and *C.R. Bard, Inc. v. M3 Systems, Inc.*¹¹³ In *Automatic Radio*, Ford entered into the car radio market and changed the design of dashboards in some of its models. Cars were no longer assembled with dashboards with holes for a radio. Rather, cars were either made with factory-installed radios or marketed with dashboards with no holes for a radio. As a result, if a dealer wished to install a radio, the entire dashboard would have to be replaced. The plaintiff, a car radio manufacturer, brought a suit against Ford, claiming that the dashboard style change raised the plaintiff's costs in violation of Section 2 of the

107 See *Berkey Photo, Inc. v. Eastman Kodak Co.*, 603 F.2d 263, 287 (2d Cir. 1979). [N]o one can determine with any reasonable assurance whether one product is "superior" to another. Preference is a matter of individual taste. The only question that can be answered is whether there is sufficient demand for a particular product to make its production worthwhile, and the response, so long as the free choice of consumers is preserved, can only be inferred from the reaction of the market.

Id.; see also *Cal. Computer Prods. v. Int'l Bus. Machs. Corp.*, 613 F.2d 727, 744 (9th Cir. 1979).

108 PHILLIP AREEDA & HERBERT HOVENKAMP, *ANTITRUST LAW* ¶ 776 (2002).

109 See *Berkey Photo*, 603 F.2d at 286; *Cal. Computer Prods.*, 613 F.2d at 744 (holding that a durapolist has "the right to redesign its products to make them more attractive to buyers—whether by reason of lower manufacturing cost and price or improved performance"); *Automatic Radio Mfg. Co. v. Ford Motor Co.*, 272 F. Supp. 744 (D. Mass. 1967), *aff'd*, 390 F.2d 113 (1st Cir. 1968); see also Phillip Areeda & Donald F. Turner, *Predatory Pricing and Related Practices Under Section 2 of the Sherman Act*, 88 HARV. L. REV. 697, 732 (1975). Professor Hovenkamp adopted an even stronger position. See HOVENKAMP, *supra* note 66, § 7.8(a) ("No reasonable basis exists for concluding that the development of a new product or group of products is illegal monopolization. Such a rule would certainly do far more harm to the innovative processes in a market economy than it would promote competitive efficiency.").

110 HOVENKAMP, *supra* note 66, § 7.8(b).

111 For exclusionary effects from raising rivals' costs, see Thomas G. Krattenmaker & Steven C. Salop, *Anticompetitive Exclusion: Raising Rivals' Costs To Achieve Power Over Price*, 96 YALE L.J. 209 (1986).

112 *Automatic Radio*, 272 F. Supp. at 744.

113 157 F.3d 1340, 1371 (Fed. Cir. 1998).

Sherman Act and other antitrust prohibitions. Ford argued that “dashboard styling and finish [were] not frills, but important and essential components of an automobile in [a] style-minded market.”¹¹⁴ The plaintiff’s motion for preliminary injunction was denied because, among other reasons, the second condition was not met: There were reasons to believe that the style change had potential purposes other than excluding competition. In *C.R. Bard*, a manufacturer of a medical appliance redesigned its product so as to fit only its complementary goods.¹¹⁵ No explanation was offered by the defendant for that product change, and the Federal Circuit permitted a jury to find unlawful monopolization.¹¹⁶

Unfortunately, Hovenkamp’s exception¹¹⁷ does not alleviate the fundamental problem of identifying a product change that aims only to render old products obsolete. Once that identification has been made, a needless product change that excludes competition by raising rivals’ costs should be deemed an unlawful exclusionary practice.

Finally, where the technique in question is based on clearing replacement and other complementary goods from the market, the durapolist runs a significant risk of liability under Section 2 of the Sherman Act. The argument in such cases is that the strategy raises rivals’ costs and excludes competitors, since they are illegally deprived of access to essential inputs.¹¹⁸ For example, in *Allen-Myland*,¹¹⁹ the Court of Appeals for the Third Circuit found that despite the dynamic planning problem, “a powerful manufacturer like IBM was in a position to maximize its profits by carefully controlling the number of mainframes

114 *Automatic Radio*, 272 F. Supp. at 748.

115 *C.R. Bard*, 157 F.3d at 1371.

116 *Id.* at 1382.

117 Professor Hovenkamp’s exception is a refined version of the exception offered in *Transamerica Computer Co. v. International Business Machines Corp.*, 481 F. Supp. 965, 1002-08 (N.D. Cal. 1979). In *Transamerica*, various practices of the defendant, IBM, were challenged. One of the challenged practices was planned obsolescence. The plaintiff was a supplier of peripherals of mainframes and owned a stock of peripherals. It charged that the interface changes in IBM’s new model of mainframes, which made the plaintiff’s stock of peripherals obsolete, were unnecessary. The court rejected those charges and in dictum briefly discussed the complexity of analyzing the legal aspects of planned obsolescence.

[If a monopolist] respond[s] to the . . . inroads [of rivals] on its assumed monopoly by changing [its primary product’s] interfaces with such frequency that [its rivals will be] unable to attach and unable to economically adapt their [products] to the ever-changing interface designs, and, if those interface changes had no purpose and effect other than the preclusion of [rival] competition, this Court would not hesitate to find that such conduct was predatory.

Id. at 1002-03.

118 See also *United States v. Varian Assoc., Inc.*, 1992-1 Trade Cas. (CCH) ¶ 69,772 (N.D. Ill. Apr. 1, 1992) (instituting a consent decree prohibiting defendant from acquiring used equipment); *Pac. Mailing Equip. Corp. v. Pitney Bowes, Inc.*, 499 F. Supp. 108 (N.D. Cal. 1980) (prohibiting the destruction of mailing machines in order to eliminate secondhand markets).

119 *Allen-Myland, Inc. v. Int’l Bus. Machs. Corp.*, 33 F.3d 194 (3d Cir. 1994); see *supra* Subsection I.C.3.b.

that would later appear on the used leasing market.”¹²⁰ This position was enhanced, according to the *Allen-Myland* court, “by IBM’s policy of recapturing old parts that could otherwise have been used to extend the useful service lives of existing used mainframes by allowing them to be upgraded and placed with new customers.”¹²¹

4. Neglected Cases

There is no need to look hard for evidence of technology suppression and manipulation by durapolists. Such evidence is abundant and often overused in the literature, probably because it is a favorite theme of urban legends.¹²² There is voluminous evidence of contrived durability in the light-bulb industry under the leadership of General Electric¹²³ and of planned obsolescence in the automobile industry.¹²⁴ Johnson & Johnson has allegedly suppressed a costless painkilling device that threatened to kill the market for painkilling drugs.¹²⁵ It is plausible that, for Johnson & Johnson, a monopoly over such a device would be far less profitable than facing some competition in the market for drugs: A painkilling device is durable, while drugs are perishable and addictive. These cases and others are well-known. Two lesser-known cases involve Monsanto’s terminator seeds and the Color Marketing Group.

a. *Monsanto’s Terminator Seeds*

Seeds are durable in certain respects, because farmers can reproduce them and save seeds from one growing season to the next. Such durability

120 33 F.3d at 203.

121 *Id.*

122 See, e.g., Robert L. Avinger, *Product Durability and Market Structure: Some Evidence*, 29 J. INDUS. ECON. 357 (1981); Symposium, *Antitrust and the Suppression of Technology in the United States and Europe: Is There a Remedy?*, 66 Antitrust L.J. 415 (1998); see also JONATHAN EISEN, SUPPRESSED INVENTIONS & OTHER DISCOVERIES (1999); 20 YEARS OF CENSORED NEWS (Carl Jensen ed., 1997).

123 See, e.g., CORWIN D. EDWARDS, ECONOMIC AND POLITICAL ASPECTS OF INTERNATIONAL CARTELS, Monograph 1, Subcomm. on War Mobilization of the Senate Comm. on Military Affairs (1944); ARTHUR A. BRIGHT, THE ELECTRIC LAMP INDUSTRY: TECHNOLOGICAL CHANGE AND ECONOMIC DEVELOPMENT FROM 1800 TO 1947 (1949) (presenting a thorough study of the light-bulb industry and its cartel strategies); GEORGE W. STOCKING & MYRON W. WATKINS, CARTELS IN ACTION: CASE STUDIES IN INTERNATIONAL BUSINESS DIPLOMACY 304-62 (1946); S.J. Prais, *The Electric Lamp Monopoly and the Life of Electric Lamps*, 23 J. INDUS. ECON. 153 (1974); Leonard S. Reich, *Lighting the Path to Profit: GE’s Control of the Electric Lamp Industry, 1892-1941*, 66 BUS. HIST. REV. 305 (1992).

