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Two Tales of Bundling

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Abstract

The economic literature on bundling has made many theoretical advances. However, several omissions reveal themselves. The advances have largely been on the theoretical side. These models contain restrictive assumptions regarding the existence of monopoly in some markets, and the nature of rivalry in others. The models generally ignore obvious and ubiquitous reasons firms may use bundled discounts. These models have not been subject to robustness checks, nor have their assumptions been tested empirically. As a result, the literature that shows the possibility of anticompetitive harm does not provide a reliable way to gauge whether the potential for harm would outweigh any demonstrable benefits from the practice.

As a result of the underdeveloped nature of the literature, simple rules that result in extreme tradeoffs between type I and type II errors may dominate more complex tests that attempt to differentiate procompetitive from anticompetitive behavior. Such complex tests may work well within the confines of a theoretical model, but not when applied to firms in actual antitrust cases. Improving the reliability of more complex tests for anticompetitive behavior will require economists to expand their understanding of both the anticompetitive and procompetitive reasons firms engage in bundling. This will entail studying the reasons bundling is adopted by firms without market power, relaxing the assumption of monopoly in theoretical models, and generating testable hypothesis and the data to test them.

Two Tales of Bundling:

Implications for the Application of Antitrust Law to Bundled Discounts.

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I. Introduction

Bundling, or the selling of two separate goods in a package, is a ubiquitous phenomenon. Bundling is used by firms producing a wide variety of products and services, and is used to sell products at both the retail and wholesale level. Bundling is used by established firms and by new entrants, by dominant firms and by firms with many competitors, and by firms in both regulated and unregulated industries. The widespread and ubiquitous use of bundling by firms, especially by those in highly competitive markets, suggests bundling yields widespread benefits for both firms and consumers.

Firms bundle for a wide variety of reasons. At the consumer level, bundling is used by firms to give selective discounts to consumers.[1] In this context, bundling is an efficient form of competitive advertising that directly benefits consumers through lower prices or high value promotional items.[2] Bundle discounts are also used by business as a way to facilitate entry into new markets. For example, cable companies are now attempting to compete with telecommunications companies by offering competing bundles that include digital telephone service, high speed internet service, and digital cable. Telecommunications companies have responded by offering discounts if consumers bundle their bundled phone service and DSL service with satellite television service.   This bundle versus bundle competition is blurring the lines between these two once-distinct industries, and the resulting increase in competition has called into question the wisdom and viability of existing telecommunications regulations.

Bundling is also used as a way to reduce the transaction and information costs involved in purchasing, distributing, and selling goods and services. Bundling can allow firms to achieve economies of scale or scope in production and distribution, and can allow firms to package and market integrated and compatible products to consumers. These transaction cost savings can explain the use of standardized option packages for automobiles, computer hardware and software, and the packaging of cold remedies and analgesics.[3]   Firms can use bundling as a way to offer a discrete number of standardized

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[1] For example, airline websites encourage consumers to "save big by bundling" hotel and rental car reservations in a package with their airline tickets. Bundling is a major component of travel websites' strategy to compete with travel agents (See Missy Sullivan, *Vacation Wars*, Forbes.com, March 20, 2003, available at http://www.forbes.com/best/2003/0320/001_print.html, discussing use of bundling by Expedia.com, Orbitz.com, and Travelocity.com). Telecommunications companies also offer discounts to customers that bundle services such as unlimited local calling, call waiting and call forwarding, unlimited long distance, a digital subscriber line, and wireless phone services. (*See, e.g*., Ray Martin, *Save by 'Bundling'*, CBSNews.com, February 28, 2003, available at http://www.cbsnews.com/stories/2003/02/28/earlyshow/contributors/raymartin/main542428.shtml, discussing savings from bundling phone, DSL, and Wireless services).

[2] See generally, Lester G. Telser, *Advertising and Competition*, 72 J. Pol. Econ.547 (1972) (discussing the relationship of advertising and competition).

[3] See, David S. Evans & Michael Salinger, *Why Do Firms Bundle and Tie? Evidence from Competitive Markets and Implications for Tying Law*, 22 Yale J. on Reg. 37 (2005).

products to consumers, and can serve to reduce consumers' and firms' search and information costs.[4]

Moreover, bundling can be used to reduce the divergence in incentives that exists between manufacturers and those who distribute their products. The provision of promotional and other point of sale services for a manufacturer's products at the retail level may be necessary for the manufacturer to increase the demand for his products and reach his optimal level of output. However, retailers will often have divergent incentives to provide such promotional and point of sale services. The use of bundled rebates can ensure that distributors and/or retailers of a manufacturer's goods have strong incentives to promote and sell these goods. Bundled rebates can be used by manufacturers as a way to compensate retailers for their efforts on behalf of the manufacturer, and thus can serve to mitigate retailer free-riding and hold up problems. Thus, bundled rebates can serve the same efficiency promoting vertical control functions as has been identified in the literature examining the use of tying, exclusive dealing and other forms of vertical restraints.[5] However, unlike exclusive dealing, use of bundled rebates do not prevent retailers from offering consumers other manufacturers' products. This difference is likely to be important when retailers' point-of-sale services and consumers' demand for variety at the retail level are both important.[6]

In many cases where bundling is observed, the reason why separate goods are sold in a package is easily explained on efficiency grounds. This is certainly the presumptive explanation for bundling when it occurs in highly competitive markets.[7] These efficiency based explanations also apply with equal force to the use of bundling by firms with market power.[8] In addition, firms with market power can use bundling for other reasons. For example, bundling can be used as a price discrimination device, or as a way to internalize pricing externalities in the presence of complementary goods.

However, in markets where firms can exercise monopoly power, bundling can have anticompetitive uses that may be scrutinized under the antitrust laws. There is a growing theoretical literature demonstrating how bundling can be used by monopolists to deter entry and exclude rivals. Indeed, if bundling can generate the same efficiency promoting functions as exclusive dealing and tying, then it stands to reason that it also could

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[4] See Roy Kenney & Benjamin Klein, *The Economics of Block Booking*, 26 J. L. & Econ. 497 (1983), (discussing the block booking of films as a way to minimize search costs and to reduce the cost of distributing a standardized product).

[5] See, e.g., Howard Marvel, *Exclusive Dealing*, 25 J. L. & Econ. 1 (1982); Benjamin Klein, *Exclusive Dealing as Competition for Distribution "on the Merits"*, 12 Geo. Mason. L. Rev. 119 (2004); Jan B. Heide, Shantanu Dutta, & Mark Bergen, *Exclusive Dealing and Business Efficiency: Evidence from Industry Practice*, 41 J. L. & Econ. 387 (1998).

[6] *See* Benjamin Klein & Joshua Wright, *The Economics of Slotting Arrangements,* Mimeo (2005), (noting a similar explanation for the use of category management), David E. Mills, *Market Share Discounts,* Mimeo (2004) (discussing similar use of loyalty or market share discount programs).

[7] *See* Evans & Salinger, *supra* note 3, David S. Evans & A. Jorge Padilla, *Designing Antitrust Rules for Assessing Unilateral Practices: A Neo-Chicago Approach,* 72 U. Chi. L. Rev. 27 (2005).

[8] *See* Evans and Padilla, *supra* note 7.

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promote the anticompetitive functions associated with such practices.[9] Because bundling can also be an efficient practice when firms possess market power, any rational antitrust evaluation of bundling must simultaneously consider both the strategic and efficiency reasons for bundling.

