ALL-UNITS DISCOUNTS BY A DOMINANT PRODUCER THREATENED BY PARTIAL ENTRY

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All-units (or "cliff") discounts are price schedules in which a buyer gets a discount on all units purchased conditional on purchasing a quantity above a given threshold. They are puzzling because they entail negative marginal prices. For example, if the price per unit is $10 for customers who buy less than 100 units and $9 for customers who buy at least 100 units, then purchasing 99 units costs $990 while purchasing 100 units costs only $900. The seller, in effect, pays the customer $90 for taking the 100th unit.

Whether all-units discounts violate the antitrust laws has been a matter of considerable controversy for many years.[1] A recent case is *Eisai v. Sanofi*.[2] At issue in the case was Sanofi-Aventis's pricing of Lovenox, an anticoagulant used to treat deep-vein thrombosis. Under its "Lovenox Program," Sanofi-Aventis defined a set of Lovenox-class drugs, which included Eisai's Fragmin.[3] During the period at issue in the case, Lovenox had between an 80 percent and 90 percent share of Lovenox-class drugs. Sanofi-Aventis provided discounts to hospitals based on Lovenox's share of the hospital's purchases of Lovenox-class drugs. The size of the discounts varied by the size of the hospital. On average, hospitals received a discount of 15 percent if Lovenox's share was at least 75 percent. For the largest hospitals, those with purchases above

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[1] The Federal Trade Commisssion and Department of Justice held a workshop on conditional pricing practices on June 24, 2014. The video, transcript, and presentation slides are available at www.ftc.gov/news-events/events-calendar/2014/06/conditional-pricing-practices-economic-analysis-legal-policy. For a general discussion of the issues, see, in particular, the introductory presentation by Michael Waldman and Michael Whinston.

[2] Eisai, Inc. v. Sanofi Aventis U.S., LLC, No. 08-4168, 2014 WL 1343254 (D.N.J. Mar. 28, 2014), *aff'd*, 821 F.3d 394 (3d Cir. 2016).

[3] *Id.* at *3.

$1.2 million, the discount was 21 percent. The discount increased by 3 percent for each 5 percent increment in share up to a share of 90 percent.[4]

All-units discounts are closely related to bundled discounts, in which the discount applied to all units of a group of products depends on the aggregate purchases of the products or even to achieving target purchase levels of each product.[5] An important case is *LePage's*.[6] LePage's was the largest seller of private label transparent adhesive tape.[7] 3M's Scotch tape is the dominant brand of transparent adhesive tape.[8] 3M, which sells many products in addition to Scotch tape, granted additional discounts on a wide range of its products to a retailer that purchased its private-label tape from 3M.[9] 3M's defense was that its discounted prices were above its incremental costs and were therefore legal under the *Brooke Group*[10] standard for predatory pricing.[11] The *LePage's* court rejected that defense and instead ruled that 3M exploited its dominance in branded transparent adhesive tape to exclude LePage's from making sales in the unbranded segment.[12]

A common criticism of *LePage's* was that it did not provide clear guidance to companies about when multi-product discounts violate the law. As the Antitrust Modernization Commission observed in its final report, "Because the court failed to evaluate whether 3M's program of bundled rebates represented competition on the merits, its decision offers no clear standards by which firms can assess whether their bundled rebates are likely to pass antitrust muster."[13]

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[4] *Id.* As a technical matter, each threshold created a "cliff" since, for example, the total payment for an 80% share would be less than the total payment for a 79.9% share. However, a hospital's total payment for an 80% share would have been greater than for a 75% share (by an amount that likely exceeded Sanofi-Aventis's incremental costs). All-units discounts necessarily inject some "lumpiness" into purchasing decisions that could otherwise be made on a purely marginal basis.

[5] The distinction between an all-units discount based on purchases of a single product and a bundled discount on multiple products can be blurry if the products in question are not homogeneous. In what follows, I use the term "cliff discount" to refer to any discount that is conditioned on achieving some purchase threshold and that applies to all units purchased.

[6] LePage's Inc. v. 3M, 324 F.3d 141 (3d Cir. 2003).

[7] *Id.* at 144.

[8] *Id.* at 175–76.

[9] *Id.* at 154.

[10] Brooke Group Ltd. v. Brown & Williamson Tobacco Corp., 509 U.S. 209, 230 (1993).

[11] *LePage's*, 324 F.3d at 147.

[12] *Id.* at 156. For a more detailed discussion of 3M's pricing, see *LePage's*, 324 F.3d at 171 (Greenberg, J., dissenting); Gary L. Roberts, *The Use of Bundled Rebates by a Dominant Firm:* LePage's v. 3M (2003), *in* THE ANTITRUST REVOLUTION 276 (John E. Kwoka, Jr. & Lawrence J. White eds., 5th ed. 2009); Daniel L. Rubinfeld, *3M's Bundled Rebates: An Economic Perspective*, 72 U. CHI. L. REV. 243 (2005).

[13] ANTITRUST MODERNIZATION COMM'N, REPORT AND RECOMMENDATIONS 94 (2007), govinfo.library.unt.edu/amc/report_recommendation/amc_final_report.pdf (describing Recommendation 16).

Shortly after the Antitrust Modernization Commission issued its report, the Ninth Circuit decided *Cascade Health*,[14] which involved contracts between hospitals and health insurers. Defendant PeaceHealth operated the only hospital providing tertiary care in Lane County, Oregon.[15] A competitor McKenzie (owned at the time of the decision by Cascade Health) provided primary and secondary care, but not tertiary care. PeaceHealth provided insurers a bigger discount on all its services (including tertiary care) if it was the only preferred provider for all hospital care.[16] In so doing, it bundled its discount on tertiary care with an insurer's purchases of primary and secondary care. Taking explicit notice of the criticism of *LePage's*, the Ninth Circuit adopted a "discount attribution" rule. As the court explained:

> Under this standard, the full amount of the discounts given by the defendant on the bundle are allocated to the competitive product or products. If the resulting price of the competitive product or products is below the defendant's incremental cost to produce them, the trier of fact may find that the bundled discount is exclusionary for the purpose of § 2.[17]

In contrast to *LePage's* and *Cascade Health*, which concerned bundled discounts on multiple goods, *ZF Meritor*[18] concerned all-units discounts on a single product. In *ZF Meritor*, defendant Eaton had been the only seller of heavy-duty truck transmissions in North America.[19] Meritor entered in 1989. In 1999, Meritor formed the joint venture ZF Meritor with ZF Friedrichshafen, a European supplier of heavy-duty truck transmissions that had developed a new technology that Eaton believed had the potential to attain a much larger share of the market than Meritor had been able to achieve on its own. There were only four US manufacturers of heavy-duty trucks. Eaton entered into contracts with each of them that entailed all-units discounts (in the form of rebates) conditional on the customer giving Eaton a share ranging from 70 percent to 97.5 percent of its heavy duty truck transmission purchases. The contracts had other terms as well. For example, heavy-duty truck purchasers can customize their orders. Heavy-duty truck manufacturers (i.e., Eaton's customers) issued "data books" that listed the options. Eaton's contracts with all four U.S. truck manufacturers required that Eaton transmissions be the standard offering and its contracts with two truck manufacturers required that Eaton's transmissions be the only offerings in the data books.

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[14] Cascade Health Sols. v. PeaceHealth, 515 F.3d 883 (9th Cir. 2008).

[15] *Id.* at 891.

[16] *Id.* at 892.

[17] *Id.* at 906.