124 See, e.g., F.M. SCHERER, INDUSTRY STRUCTURE, STRATEGY AND PUBLIC POLICY 279-335 (1996); Fisher et al., *supra* note 100; John A. Menge, *Style Change Costs as a Market Weapon*, 76 Q.J. ECON. 632 (1962); Pashigian et al., *supra* note 102; Note, *supra* note 106.

125 *McDonald v. Johnson & Johnson*, 537 F. Supp. 1282 (D. Minn. 1982), *rev’d*, 722 F.2d 1370 (8th Cir. 1983); see also Francesca Lunzer, *No Pain, No Gain*, FORBES, Nov. 21, 1983, at 324; *New Killers of Chronic Pain*, BUS. WK., Dec. 10, 1979, at 127.

is against the interests of seed durapolists. Monsanto, one of the world's largest seed corporations, had tried for many years to abolish the practice of saving seeds from one season to another by requiring farmers to enter into agreements committing them not to sow seeds that their crops yield. These attempts failed because it was too costly to enforce the agreements.¹²⁶ In May 1998, Monsanto acquired Delta & Pipe Land, which owned a patent on a technology that genetically disabled a seed's ability to germinate when planted in a second season.¹²⁷ The relief to Monsanto's agonies emerged through what came to be known as the "terminator seeds."¹²⁸ The terminator seeds were marketed only in limited pilot programs and, in October 1999, Monsanto announced it would not commercially market the terminator seeds. The announcement was a consequence of fierce public opposition, a flood of antitrust suits, and a sharp decline in Monsanto's market value.¹²⁹ Monsanto's problem and solution have not been explicitly discussed within the analytical framework of the durapolist problem, but the underlying intuition explains public reaction to Monsanto's proposal.

b. *The Color Marketing Group*

The Color Marketing Group ("CMG") is an international trade association of 1500 color designers, who are "involved in the use of color as it applies to the profitable marketing of goods and services."¹³⁰ Color designers are "professionals who enhance the function, salability and/or quality of a product."¹³¹ CMG was founded in 1962 in the interest of saving the world from the aftermath of postwar color technology, "which had so expanded the usable universe of hues that without some sort of coordination, the public was in imminent danger of being overwhelmed by mismatched home furnishings, clashing car interiors, [and] repellent fashion combinations."¹³²

126 See Barnaby J. Feder, *Plant Sterility Research Inflames Debate on Biotechnology's Role in Farming*, N.Y. TIMES, Apr. 19, 1999, at A18; Jeffrey Kluger, *The Suicide Seeds*, TIME, Feb. 1, 1999, at 44.

127 See Jennifer Ferrara, *Revolving Doors: Monsanto and the Regulators*, ECOLOGIST, Sept.-Oct. 1998, at 280; Brian Tokar, *Monsanto: A Checkered History*, ECOLOGIST, Sept.-Oct. 1998, at 254; Leora Karen Lundegaard, *Ga. Growers Sue Maker of Cotton Seeds*, WALL ST. J., Mar. 24, 1999, at S2.

128 Feder, *supra* note 126.

129 Barnaby J. Feder, *Monsanto To Bar a Class of Seeds*, N.Y. TIMES, Oct. 5, 1999, at A1; Scott Kilman & Thomas M. Burton, *Monsanto Feels Pressure From the Street*, WALL ST. J., Oct. 21, 1999, at C1; *Seeds of Trouble*, WALL ST. J., Sept. 15, 1999, at A32.

130 Color Marketing Group, *Who We Are*, at http://www.colormarketing.org/media/about_cmg/who_we_are.htm (last accessed Dec. 6, 2003).

131 Color Marketing Group, *Glossary of Terms*, at http://www.colormarketing.org/media/about_cmg/glossary_of_terms.htm (last accessed Dec. 6, 2003).

132 Garry Trudeau, *Hues You Can Use: Will That Taupe Fabric Still Be Hot Next Year? Stand by. The Color Cartel Is on the Job*, TIME, Jan. 27, 1997, at 67.

CMG is in the business of forecasting “color directions,”¹³³ which are forecasted bi-annually in a five-step process.¹³⁴ First, each CMG member develops his or her own individual forecast. Second, CMG members from around the world collaborate to analyze color trends. Third, the directions of colors are interpreted in color forecast workshops. Fourth, each workshop develops a color forecast. At the fifth and final stage, a steering committee consolidates the forecasts into a palette.

CMG hosts competing companies from many industries of durable goods. For example, color designers from Ford, General Motors, Daimler-Chrysler, Honda, Toyota, Volkswagen, and other car manufacturers forecast together the color directions of cars. Later on, informed executives from those companies “independently” decide which colors and hues will be the premium colors of next year. Similarly, color designers from Adidas, Nike, Reebok, and other leading companies in the sports fashion industry forecast in concert the fashionable colors of next season that will make some of our current favorites outdated. Although CMG color directions are not directives,¹³⁵ the fact that color designers from competing companies apply the same color directions facilitates coordinated fashion changes that render durables obsolete.¹³⁶ CMG, therefore, conveniently serves the interests of durapolists and other sellers of durable goods.¹³⁷ It is a platform to expedite depreciation of durables without the risks and costs associated with the design and production of new models.¹³⁸

133 Color directions are defined as follows:

The directional change (i.e., warmer/cooler, lighter/darker, clearer/grayer and/or the relative importance of a hue) a color family may be expected to take . . . in 19 months or more

Color [d]irections . . . are not meant to represent exact shades, or meant to be used in their precise value, hue or chroma, but to be interpreted by each member as to their usefulness in specific products.

Color Marketing Group, Glossary of Terms, *supra* note 131.

134 Color Marketing Group, Color Forecasting Process, at http://www.colormarketing.org/media/about_cmg/color_forecasting_process.htm (last accessed Dec. 6, 2003).

135 *Id.*

136 [The] Color Marketing Group [is a] color cartel that has held a largely unknown public under its sway for more than 30 years. It was the CMG that forecast avocado refrigerators in the late '60s and mauve motel rooms in the '70s and hunter-green automobiles in the '90s. And it was the CMG that predicted the 1996 consumer palette would be, in the words of former president Laraine Turner, “kissed by the yellow.”

Trudeau, *supra* note 132.

137 Deborah L. Jacobs, *The Titans of Tint Make Their Picks*, N.Y. TIMES, May 29, 1994, at C7; see also Daniel Akst, *The Culture of Money: Having Our Colors Done*, N.Y. TIMES, Apr. 4, 1999, at C6 (“The Mount Olympus of the world of color is an organization called the Color Marketing Group, in which people from various industries get together either to divine or dictate, depending on our level of cynicism, the colors that people will like and want.”).

138 For an interesting theoretical analysis, which predicts fashion cycles in colors, see Edi Kami & David Schmeidler, *Fixed Preferences and Changing Tastes*, 80 AM. ECON. REV. 262 (1990).

D. *The Tying Durapolist: Tying Arrangements*

1. The Economics of Tying Complementary Goods to Durables

A tying arrangement is a sale (or lease) of one product or service on condition that the buyer (or the lessee) take another product or service. When a durapolist effectively ties complementary perishables (or short-lived durables) to its durables, it becomes the sole seller of the tied perishables for its customers. For the durapolist, such an arrangement is convenient; while the exercise of market power in markets for its durables is difficult, as the sole source of the tied perishables it can charge the monopoly price for them. In a simple pricing scheme, the durapolist prices its durables at the competitive level, or even lower, and draws profits from the sales of the tied perishables.¹³⁹

To illustrate, consider the case of a durapolist of copiers that faces difficulties in charging the monopoly price for its copiers because of their durability and, therefore, ties paper to its machines.¹⁴⁰ Let the lifetime of a copier be ten years, the monopoly price of the tied paper three cents per page, and the cost per page one cent. Assuming that the durapolist sells its copiers at cost, the profits it reaps from customer i are $0.02 \cdot 10 \cdot k_i$ dollars, where k_i stands for the average number of copies customer i makes per year. That is, the durapolist's profits per customer vary with the average number of copies the customer makes: \$2400 for a yearly average of 1000 copies, \$4800 for a yearly average of 2000 copies, \$7200 for a yearly average of 3000 copies, and so forth. In this case, tying is an effective means of generating profits because it constitutes a legitimate price-discrimination device.¹⁴¹ The customer's requirements for perishables determine the indirect price she pays for the durable. As a Xerox official once put it, "We've set prices from an economic value to the user—how much a copy is worth, not according to the value of the machine."¹⁴²

Indeed, tying is an antidote to the durapolist problem. The commitment problem is cured because the durables are sold at low prices, so that consumers do not expect prices to fall. The dynamic planning and timing problems become irrelevant, because the durapolist no longer draws profits from its durables. Similarly, the consumer is more amenable to

139 The durapolist may price his durables below costs in order to enhance profits from the markets of the tied complementary goods. See Kühn & Padilla, *supra* note 105.