This article examines two distinct parts of the voluminous economic literature on bundling as a first attempt to gauge how much is known about the relative costs and benefits of bundling. The first, the literature on bundling by a multiproduct monopolist was chosen because the progression of the literature nicely illustrates several key methodological issues. Specifically it illustrates how the academic literature on bundling reflects a selection of topics that are determined by the interests of academic economists, and not by an attempt to provide a representative or comprehensive explanation for bundling. As a result, the academic literature has focused on theoretically interesting uses of bundling that are likely to be of little empirical relevance. Little attention has been paid to the many well known and obvious efficiency explanations for bundling, largely because the obvious and transparent nature of such efficiency explanations makes them unlikely subjects for publishable academic articles.[10]

The article also examines the recent literature on bundling as an exclusionary device. This area was chosen because of its potential relevance to current antitrust issues. While these papers present interesting results, they are underdeveloped in several important ways.   These articles begin with the assumption of monopoly, explicitly ignore efficiency considerations in order to highlight the possibility of anticompetitive harm, and do not apply consistent welfare standards.   Moreover, these papers are almost exclusively theoretical, and contain many restrictive assumptions that have not been subjected to tests of robustness or to rigorous empirical testing.

Both areas illustrate the underdeveloped nature of the current literature. As a basis for guiding antitrust policy, the literature does not provide any reliable way to trade off the theoretical risk of exclusionary harm against the potential efficiency gains from bundling. As a result, when applied in practice, simple bright line rules may dominate more complex tests that attempt to differentiate procompetitive from anticompetitive behavior. Improving the reliability of more complex tests for anticompetitive behavior will require economists to expand their understanding of both the anticompetitive and procompetitive reasons firms engage in bundling.

The article is organized as follows. Section II provides an overview of the academic literature, and an evaluation of the literature on the use of bundling as an exclusionary device.   Section III examines recent antitrust developments, and considers potential

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[9] *See, generally,* Willard K. Tom, David A. Balto, & Neil W. Averitt, *Anticompetitive Aspects of Market-Share Discounts and other Incentives to Exclusive Dealing,* 67 Antitrust L. J. 615 (2000); Andrew Gavil, *Exclusionary Distribution Strategies by Dominant Firms: Striking a Better Balance,* 72 Antitrust L. J. 3 (2004).

[10] *See* Evans & Salinger, *supra* note 3. Moreover, there may be efficiency benefits from bundling that are less obvious. These too have been largely ignored by academics.

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antitrust rules that might be used to evaluate bundling by firms with market power. Section IV concludes.

II.   The Academic Literature on the Economics of Bundling: Two Examples

The academic literature has defined bundling to be the sale of two or more separate products in a package. Separate products are defined to be those where consumer demand exists for the stand alone products outside of the bundle. This definition of bundling can include the packaging of a fixed quantity of a single good, as well as the packaging of two or more separate goods.

There are two basic types of bundling. The first type is pure bundling, where the firm selling the bundle chooses only to sell the package and not the stand alone goods. The second type of bundling is mixed bundling, where the firm selling the package also sells the stand alone goods. Bundling can be achieved via price bundling, where the bundle is sold at a discount (as in the bundling of a hotel, rental car and airline ticket), or by product bundling, where the component goods are physically integrated to yield extra value to the buyer (e.g., a high degree or interoperability in a computer operating system or a suite of office software), or by a combination of the two.

While some authors define all types of pure bundling as tying, bundling has been distinguished from tying under the antitrust laws. The Supreme Court has defined tying to include those cases in which the seller conditions the sale of the tying good upon the buyer agreeing to purchase the tied product from him.[11] Practices by firms with monopoly power that involve such coercion can be per se illegal. Bundling and other forms of packaged sales have generally been found to lack this coercive element.

The economic literature on bundling is voluminous, and has a long history. Rather than attempt to comprehensively describe the literature,[12] this Section will focus on two distinct areas in which economists have studied the use of bundling. The first is the literature on the use of bundling by a multiproduct monopolist. The second is the recent literature on the use of bundling as an exclusionary device. The former was chosen because it nicely illustrates many of the methodological issues described above. The latter was chosen because of its potential relevance to current antitrust issues.

a.   Block Booking and the Multiproduct Monopolist

The most common explanation in the literature for bundling is price discrimination. This does not imply, however that price discrimination is the most common reason firms engage in bundling.[13] Rather, it is the explanation that has drawn the most attention from

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[11] *Jefferson Parish Hospital District No. 2 v Hyde,* 466 U.S. 2 (1984).

[12] For a recent comprehensive survey of the literature, *see* Bruce H. Kobayashi, *Bundling: A Survey of the Economic Literature,* George Mason University Law School Working Paper (2005).

[13] For an example of a statement that conflates the two concepts, *see, e.g.*, Richard A. Posner, Vertical Restraints and Antitrust Policy, 72 U. Chi. L. Rev. 229, 235 (2005), (stating that "the usual purpose of bundling, as of tying, is price discrimination").

academics.   The disproportionate attention to the price discrimination is in part due to the path dependent nature of the economics literature. While the economic analysis of bundling can be traced as far back as Cournot's 1838 treatment of bundling as a solution to pricing externalities with complementary goods,[14] the modern treatment of bundling is generally traced back to Stigler's analysis of block booking in the *Loew's* case.[15] While only indirectly related to the antitrust issues of interest today, the history of the academic literature that followed Stigler forcefully illustrates many of the defects of the academic literature on bundling generally.

In his Note on Block Booking, Stigler rejected the leverage theory used by the Court in *Loew's*, and proposed an alternative explanation for the practice. He showed, using an example, that a multiproduct monopolist could increase profits by using block booking as a subtle form of price discrimination. In Stigler's example, there are two demanders *A* and *B* and two films *X* and *Y*. The demands for the films are assumed to be negatively correlated, so *A* values film *X* more that *B*, and film *Y* less than *B*. In the now familiar example, buyer *A* would pay $8,000 for film *X* and $2,500 for film *Y*. Buyer *B* would pay $7,000 for film *X* and $3,000 for film *Y*.   If the films were priced separately, the monopolist would set the price of films *X* and *Y* at $7,000 and $2,500 respectively. He would sell two units of each film, and have revenues of $19,000. If however he engaged in pure bundling, he could sell a block that consisted of both films to both buyers for $10,000, and his revenues would rise to $20,000.   Intuitively, when consumers' valuations are negatively correlated, offering films in a block reduces the between consumer variation in reservation values, and allows the seller to extract more of the consumer surplus though a uniform block price.

While Stigler presented some general evidence in support of his price discrimination hypothesis,[16] Kenney and Klein's in depth examination of the *Loew's* case found that the facts were not consistent with Stigler's price discrimination hypothesis. Prices charged for the block were not uniform, and varied across geographic markets. Moreover, in multiple station markets, Loew's used competitive bidding to grant to a single station in a given geographic market the exclusive rights to broadcast the block of films. The use of competitive bidding would have provided an alternative way through which stations' reservation values for individual films could be revealed, and thus would reduce Stigler's hypothesized reason for the use of the blocks in such markets.

This would not be the case in single station markets, where competitive bidding would not be feasible. Thus, a testable implication of the price discrimination theory would be that block booking would be more prevalent in single station markets. Kenney

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[14] Augustin Cournot, *Research into the Mathematical Principles of the Theory of Wealth,* (1838).

[15] George J. Stigler, *U.S. v. Loew's Inc.: A Note on Block Booking,* 1963 Supreme Court Review 152 (1964), discussing *United States v. Loew's* 371 U.S. 38 (1962). Block Booking refers to the sale of a bundle or package of films to television stations. In the *Loew's* case, the Supreme Court struck down the use of block sales based on a leverage theory. *See also United States v. Paramount Pictures, Inc.,* 344 U.S. 131 (1948).

[16] *See* Stigler, *supra* note 15, Appendix A (showing that the share of receipts for individual movies varied widely from city to city, and citing a study that suggested the aggregate value of a television station could be reliably predicted from a few observable factors).

and Klein instead found that the blocks were broken more frequently in the single station markets than in markets where competitive bidding was used to price the block. Based on this finding, they reject the hypothesis that block booking was used to engage in third degree price discrimination.

Kenney and Klein argue instead that the average pricing of a block of films was a way to minimize information costs associated with the sale of a standardized product. Block booking lowered information costs in two ways. First, it prevented television stations from investing in information with little private or social value. Second, block booking facilitated the accurate pricing of the standardized product by increasing the number of transactions and thus the quality of price information for the sales of a like product. Both effects would tend to reduce buyer search costs and increase the efficiency of the film distribution system.