[18] ZF Meritor, LLC v. Eaton Corp., 696 F.3d 254 (3d Cir. 2012).

[19] *Id.* at 264.

The antitrust treatment of all-units and bundled discounts has been a contested issue in Europe as well as in the United States. The European Commission's 2009 guidance on its enforcement of Article 102 contains a section on conditional discounts.[20] The staff paper that was prepared as input into that guidance was notable for distinguishing between all-units (termed "retroactive") discounts and discounts on incremental units as well as a discussion of the need to determine when the range of below-cost pricing that arises from any single-product all-units discount is substantial enough to constitute a possible abuse.[21] Interestingly, the guidance paper did not follow the staff paper in distinguishing between all-units discounts and discounts on incremental units.

An important recent case in Europe is *Intel*,[22] which concerned Intel's rebates to four computer manufacturers for its microprocessors. In upholding the European Commission's ruling and fine, the European General Court ruled that discounts for exclusivity by a dominant undertaking are necessarily an abuse and that the European Commission did not have to demonstrate an anticompetitive effect in that particular case.[23]

These cases illustrate that how cliff discounts fit into the lexicon of antitrust offenses remains controversial. Because discounting is generally a form of price competition, some courts (such as the *Eisai*[24] court) have been reluctant to condemn it. Other courts have recognized, however, that companies can structure cliff discounts so that their average price is high but the incremental price for a portion of their sales is low or even negative. Even though the economics literature is clear on this point and a court articulated the principle well in *Ortho*,[25] other courts have considered it relevant to assess whether the practice at issue was purely a pricing practice or, alternatively, whether it had other dimensions that would justify a classification other than predatory pric-

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[20] Eur. Comm'n, DG Competition, *Communication from the Commission—Guidance on the Commission's Enforcement Priorities in Applying Article 82 of the EC Treaty to Abusive Exclusionary Conduct by Dominant Undertakings*, 2009 O.J. (C 45) 13 (Feb. 24, 2009).

[21] Eur. Comm'n, DG Competition, *DG Competition Discussion Paper on the Application of Article 82 of the Treaty to Exclusionary Abuses* 39, 44–47 (Dec. 2005), ec.europa.eu/competition /antitrust/art82/discpaper2005.pdf.

[22] Case T-286/09, Intel v. Comm'n, ECLI:EU:T:2014:547 (GC June 12, 2014).

[23] To use terminology that is standard in Europe, the ruling of the European General Court provides for "forms-based" rather than "effects-based" analysis of exclusivity provisions. In U.S. terminology, the court made pricing conditions based on exclusivity per se illegal for dominant firms. Moreover, the ruling makes pricing conditioned on exclusivity illegal without regard to the magnitude of the discount and, therefore, without regard to whether the discount is large enough to force exclusivity and thereby preclude an efficient competitor from competing for a portion of the sales to a customer. For a discussion and critique of *Intel*, see Luc Peeperkorn, *Conditional Pricing: Why the General Court Is Wrong in* Intel *and What the Court of Justice Can Do to Rebalance the Assessment of Rebates*, CONCURRENCES 43 (Feb. 2014).

[24] Eisai, Inc. v. Sanofi Aventis U.S., LLC, 821 F.3d 394 (3d Cir. 2016).

[25] Ortho Diagnostic Sys. v. Abbott Labs., 926 F. Supp. 371, 373 (S.D.N.Y. 1996).

ing—either exclusive dealing for cases involving a single product or tying for those involving multiple products. For instance, the *ZF Meritor* court relied on the conditions on the data books in concluding that the practice was not merely a form of discounting,[26] and the *Eisai* court used the lack of such additional dimensions to the strategy to judge that case under a *Brooke Group* standard.[27]

In *Eisai*, *LePage's*, *Cascade Health*, and many of the other cases in which cliff discounts have been an issue, the defendant in the case was a dominant firm faced by a firm that could, as a practical matter, compete for part but not all of the dominant firm's business. In *Eisai*, Fragmin and the other competitive drugs had FDA approval for fewer indications than did Lovenox.[28] Le-Page's could compete to supply private-label tape, but it could not as a practical matter compete in the branded segment.[29] Another key feature of many of the cases is that the discount thresholds did not require that the customer purchase a 100 percent share from the dominant firm. For example, the key threshold in *Eisai* was 75 percent.[30]

This article presents an analysis of cliff discounts in a setting with these key features—that is, a dominant firm faces competition for part but not all of its market, and it can choose an all-units discount in which the threshold is a key parameter. I compare the outcome with other pricing structures: simple pricing, segment pricing, and discounts on incremental units.

I show that the choice of a threshold below 100 percent can qualitatively alter the economic effect of the pricing strategy. The discount forces the competitor to choose between accepting its allocated share at a high price or competing very aggressively to get more than its allocated share. If the incumbent designs its pricing scheme appropriately, the entrant rationally chooses to take its allocated share at a high price. In anticipation of the entrant making such a choice, the incumbent can also choose a relatively high price. As I discuss in more detail in Part V, the result adds a wrinkle to the dilemma of the proper legal treatment of cliff discounts, for, while the analysis reveals a way in which cliff discounts can be anticompetitive, the harm arises from a softening of competition rather than exclusion.

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[26] ZF Meritor, LLC v. Eaton Corp., 696 F.3d 254, 287 (3d Cir. 2012).

[27] *Eisai*, 821 F.3d at 409.

[28] *Id.* at 399.

[29] Whether one could clearly delineate competitive and noncompetitive segments in *ZF Meritor* is debatable, as any truck buyer might have considered Meritor's technology to be a reasonable substitute for Eaton's. However, given that Meritor entered with a differentiated product, it is possible that only a subset of truck buyers was willing to seriously consider Meritor's offerings.

[30] *Id.* at 406.

I. PREVIOUS LITERATURE

The academic literature on loyalty discounts is split between papers that present models in which loyalty discounts are efficient ways for manufacturers to elicit effort (which is assumed not to be directly observable) from retailers and those in which the practice creates, extends, or exploits market power.

Sreya Kolay, Greg Shaffer, and Janusz Ordover are in the former category.[31] In their model, a cliff discount elicits the efficient level of what is otherwise unobservable effort from a retailer.[32] Also, all-units discounts are similar in effect to requirements contracts, which are not inherently anticompetitive. Thus, some formal analysis is necessary both to confirm the intuition that the practice can be anticompetitive and to identify the salient features that distinguish anticompetitive cases.

As noted above, a key feature of some of the antitrust cases concerning cliff discounts is the presence of a dominant firm that faces competition for part of its market (the competitive segment) but not the rest (the protected segment). Patrick Greenlee and David Reitman have analyzed such settings in joint work, as has Patrick DeGraba.[33] DeGraba's paper differs from Greenlee and Reitman's in two important respects. First, it compares loyalty discounts with a more complete set of alternative, non-linear pricing schemes. Second, it explores the incentives loyalty discounts create for small competitors in more detail. This in turn leads to the insight that a loyalty discount can facilitate tacit collusion.

Greenlee, Reitman, and Sibley present a variety of models that examine different aspects of bundled discounts.[34] The first two models examine bundled discounts across two goods, one of which is monopolized. The market for the other is competitive. An essential feature of their models is that the pricing of the monopoly good is inefficient both in leaving consumers with

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[31] Sreya Kolay, Greg Shaffer & Janusz A. Ordover, *All-Units Discounts in Retail Contracts*, 13 J. Econ. & Mgmt. Strategy 429 (2004).

[32] *Id.* at 443.