140 For an analysis of tying paper and supplies to copiers, see Erwin A. Blackstone, *Restrictive Practices in the Marketing of Electrofax Copying Machines and Supplies: The SCM Corporation Case*, 23 J. INDUS. ECON. 189 (1975).

141 Note that all consumers pay the same price for copiers and paper, and therefore this type of price discrimination does not violate the Robinson-Patman Act, which applies only when the same product is sold to two different people at two different prices.

142 *Two Gee-Whiz Giants Go at Each Other*, BUS. WK., June 13, 1970, at 70.

paying the monopoly price for tied perishables, because her ability and willingness to pay such a price for perishables is always greater than for durables, as set forth in Part I above.

It is not surprising, therefore, that so many durapolists have tied complementary perishables to their durables. Heaton-Peninsular Button-Fastener tied staples to its button-fastening machinery;¹⁴³ A.B. Dick tied ink to its mimeograph machines;¹⁴⁴ IBM tied punch cards to its business machines;¹⁴⁵ Motion Picture Patents Company tied films to its projectors;¹⁴⁶ International Salt tied salt and salt tablets to its salt-injecting machinery;¹⁴⁷ American Can and Continental Can tied cans to their can-closing machinery;¹⁴⁸ United Shoe Machinery tied supplies to its shoe machinery;¹⁴⁹ and the list continues.

The foregoing analysis also applies to the common practice of franchise tying arrangements.¹⁵⁰ In franchise agreements, the franchise (the durable) consists of licenses for trademarks, rights to use methods of doing business, and other intellectual-property rights. The demand for a franchise varies among consumers according to the anticipated profits, liquidity constraints, and individual confidence in the economy. Therefore, where a franchisor sells a franchise at a constant price it is likely to encounter the standard durapolist problem. However, if the franchisor gives away the franchise at no charge and ties to the franchise complementary perishables, it can escape that fate. In that respect, chicken wings are to a franchise what paper is to a copier.¹⁵¹

143 See *Heaton-Peninsular Button-Fastener Co. v. Eureka Specialty Co.*, 77 F. 288 (6th Cir. 1896).

144 See *Henry v. A.B. Dick Co.*, 224 U.S. 1 (1912).

145 See, e.g., *Int'l Bus. Machs. Corp. v. United States*, 298 U.S. 131 (1936).

146 See *Motion Picture Patents Co. v. Universal Film Mfg. Co.*, 243 U.S. 502 (1917).

147 See *Int'l Salt Co. v. United States*, 332 U.S. 392 (1947). For analyses of the peculiar circumstances of this case, see Victor P. Goldberg, *The International Salt Puzzle*, 14 RES. L. & ECON. 31 (1991); John L. Peterman, *The International Salt Case*, 22 J.L. & ECON. 351 (1979).

148 See *United States v. Am. Can Co.*, 87 F. Supp. 18, 23-24 (N.D. Cal. 1949). For an analysis of the tying practices, see JAMES W. MCKIE, *TIN CANS AND TIN PLATE: A STUDY OF COMPETITION IN TWO RELATED MARKETS* 182-88 (1959).

149 *United States v. United Shoe Mach. Corp.*, 110 F. Supp. 295 (D. Mass. 1953). For a thorough analysis, see CARL KAYSER, *UNITED STATES V. UNITED SHOE MACHINERY CORPORATION: AN ECONOMIC ANALYSIS OF AN ANTI-TRUST CASE* 250-55 (1956) ("There is evidence . . . that shows that United terms on certain supply-consuming machines were established in anticipation of low return . . . and that these rates were considered desirable in order to promote the sale of United supplies.").

150 For analyses of such agreements, see Benjamin Klein & Lester F. Saft, *The Law and Economics of Franchise Tying Contracts*, 28 J.L. & ECON. 345, 356 (1985); Alan J. Meese, *Antitrust Balancing in a (Near) Coasean World: The Case of Franchise Tying Contracts*, 95 MICH. L. REV. 111 (1996).

151 In *Siegel v. Chicken Delight, Inc.*, 448 F.2d 43 (9th Cir. 1971), cooking equipment and supplies were tied to the franchise and sold for supracompetitive prices; no fee was charged for the franchise itself; see also *Queen City Pizza, Inc. v. Domino's Pizza, Inc.*, 124 F.3d 430 (3d Cir. 1997) (holding that pizza supplies are not a separate market from franchise contracts for purposes of a tying claim); *Krehl v. Baskin-Robbins Ice Cream Co.*, 664 F.2d 1348 (9th Cir. 1982) (allowing the tying of an ice cream store franchise to ice cream); *Kypta v. McDonald's Corp.*, 671 F.2d 1282 (11th Cir. 1982)

The analysis is similar when tied complementary goods are short-lived durables, such as replacement parts for machinery, disposable blades for razors, and cooking equipment for a franchise. In such circumstances, the durapolist has particularly strong incentives to shorten the lifetime of the tied complementary goods, since it aspires to make them as close as possible to perishables.¹⁵²

An example of the latter strategy is the history of the market for disposable blades. King C. Gillette followed his boss' advice and invented something "which when used once, is thrown away and the customer comes back for more."¹⁵³ Gillette invented a system with a razor tied to disposal blades that replaced the traditional, durable razor. There is compelling evidence that on at least one occasion Gillette Co. suppressed a technology of relatively durable blades in favor of less durable blades in order to enhance profits from the blades.¹⁵⁴ Indeed, as we already saw, durapolists do not always offer the "best a man can get."¹⁵⁵

2. Legal Implications

Tying durapolists often argue in court that their practices do not constitute tying because the tying and tied goods are one compound product. For example, it has been argued that replacement parts are not separate from the tying durable,¹⁵⁶ supplies are not separate from the tying franchise,¹⁵⁷ and perishable inputs are not separate from the tying machinery.¹⁵⁸ The legal test of tying examines the character of the demand for the tying and tied products, rather than the functional relationship between them.¹⁵⁹ In general, tying exists where there is demand for the tied

(holding that—absent a showing of economic injury—McDonald's Corporation's requirement that all franchisees be its tenants does not violate antitrust prohibitions on tying).

152 Fethke & Jagannathan, *supra* note 88; Gary Fethke & Raj Jagannathan, *Why Would a Durable Good Monopolist Also Produce a Cost Inefficient Nondurable Good?*, 18 INT'L J. INDUS. ORG. 793 (2000).

153 RUSSELL B. ADAMS, JR., KING C. GILLETTE: THE MAN AND HIS WONDERFUL SHAVING DEVICE 18-19 (1978).

154 In 1928, Gillette introduced stainless blades, which were significantly more durable than the existing carbon blades. Shortly thereafter, Gillette abandoned the product. In 1961, following the introduction of stainless blades by Wilkinson Sword, a fringe firm, Gillette almost lost its global leadership. Gillette delayed the introduction of its own stainless blades even after the success of Wilkinson Sword's blades and opted, instead, to sue Wilkinson Sword for patent infringement. *Id.* at 238-47.

155 GORDON MCKIBBEN, CUTTING EDGE: GILLETTE'S JOURNEY TO GLOBAL LEADERSHIP 235-36 (1998) (describing the incipency of Gillette's slogan). Oliver Wendell Holmes noted that shaving with Gillette's blades "could be performed with almost reckless boldness, as one cannot cut himself, and in fact had become a pleasant amusement instead of an irksome task." ADAMS, *supra* note 153, at 13.