Separate from its historical significance, the example of block booking illustrates the following lessons regarding the economic analysis of bundling. First the example highlights the value of generating testable hypothesis and finding the data to carry out the tests. Whether or not the block booking of films was used as a price discrimination mechanism, price discrimination became the primary non-cost based explanation for bundling studied by economists. A large number of papers examined in depth the conditions under which a multiproduct monopolist could profitably use bundling to extract additional surplus.[17] However, if Kenney and Klein are correct, and price discrimination is an unlikely explanation for the practice in *Loew's*, then the absence of an early in-depth examination may have caused a type of path dependence in the economics literature that resulted in the intense study of a phenomenon of little empirical relevance.

Moreover the focus on price discrimination may have diverted attention away from examining the real underlying reasons firms use bundling. Authors attempting to characterize the general conditions under which bundling facilitated rent extraction did not generally consider obvious bundling specific efficiencies.[18] Moreover, it may have delayed the search for less obvious reasons why bundling would be used. For example, Kenney and Klein's explanation for bundling specific cost reductions do not flow from an observable reduction in "package costs". Rather, the efficiencies result from the alteration of incentive to engage in socially wasteful search, which would not be obvious in the absence of an in depth examination of the institutions and markets involved.

      b.   Entry Deterrence and Exclusion

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[17] *See, e.g.,* W. J. Adams & Janet L. Yellen, *Commodity Bundling and the Burden of Monopoly,* 90 Q. J. Econ. 475 (1976); Richard Schmalensee, *Gaussian Demand and Commodity Bundling* 58 J. Bus. S211 (1984), R. Preston McAfee, John McMillian, & Michael D. Whinston, *Multiproduct Monopoly, Commodity Bundling, and Correlation of Values,* 104 Q. J. Econ. 371 (1989), Michael A. Salinger, *A Graphical Analysis of Bundling,* 68 J. Bus. 85 (1995).
[18] An exception is Salinger, *supra* note 17.

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Of greater relevance to recent antitrust cases are the papers that examine the use of bundling as an exclusionary or entry deterring device. For example, Nalebuff, in a series of papers, has demonstrated how bundling could be used by a monopolist in one market to reduce competition in a second market. In his entry deterrence model, a monopolist currently producing in two markets is faced with entry in one market.[19] Nalebuff demonstrates how pure bundling can reduce the residual demand facing a one-market entrant, and thus reduces the profitability of entry. In some cases, bundling deters entry that would have occurred in the absence of bundling. Moreover, Nalebuff shows that such entry deterrence can occur in the absence of a commitment to bundling, as the use of bundling can be optimal even when entry occurs.[20]

It is far from clear, however, what inferences can be drawn from Nalebuff's model and results. The standard criticisms of the theoretical literature apply to Nalebuff's model – the model contains restrictive assumptions, including the assumption of monopoly, and the absence of any efficiencies from bundling. Even setting aside these standard criticisms, interpretation of the results is problematic because the article examines entry independent of the effect of bundling on welfare.[21] Moreover, if the welfare effects are considered, bundling generally increases welfare in the model. Relative to the no-bundling equilibrium with entry, welfare in almost any alternative equilibrium rises, including those equilibria where bundling results in marginal entry deterrence.[22] Thus, based on a welfare standard, the model would imply that bundling, even if it deters entry, should not be condemned.

Critics of the welfare standard would argue that the model only considers short run welfare, and that the effect of entry deterrence would be felt over the long run. If so, then the models should be modified to consider such long run or dynamic effects.[23] However, the ability to make general inferences or to formulate antitrust rules from models that explicitly consider dynamic or long run effects is extremely limited.[24] Such models are either plagued by an inability to make specific predictions, or require very restrictive assumptions to generate specific predictions. As a result, the power of such models is generally quite low.[25]

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[19] Barry Nalebuff, *Bundling as a Barrier to Entry,* 119 Q. J. Econ. 159 (2004).

[20] This feature distinguishes Nalebuff's result from Whinston's prior result that tying could deter entry. *See* Michael D. Whinston, *Tying Foreclosure, and Exclusion,* 80 Am. Econ. Rev. 837 (1980). In Whinston's, model, a commitment to tying is required, as the monopolist would abandon tying if entry occurred.

[21] For a general criticism of this approach, *see* Harold Demsetz, *Barriers to Entry*, 72 Am. Econ. Rev. 47 (1982), C. C. von Weizsacker, *A Welfare Analysis of Barriers to Entry,* 11 The Bell J. of Econ. 399 (1980).

[22] *See* Timothy J. Brennan, *Competition as an Entry Barrier? Consumer and Total Welfare Benefits of Bundling*, AEI-Brookings Joint Center for Regulatory Studies Related Publication 05-08 (2005).

[23] For an example of a model with dynamic or multiperiod effects, see 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).

[24] Carlton & Waldman suggest that "a very cautions approach" to antitrust liability be taken based on such dynamic models. See Dennis W. Carlton & Michael Waldman, *How Economics Can Improve Antitrust Doctrine Towards Tie-In Sales,* 1 Comp. Pol. Int'l. 27 (2005).

[25] *See generally,* Bruce H. Kobayashi, *Game Theory and Antitrust: A Post-Mortem,* 5 Geo. Mason L. Rev. 411 (1997).

In related papers, Nalebuff and Greenlee, et al. demonstrate how bundling can be used as an exclusionary device.[26] In these models a monopolist in product *Y* engages in the bundling of *Y* and a competitively supplied good *X*. Absent bundling, the *Y* monopolist will set the price of Y equal to the stand alone monopoly price *m*. Because the *X* market is assumed to be competitive, the price of *X* in the absence of bundling will equal the cost of production *c*.

Now consider a bundle that offers a small discount *e* on the price of *Y* for those consumers that agree to buy all of their units of *X* from the *Y* monopolist at a small premium *d*. This results in bundle prices for *X* and *Y* equal to *m – e* and *c + d* respectively. At the no-bundling monopoly price *m*, the small decrease in the price of *Y* will have a second order effect on profits. However, the small increase in the price of *X* will have a first order effect on profits. Thus, for some small *e* and *d*, offering the bundle discount increases the profits of the monopolist. Moreover, for some small *e* and *d*, the bundle also will be preferred by consumers to the stand alone prices *m* and *c*. Thus, such bundle discounts increase both consumer welfare and total welfare. However, because the bundle is preferred to the stand alone prices *m* and *c*, such a bundle discount can exclude an equally or even a more efficient competitor in the *X* market. Moreover, the *Y* monopolist does not have to price below cost in order to exclude competitors in the *X* market.

To illustrate these points, consider the following numerical example.[27] Let the demand for *Y* be given by $Q_Y = 100 - P_Y$, and let the demand for *X* be inelastic at 20. *Y* costs nothing to produce, and the marginal cost of producing *X* is 10. Equilibrium prices for *X* and *Y* absent bundling are *50* and *10* respectively. Now consider a bundle discount in which the price of *Y* is decreased to 49 for those who also purchase their *X* from the *Y* monopolist at a price of *11*. By taking the lower price on *Y*, the consumer that buys the bundle saves at least 50 on his purchases of *Y* (one on each of 50 units of *Y*, plus the surplus from the 51st unit of *Y*). He pays an additional 20 for the 20 units of *X*, and thus is better off by at least 30. The Monopolist's profits from the sale of *Y* fall by 1, from 2500 (50*50) to 2499 (49*51). However, he now makes an additional 20 on the sale of *X*. Thus both the monopolist and the consumer are better off with the bundle.