[33] *See* Patrick Greenlee & David Reitman, *Distinguishing Competitive and Exclusionary Uses of Loyalty Discounts*, 50 Antitrust Bull. 441 (2005); Patrick Greenlee & David Reitman, Competing with Loyalty Discounts (2006), www.wcas.northwestern.edu/csio/Conferences/Papers2006/GreenleeandReitmanpaper.pdf; Patrick DeGraba, *Naked Exclusion by a Dominant Supplier: Exclusive Contracts and Loyalty Discounts*, 31 Int'l J. Indus. Org. 516–26 (2013). One example cited by DeGraba is a substantial all-units discount for buying 90–95% of a purchaser's total pulse oxometer needs from Tyco-Nelcor, the dominant seller of pulse oxometers. *Hospital Group Purchasing: Lowering Costs at the Expense of Patient Health and Medical Innovation? Hearing Before the Subcomm. on Antitrust, Bus. Rights, and Competition of the S. Comm. on the Judiciary*, 107th Cong. 24–26 (Apr. 23, 2002) (statement of Joe E. Kiani, Pres. & CEO, Masimo Corp.).

[34] Patrick Greenlee, David Reitman & David Sibley, *An Antitrust Analysis of Bundled Loyalty Discounts*, 26 Int'l J. Indus. Org. 1132–52 (2008) [hereinafter Greenlee et al.].

some surplus and also generating deadweight loss.[35] The unexploited surplus makes it possible to tie the competitive good to the monopolized good, charge a price above the competitive price for the competitive good, induce consumers to buy the tied offering, and exclude an equally efficient rival in the competitive market.[36] The key difference between the model I present in this article and the first two Greenlee et al. models is that in my article, the structure of the "competitive segment" is a duopoly rather than perfect competition. Greenlee et al. also present a model in which the competitive segment is a duopoly among differentiated sellers. They find that bundled discounts are a form of mixed bundling/price discrimination.[37] Their model does not capture the effect highlighted by the analysis presented below in this article because the dominant firm's competitor is not confronted with the choice of taking a high profit on an allocated portion of the market rather than having to cut price drastically to increase its share.

While the market setting I analyze below resembles the settings in the Greenlee-Reitman and DeGraba papers, the results more nearly resemble those in a 2009 article by Einer Elhauge and a 2014 paper by Elhauge and Abraham Wickelgren.[38] Elhauge and Wickelgren analyze commitments by a dominant seller faced by an entrant to offer a discount off its regular price for a subset of its potential market.[39] In making these commitments, the dominant firm imposes a cost on itself of responding to an entrant's price. If the entrant undercuts it, the dominant firm has to decide between matching the entrant's price with its discounted price or with its regular price. If the dominant firm matches with its discounted price, it only sells to its "loyal" customers and cedes its regular customers to the entrant. If the dominant firm matches the entrant's price with its regular price, then it has to charge its loyal customers the promised discount from the entrant's price. Given these commitments, the entrant wants to choose a price that the dominant firm prefers to match with its discounted price rather than its regular price. In effect, the dominant firm's contractual commitments create an artificial market division which then facilitates an allocation between the entrant and the incumbent where both charge relatively high prices.[40]

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[35] *Id.* at 1150.

[36] *Id.* For a similar argument, see Barry Nalebuff, *Exclusionary Bundling*, 50 Antitrust Bull. 321 (2005).

[37] Greenlee, Reitman & Sibley, *supra* note 34, at 1143.

[38] *See* Einer Elhauge, *How Loyalty Discounts Can Perversely Discourage Discounting*, 5 J. Competition L. & Econ. 189 (2009); Einer Elhauge & Abraham Wickelgren, *Robust Exclusion and Market Division Through Loyalty Discounts*, 43 Int'l J. Indus. Org. 111 (2015).

[39] Elhauge & Wickelgren, *supra* note 38, at 112.

[40] *Id.* at 117. For example, suppose that unit costs are 20 and a market consists of 100 customers with individual demands given by $Q = 100 - P$. The simple monopoly price is $60, each customer demands 40, and profits are 40 x ($60 - $20) = $1600 per customer. Now suppose the dominant firm commits to giving 60% of its customers a $20 discount on its regular price. If the

Roman Inderst and Greg Shaffer examine loyalty discounts by a manufacturer engaged in interbrand competition against other manufacturers to retailers who compete with each other in intrabrand competition to sell the manufacturer's product.[41] In choosing its wholesale price, the manufacturer has to trade off competing efficiently with other manufacturers (which would generally entail low pricing on the margin) and preventing intrabrand competition from being too intense (which requires prices above marginal cost).[42] In their model, the solution is to condition a discount on all units on achieving a threshold market share for the manufacturer's product.[43] The discounted price is above marginal cost and is at a level that prevents intrabrand competition from being too intense.[44] But it is still discounted relative to the price for retailers that do not achieve the threshold market share.[45] By linking the discount to the market share, the manufacturer prevents its customers from responding to its high price by shifting sales to the goods produced by the manufacturer's competitor.[46]

II. UNDERLYING ASSUMPTIONS

The assumptions underlying the analysis are similar to those in the articles by Greenlee and Reitman, and by DeGraba.[47] The market consists of a dominant firm/incumbent (*n*), which can supply the entire market, and a small competitor/entrant (*e*), which can compete for part but not all of the demand of each purchaser. The products or uses for which the customer considers the entrant's product to be a substitute are the "competitive segment" and the remaining products or uses are the "monopolized segment." The assumption that the demand for each customer has a contestable and non-contestable portion is necessary to the analysis because the non-contestable portion enables the dominant firm to construct discounts that the entrant cannot match. This assumption is generally more realistic for intermediate customers such as a

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entrant charges $40, which is below the monopoly price but still substantially above unit cost, the incumbent has two practical options. It can match the entrant's $40 with either its list price or its discounted price. If it matches with its list price, it gets the entire market, but the $20 discounted price leaves it with no margin on sales to 60% of the customers. If it matches the entrant only with its discounted price (and therefore charges $60 as a list price), it only gets 60% of the market, but it gets a $20 per unit margin on its sales at the discounted price. Matching the entrant only with the discounted price yields higher profits because the incumbent gets a $20 margin on 60% of the market instead of 40% of the market. As a result, the entrant knows that it can charge $40 and not fear being undercut for 40% of the market.

[41] Roman Inderst & Greg Shaffer, *Market-Share Contracts as Facilitating Practices*, 41 RAND J. ECON. 709–29 (2010).

[42] *Id.* at 711–12.

[43] *Id.* at 712.

[44] *Id.* at 711.

[45] *Id.* at 722.

[46] *Id.* at 723.

[47] Greenlee & Reitman, *supra* note 33; DeGraba, *supra* note 33.

retailer (as in *LePage's*), a purchasing agent (as in *Eisai)*, or a manufacturer (as in *Meritor*) than it is for individual customers. Because including costs in the model would not materially affect the results, I assume that costs are 0.[48]

Suppose that each customer has a demand for 100 units and that, of these, the monopolized segment is 80 and the competitive segment is 20.[49] Customers value the incumbent's good at 100 for all uses. For the competitive uses, each customer considers the products to be differentiated. If they were homogeneous, then the customer would buy its needs in the competitive segment entirely from the incumbent or entirely from the entrant depending on which one offered the lower price. With differentiated products, a purchaser might divide its purchases for the competitive portion of its demand between the two companies, with the proportions depending on the price differential. Specifically, assume that when the price differential between the entrant and the incumbent for the contested portion is at least 20 per unit, the purchaser buys entirely from the less expensive firm. When the incumbent and entrant charge the same price in the competitive segment, the customers split their purchases for the competitive segment evenly, buying 10 from each. For price differences between 0 and 20, the quantity the customer buys from each firm varies linearly to the price difference. For example, if the entrant's price was 10 more than the incumbent's in the competitive portion, the customer would buy 15 from the incumbent and 5 from the entrant.