156 See, e.g., *Parts & Elec. Motors, Inc. v. Sterling Elec., Inc.*, 826 F.2d 712 (7th Cir. 1987).

157 See *Queen City Pizza, Inc. v. Domino's Pizza, Inc.*, 124 F.3d 430 (3d Cir. 1997).

158 See *Advance Bus. Sys. & Supply Co. v. SCM Corp.*, 287 F. Supp. 143 (D. Md. 1968).

159 *Eastman Kodak Co. v. Image Technical Servs., Inc.*, 504 U.S. 451, 462 (1992) ("[F]or

product that is sufficient to support a separate supply of the tied goods.¹⁶⁰ Accordingly, there is no tying in selling cars with wheels because in well functioning markets consumers would prefer the package over separate products. In contrast, there is sufficient demand for an independent supply of replacement parts for cars, and, therefore, cars and replacement parts are separate products.¹⁶¹ Thus, short-lived complementary goods and perishables are less likely to be found tied in initial sales when they are sold together with the tying product than in subsequent sales. The rationale is that in the initial sale there are transaction-cost efficiencies in tying, whereas in subsequent sales there are no such efficiencies.

Once the existence of tying is established, a tying durapolist is exposed to potential liability under antitrust and intellectual property laws.¹⁶² This risk exposure is volatile because the law of tying is so vague and disputed that the courts regularly fracture over the appropriate rule. Richard Posner recently described tying strategies as “[a] practice long thought to epitomize the exclusionary practices but now recognized to be only rarely exclusionary.”¹⁶³ This view, which is generally associated with the old Chicago School,¹⁶⁴ has been heavily criticized. Most scholars today agree that tying arrangements often have exclusionary effects.¹⁶⁵ Case law,

[photocopier] service and parts to be considered two distinct products, there must be sufficient consumer demand so that it is efficient for a firm to provide service separately from parts.”); *Jefferson Parish Hosp. Dist. No. 2 v. Hyde*, 466 U.S. 2, 19 (1984) (“[T]he answer to the question whether one or two products are involved turns not on the functional relation between them, but rather on the character of the demand for the two items.”); see also *Allen-Myland, Inc. v. Int’l Bus. Machs. Corp.*, 33 F.3d 194, 211-16 (3d Cir. 1994).

160 *Eastman Kodak Co.*, 504 U.S. at 462; *Jefferson Parish Hosp. Dist. No. 2*, 466 U.S. at 19.

161 See *Parts & Elec. Motors*, 826 F.2d 712; *Mozart Co. v. Mercedes-Benz of N. Am., Inc.*, 593 F. Supp. 1506, 1514-15 (N.D. Cal. 1984); *Grappone, Inc. v. Subaru of New England, Inc.*, 534 F. Supp. 1282, 1289 (D.N.H. 1982).

162 See generally HOVENKAMP, *supra* note 66, at 391-439. Tying may be found illegal under Sections 1 and 2 of the Sherman Act and Section 5 of the Federal Trade Commission Act. Tying is explicitly prohibited under Section 3 of the Clayton Act.

It shall be unlawful . . . to lease or make a sale or contract for sale . . . on the condition, agreement, or understanding that the lessee or purchaser thereof shall not use or deal in the goods, wares, merchandise, machinery, supplies, or other commodities of a competitor or competitors of the lessor or seller, where the effect of such lease, sale, or contract for sale or such condition, agreement, or understanding may be to substantially lessen competition or tend to create a monopoly in any line of commerce.

Clayton Act § 3, 15 U.S.C. § 14 (2000).

163 RICHARD A. POSNER, *ANTITRUST LAW* 197 (2d ed. 2001).

164 Posner presented this view thirty years ago in an article and the first edition of his book. RICHARD A. POSNER, *ANTITRUST LAW: AN ECONOMIC PERSPECTIVE* 171-84 (1st ed. 1976); Richard A. Posner, *Exclusionary Practices and the Antitrust Laws*, 41 U. CHI. L. REV. 506 (1974); see also ROBERT H. BORK, *THE ANTITRUST PARADOX: A POLICY AT WAR WITH ITSELF* 140-44, 365-81 (1978); Ward S. Bowman, Jr., *Tying Arrangements and the Leverage Problem*, 67 YALE L.J. 19 (1957); Aaron Director & Edward H. Levi, *Law and the Future: Trade Regulation*, 51 NW. U. L. REV. 281 (1956).

165 See, e.g., Dennis W. Carlton & Michael Waldman, *The Strategic Use of Tying To Preserve and Create Market Power in Evolving Industries*, 33 RAND J. ECON 194 (2002); Jay Pil Choi & Christodoulos Stefanadis, *Tying, Investment, and the Dynamic Leverage Theory*, 32 RAND J. ECON. 52 (2001); Warren S. Grimes, *Reponses and Replies: The Antitrust Tying Law Schism: A Critique of*

however, still lags behind.

In considering the desirable legal rule, a critical point is whether prohibiting durapolists from tying would undermine entrepreneurs' incentives to enter markets for durables.¹⁶⁶ In general settings, it has been rightfully argued that, where the tying seller can leverage his market power to the market for the tied goods, the entrepreneur may be rewarded more than once. His incentives to invest in creating markets and improving products, therefore, are too high. In durable-goods industries, however, the situation is different since sufficient profits may not be made in the tying market. To address this problem, antitrust laws allow three types of tying arrangements employed to exploit the value of the sold durables through tied goods.

a. *Technological Tie*

A seller, even a monopolist, is free to design its durables so that they will be compatible only with complementary goods of its production lines.¹⁶⁷ Despite the possible detrimental effects on competition, courts will not second guess such technological tying designs. Exceptions to this rule obtain when a product that is an assembled package can be disassembled¹⁶⁸ and when a product's only purpose is to exclude competitors.¹⁶⁹

b. *The New Product Exception*

Under the new product exception, tying is justified when the tie itself

Microsoft III and a Response to Hylton and Salinger, 70 ANTITRUST L.J. 199 (2002); Keith N. Hylton & Michael Salinger, *Tying Law and Policy: A Decision-Theoretic Approach*, 69 ANTITRUST L.J. 469 (2001); Louis Kaplow, *Extension of Monopoly Power Through Leverage*, 85 COLUM. L. REV. 515 (1985); Janusz A. Ordover et al., *Nonprice Anticompetitive Behavior by Dominant Firms Toward the Producers of Complementary Products*, in ANTITRUST AND REGULATION: ESSAYS IN MEMORY OF JOHN J. MCGOWAN 115 (Franklin M. Fisher ed., 1985); Michael D. Whinston, *Tying, Foreclosure, and Exclusion*, 80 AM. ECON. REV. 837 (1990); Oliver E. Williamson, *Assessing Vertical Market Restrictions: Antitrust Ramifications of the Transaction Cost Approach*, 127 U. PA. L. REV. 953 (1979).

166 POSNER, *supra* note 163, at 203 (“[O]bjections [to tying] dwindle in settings in which society wants to increase the amount of monopoly, for example to spur invention . . .”).

167 See, e.g., *Foremost Pro Color, Inc. v. Eastman Kodak Co.*, 703 F.2d 534 (9th Cir. 1983); *Memorex Corp. v. Int'l Bus. Machs.*, 636 F.2d 1188 (9th Cir. 1980); *Berkey Photo, Inc. v. Eastman Kodak Co.*, 603 F.2d 263, 287 (2d Cir. 1979); *Cal. Computer Prods., Inc. v. Int'l Bus. Machs. Corp.*, 613 F.2d 727, 735 (9th Cir. 1979); *Transamerica Computer Co. v. Int'l Bus. Machs. Corp.*, 481 F. Supp. 965, 996-98 (N.D. Cal. 1979); see also Note, *An Economic and Legal Analysis of Physical Tie-Ins*, 89 YALE L.J. 769 (1980).

168 *United States v. Jerrold Elec. Corp.*, 187 F. Supp. 545, 559 (E.D. Pa. 1960) (“[I]t is . . . clear that one cannot circumvent the anti-trust laws simply by claiming that he is selling a single product.”); *United States v. Microsoft*, 1998-2 Trade Cases (CCH) ¶ 72,188, at 72,261 (D.D.C. Aug. 19, 1998).