Although the bundle prices for both *X* and *Y* are above cost, equally efficient competitors in the *X* market will not sell any units when the bundle is offered. In order for stand-alone suppliers of *X* to make sales, they would have to offer the consumer savings of at least 30 (the consumer's net savings from the bundle). In order to generate savings of more that 30 on the sales of 20 units of *X*, the stand alone price of *X* would have to be between 7 and 8, which would be below the cost of an equally efficient competitor, and would also exclude a more efficient competitor with costs as low as 8.

In this example, static consumer welfare and total welfare increase. In effect, because of the assumption that the demand for *X* is inelastic, the bundle implements a two

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[26] Barry Nalebuff, *Exclusionary Bundling*, Mimeo (2005), Patrick Greenlee, David Reitman & David Sibley, *An Antitrust Analysis of Bundled Loyalty Discounts,* Mimeo (2004).
[27] This example is from Nalebuff, *supra* note 26.

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part tariff, which lowers the price of the good with the downward sloping demand curve, thus reducing the deadweight losses from monopoly.[28]   Because this bundle discount would exclude a hypothetically equally efficiency competitor, Nalebuff, and those that would adopt this standard, would condemn such bundled discounts based on their exclusionary effect.[29]   As was the case with Nalebuff's entry deterrence result, use of such a test would erroneously condemn welfare increasing conduct.[30]

However, not all forms of bundled discounts increase consumer or total surplus. Both Nalebuff and Greenlee, et al. consider a bundled discount where the bundle is priced at $m + c$, but the stand alone price for the monopoly good is increased above m. Once again, consumers prefer the bundle to the stand alone prices, so that an equally efficient competitor would be excluded as he would not be able to make sales at c. Moreover, in this case, consumer welfare unambiguously falls. Consumers that purchase the bundle are indifferent, as the bundle prices are equal to the non-bundling stand alone prices. The same is true for those who purchase X at the stand alone price c. But consumers that purchase Y at the stand alone price are made worse off. Thus consumer surplus must fall under these circumstances.

Because an equally efficient competitor would be excluded, this bundle offer would fail Nalebuff's equally efficient competitor test.   Because consumer welfare falls, Greenlee et al. would also condemn such bundle offers on antitrust grounds. This leads Greenlee, et al. to propose the following test for welfare decreasing bundled discounts: Under the assumption that the bundle prices are optimal, a bundle discount will decrease consumer surplus if the stand alone price for good Y is above the monopoly price of Y in the absence of bundling. Such welfare reducing bundle discounts would be found to violate the antitrust laws. Such a test is more conservative that the equally efficient competitor test suggested by Nalebuff. It would leave bundled discounts that actually yielded lower prices to consumers alone and only condemn those where the bundle discount is only a discount compared to inflated stand alone prices.

On the other hand, such a test may be difficult to implement. Accepting for the moment the validity of the model, carrying out the test suggested by Greenlee, et al. would require a comparison between the existing stand alone price for the monopoly good Y offered in conjunction with the bundle with the optimal monopoly price that would be charged in the absence of bundling. While this task is well defined within the context of a theoretical model with known and stable demand, such a task is likely to be much more difficult to administer in practice.[31]

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[28] In effect, the overcharge on X serves as the entry fee. *See generally*, Walter Y. Oi, *A Disneyland Dilemma: Two Part Tariffs for a Mickey Mouse Monopoly,* 85 Q. J. Econ. 77 (1971).

[29] The exclusion result does not follow if the monopolist can source production of X from competitive suppliers. The monopolist is indifferent between producing X himself and purchasing X from an equally efficient competitive supplier at 10. Indeed, if the competitive suppliers are more efficient, the monopolist would be better off purchasing these units at a price below 10 and reselling them in the bundle at 11. See Richard Schmalensee, *Commodity Bundling by Single Product Monopolies,* 25 J. L. & Econ. 67 (1982).

[30] *See* Nalebuff, *supra* note 19 and accompanying text.

[31] The test would require the estimation of the but-for-bundling optimal price of Y. One proxy for this would be the direct observation of the price of good Y before the monopolist began bundling. However,

Taken as a whole, the literature on exclusionary bundling provides the following useful results. First, bundled discounts can exclude or deter the entry of equally efficient competitors. Second, this exclusion can occur at prices that are above cost. Third, bundled discounts that exclude equally efficient competitors can increase or decrease consumer and total welfare.

On the other hand, the literature, as it currently stands, does not go beyond showing that such effects are possible. Because of the lack of empirical work, there is little or no evidence that such harm is likely under real world conditions. The models contain many restrictive assumptions. The models assume that the firm selling Y has an actual monopoly. In practice, firms rarely have a market share equal to 1, and little attention has been paid to considering how the existence of competition in the market for Y might affect their results. This latter point is important given that under the antitrust laws, firms that face some competition in all markets can be found to possess "market power", which is often erroneously equated with "monopoly power."[32]

Moreover, both the Nalebuff and Greenlee et al. papers ignore the large and varied reasons why bundling might be used. For example, neither paper considers alternative explanations for bundling based on inducing self selection by heterogeneous consumers.[33] Nor do these models consider how their results would be affected by efficiencies from bundling. Moreover, while they analogize the use of bundled rebates to tying and exclusive dealing, they do not consider the pro-competitive reasons why manufacturers adopt such policies. And while others have studied these pro-competitive uses in the context of exclusive dealing and tying, this work has not been undertaken in the context of bundling and bundled rebates. As a result, these models do not provide a reliable way to gauge whether the potential for harm would outweigh any demonstrable benefits from the practice.

III.   Antitrust and Bundling

The importance of better understanding why bundling occurs and how bundling affects markets has been highlighted by recent developments in the antitrust laws. Part a of this Section briefly reviews the Third Circuit's recent decision in *LePage's v. 3M* and its implications for bundling. Part b evaluates some of the tests for anticompetitive bundling that have been suggested in the economics literature.

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such prices are not always available, and changes in demand and cost conditions may make such a proxy unreliable. In such cases, estimating the but-for monopoly price would require an econometric estimation that controlled for these changing variables.

[32] *See, e.g.,* Benjamin Klein, *Market Power in Antitrust: Economic Analysis After Kodak,* 3 Sup. Ct. Econ. Rev. 43 (1993).

[33] Consideration of such issues would further complicate application of the Greenlee, et al. test, as the stand alone prices for X and Y associated with mixed bundling are often higher than the optimal prices for X and Y in the absence of bundling. For an example, *see* Adams and Yellen, *supra* note 17 (containing example of mixed bundling with these characteristics). *See generally* Sreya Kolay and Greg Shaffer, *Bundling and Menus of Two-Part Tariffs,* 51 J. Indus. Econ. 383 (2003).

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a.   Bundling and Antitrust Law: *LePage's v. 3M*

In *LePage's v. 3M*, the Third Circuit Court of Appeals upheld a jury verdict that found 3M's use of bundled rebates violated Section 2 of the Sherman Act.[34] 3M's bundled rebates gave large retailers (such as Wal Mart, K-Mart, and Target) discounts if they purchased certain volumes of various 3M products. The size of the bundled rebates increased when retailers met volume goals across six product categories, with the largest rebates being given to retailers that met the volume targets in all six categories. The use of bundled rebates was challenged by LePage's, the leading manufacturer of unbranded transparent tape. LePage's alleged that the 3M's use of bundled rebates caused retailers to drop LePage's as a supplier not because of competition on the merits, but rather because of the possibility that they might fail to qualify for the largest rebates. A jury found that 3Ms practices violated Section 2 of the Sherman Act. A Third Circuit Panel reversed,[35] but the Third Circuit, sitting en banc, upheld the jury's verdict on the bundling claims.

Despite noting that the Third Circuit's en banc decision rested on an incomplete record and a poorly articulated theory of economic harm, the United States, in its brief to the Supreme Court in *3M v. LePage's*, urged the Court not to take the case.[36] While the United States recognized that "the business community and consumers would benefit from clear, objective guidance on the application of the Section 2 to bundled rebates", they had little confidence that this case would provide the Court "a suitable vehicle" for providing such guidance. In addition to the identified shortcomings of the case record and decision, the United States' position was influenced by the judiciary's relative lack of experience with this issue,[37] and the underdeveloped nature of the "relatively recent and sparse" academic literature on bundling.