Let p_n and p_e be the incumbent's and the seller's price, respectively. With a constant per unit price, the customer chooses how much of each good to purchase to maximize its surplus net of price. Let x_i be the quantity sold by seller i. As long as the two prices are within 20 of each other (and p_n does not exceed 100),[50] demands are given by:

$$x_n = 80 + 10\left(1 - \frac{p_n - p_e}{20}\right) \tag{1}$$

$$x_e = 10\left(1 - \frac{p_e - p_n}{20}\right) \tag{2}$$

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[48] *See infra* note 71 (explaining how to extend the model to allow for costs and how doing so affects the results).

[49] I use a numerical example for the demand by a single customer in the body of this article. For the full model, see Michael A. Salinger, Cliff Discounts by a Dominant Producer Threatened by Partial Entry (Mar. 25, 2015) (unpublished), papers.ssrn.com/sol3/papers.cfm?abstract_id= 2585023. The general model is of sales to individual customers, the implicit assumption being that the seller can tailor contract terms to the parameters relevant for each customer. As the cases discussed in the introduction demonstrate, such variation does occur in at least some cases.

[50] If the entrant's price exceeds the incumbent's by at least 20, then the incumbent gets the entire market. (That is, the incumbent sells 100 and the entrant sells 0.) If the incumbent's price exceeds the entrant's by at least 20, the incumbent gets the entire competitive segment and the incumbent sells just to the monopolized segment. (The entrant sells 20 and the incumbent sells 80.) *See infra* Tables 1 and 2.

Tables 1 and 2 are a more visual representation of the demand relationship. Table 1 gives demand for the incumbent's product as a function of both prices. There are three ranges of results. In one, denoted **, the entrant's price exceeds the incumbent's by at least 20, in which case the incumbent captures the entire market of 100. In another, denoted *, the incumbent's price exceeds the entrant's by at least 20; the entrant captures the entire competitive segment, leaving the incumbent to sell just to the monopolized segment. In the intermediate range, the two prices are within 20 of each other. The two firms divide the competitive segment with the respective shares depending on the price differential. Table 2 gives demand for the entrant's product as a function of both prices. It also has three ranges corresponding to the ranges in Table 1. The notation "+" indicates the range where the entrant captures the entire competitive segment of 20 by charging at least 20 less than the incumbent. The notation "−" indicates that the entrant gets no sales because its price exceeds the entrant's by at least 20.

TABLE 1:
DEMAND FOR INCUMBENT'S PRODUCT

		Incumbent's Price (p_n)									
		0	10	20	30	40	50	60	70	80	90	100
	0	90.0	85.0	*	*	*	*	*	*	*	*	*
	10	95.0	90.0	85.0	*	*	*	*	*	*	*	*
	15	97.5	92.5	87.5	82.5	*	*	*	*	*	*	*
	20	**	95.0	90.0	85.0	*	*	*	*	*	*	*
	25	**	97.5	92.5	87.5	82.5	*	*	*	*	*	*
Entrant's	30	**	**	95.0	90.0	85.0	*	*	*	*	*	*
Price	35	**	**	97.5	92.5	87.5	82.5	*	*	*	*	*
(p_e)	40	**	**	**	95.0	90.0	85.0	*	*	*	*	*
	50	**	**	**	**	95.0	90.0	85.0	*	*	*	*
	60	**	**	**	**	**	95.0	90.0	85.0	*	*	*
	70	**	**	**	**	**	**	95.0	90.0	85.0	*	*
	80	**	**	**	**	**	**	**	95.0	90.0	85.0	*
	90	**	**	**	**	**	**	**	**	95.0	90.0	85.0
	100	**	**	**	**	**	**	**	**	**	95.0	90.0

Note: Entries give demand for incumbent's product as a function of incumbent's and entrant's prices as given by equation (1). * denotes 80, meaning that the incumbent only sells to the monopolized segment. ** denotes 100, meaning that the incumbent captures the entire market.

TABLE 2:
DEMAND FOR ENTRANT'S PRODUCT

					Incumbent's Price (p_n)						
		0	*10*	*20*	*30*	*40*	*50*	*60*	*70*	*80*	*90*	*100*
	0	10.0	15.0	+	+	+	+	+	+	+	+	+
	10	5.0	10.0	15.0	+	+	+	+	+	+	+	+
	15	2.5	7.5	12.5	17.5	+	+	+	+	+	+	+
	20	-	5.0	10.0	15.0	+	+	+	+	+	+	+
	25	-	2.5	7.5	12.5	17.5	+	+	+	+	+	+
Entrant's	*30*	-	-	5.0	10.0	15.0	+	+	+	+	+	+
Price	*35*	-	-	2.5	7.5	12.5	17.5	+	+	+	+	+
(p_e)	*40*	-	-	-	5.0	10.0	15.0	+	+	+	+	+
	50	-	-	-	-	5.0	10.0	15.0	+	+	+	+
	60	-	-	-	-	-	5.0	10.0	15.0	+	+	+
	70	-	-	-	-	-	-	5.0	10.0	15.0	+	+
	80	-	-	-	-	-	-	-	5.0	10.0	15.0	+
	90	-	-	-	-	-	-	-	-	5.0	10.0	15.0
	100	-	-	-	-	-	-	-	-	-	5.0	10.0

Note: Entries give demand for entrant's product as a function of incumbent's and entrant's prices as given by equation (2). - denotes 0. + denotes 20, meaning that the entrant captures the entire competitive segment.

III. BENCHMARK PRICING REGIMES

The competitive effects of all-units or bundled discounts depend on what pricing formula the incumbent might use instead. Three natural benchmarks are constant prices per unit, "segment pricing," and discounted marginal pricing.

A. SIMPLE PRICING

Simple pricing, meaning that both firms charge a constant price per unit, is a natural point of comparison for all-units discounts. As is standard in economic analysis, assume that each firm chooses its price to maximize its profits. Because each firm's profits depend not only on its own price but also on the price the other firm charges, the decision problem falls within the province of game theory.[51]

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[51] Game theory is the mathematical analysis of interdependent decisions. For a general reference, see JEAN TIROLE, THE THEORY OF INDUSTRIAL ORGANIZATION 423–56 (1988).

Tables 3 and 4 give the profits for the incumbent and entrant, respectively.[52] Table 3 is based on Table 1. Each entry is the quantity from Table 1 multiplied by the incumbent's price at the top of the column.[53] The first column of entries consists entirely of 0's because the incumbent's revenue is 0 when its price is 0. The entry of 850 in the first row of the second column is the price of 10 (found at the top of the column) multiplied by the quantity of 85 (from the first row of the second column of Table 1). Similarly, Table 4 is based on Table 2 with the relevant price being the entrant's price at the head of the row.[54] Like the first column in Table 3, the first row of Table 4 indicates that the entrant's profits are 0 when its price is 0. The 0's below the diagonal in Table 4 are cases where the entrant's quantity is 0 because the entrant's price is at least 20 greater than the incumbent's.