169 See *supra* Subsection II.C.3.b.

is necessary to introduce a new product onto the market.¹⁷⁰ This exception is limited in time to the introductory period of the new product. For example, in *United States v. Jerrold Electronics Corp.*,¹⁷¹ the defendant developed an early form of cable system and tied equipment and services to its system. The court concluded that tying was necessary for a profitable introduction of the product and held the practice to be reasonable during the introductory period.

c. *The Franchise Exception*

Tying franchise agreements are justified, among other things, by the need to maintain the quality of the brand and avoid free-riding.¹⁷² For example, Baskin-Robbins ties ice cream to its franchises to avoid dilution of its brand by franchisees who wish to sell cheaper ice cream.¹⁷³ Similarly, pizza franchisors tie indistinguishable supplies to their franchises.¹⁷⁴

E. *The Destructive Durapolist: Crippling Secondhand Markets and Aftermarkets*

As already discussed, durapolists may use control over secondhand markets and aftermarkets (the markets for complementary goods and services) to overcome the durapolist problem. This Section elaborates on the legal consequences of exercising control in these markets.

1. Secondhand Markets

Used goods are durables that outlast the consumer's needs and return to the market to be traded as cheap substitutes for new durables. The trade in used durables extends the economic life of a durable beyond the use of the first user to the needs of subsequent consumers.¹⁷⁵ For durapolists, crippling the trade in used goods alleviates some of the problems that durability creates. In particular, the dynamic planning and timing problems that stem directly from trade in used goods are likely mitigated when secondhand markets are interrupted. Courts therefore usually condemn practices that tend to cripple secondhand markets, such as limiting access

170 See AREEDA & HOVENKAMP, *supra* note 108, ¶ 1746 (2002).

171 *Jerrold Elec.*, 187 F. Supp. at 545.

172 See *supra* note 150.

173 *Krehl v. Baskin-Robbins Ice Cream Co.*, 664 F.2d 1348, 1353-54 (9th Cir. 1982); see also *Queen City Pizza, Inc. v. Domino's Pizza, Inc.*, 124 F.3d 430, 442-43 (3d Cir. 1997).

174 *Queen City Pizza*, 124 F.3d at 444-47.

175 See John Rust, *When Is It Optimal To Kill Off the Market for Used Durable Goods?*, 54 *ECONOMETRICA* 65 (1986); Swan, *supra* note 39.

to necessary replacement parts¹⁷⁶ and lease-only policies.¹⁷⁷

It is noteworthy that crippling the market for secondhand goods does not serve the interests of durapolists that engage in the practice of contrived durability in the form of depreciation.¹⁷⁸ The existence and performance of secondhand markets allows such durapolists to sell their durables to initial buyers at a higher price, because the buyer anticipates selling the durable in the future. Therefore, it may even be in the interest of durapolists to foster secondhand markets of their durables.¹⁷⁹

2. Aftermarkets

For durapolists, control over aftermarkets, on which complementary goods and services are sold, is necessary for tying¹⁸⁰ and may be used to convince consumers to upgrade their durables. Durapolists, therefore, have incentives to monopolize the aftermarkets of their goods in order to secure monopoly profits that they could not collect otherwise or to extend market power. The legal question is whether a strategy, designed to facilitate control over the aftermarkets, is (or should be) lawful.

A partial answer to this question lies in the discussion above on tying arrangements. Several tying arrangements¹⁸¹ that facilitated control over aftermarkets have been deemed lawful. For example, a durapolist does not have any duty to design its goods to be compatible with complementary goods offered by its competitors¹⁸² or to make any disclosure to its competitors regarding product changes.¹⁸³ Other strategies, however, have been held illegal under antitrust laws, particularly those aimed at recapturing and destroying parts of old machines in order to prevent participants in aftermarkets from reconditioning used machines.¹⁸⁴

176 See, e.g., *Allen-Myland, Inc. v. Int'l Bus. Machs. Corp.*, 33 F.3d 194 (3d Cir. 1994); *United States v. Varian Assoc., Inc.*, 1992-1 Trade Cas. (CCH) ¶ 69,772 (N.D. Ill. Apr. 1, 1992); *Pac. Mailing Equip. Corp. v. Pitney Bowes, Inc.*, 499 F. Supp. 108 (N.D. Cal. 1980); cf. *Bepco, Inc. v. Allied Signal, Inc.*, 106 F. Supp. 2d 814 (M.D.N.C. 2000) (approving the practice of discounts to customers who returned the "core" of a worn-out part).

177 Waldman, *supra* note 104; see also *Cole v. Hughes Tool Co.*, 215 F.2d 924, 942-43 (10th Cir. 1954); *infra* Section II.F.

178 See *supra* Subsection II.C.2.b.

179 See Hendel & Lizzeri, *supra* note 95.

180 Several scholars have argued that tying through control over aftermarkets is utilized primarily for "competitive price discrimination." See, e.g., Benjamin Klein & John Shepard Wiley, Jr., *Competitive Price Discrimination as an Antitrust Justification for Intellectual Property Refusals To Deal*, 70 ANTITRUST L.J. 599 (2003).

181 See *supra* notes 167-169 and accompanying text.

182 *Transamerica Computer Co. v. Int'l Bus. Machs. Corp.*, 481 F. Supp. 965, 1009-10 (N.D. Cal. 1979).

183 *Berkey Photo, Inc. v. Eastman Kodak Co.*, 603 F.2d 263, 283-84 (2d Cir. 1979).

184 See, e.g., *Allen-Myland, Inc. v. Int'l Bus. Machs. Corp.*, 33 F.3d 194 (3d Cir. 1994); *United States v. Varian Assocs.* 1992-1 Trade Cas. (CCH) ¶ 69,772 (N.D. Ill. Apr. 1, 1992); *Pac. Mailing Equip. Corp. v. Pitney Bowes, Inc.*, 499 F. Supp. 108, 114-15 (N.D. Cal. 1980); cf. *Bepco, Inc. v. Allied Signal, Inc.*, 106 F. Supp. 2d 814, 818-21 (M.D.N.C. 2000).

Moreover, following *Kodak*,¹⁸⁵ a durable-goods seller may be required to sell complementary goods to competitors in the aftermarket even if its hold in the primary market does not confer market power. The rationale behind this duty to help competitors is that in the case of durables, especially costly, complex durables, the consumers are locked in due to switching costs and willing to tolerate increases in the prices of complementary services. The duty to sell complementary goods to competitors in such circumstances prevents evil lock-in effects.¹⁸⁶ However, this logic was apparently narrowed in *CSU v. Xerox*,¹⁸⁷ where the Court of Appeals for the Federal Circuit held that a refusal to sell or license complementary goods, protected by intellectual-property rights, does not violate antitrust laws.¹⁸⁸

F. *The Leasing Durapolist: Lease-only Practices*

Lease-only policies have been popular among prominent durapolists during the first three quarters of the twentieth century. IBM, Xerox, United Shoe Machinery, International Salt, American Can, and other notable durapolists offered some of their models on a lease-only basis.

The leasing durapolist was popularized among lawyers and economists following the joint work of Judge Charles Wyzanski and his “law clerk,” the economist Carl Kaysen, who worked together on the *United Shoe Machinery* case.¹⁸⁹ In his famous decision, Judge Wyzanski condemned the lease-only practice, primarily because of its exclusionary effects.¹⁹⁰ United Shoe was ordered to sell its machines at prices that were equivalent to the respective lease prices. The *United Shoe* decision was not questioned by the Supreme Court and has provided the authority for

185 *Eastman Kodak Co. v. Image Technical Servs., Inc.*, 504 U.S. 451 (1992); *Image Technical Servs., Inc. v. Eastman Kodak Co.*, 125 F.3d 1195 (9th Cir. 1997).

186 *Eastman Kodak*, 504 U.S. at 473-76. For a good presentation of this rationale, see Jeffery K. Mackie-Mason & John Metzler, *Links Between Markets and Aftermarkets: Kodak* (1997), in *THE ANTITRUST REVOLUTION: ECONOMICS, COMPETITION, AND POLICY* 428 (John E. Kwoka, Jr. & Lawrence J. White eds., 4th ed. 2004); Carl Shapiro, *Aftermarkets and Consumer Welfare: Making Sense of Kodak*, 63 *ANTITRUST L.J.* 483 (1995).