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[34] 324 F.3d 141 (3d Cir 2003). For a detailed discussion of the case, *see* Daniel L. Rubinfeld, *3M's Bundled Rebates: An Economic Perspective,* 72 U. Chi. L. Rev. 243 (2005).

[35] *LePage's v. 3M,* 200 F.3d 365 (2002).

[36] See Brief of the United States as Amicus Curiae, 2004 WL 120591 (May 28, 2004) at 16 (noting that the Third Circuit "failed to explain precisely why the evidence supported a jury verdict of liability in this case, including what precisely rendered 3M's conduct unlawful.").

[37] Prior to *LePage's*, there was only one reported decision in the Federal Courts that condemned the use of bundled rebates on antitrust grounds. *See SmithKline Corp. v. Eli Lilly & Co*., 575 F.2d 1056 (3d Cir. 1978). In the only other case involving an antitrust challenge to the use of bundled rebates, the defendant prevailed on summary judgment. *See Ortho Diagnostic Systems, Inc., v Abbot Labs., Inc.* 920 F. Supp. 455, 471 (1996). Other cases involving loyalty or volume discounts that spanned multiple markets or submarkets include *Advo, Inc., v. Philadelphia Newspapers, Inc.,* 51 F.3d 1191 (3d Cir 1995) (affirming summary judgment for defendant under *Matsushita* predatory pricing test), *Virgin Atlantic Airways, Ltd. V. British Airways*, *Plc*., 257 F.3d 256 (2d Cir.2000) (affirming summary judgment for defendant under *Brooke Group* test.). In both these cases, the defendant prevailed on summary judgment. Internationally, the European Union has condemned a large number of pricing policies by dominant firms, including the policies used by British Airways that were the subject of the previously cited U.S. case. *See British Airways v. Commission,* Case T-219(99), 2003 ECR _ (2003). The European Union has also condemned the use of bundled rebates by tire maker Michelin. *See Michelin v. Commission,* Case T-203/01, 2003 ECR _ (2003). For a summary, see James C. Cooper, Luke M. Froeb, Daniel P. O'Brien, & Michael Vita, *A Comparative Study of United States and European Union Approaches to Vertical Policy,* Vanderbilt Working Paper No. 05-11 (2005).

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The Supreme Court declined to review the case.[38] By deferring consideration of the issues presented in *3M v. LePage's*, the Court chose to await a case with a record better adapted to development of an appropriate standard, and as urged by the United States in its brief, could allow "the case law and economic analysis to develop further". In principle, the cautious approach urged by the United States in its brief and implicitly chosen by the Court is understandable. In general, the federal courts have taken a cautions approach to the expansion of antitrust liability under Section 2 of the Sherman Act. Even in cases where the economic literature on vertical practices is relatively developed, the ability of courts to distinguish between pro and anticompetitive vertical restrictions is not so easy in practice. And without a reliable way to distinguish pro and anticompetitive uses, any rule that condemned such a ubiquitous practice without a showing of likely harm to competition would result in the widespread condemnation of efficient practices.[39] Such a result would be particularly damaging to the economy as it would chill the very conduct the antitrust laws are designed to protect.[40]

Given its ubiquitous nature, the courts' lack of experience with the practice of bundling, and the lack of empirical evidence regarding the relative prevalence of exclusionary versus pro-competitive uses of bundling and bundled rebates, these arguments for a cautious approach would seem to apply *a fortiori* to the application of Section 2 to bundling. The problem with the cautious approach taken by the United States and by the Supreme Court is that Third Circuit, in its en banc opinion in *LePage's*, failed to exercise such caution. The Third Circuit concluded that it was sufficient for LePage's to prove that it could not compete with 3M's bundled rebates because "they may foreclose portions of the market to a potential competitor who does not manufacture an equally diverse group of products and who therefore cannot make a comparable offer."[41] Although the Third Circuit suggested that 3M's bundled rebates could exclude an equally efficient competitor, it did not cite any evidence that an equally efficient competitor would have been excluded by 3M's bundled rebates. Thus, the Third Circuit would allow a jury to find a dominant firm liable under the antitrust laws based on *the possibility* that bundled rebates, including those that *increase* consumer welfare, could exclude an equally efficient competitor that produces a less diverse set of products.[42] The plaintiff would not have to show that it was an equally efficient competitor, nor would it have to prove that the bundled rebates in question would have, in fact, excluded a hypothetical equally efficient competitor.

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[38]*LePage's v. 3M*, 124 S. Ct. 2932 (2004) (*cert. denied)*.

[39] Courts and commentators have generally recognized the potential costs of antitrust enforcement under Section 2 of the Sherman Act that would condemn a ubiquitously used vertical practice. *See, e.g.,* Evans and Padilla, *supra* note 7

[40] See *U.S. v. Microsoft*, 253 F.3d 34, 69 (DC Cir 2001)), *Verizon Communications Inc. v. Law Offices of Curtis V. Trinko, LLP,* 124 S. Ct. 872, 882 (2004)).

[41] LePage's, *supra* note 34 at 177.

[42] Other courts have considered antitrust harm based on similar theoretical arguments, but have rejected them when not supported by any evidence. *See, e.g., Virgin Atlantic, supra* note 37 at 270-1 (rejecting theory because of a lack of evidence); *Ortho, supra* note 37 at 471 (noting that "a party may not rest on economic theories that may or may not apply to the facts of the case or on conclusory or incomplete expert analyses any more than it may rest on unsubstantiated allegations of its pleadings"; *Advo supra* note 37 at 198-99 (same).

As a result, *LePage's* has generated much uncertainty over the legality of using a ubiquitous practice. The Third Circuit exposed to potential antitrust liability any firm found to possess sufficient market power that chooses to offer discounts on a bundle that contains products that are also sold separately by firms that sell only a subset of these products. The potential for liability will result in such firms being deterred from using bundling that would have led to reduced prices for consumers, and higher consumer welfare. Thus, this decision is likely to impose the high type I error costs (costs associated with erroneously condemning or deterring an efficient business practice) the Federal Courts has been so careful in avoiding in the past.

Moreover, the effect of *LePage's* has not been limited to the Third Circuit, or to bundled rebates. For example, in *McKenzie-Willamette Hospital v PeaceHealth*, the plaintiff MacKenzie, who operated a hospital that offered primary health services, successfully argued that a contract between a PeaceHealth, a firm that operated hospitals that provided a more expansive range of services, and two Preferred Provider Organizations contained an unlawful bundled discount.[43] In a stark example of the type of result made possible by the Third Circuit's standard-free ruling in *LePage's*, the court instructed the jury that:

> [b]undled pricing occurs when price discounts are offered for purchasing an entire line of services exclusively from one supplier. Bundled price discounts may be anti-competitive if they are offered by a monopolist and substantially foreclose portions of the market to a competitor who does not provide an equally diverse group of services and who therefore cannot make a comparable offer.

b. Evaluating Anticompetitive Tests

Beyond criticizing *LePage's* for its standard-free approach to the problem, the issue to be addressed is how to come up with a standard that can be applied to the use of bundling by dominant firms. In general, the optimal standard would be one that minimized the sum of direct costs and error costs.[44] Error costs include the costs of type I errors and the costs of type II errors (the costs of allowing anticompetitive conduct).[45] Direct costs include the costs associated with the administration of, compliance with, and litigation over the antitrust laws.

The choice of an optimal test will depend on the cost and frequency of the relative types of error, and on the costs of administration. Figure 1 illustrates the tradeoff between type I and type II errors. The horizontal axis shows a test's rate of type I error. The vertical axis shows the power of a test, equal to 1 minus the test's rate of type II

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[43] *McKenzie-Willamette Hospital v. PeaceHealth,* D. Or., Case No. 02-6032-HA, 2004 WL 3168282 (2004) (denial of renewed motion for directed verdict).