TABLE 3:
INCUMBENT'S PROFITS

		Incumbent's Price										
		0	*10*	*20*	*30*	*40*	*50*	*60*	*70*	*80*	*90*	*100*
	0	0	850	1600	2400	3200	4000	4800	5600	6400	7200	8000
	10	**0**	900	1700	2400	3200	4000	4800	5600	6400	7200	8000
	15	0	**925**	1750	2475	3200	4000	4800	5600	6400	7200	8000
	20	0	950	**1800**	2550	3200	4000	4800	5600	6400	7200	8000
	25	0	975	1850	**2625**	3300	4000	4800	5600	6400	7200	8000
	30	0	1000	1900	2700	**3400**	4000	4800	5600	6400	7200	8000
Entrant's	*35*	0	1000	1950	2775	3500	**4125**	4800	5600	6400	7200	8000
Price	*40*	0	1000	2000	2850	3600	4250	**4800**	5600	6400	7200	8000
	50	0	1000	2000	3000	3800	4500	5100	**5600**	6400	7200	8000
	60	0	1000	2000	3000	4000	4750	5400	5950	**6400**	7200	8000
	70	0	1000	2000	3000	4000	5000	5700	6300	6800	**7200**	8000
	80	0	1000	2000	3000	4000	5000	6000	6650	7200	7650	**8000**
	90	0	1000	2000	3000	4000	5000	6000	7000	7600	8100	8500
	100	0	1000	2000	3000	4000	5000	6000	7000	8000	8550	9000

Note: Entries are incumbent's profits as a function of incumbent's and entrant's prices. They equal the incumbent's quantity from the comparable cell in Table 1 multiplied by the incumbent's price at the top of the column. Profits equal revenues because costs are 0 by assumption. Cells in bold type correspond to cells in bold type in Table 4. The note to Table 4 explains which cells are in bold type.

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[52] One could combine Tables 3 and 4 into a single "game matrix," showing the payoffs for both firms together. I have presented them separately to make the links with Tables 1 and 2 clear.

[53] Recall that in Table 1, ** denotes a quantity of 100 while * denotes a quantity 80. In Table 2, + denotes a quantity of 20 and − denotes a quantity of 0.

[54] Again, recall that in Table 2, + denotes a quantity of 20 and − denotes a quantity of 0.

TABLE 4:
ENTRANT'S PROFITS

		Incumbent's Price									
		0	*10*	*20*	*30*	*40*	*50*	*60*	*70*	*80*	*90*	*100*
	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10	**50.0**	100.0	150.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
	15	37.5	**112.5**	187.5	262.5	300.0	300.0	300.0	300.0	300.0	300.0	300.0
	20	0.0	100.0	**200.0**	300.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0
	25	0.0	62.5	187.5	**312.5**	437.5	500.0	500.0	500.0	500.0	500.0	500.0
	30	0.0	0.0	150.0	300.0	**450.0**	600.0	600.0	600.0	600.0	600.0	600.0
Entrant's	*35*	0.0	0.0	87.5	262.5	437.5	**612.5**	700.0	700.0	700.0	700.0	700.0
Price	*40*	0.0	0.0	0.0	200.0	400.0	600.0	**800.0**	800.0	800.0	800.0	800.0
	50	0.0	0.0	0.0	0.0	250.0	500.0	750.0	**1000.0**	1000.0	1000.0	1000.0
	60	0.0	0.0	0.0	0.0	0.0	300.0	600.0	900.0	**1200.0**	1200.0	1200.0
	70	0.0	0.0	0.0	0.0	0.0	0.0	350.0	700.0	1050.0	**1400.0**	1400.0
	80	0.0	0.0	0.0	0.0	0.0	0.0	0.0	400.0	800.0	1200.0	**1600.0**
	90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	450.0	900.0	1350.0
	100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	500.0	1000.0

Note: Entries are entrant's profits as a function of incumbent's and entrant's prices. They equal the entrant's quantity from the comparable cell in Table 2 multiplied by the entrant's price at the start of the row. Profits equal revenues because costs are 0 by assumption. Bold type indicates the maximum value in the column.

Given the underlying assumptions, it makes sense to assume that the incumbent sets its price first and the entrant then responds by setting its price.[55] To understand what this assumption implies, first consider Table 4. Each column represents a possible price by the incumbent. The entries in each column represent the entrant's profits as a function of its price. The bold number (or numbers) in each column represent the highest attainable profit, and the entrant generates that profit by charging the price corresponding to the row that contains the maximum profit level. For example, if the incumbent charges 80, the entrant would maximize its profits at 1200 by charging a price of 60. The entrant price that maximizes the entrant's profits for each possible price

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[55] In the numerical example developed here, assuming that the firms choose price simultaneously would yield the same outcome. This latter assumption might well be the more standard approach in the economics literature. The assumption is called the "Bertrand assumption" (after the French mathematician who introduced it) and an equilibrium that results from it is called a "Bertrand equilibrium." For some parameter values, however, there is not a Bertrand equilibrium (or, more precisely, a "pure strategy" Bertrand equilibrium). When the result from assuming that the incumbent moves first is not a Bertrand equilibrium, the incumbent would like to lower its price after it sees what the entrant has charged *assuming that the entrant could not then respond with a price cut of its own*. No matter how frequently economists are willing to make it, this assumption often defies common sense.

charged by the entrant is called the entrant's "reaction" or "best response" function.

Since the incumbent moves first (by assumption), its decision rationally depends on how it expects the entrant to respond to its choice, and a reasonable basis for predicting the entrant's response is to consider what is in the entrant's best financial interest. For example, the incumbent should assume that if it charges 20, the entrant will charge 20 as well and, if so, the incumbent's profits will be 1800. In Table 3, the bold type for 1800 in the column representing an incumbent price of 20 indicates that the incumbent should anticipate a profit of 1800 if it charges 20. Alternatively, suppose the incumbent charges 40. Table 4 indicates that the entrant's best response would be 30 (which would give the entrant a profit of 450). Given that response, the incumbent should anticipate that it will earn 3400 if it charges 40. More generally, the bold entries in Table 3 correspond to the bold entries in Table 4. They represent the outcome that the incumbent should expect from each of its possible choices.

To find the decision that maximizes the incumbent's profits, therefore, we look for the highest bold value in Table 3. It is 8000, which is the incumbent's profits when it charges 100 and the entrant charges 80.[56] Given this pair of prices, the entrant captures the entire competitive segment while the incumbent charges the monopoly price to the monopolized segment.

While this outcome reflects a single set of parameter values, it captures an important and more general economic phenomenon associated with uniform pricing. If a dominant firm can target discounts to sales where it faces competition, is it anticompetitive or procompetitive for it to do so? The result in this Part reveals why a ban on selective price cutting could be detrimental. When the incumbent forgoes the competitive segment, the customer pays the full monopoly price in the monopoly segment. In the competitive segment, the price does drop below the monopoly price, but only by the discount that the entrant has to offer to attract the entire competitive segment given that the incumbent is charging the monopoly price.[57]

B. SEGMENT PRICING

When the incumbent sells a single good for which there are multiple uses and it faces competition for some but not all uses, it may be able to devise

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[56] As Table 3 shows, the incumbent would earn still more if it charged 100 and the the entrant charged 90 or 100. However, it is the entrant that chooses the entrant's price, and charging 90 or 100 would lower the entrant's profits.