187 *In re Indep. Serv. Orgs. Antitrust Litig.*, 203 F.3d 1322 (Fed. Cir. 2000).

188 See Michelle M. Burtis & Bruce H. Kobayashi, *Why an Original Can Be Better than a Copy: Intellectual Property, the Antitrust Refusal To Deal, and ISO Antitrust Litigation*, 9 *SUP. CT. ECON. REV.* 143 (2001); cf. Klein & Wiley, *supra* note 180.

189 *United States v. United Shoe Mach. Corp.*, 110 F. Supp. 295, 344 (D. Mass. 1953). Kaysen's Ph.D. dissertation was based on this case. In 1956, the dissertation was published as a book and became one of Harvard University Press's best sellers. KAYSEN, *supra* note 149. See *supra* Subsection I.D.3.

190 [United Shoe's leasing practices] are contracts, arrangements, and policies which, instead of encouraging competition based on pure merit, further the dominance of a particular firm. In this sense, they are *unnatural barriers*; they unnecessarily exclude actual and potential competition; they restrict a free market.

United Shoe Machinery, 110 F. Supp. at 344-45 (emphasis added).

successful government attacks against other formidable durapolists' lease-only policies.¹⁹¹ Where the durapolists were "midgets," however, some courts have rejected "what appears to be a novel theory under the antitrust laws."¹⁹²

Economics textbooks frequently present the lease-only practice as a solution to the commitment problem,¹⁹³ because leasing can be conveniently modeled as a sale of machinery inputs, the use of which is limited in time.¹⁹⁴ Professor Coase, though, would likely disagree. According to Coase, the commitment problem can be alleviated through a lease-only policy only if the durapolist leases its durables "for relatively short period of times."¹⁹⁵ Otherwise, the leases are similar to sales of durables. Nonetheless, the lease-only practice may cure the durapolist problem by facilitating other strategies employed to overcome the durapolist's dilemma: price discrimination,¹⁹⁶ tying,¹⁹⁷ elimination of secondhand markets,¹⁹⁸ clearing the markets of replacement parts,¹⁹⁹ and

191 For a description of lease-only practices in the computer industry, see *United States v. Int'l Bus. Mach. Corp.*, 1956 Trade Cas. (CCH) ¶ 68,245 (S.D.N.Y. Jan. 25, 1956); GERALD W. BROCK, *THE U.S. COMPUTER INDUSTRY: A STUDY OF MARKET POWER* 155-59 (1975); RICHARD T. DELAMARTER, *BIG BLUE: IBM'S USE AND ABUSE OF POWER* 106-17 (1986); FRANKLIN M. FISHER ET AL., *FOLDED, SPINDLED AND MUTILATED: ECONOMIC ANALYSIS AND U.S. v. IBM* 191-96 (1983). For lease-only practices in the photocopier industry, see *In re Xerox Corp.*, 86 F.T.C. 364 (1975); Blackstone, *supra* note 140; Timothy F. Bresnahan, *Post-Entry Competition in the Plain Paper Copier Market*, 75 AM. ECON. REV. 15 (1985). For lease-only practices in the can-machinery industry, see MCKIE, *supra* note 148.

192 See, e.g., *Souza v. Estate of Bishop*, 821 F.2d 1332, 1334 (9th Cir. 1986). In *Souza*, the defendant apparently dominated the market for residential land in Honolulu. In its decision, the *Souza* court relied on the *Berkey Photo* case, where the court held that "any firm, even a monopolist, may generally bring its products to market whenever and however it chooses." *Berkey Photo, Inc. v. Eastman Kodak Co.*, 603 F.2d 263, 286 (2d Cir. 1979).

193 See, e.g., JEAN TIROLE, *THE THEORY OF INDUSTRIAL ORGANIZATION* 80-82 (1988).

194 The production of a less durable good as against a more durable good is very similar to a policy of leasing since, by making the good less durable, the producer sells the services provided by the good for short periods of time (because the good wears out) whereas in leasing the same result is achieved by selling the services of a given durable good in short period segments.

Coase, *supra* note 1, at 147.

195 *Id.* at 145; see also Patrick DeGraba, *No Lease Is Short Enough To Solve the Time Inconsistency Problem*, 42 J. INDUS. ECON. 361 (1994) (arguing that lease-only policies cannot alleviate the commitment problem).

196 See *Int'l Bus. Machs. Corp. v. United States*, 298 U.S. 131, 134-35 (1936); KAYSSEN, *supra* note 149, at 75-78, 124-30; MCKIE, *supra* note 148, at 55-65. *Williamsburg Wax Museum, Inc. v. Historic Figures, Inc.*, 810 F.2d 243 (D.C. Cir. 1987), may also illustrate a technique of price discrimination. In *Williamsburg*, the alleged wax-figure durapolist, Lynch Display Corporation, fixed the rent for its wax figures at ten percent of the gross receipts of lessee wax museums and, thus, the rent varied according to the income of museums' exhibitions of Lynch's wax figures.

197 A lease-only strategy is an effective means to facilitate tying, because the durapolist controls maintenance of its durables, has some control over their usage, and can sanction a lessee who purchases alternatives to the tied goods. See, e.g., *Int'l Salt Co. v. United States*, 332 U.S. 392 (1947); *IBM Corp.*, 298 U.S. at 131; *Advance Bus. Sys. & Supply Co. v. SCM Corp.*, 287 F. Supp. 143 (D. Md. 1968); *United States v. Am. Can Co.*, 87 F. Supp. 18 (N.D. Cal. 1949); *In re Xerox Corp.*, 86 F.T.C. 364 (1975).

198 See Waldman, *supra* note 104.

even predatory planned obsolescence.²⁰⁰ The lease-only strategy is an umbrella under which strategic durapolists may be able to exclude competition and to charge monopoly prices.

Many lawyers and economists have criticized *United Shoe*.²⁰¹ Some have even expressed their wish that “*Shoe [were] dead*,”²⁰² although no court has ever pronounced its death. Lease-only policies employed by durapolists, however, may still be exclusionary in circumstances where they serve as the platform for exclusionary practices.

III. Conclusion

A core question that arises in monopolization and merger cases involves the market power held by the firm in question in the relevant market. Durapolists often argue that, in their case, secondary markets and other factors limit their ability to exercise market power. Questionable business strategies, such as tying, are consistently defended as necessary to achieve reasonable profitability. This Article shows that a careful analysis of the nature of the markets and strategies durapolists employ may indicate that the opposite is true: Durapolists may collect profits higher than static monopoly profits.²⁰³ In fact, some of the practices durapolists employ to increase profits are not available to perishable-goods monopolists, and, therefore, monopolies over durable-goods markets may be *more* profitable than monopolies over perishable-goods markets.

Another important lesson is that monopoly power in durable-goods markets may entail social losses greater than the general deadweight and

199 United’s lease system makes impossible a second-hand market in its own machines. This has two effects. It prevents United from suffering that kind of competition which a second-hand market offers. Also it prevents competitors from acquiring United machines with a view to copying such parts of the machines as are not patented, and with a view to experimenting with improvements without disclosing them to United.

United States v. United Shoe Mach. Corp., 110 F. Supp. 295, 325 (D. Mass. 1953).

200 See Greyhound Computer Corp. v. Int’l Bus. Machs. Corp., 559 F.2d 488, 498 n.22 (9th Cir. 1977) (“Leasing was more advantageous to IBM than selling the same equipment [because it] facilitated introduction of newly developed products, since lessees were not inhibited by a large investment in either the new or the old machine.”).

201 See, e.g., AREEDA & HOVENKAMP, *supra* note 108, ¶ 769; BORK, *supra* note 164, at 136-60, 164-75; David Flath, *The Economics of Short-Term Leasing*, 18 ECON. INQUIRY 247 (1980); Scott E. Masten & Edward A. Snyder, United States versus United Shoe Machinery Corporation: *On the Merits*, 36 J.L. & ECON. 33 (1993); John S. Wiley et al., *The Leasing Monopolist*, 37 UCLA L. REV. 693 (1990); Victor P. Goldberg, *The United Shoe Machinery Leases* (1990) (unpublished manuscript, on file with Yale Journal on Regulation).

202 Wiley et al., *supra* note 201, at 703 (“The horse we beat is not dead. But . . . neither is it well shod.”).

203 Static monopoly profits are those earned at the static monopoly price. For a discussion of the static monopoly price, see *supra* Subsection I.B.3.