[44] *See generally,* Richard A. Posner, *Economic Analysis of Law,* 536 (6th ed. 2002), Evans & Padilla, *supra* note 7.

[45] *See generally,* Frank H. Easterbrook, *The Limits of Antitrust,* 63 Texas L. Rev. 1 (1984) (discussing relative magnitudes of type I and type II errors in antitrust).

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error. From an error cost standpoint, an ideal test would be at Point *N*, where both the type I and type II error rate equals zero. However, such a point is generally not attainable, or only attainable at a prohibitive cost. Certainly, in the case of applying Section 2 to bundling by dominant firms, any test will be far from perfect   The 45 degree line are tests where the probability of finding anticompetitive behavior are the same whether or not the underlying behavior was anticompetitive or not.   The standard-free approach in *LePage's* would lie somewhere on this line.

Moreover, rules of *per se* legality and *per se* illegality are on this line. *Per se* rules are simple bright line tests that simply focus on determining whether or not certain conduct took place. Point *I* represents a rule of *pre se* illegality, which would condemn all conduct covered by the rule. Point *L* represents a rule of per se legality. Under a rule of *per se* legality, the conduct covered by the rule would be immune from the antitrust laws. While such *per se rules* are not useful for the purposes of distinguishing anti-and pro-competitive conduct, they may be useful as bright line administrative rules. A rule of *per se* illegality would be rational if the conduct in question (i) involved behavior that was almost certain to be socially undesirable, and (ii) such conduct could be reliably distinguished from other types of behavior. While in general it is optimal to trade off type I and type II errors, such a tradeoff is not necessary in such cases because the danger of condemning socially desirable behavior is minimal. Naked horizontal price fixing is often argued to have these attributes.[46]

These conditions are illustrated in Figure 1, which contains a social indifference curve that reflects the tradeoff between the expected cost of type I and type II errors.   In general, the shape of these social indifference curves will depend on the magnitude of the cost and relative frequency of each type of error.[47] Under the assumption that naked horizontal price fixing involves activity that is almost certain to be socially undesirable, the frequency and thus the total expected cost of type I errors is close to zero. Under these circumstances, the social indifference curves will be near horizontal and a rule of *per se* illegality will result in total error costs that are nearly identical to the total error costs associated with using an ideal test at Point *N*. Both tests correctly condemn anticompetitive behavior. And the expected costs of type I error are similar for both tests even though the rate of type I error for Test *N* is zero, while the rate of type I error for Test *I* is one.   This is because the near zero frequency of procompetitive naked horizontal price fixing keeps the expected costs of committing type I errors under Test *I* low. With such preference curves, a rule of per se illegality would dominate any equal cost test in the shaded area **R** in Figure 1. Moreover, *per se* tests are likely to have lower direct costs than tests that actually attempt to distinguish pro and anticompetitive behavior.

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[46] *But see* Bruce H. Kobayashi, *Antitrust, Agency, and Amnesty: An Economic Analysis of the Criminal Enforcement of the Antitrust Laws Against Corporations,* 56 Geo. Wash. L. Rev. 715, 732 (2001) (discussing the characterization issue).
[47] See generally, Cooper et al., *supra* note 37 (explaining differences in U.S. and European Union enforcement on differing evaluations of the relative costs of type I and type II error).

Figure 2 depicts other tests that have been considered by the courts, or proposed by academics. Point *B* depicts the application of the *Brooke Group* test to bundled rebates. *Brooke Group* involved a challenge to the use of volume discounts on generic cigarettes.[48] The Supreme Court upheld the dismissal of a 148.8 million dollar jury award. The Court held that plaintiffs who allege predatory pricing under Section 2 of the Sherman Act or under the Robinson-Patman Act must satisfy two "not easy to establish" requirements. First, the plaintiff must prove that the alleged predatory prices are "below an appropriate measure" of the defendant's costs.[49]   Second, the plaintiff must demonstrate that the defendant had a reasonable prospect, or under Section 2, a dangerous probability, of recouping its investment in below cost-prices. [50]

In addressing the potential for error costs of using such a standard, the Court noted that any exclusionary effect from above-cost prices either "reflects the lower cost structure of the alleged predator, and so represents competition on the merits, or is beyond the practical ability of a judicial tribunal to control without courting intolerable risks of chilling legitimate price cutting." Stated in terms of the error costs, the Supreme Court set out a test for predatory pricing that minimized the probability of a type I error, at a cost of tolerating a higher cost of type II error. In the error cost space of Figure 2, such a test would lie in the lower left part of the Figure.

Such a choice would be rational if the expected costs of type II errors are small relative to the expected costs of type I errors. The Court noted that successful predation, while theoretically possible,[51] is rare.[52] Thus, in contrast to the social indifference curve depicted in Figure 1, the social indifference curves for predation are likely to have a steep slope. Under these conditions, a rule that has the error characteristics of the *Brooke Group* rule will dominate any test that lies below and to the right of the indifference curve labeled U_B in Figure 2.

However, it may be the case that the tradeoffs involved in the single price predation case are different from those that apply to the case of bundled rebates. As discussed in Section II.b, there are theoretical models that show that bundling can allow a monopolist to engage in above cost exclusion. In such cases, the second prong of the *Brooke Group Test,* the ability to recoup losses, is not an issue. Accordingly, the tradeoffs between type I and type II errors that are applicable to the single product case of price predation may differ from those that apply to bundled discounts.[53]

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[48] *Brooke Group v. Brown & Williamson Tobacco Corp.,* 509 U.S. 209 (1993).

[49] In *Brooke Group*, the parties agreed that the appropriate measure of costs was average variable costs. *Id.*

[50] *Id.*

[51] *See, e.g.,* Paul Milgrom & John Roberts, *Predation, Reputation, and Entry Deterrence,* 27 J. Econ Theory 280 (1982) (model showing predation is possible if there is a small probability that the predator is irrational).

[52] *Brooke Group,supra* note 48 at 220-24. *See also* Frank Easterbrook, *Predatory Strategies and Counterstrategies,* 48 U. Chi. L. Rev. 263 (1981); John R. Lott, Jr., *Are Predatory Commitments Credible? Who Should the Courts Believe?* (1999); John S. McGee, *Predatory Price Cutting: The Standard Oil (N.J.) Case,* 1 J. L. & Econ. 137 (1958) and *Predatory Pricing Revisited,* 23 J. L. & Econ.289 (1980).

[53] *See* Bruce H. Kobayashi, *The Economics of Loyalty Discounts and Antitrust Law in the United States,* mimeo, George Mason University School of Law (2005) (noting a similar distinction made by some U.S. Federal Courts).

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The possibility that above cost exclusion is possible does not mean that the *Brooke Group* rule, modified for the case of bundled discounts,[54] is no longer optimal. First, it is not clear that the relevant indifference curves in the case of a rule applying Section 2 to bundled discounts will differ much from those applicable to the single product price predation case. Even if one accepts that the potential for type II errors may have increased in the case of bundled discounts, the existence of demonstrable and ubiquitous benefits from bundling suggest that any antitrust rule applying Section 2 to bundled discount would also be associated with an increase in the cost of type I errors. Thus, *ex-ante*, it is unclear which way the tradeoff would shift.

Second, even if an increased potential for anticompetitive harm flattens out the indifference curves (in Figure 2, from U_B to U_{MB}), the *Brooke Group* rule may still be preferred to any feasible alternative test.[55] As depicted in Figure 2, Test *B* would still dominate alternative tests at Point *G* and Point *E*. Whether or not this is actually the case will depend on what alternatives are available. Consider the equally efficient competitor test suggested by Nalebuff and others. As Greenlee et al. note, such a test is overinclusive, and does not distinguish between offending bundle discounts that raise or lower consumer welfare. Such a test with these characteristics would arguably lie near the 45 degree line in the upper right hand corner of the error cost space. Test *E* depicts such a test. Unless the social indifference curves were flat, reflecting a low expected cost of type I errors, such a test, located in the upper right hand portion of the error cost space, is unlikely to be optimal.