[57] The result in this Part provides a formalization of the concern Peeperkorn raises about the European General Court's decision in *Intel. See* Peeperkorn, *supra* note 36; *see also* Case T-286/09, Intel v. Comm'n, ECLI:EU:T:2014:547 (GC June 12, 2014).

strategies (perhaps by selling different versions of the good) to charge different prices for the monopolized and competitive segments. Such segment pricing allows the incumbent to target price cuts on the competitive segment while continuing to charge the monopoly price for the monopolized segment. The analysis of segment pricing is equivalent to the analysis of the pricing of two separate goods, which is the more relevant benchmark for bundled discounts than the above analysis of simple pricing of a single good.[58]

Given our numerical example, the incumbent will charge the monopoly price of $100 in the monopolized segment. Table 5 is similar to Table 1 except that it gives demand for the incumbent's product in just the competitive segment rather than total demand for the incumbent's product.

TABLE 5:
DEMAND FOR INCUMBENT'S PRODUCT IN THE
COMPETITIVE SEGMENT

		Incumbent's Price									
		0	10	20	30	40	50	60	70	80	90	100
	0	10.0	5.0	*	*	*	*	*	*	*	*	*
	10	15.0	10.0	5.0	*	*	*	*	*	*	*	*
	15	17.5	12.5	7.5	2.5	*	*	*	*	*	*	*
	20	**	15.0	10.0	5.0	*	*	*	*	*	*	*
	25	**	17.5	12.5	7.5	2.5	*	*	*	*	*	*
	30	**	**	15.0	10.0	5.0	*	*	*	*	*	*
Entrant's	35	**	**	17.5	12.5	7.5	2.5	*	*	*	*	*
Price	40	**	**	**	15.0	10.0	5.0	*	*	*	*	*
	50	**	**	**	**	15.0	10.0	5.0	*	*	*	*
	60	**	**	**	**	**	15.0	10.0	5.0	*	*	*
	70	**	**	**	**	**	**	15.0	10.0	5.0	*	*
	80	**	**	**	**	**	**	**	15.0	10.0	5.0	*
	90	**	**	**	**	**	**	**	**	15.0	10.0	5.0
	100	**	**	**	**	**	**	**	**	**	15.0	10.0

Note: Entries give demand for incumbent's product just in the competitive segment. Each entry is 80 less than the comparable entry in Table 1. * denotes 0. ** denotes 20.

Demand for the entrant's product is identical to Table 2 (provided that we interpret the incumbent's price as being the incumbent's price in the competitive segment). As a result, Table 4, which gives the entrant's profits and also

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[58] The analysis in Part III.A only provides a relevant benchmark for bundled discounts if there is some reason why the incumbent should charge the same price for the two goods.

identifies the entrant price that maximizes the entrant's profits, applies to segment pricing as well.

Table 6 gives the incumbent's profits from the competitive segment as a function of both prices. It is similar to Table 3 except that it gives the dominant firm's profits just in the competitive segment as a function of its price (for the competitive segment) and the entrant's price.

TABLE 6:
INCUMBENT'S PROFITS IN COMPETITIVE SEGMENT

		Incumbent's Price in Competitive Segment									
		0	*10*	*20*	*30*	*40*	*50*	*60*	*70*	*80*	*90*	*100*
	0	0	50	0	0	0	0	0	0	0	0	0
	10	**0**	100	100	0	0	0	0	0	0	0	0
	15	0	**125**	150	75	0	0	0	0	0	0	0
	20	0	150	**200**	150	0	0	0	0	0	0	0
	25	0	175	250	**225**	100	0	0	0	0	0	0
	30	0	200	300	300	**200**	0	0	0	0	0	0
Entrant's	*35*	0	200	350	375	300	**125**	0	0	0	0	0
Price	*40*	0	200	400	450	400	250	**0**	0	0	0	0
	50	0	200	400	600	600	500	300	**0**	0	0	0
	60	0	200	400	600	800	750	600	350	**0**	0	0
	70	0	200	400	600	800	1000	900	700	400	**0**	0
	80	0	200	400	600	800	1000	1200	1050	800	450	**0**
	90	0	200	400	600	800	1000	1200	1400	1200	900	500
	100	0	200	400	600	800	1000	1200	1400	1600	1350	1000

Note: Entries are incumbent's profits in the competitive segment as a function of incumbent's and entrant's prices. They equal the incumbent's quantity from the comparable cell in Table 5 multiplied by the incumbent's price at the top of the column. Profits equal revenues because costs are 0 by assumption. Cells in bold type correspond to cells in bold type in Table 4.

As in Table 3, the cells in bold type in Table 6 give, for each incumbent price (column), the row (which represents a price for the entrant) that the entrant would choose as a best response. For example, the entry in the third row of the second column (125) is in bold indicating that if the incumbent charges 10, the entrant's best response would be 15. Similarly, if the incumbent charges 20, the entrant would charge 20, and if the incumbent charges 30, the entrant charges 25. The values in bold type represent the profits in the competitive segment that are feasible for the incumbent given how the entrant would rationally respond.

To find the equilibrium, we look for the maximum value in bold type in Table 6. It is 225, which represents the incumbent's profits if it charges 30 in the competitive segment, eliciting a price of 25 from the entrant. From Table 5, we can see that when the incumbent charges 30 in the competitive segment while the entrant charges 25, the incumbent sells 7.5, which leaves 12.5 of the sales in the competitive segment for the entrant (see Table 2). The entrant's profits are \$312.50 (see Table 4). The incumbent's profits are the sum of its \$225 from the competitive segment and \$8000 from the non-competitive segment, or \$8225.

If we compare segment pricing with simple pricing, purchasers in the competitive segment get much lower prices while consumers in the monopolized segment get the same price. The difference exists because a requirement that the incumbent charge the same price in both segments makes the incumbent choose to forgo the competitive segment altogether, which, in effect, gives the entrant a monopoly over the competitive segment. When the incumbent can focus price cuts on the competitive segment, it competes with the entrant for those sales. As a result of the competition, customers have the option of buying the entrant's product for \$25 rather than \$80. Some customers do end up paying \$30, but those are the customers who have a strong preference for the incumbent's product (and are therefore willing to pay at least a \$5 premium for it).

C. Discounted Marginal Prices

An alternative pricing strategy for a firm to focus its price cuts on the competitive segment is with quantity discounts that apply just to incremental units. Such strategies are feasible with a single product or with multiple products. Whether quantity discounts apply only to incremental units or to all units might initially appear to be a mere technical detail. In fact, the different pricing formulas have very different effects.

To understand why, consider two pricing formulas. In one, which closely resembles the segment pricing from above, the customer pays \$100 for the first 80 units and \$30 for any incremental units above 80. In the other, the customer pays \$90 for the first 90 units and \$30 for any incremental units above 90. Table 7 compares the total and marginal cost (i.e., incremental cost per unit) to a customer for quantities purchased. Notice that the threshold for lower incremental prices is higher in the alternative price scheme, but the total the purchaser pays is less for all quantities listed.

TABLE 7:
ILLUSTRATION OF DISCOUNT ON INCREMENTAL UNITS

Pricing Formula				Quantity purchased from incumbent				
No Discount	*With Discount*	*Thresh-old*	*Customer Expenditure*	*80*	*85*	*87.5*	*90*	*95*
$100	$30	80	*Total*	$8,000	$8,150	$8,225	$8,300	$8,450
			Marginal		$30	$30	$30	$30
$90	$30	90	*Total*	$7,200	$7,650	$7,875	$8,100	$8,250
			Marginal		$90	$90	$90	$30

Note: Left-hand panel contains pricing formula parameters. For units up to "Threshold," the price per unit is the "No Discount" price. For units beyond the threshold, the incremental price per unit is the "With Discount Price." The right-hand panel contains two rows for each pricing formula, one for the total expenditure (all units) and one for the marginal expenditure (per incremental unit).