In *Eastman Kodak Co.*, the Supreme Court recognized that the characteristics of durables may assist in leveraging market power. *Eastman Kodak Co. v. Image Technical Servs., Inc.*, 504 U.S. 451, 473-75 (1992); see also Mackie-Mason & Metzler, *supra* note 186.

inefficiency losses normally attributed to monopolies.²⁰⁴ This additional loss stems from durapolists' incentives to lower their products' durability and quality.²⁰⁵ This lesson should be an important factor in reviewing mergers in concentrated industries and may justify stricter standards for durable-goods industries than for perishable-goods industries. Under the present law, some of the strategies durapolists are likely to employ to increase profits are perfectly legal, although they entail social losses and are less likely to appear in competitive industries.

Finally, this Article can also be read as a criticism against the Chicago School of antitrust.²⁰⁶ The Chicago School has shaped much of present antitrust law, and, despite massive criticism and the celebrated rise of the Post-Chicago Movement, this school of thought has remained almost unshaken in practice.²⁰⁷ Chicago scholars were the first to argue that durapolists have limited market power and that the practices in which such monopolists engage are either competitive or necessary to guarantee the minimal profitability needed for a functioning market. This Article shows that the Chicago antitrust analysis of durable-goods markets and durapolists' strategies is too simplistic. Variable durability, product quality, consumer heterogeneity, time preferences, and liquidity constraints undermine the competitive justifications for durapolists' behavior. Once such factors are taken into account, a more nuanced and realistic antitrust analysis emerges.

IV. Appendix: Geometric Illustrations of the Durapolist Problem and Its Welfare Implications

This Appendix offers geometric illustrations of the durapolist problem and the welfare implications of durability and discount rates in industries dominated by durapolists. The model underlying the geometric illustrations contains a few simplifying assumptions but, nevertheless, furnishes insights to understanding the durapolist problem and its welfare implications.

204 See generally Harvey Leibenstein, *Allocative Efficiency vs. "X-Efficiency"*, 56 AM. ECON. REV. 392 (1966); Gordon Tullock, *The Welfare Costs of Tariffs, Monopolies, and Theft*, 5 W. ECON. J. 224 (1967).

205 See *infra* Section IV.B.

206 For two prominent sources of this school of thought, see BORK, *supra* note 164; POSNER, *ANTITRUST LAW*, *supra* note 163. For the best brief description, see Richard A. Posner, *The Chicago School of Antitrust Analysis*, 127 U. PA. L. REV. 925 (1979).

207 See generally Herbert Hovenkamp, *Antitrust Policy After Chicago*, 84 MICH. L. REV. 213 (1985); Herbert Hovenkamp, *Post-Chicago Antitrust: A Review and Critique*, 2001 COLUM. BUS. L. REV. 257.

A. *The Durapolist Problem*

Consider a two-period world²⁰⁸ inhabited by a durapolist that produces homogeneous goods. The goods are characterized by durability, represented by $\lambda \in [0, 1]$. Where $\lambda = 0$, the good is a perfect perishable that lasts the one period in which it is used. Where $\lambda = 1$, the good is a perfect durable that lasts forever. For simplicity, assume that the costs of production are zero, so that the durapolist can produce as much as it wishes in each period. Both the durapolist and the consumer have the same discount factor, δ , which is defined as $\delta = \frac{1}{1+r}$ where $r \in [0, \infty]$ is the discount rate. Accordingly, $0 \leq \delta \leq 1$ for any discount rate. The goods are perfectly divisible, and the consumer does not consume more than one unit of goods in a given period. In period $t=0$, there is no activity. In period $t=\{1, 2\}$, the durapolist sells quantity q_t of its goods. These goods are used in period $t=\{1, 2\}$, and whatever is left from $t=1$ is rolled over to the subsequent period. Let the value for the consumer of consumption of one new durable be 1, and let Q_t represent the quantity of durables used in period t , where $Q_t = q_t + \lambda q_{t-1}$, q_t is the quantity bought by the consumer in period t , and λq_{t-1} is the quantity remaining from the previous period. The consumer's marginal value of consumption is $\hat{v} = 1 - Q_t$. Note that $0 \leq Q_t \leq 1$ because there are no transfers of goods from the consumer to the durapolist and because the consumer will not buy quantities that will make her worse off (that is, such quantities that render $\hat{v} < 0$).

In period 2, there is a competing supply of used durables that were purchased in period 1. The value of this supply is λq_1 because of wear and tear. Accordingly, given the inverse demand function, the maximum price that the consumer is willing to pay for q_2 new durables in period 2 is $p_2 = 1 - q_2 - \lambda q_1$.

In contrast, durables that are purchased in period 1 have some value for the consumer in period 2, and, therefore, she is willing to pay their discounted prospective value, $\delta \lambda p_2$. Accordingly, the price that the consumer is willing to pay in period 1 is $p_1 = 1 - q_1 + \delta \lambda p_2$.

We can now begin in period 2, in which the durapolist solves:

$$(1) \max_{q_2} \pi_2 = (1 - q_2 - \lambda q_1)q_2$$

Under the standard conditions on demand, which guarantee that second order conditions are satisfied, the optimal quantity must satisfy the following first order condition:

208 There can be various interpretations for a two-period world. The simplest one is that the consumer's life lasts for two periods and she does not take future generations into account.

$$(2) \quad 1 - \lambda q_1 - 2\bar{q}_2 = 0$$

It follows that $\bar{q}_2 = \frac{1}{2}(1 - \lambda q_1)$, where \bar{q}_2 is the optimal quantity sold by the durapolist in period 2. The price the consumer would be willing to pay for this quantity is $p_2 = \frac{1}{2}(1 - \lambda q_1)$, and the durapolist's profit in period 2 is $\pi_2 = \frac{1}{4}(1 - \lambda q_1)^2$.

We now can go backward to period 1 and solve the durapolist's maximization problem for this period. The price the consumer is willing to pay in period 1 is $p_1 = 1 + \frac{1}{2}\delta\lambda - (1 + \frac{1}{2}\delta\lambda^2)q_1$ and the durapolist solves:

$$(3) \quad \max_{q_1} \pi_1 = (1 + \frac{1}{2}\delta\lambda)q_1 - (1 + \frac{1}{2}\delta\lambda^2)q_1^2$$

Under the standard conditions on demand, the optimal quantity must satisfy the following first order condition:

$$(4) \quad (1 + \frac{1}{2}\delta\lambda) - 2q_1(1 + \frac{1}{2}\delta\lambda^2) = 0$$

The optimal quantity is $\bar{q}_1 = \frac{1 + \frac{1}{2}\delta\lambda}{2 + \delta\lambda^2}$, and the consumer will pay a price $p_1 = \frac{1}{2}(1 + \frac{1}{2}\delta\lambda)$.

The durapolist's profit in period 1 is $\pi_1 = \frac{(1 + \frac{1}{2}\delta\lambda)^2}{4 + 2\delta\lambda^2}$.

We can return now to period 2 and find the durapolist's profit:

$$(5) \quad p_2 = q_2 = \frac{1}{2}(1 - \lambda q_1) = \frac{1}{2} - \frac{1}{2}\lambda \frac{1 + \frac{1}{2}\delta\lambda}{2 + \delta\lambda^2}$$

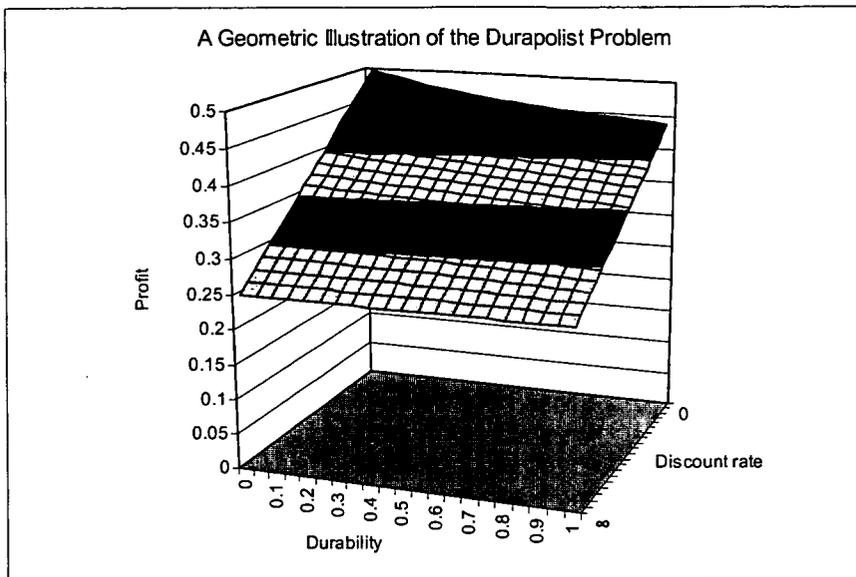
$$(6) \quad \pi_2 = \left(\frac{1}{2} - \lambda \frac{1 + \frac{1}{2}\delta\lambda}{4 + 2\delta\lambda^2} \right)^2 = \left(\frac{2 + \delta\lambda^2 - \lambda - \frac{1}{2}\lambda\delta}{4 + 2\delta\lambda^2} \right)^2$$