One way in which flatter social indifference curves could be generated would be to limit the application of Test *E* to situations where the costs of type I error are diminished.[56] For example, the influential Areeda & Hovenkamp treatise suggests a test that would condemn use of bundled rebates by firms with monopoly power if a hypothetical equally efficient competitor standard would be excluded. However, the treatise would limit its application to situations of near monopoly, suggesting that "[i]n any event, the theory should not be extended to situations involving substantially smaller market shares or significant uncertainty about market definition. The defendant in this case [*LePage's*] was conceded to be the dominant firm with a historic market share of 90 percent in what appeared to be a well-defined market. Indeed, unless there is evidence of collusive behavior we would be reluctant to extend the doctrine to any situation in which there was at least one competing firm able to match the defendant's discount across all

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[54] One such rule would require a plaintiff to prove that the price of the bundle be above the appropriate measure of the cost of the bundle. A second variant, discussed below, would attempt to allocate the bundle discount among it components.

[55] *See* Timothy J. Muris, *Antitrust Law, Economics, and Bundled Discounts,* submitted on behalf of the United States Telecom Association in response to the Antitrust Modernization Commission's Request for Public Comments, (July 15, 2005), available at
http://www.amc.gov/public_studies_fr28902/exclus_conduct_pdf/050715_US_Telecom-Exclus_Conduct-Bundling.pdf.

[56] For a discussion of this issue in the context of criminal antitrust enforcement, *see* Kobayashi, *supra* note 46.

product lines." [57] In all other cases, bundled discounts would be treated under the treatise's approach to package pricing, which would not condemn package discounts as long as the price of the package exceeds the total cost of the package.

To the extent that these limits are followed, such an approach will limit the costs of type I error by limiting the application of the hypothetical equally efficient competitor test to situations where the perceived threat is the greatest,[58] and apply a modified version of the *Brooke Group* test elsewhere. However, it is far from clear that antitrust plaintiffs, courts, and juries will adhere to such limits. While the possession of monopoly power is one of the two necessary elements of a Section 2 case, many courts use the term market power and monopoly power interchangeably. Market power, possessed by a large number of firms in a wide variety of markets, is a much broader concept that monopoly power.[59] Even if the equally efficient competitor test was limited to firms with "substantial market power," such a term is likely to expand well beyond firms with near monopoly or with market shares in well defined markets greater than 90 percent.[60]

Another potential alternative would be the test suggested by Greenlee, et al. As noted in Section II.b, this test would only condemn instances of exclusionary bundling that resulted in consumer welfare falling. In contrast, the hypothetical equally efficient competitor test would not make any such distinction. Relative to Test *E*, this test (labeled Test *G* in Figure 2) would have a lower rate of type I error. Thus, Test *G* would lie to the left of Test *E*.

Given that Test *G* differentiates between welfare decreasing and welfare increasing bundled discounts, and only condemns the former, a perfectly administered Test *G* should coincide with the ideal test (Test *N*). However, this is not likely to be the case for two primary reasons. As noted in Section II.b, the Greenlee, et al. test requires knowledge or estimation of the but-for monopoly price, and likely will be difficult to administer in many cases. As a result, such a test will be relatively more costly to administer, and it also likely will be administered with error. As the Second Circuit noted in *Barry Wright v. ITT Grinnell Co.:*

> "[U]like economics, law is an administrative system, the effects of which
> depend upon the content of rules and precedents only as they are applied
> by judges and juries in courts and by lawyers advising their clients. Rules

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[57] Phillip E. Areeda & Herbert Hovenkamp, 3 *Antitrust Law* ¶ 749 (2005 Supp.) at 184.

[58] As noted above, this is an assumption. There is little or no evidence to suggest that this is the case, or that any potential threat from exclusionary bundling would outweigh any efficiencies dominant firms gain from bundling. Note that firms that fail the liability test could in theory escape liability by bearing the burden of proving that they had a legitimate business justification for the practice. However, meeting this burden is not so easy in practice. *See* Richard A Epstein, *Monopoly Dominance or Level Playing Field: The New Antitrust Paradox*, 72 U. Chi. L. Rev. 49, 58 (2005). The pro-competitive reasons firms engage in bundling can be complex, have largely been ignored in the economic literature, and as a result are not well understood. Thus communicating these reasons to a judge or jury may be difficult.

[59] *See* Klein, *supra* note 32.

[60] *See, e.g.,* Einer Elhauge, *Defining Better Monopolization Standards,* 53 Stan. L. Rev. 253 (2003) (citing examples, and suggesting a threshold of 50%).

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that seek to embody every economic complexity and qualification may well, through the vagaries of administration, prove counterproductive, undercutting the very economic end they seek to serve."[61]

As a result, tests that are complex and difficult to administer will fall far short of the ideal test at Point *N*. Indeed, because of the potential for errors in administration of the test, it is possible that the rate of type II error under Test *G* will be greater than under Test *E*. More generally, these effects cause complex and hard to administer tests to lie closer to the 45 degree line than to the ideal test at Point *N*.[62] A similar effect will result from use of tests derived from models that are based on critical assumptions that do not hold in practice. A test that works well given the strict assumptions of a theoretical model may perform poorly when confronted with real markets. Again, the effect is to move tests that are close to Test *N* in theory, but not in practice, towards the 45 degree line. Such a result is more likely when the models and their assumptions have not been checked for robustness or tested empirically.

Because of the relatively underdeveloped nature of the economic literature, it is likely that any new tests, based on the current economic understanding of bundling, will suffer the same fate, and lie closer to the 45 degree line than to the ideal test at Point *N*. Figure 2 illustrates the likely feasible set of current and future tests given the current state of knowledge.[63] Given the indifference curves illustrated in Figure 2, the feasible set would have to expand significantly away from the 45 degree line towards point N in order for any test to improve on the error cost tradeoff of Test *B*. The fact that the set of feasible tests consist of tests that do not lie far from the 45 degree line makes it more likely that tests which lie near one of the per se corner solutions will be optimal.

The discussion so far has not addressed the issue of direct costs. The relative rankings illustrated by the iso-preference curves depicted in the figures are for tests that have equal direct costs. However, some tests will result in higher direct costs than others. As noted above, an advantage of the both of the per-se tests is that the costs of administering such tests will be relatively low. In addition, low costs of administration have also been suggested as reasons in favor of using both Test *E* and Test *B*.[64] Moreover, to the extent that these tests will result in lower direct costs than Test *G*, Test *B* will be preferred to Test *G* even if both lie on the same indifference curve. As depicted in Figure 2, this consideration will make the case for Test *B* over Test *G* stronger.

The cost and administrability issues are also relevant to the question of how one would modify the *Brooke Group* test in the case of bundled discounts. As noted above, a simple approach would be to compare the price of the bundle, with discount, to the

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[61] 724 F.2d 227, 234 (1st Cir. 1983).

[62] If the test was so complex and burdensome to administer, it would be possible, in theory, for the test to lie below the 45 degree line. Such a test would give perverse results – that is, welfare increasing conduct would be condemned with a higher probability that welfare decreasing conduct.

[63] As depicted in the Figure, the feasible set is the area between the 45 degree line and the curve through the points *LBGEI*.

[64] *See* Areeda & Hovenkamp, *supra* note 57, at 182.

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appropriate cost of the bundle. Some have criticized such a rule as too permissive, and suggest that the bundle discount be allocated between the component goods. The problem with such an approach is that there is no consensus, in theory or in practice, on how to make such allocations. The problem will often require a court to allocate joint and common costs among the products in the bundle.[65] Unless this is done in an arbitrary fashion (e.g. through a pro-rata rule), such a task is likely to be an administrative nightmare for the courts. And an arbitrary decision can simultaneously increase both types of error costs.[66]

IV.   Conclusion

The economic literature on bundling has made many theoretical advances. However, several omissions reveal themselves. The advances have largely been on the theoretical side. These models contain restrictive assumptions regarding the existence of monopoly in some markets, and the nature of rivalry in others. The models generally ignore obvious and ubiquitous reasons firms may use bundled discounts. These models have not been subject to robustness checks, nor have their assumptions been tested empirically. As a result, the literature that shows the possibility of anticompetitive harm does not provide a reliable way to gauge whether the potential for harm would outweigh any demonstrable benefits from the practice.