With the aid of Table 7, consider how the purchaser would respond to the second pricing scheme compared with the first, assuming that the entrant charges $25 per unit (as in Part III.B, *supra*). In particular, consider whether the purchaser would buy 90 from the incumbent rather than 87.5. The second pricing formula entails a total payment to buy 90 units that is $200 less than the first formula. But that pricing formula does not induce the purchaser to expand its purchases from 87.5 to 90 units because the discount offered under that formula does not apply until purchases exceed 90 units. In fact, if the purchaser buys 87.5 units, it pays $350 less under the second formula compared to the first. A rational purchaser's decision to expand its purchases from 87.5 to 90 units would consider the incremental cost of $90 per unit and compare it with the $25 per unit that it could pay for the entrant's good. While the purchaser is willing to pay some premium for some units of the incumbent's good for the competitive segment, there are no units for which it is willing to pay a $65 premium. Thus, not only would the purchaser not respond to the second pricing formula by increasing its purchases from the incumbent, it would restrict its purchases from the incumbent to its monopolized needs and buy from the entrant all 20 units for which the entrant's product provides a competitive substitute.

One might suspect that pricing with discounts on incremental units is equivalent to segment pricing, but there is an additional complication that causes them to be somewhat different. When, under segment pricing, the incumbent charges $100 in the monopolized segment and $30 in the competitive segment, it sells 7.5 units for the competitive segment. The purchaser strictly prefers the incumbent's product for these uses. Indeed, it prefers them enough to pay at least a $5 premium. But it is willing to pay more than a $5

premium for some of the units. The premium it is willing to pay for the incumbent's good over the entrant's ranges from $5 to $20 for these 7.5 units and, given our assumptions, averages $12.50. Since it is willing to pay an average premium of $12.50 but only has to pay a premium of $5, the purchaser receives a "consumer surplus" $7.50 per unit for the 7.5 units it buys from the incumbent firm in the competitive segment.

According to the economic theory of "non-linear" pricing, the incumbent can capture this surplus through its list (undiscounted) price. For example, if it were to charge a discounted price of $30 for purchases above 80, the purchaser would get surplus of $7.50 x 7.5 = $56.25 from its purchases at the discounted rate. To capture this surplus with its list price, the incumbent could add $56.25/80 = $0.70 to the monopoly price of $100 in the monopolized segment and charge $100.70. One might find it surprising that the purchaser would pay $100.70 per unit for units that it values at only $100 per unit, but it is willing to do so because the purchase then gives it the right to buy subsequent units at $30 per unit. It overpays for the first 80 units to get the consumer surplus that the pricing formula leaves it for the remaining units.[59] Henceforth, the term "captured surplus component" is used to refer to the part of the list price that captures the surplus the customer gets from its purchases at the discounted price.

With discounted marginal prices, the demand analysis is the same as for segment sales with the exception that the relevant price for the incumbent is its discounted price—that is, Table 2 still gives the quantity the entrant sells as a function of its price and the incumbent's discounted price while Table 5 gives the quantity that the incumbent sells in the competitive segment. Moreover, Table 4 continues to give the entrant's best response. The only difference is that the profits (or payoffs) from the competitive segment must include the revenue generated by the captured surplus component of the list price. The results are in Table 8, which is similar to Table 6 except that the payoffs include this additional component.

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[59] The threshold of 80 is not unique. The incumbent could choose a lower threshold at which the discounted marginal price applies and make up the difference with the undiscounted price. The strategy is ineffective, however, when the threshold is too high, as is the case with the second pricing formula in Table 7.

TABLE 8:
INCUMBENT'S PROFITS FROM COMPETITIVE SEGMENT
WITH DISCOUNTED MARGINAL PRICES

		Incumbent's Discounted Price for Incremental Sales									
		0	10	20	30	40	50	60	70	80	90	100
	0	100.0	75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	10	**225.0**	200.0	125.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	15	306.3	**281.3**	206.3	81.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	20	400.0	375.0	**300.0**	175.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	25	500.0	481.3	406.3	**281.3**	106.3	0.0	0.0	0.0	0.0	0.0	0.0
	30	600.0	600.0	525.0	400.0	**225.0**	0.0	0.0	0.0	0.0	0.0	0.0
Entrant's	35	700.0	700.0	656.3	531.3	356.3	**131.3**	0.0	0.0	0.0	0.0	0.0
Price	40	800.0	800.0	800.0	675.0	500.0	275.0	**0.0**	0.0	0.0	0.0	0.0
	50	1000.0	1000.0	1000.0	1000.0	825.0	600.0	325.0	**0.0**	0.0	0.0	0.0
	60	1200.0	1200.0	1200.0	1200.0	1200.0	975.0	700.0	375.0	**0.0**	0.0	0.0
	70	1400.0	1400.0	1400.0	1400.0	1400.0	1400.0	1125.0	800.0	425.0	**0.0**	0.0
	80	1600.0	1600.0	1600.0	1600.0	1600.0	1600.0	1600.0	1275.0	900.0	475.0	**0.0**
	90	1800.0	1800.0	1800.0	1800.0	1800.0	1800.0	1800.0	1800.0	1425.0	1000.0	525.0
	100	2000.0	2000.0	2000.0	2000.0	2000.0	2000.0	2000.0	2000.0	2000.0	1575.0	1100.0

Note: Entries are incumbent's profits attributable to its sales in the competitive segment as a function of incumbent's and entrant's prices. They are the sum of the revenues from units sold at the discounted price and the captured surplus portion of the list price. Cells in bold type correspond to cells in bold type in Table 4.

As with Table 6, the bold value in each column represents the incumbent's payoff for each price, taking account of the entrant's reaction. The maximum payoff is $300, which the incumbent achieves by charging a discounted price of $20. The entrant responds with a price of $20 as well, so the two firms split the competitive segment. The entrant's profits are $200. The incumbent's profits attributable to its sales at the discounted price consist of 10 units sold at $20 (for $200) plus $100 of consumer surplus that it generates through the captured surplus component of the list price. (In this case, the captured surplus component of the list price is $100/80 = $1.25, and the list price is $100 + $1.25 = $101.25.) By selling 80 units at $101.25 and 10 units at $20, it earns revenue and profits of $8300. The average price is 85, and total purchase surplus is 1700.

The incumbent's low price and the entrant's price are lower with non-linear pricing than with segment pricing. That result should not be surprising. With non-linear pricing, the incumbent can cut its price on the competitive segment and then make up the loss on the monopolized segment. Thus, it has a greater incentive to compete on the margin than when it engages in segment pricing.

IV. ALL-UNITS DISCOUNTS

With the analysis of simple pricing and pricing structures that allow the incumbent to target discounts to the competitive segment, we now turn to all-units discounts. The incumbent charges a high price on all units if purchases are below a threshold share and a lower price on all units if demand meets the threshold. The pricing structure is similar to the one analyzed in Part III.C, with the key exception that the lower price applies to all units once the threshold is met, not just the marginal units.