The total discounted profits of the durapolist are therefore:

$$(7) \quad \pi_{1,2} = \frac{(1 + \frac{1}{2}\delta\lambda)^2}{4 + 2\delta\lambda^2} + \delta \left(\frac{2 + \delta\lambda^2 - \lambda - \frac{1}{2}\lambda\delta}{4 + 2\delta\lambda^2} \right)^2$$

Now, when we have the durapolist's profit represented as a function of durability and the discount factor, we can depict its profit function in a

three dimensional chart that illustrates the effects of durability and discount rate on profit.



The graph presents in a simple manner the adverse effects of durability and discount rate on the durapolist’s market power, whose control over prices shrinks when each of these factors goes up.²⁰⁹ An important feature of the inverse relationship between durability and market power is that, for realistic discount rates, the durapolist’s profit function is

209 The following table presents the durapolist’s profits under various combinations of durability (λ) and discount rate (r):

r/λ	0	0.2	0.4	0.6	0.8	1.0
0	0.5	0.478	0.464	0.454	0.446	0.438
5%	0.488	0.468	0.455	0.445	0.437	0.429
10%	0.477	0.459	0.446	0.437	0.429	0.420
100%	0.375	0.369	0.363	0.357	0.351	0.344
∞	0.25	0.25	0.25	0.25	0.25	0.25

convex with respect to durability: For a given increase in durability, profits decline faster at low levels of durability than at high levels of durability. For example, under a zero discount rate, an increase in the durability level from 0 to 0.2, results in a loss of profits of 4.4% (from 0.5 to 0.478), while the same magnitude of increase in durability level but from 0.6 to 0.8 results in a loss of 1.76% (from 0.454 to 0.446). The decline in profitability, however, becomes more and more moderate as the discount rate increases.

B. Welfare Implications

We can now turn to examine the welfare implications of the durapolist problem. The consumer's marginal value of consumption is $\hat{v} = 1 - Q_t$, and her surplus in period t is:

$$(8) \quad S_t^c = \int_0^1 \hat{v}_t dQ_t - p_t q_t = Q_t - \frac{1}{2} Q_t^2 - p_t q_t$$

Since the durapolist incurs no production costs its surplus in period t is $S_t^d = p_t q_t$. The social surplus in period t is:

$$(9) \quad S_t = Q_t - \frac{1}{2} Q_t^2$$

We can now find the total social surplus. In period 1, the consumer purchases q_1 durables and has no durables from previous periods. The social surplus in this period is $S_1 = q_1 - \frac{1}{2} q_1^2$. In period 2, the consumer has λq_1 durables left over from period 1, and she purchases additional q_2 durables. Accordingly, the social surplus in period 2 is:

$$S_2 = \lambda q_1 - \frac{1}{2} \lambda^2 q_1^2 - \lambda q_1 q_2 + q_2 - \frac{1}{2} q_2^2.$$

Since $\bar{q}_2 = \frac{1}{2}(1 - \lambda q_1)$, the social surplus in period 2 is:

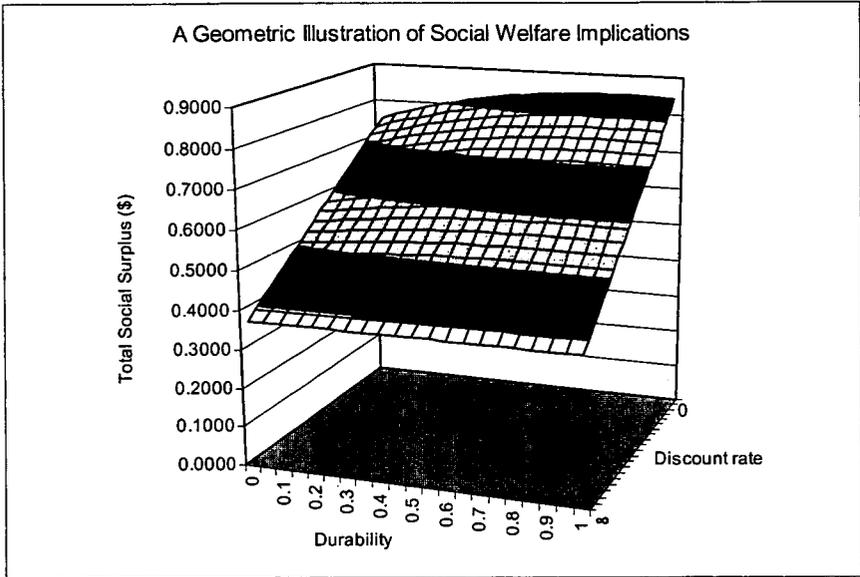
$$(10) \quad S_2 = \frac{1}{4} \lambda q_1 - \frac{1}{8} \lambda^2 q_1^2 + \frac{3}{8}$$

The total social surplus is $S = S_1 + \delta S_2$ and $\bar{q}_1 = \frac{1 + \frac{1}{2} \delta \lambda}{2 + \delta \lambda^2}$. Therefore,

the total social surplus can be presented as a function of durability and the discount rate:

$$(11) \quad S = \left(\frac{1 + \frac{1}{2} \delta \lambda}{2 + \delta \lambda^2} \right) \left(1 + \frac{1}{4} \delta \lambda \right) - \left(\frac{1 + \frac{1}{2} \delta \lambda}{2 + \delta \lambda^2} \right)^2 \left(\frac{1}{2} + \frac{1}{8} \delta \lambda^2 \right) + \frac{3}{8} \delta$$

Again, a three-dimensional graph of the results illustrates the effects of durability and discount rate on the total social surplus in light of the durapologist problem.²¹⁰



The most important observation the graph offers is that the total social surplus increases with durability up to a certain point and then, at a high level of durability (in this model, around 0.8), changes direction and slightly decreases. The explanation for this pattern of the total social surplus lies in the operation of two opposite factors: (i) the decrease in the durapologist's market power as its goods become more durable and (ii)

210 The following table presents the total social surplus under various combinations of durability (λ) and discount rate (r):

r/λ	0	0.2	0.4	0.6	0.8	1.0
0	0.75	0.794	0.826	0.843	0.848	0.844
5%	0.734	0.774	0.804	0.821	0.826	0.821
10%	0.716	0.756	0.785	0.801	0.805	0.801
100%	0.563	0.585	0.600	0.609	0.612	0.609
∞	0.375	0.375	0.375	0.375	0.375	0.375

quantity produced in period 1, which decreases with durability because of the reasons discussed above.

The durapolist's market power is adversely affected by durability and the discount rate. Here, as in the standard textbook case, a negative relation exists between market power and the total social surplus. In contrast, in period 1 the durapolist anticipates that the competition from its own good in period 2 will be fiercer if its goods are more durable and, accordingly, limits its production output in period 1. As a result, durability also has a negative effect on the total social surplus. The combination of these two opposite factors determines the exact shape of the social surplus graph.

The graph further illustrates that the significance of durability diminishes when the discount rate goes up. At the extreme, when the discount rate is infinite, durability has no impact on the social surplus, since consumers do not value it. However, it is important to realize that even under hyperinflation conditions durability still has a significant impact on the total social welfare. For example, when the discount rate is 100% a year, that is, $\delta=0.5$, an increase in the durability level from 0.6 to 0.8 results in an increase in the total social surplus by 4.74% (from 0.6091 to 0.612).