As a result of the underdeveloped nature of the literature, simple rules that result in extreme tradeoffs between type I and type II errors may dominate more complex tests that attempt to differentiate procompetitive from anticompetitive behavior. Such complex tests may work well within the confines of a theoretical model, but not when applied to firms in actual antitrust cases. Improving the reliability of more complex tests for anticompetitive behavior will require economists to expand their understanding of both the anticompetitive and procompetitive reasons firms engage in bundling. This will entail studying the reasons bundling is adopted by firms without market power, relaxing the assumption of monopoly in theoretical models, and generating testable hypothesis and the data to test them.

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[65] For an example of this issue, see *Virgin Atlantic, supra* note 37, at 267-9.

[66] One suggested variant of the *Brooke Group* rule would be to allocate the entire bundle discount to the product or products produced by the plaintiff's firm. Such a rule would be equivalent to Test *E*, and thus would significantly increase the rate of type I error. Some have suggested that such a rule be used as a safe harbor. But there is little consensus on how one would proceed when the safe harbor test is not met. Nor is it clear how one could prevent the safe harbor from becoming the substantive test that separates legal from illegal bundling.
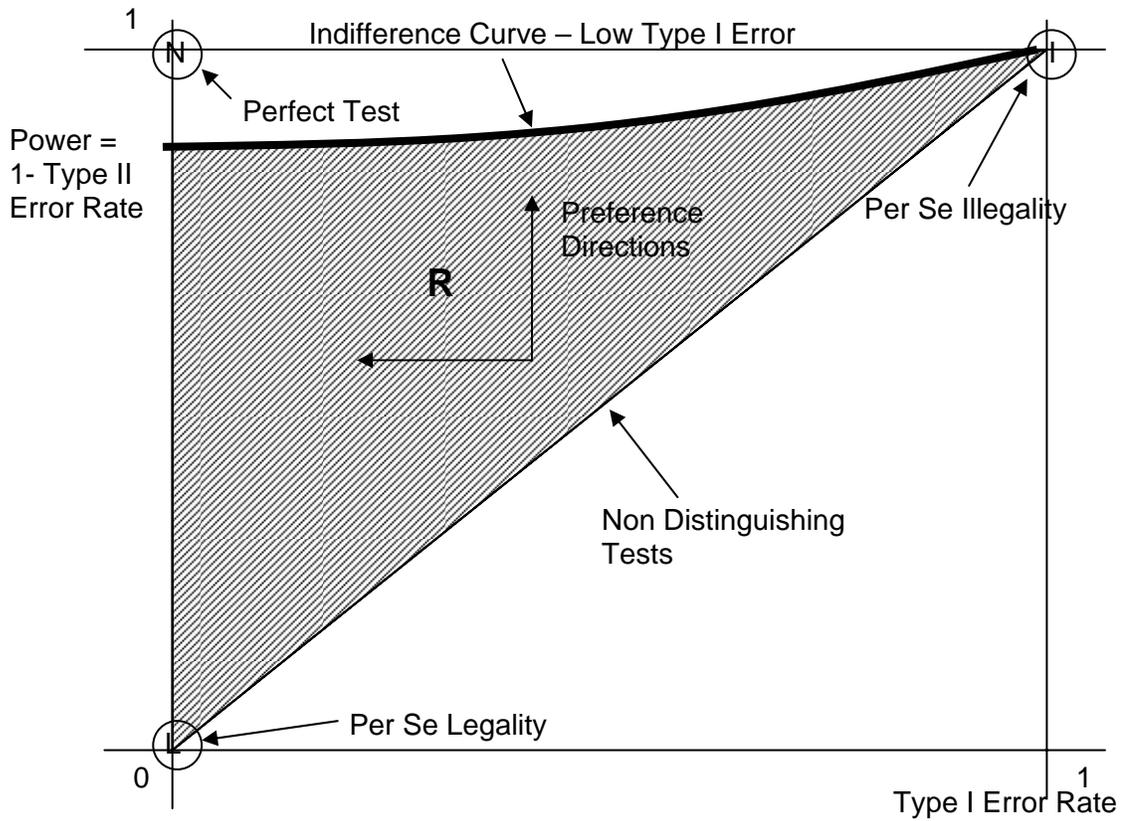
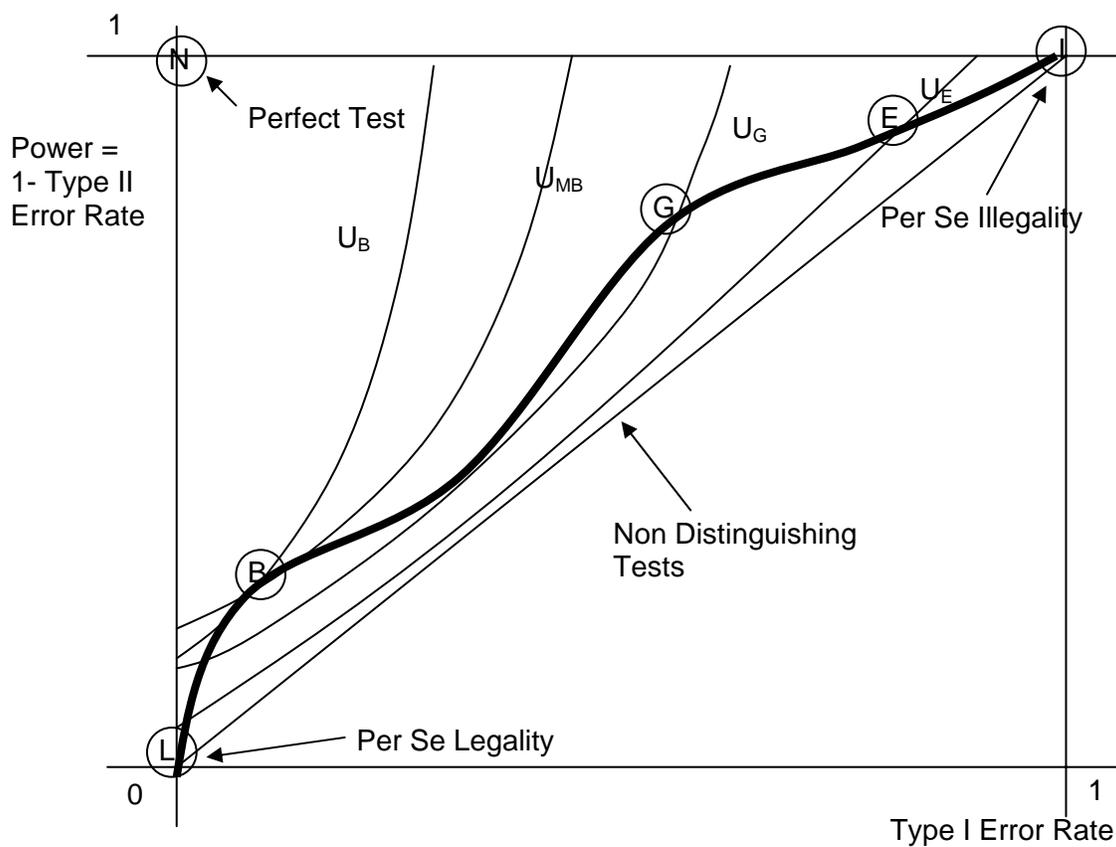**Figure 1 – Tests for Anticompetitive Conduct**

Figure 2 -   Tests for Anticompetitive Bundling and the Feasible Set