Given the stark assumptions of the model (and, in particular, the assumptions that the demand parameters are constant across customers and the absence of uncertainty), purchases below the threshold do not occur. Thus, there is no reason to model the undiscounted price. The incumbent sets it high enough so that purchasing below the threshold is simply not an option for the customer. In this model, all-units discounts are equivalent to quantity forcing.[60]

One might suspect that the incumbent could set a price of a $100 conditional on the purchaser buying 100 units from the incumbent. That is, the incumbent would sell only on an exclusive basis and would charge the monopoly price. The strategy would fail, however, because it would leave the purchaser with no surplus. The entrant would rationally respond by charging $80, which would capture the entire competitive segment and leave the purchaser with a surplus of $400 on the 20 units it would purchase.[61] Given that the purchaser would get more surplus from buying 20 units from the entrant than it would by buying 100 units from the incumbent, it would choose not to purchase from the incumbent.[62]

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[60] In the model, whether the threshold is stated as an absolute quantity or as a market share does not matter. When the threshold is a market share, however, increased purchases from a competitor can force the buyer below the threshold (and thereby increase what it has to pay the incumbent), even holding purchases from the incumbent constant. *See* Fiona Scott Morton, Deputy Assistant Att'y Gen. for Econ. Analysis, Antitrust Div., U.S. Dep't of Justice, Presentation at Georgetown Univ. Law Ctr. Antitrust Seminar, Contracts that Reference Rivals (Apr. 5, 2012), justice.gov/atr/public/speeches/281965.pdf. From an antitrust perspective, imposing a penalty for purchasing additional units from a rival is problematic. Basing pricing on market shares rather than quantities are, however, a simple way to have a common pricing structure apply across customers with different scales.

[61] Recall that the incumbent's product provides a constant value of 100 per unit and that in the competitive segment, the premium that the purchaser would pay for the entrant's product over the incumbents ranges (uniformly) from 20 to -20. The average premium over the entire competitive segment that the purchaser is willing to pay for the entrant's product over the incumbent's is 0. As a result, the entrant's product provides an average value of 100 over the entire competitive segment. If the entrant charges 80 and its product provides an average value of 100, the surplus the purchaser gets from buying its needs for the competitive segment entirely from the entrant is $(100 - 80) \times 20 = 400$.

[62] One might object that the purchaser would buy from the incumbent because it "needs" the incumbent's product for its monopolized needs. But there has to be limit to what the incumbent

Suppose that instead of demanding exclusivity and charging a price of $100, the incumbent instead demanded exclusivity and charged $96. That strategy would leave the purchaser with a surplus of $4 per unit (and, therefore, a total surplus of $400), so it would succeed against a counterstrategy by the entrant of charging $80 per unit. However, the entrant could undercut that strategy by charging $79 per unit, which would give the purchaser a surplus of $420. Again, the purchaser would respond by buying just from the entrant.

If the incumbent insists on exclusivity (and therefore keeping the entrant out of the market altogether), the entrant in this scenario would be willing to cut its price to any positive number to make some sales. With an entrant price of 0, the purchaser would get surplus of $100 x 20 = $2000 if it buys 20 units from the entrant (and none from the incumbent). To match the surplus the purchaser can get by buying from the entrant, the incumbent would have to reduce its price to $80 (which would provide a surplus of $20/unit on 100 units).

This discussion reveals two reasons why the optimal contract for the incumbent does not entail exclusivity. The first and more important reason is the pricing incentive that exclusivity creates for the entrant. To get the purchaser to agree to an exclusive contract, the incumbent must offer a price that induces the purchaser to accept, and the price that a purchaser would willingly accept from the incumbent depends on what price the entrant offers. An exclusive contract between the purchaser and the incumbent leaves the entrant with no sales at all, so the entrant has a strong incentive to price aggressively to dissuade the purchaser from accepting the exclusive contract. In the discussion above, we had to consider the possibility that the entrant would charge a price of $0 because it would rationally cut price to (or very near to) 0 to dissuade the purchaser from accepting the exclusive contract. The second and more subtle reason is that with a quantity-forcing contract, the incumbent can set a price that extracts all the incremental[63] surplus it provides. All else equal, therefore, the incumbent's incentive is to set the quantity that maximizes the incremental surplus purchasers get from it. In this example, that quantity is 90, not 100. The purchaser prefers the entrant's product for half its competitive segment purchases. Exclusivity imposes an inefficiency by denying the purchaser the good it prefers and thereby reduces the surplus the incumbent can capture through its price.

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can charge, which means that the purchaser forgoes the monopolized product if the incumbent charges too high a price. The principle that determines the maximum the incumbent can charge is that it must leave the purchaser with as much surplus if it buys from the incumbent as it would get if it does not buy from the incumbent.

[63] Here, incremental means over and above what it can get from purchasing other products available in the market.

An all-units discount with a threshold below full exclusivity addresses both problems. In particular, leaving a share of the market for the entrant substantially alters the entrant's incentive to cut prices. As discussed above, if the incumbent insists on exclusivity, the entrant could and would have an incentive to undercut it for any price above $20 per unit. Suppose, instead, the incumbent charges $90 per unit for purchasers that buy at least 90 units. The entrant could then charge $90 and capture the half of the competitive segment for which the purchaser strictly prefers the entrant's product. Doing so would earn it a margin of $900.

In contrast to the case with full exclusivity, the entrant has no incentive to offer a price below $90. In particular, to make at least $900 by selling to the entire competitive segment, the entrant would have to charge a price of at least $45. Doing so would not, however, induce the purchaser to forgo the incumbent's contract. Rather, the purchaser would rationally respond by buying 10 units from the entrant at a price of $45 and 90 from the incumbent at a price of $90. Its total surplus would be $1650,[64] which exceeds the $1100 surplus it would get by buying 20 units from the entrant at a price of $45.[65]

Not only does the entrant have no incentive to undercut the incumbent's price when it charges $90 conditional on purchasing at least 90, it would have no incentive to undercut a price of $95. If the entrant follows the incumbent's price, it sells 10 units and makes a margin of $950. To make more by selling 20 units, it would have to charge at least $47.50. With an incumbent price of $95 and an entrant price of $47.50, the purchaser can either buy 90 from the incumbent and 10 from the entrant or 20 from the entrant. Buying from both yields a surplus of $1175.[66] Because buying just from the entrant gives a surplus of $1050,[67] the entrant would have to charge less than $47.50 to compete successfully for the remainder of the competitive segment. As a result, the incumbent can anticipate that the entrant will simply match its price of $95 (conditional on purchasing a quantity of at least 90).

An all-units discounted price of $95 conditional on purchases of at least 90 is very close to the theoretically optimal all-units discount,[68] and the mathe-

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[64] When the purchaser buys 90 from the incumbent, the total value it gets from its combined purchases is $10,200. (In the monopolized segment, the value the customer gets is 100 per unit. In the competitive segment, it gets 100 per unit plus the value of differentiation, which is $10 per unit on average.) Subtracting out the payment of $90 x 90 + $45 x 10 gives a surplus $1650.

[65] When the customer buys 20 units from the entrant, it does not buy anything from the incumbent. The average differentiation value is 0 because the customer prefers the incumbent's product for half of its competitive segment purchases. As a result, the value the customer gets is $100 x 20 = $2000. Subtracting out the $45 per unit price gives a surplus of $1,100.

[66] Similar to the logic in note 64, *supra*, the calculation is $10,200 – 90 x $95 – 10 x $47.50.

[67] Similar to the logic in note 65, *supra*, the calculation is $10,000 – 20 x $47.50.

[68] While the mathematics of the theoretically optimal solution are complicated, the differences arise for two reasons. First, given a threshold quantity of 90, the incumbent can charge slightly

matics underlying the exact optimum does not yield much additional insight. The strategy of charging a discounted price of $95 conditional on a quantity of 90 is a feasible strategy that gives the entrant an incentive to match the $95 price rather than undercut it. As a result, the average (and indeed uniform) price is $95 per unit. The incumbent earns a margin of $8550, and the entrant earns a margin of $950. A consumer receives a total surplus of $600.[69]

As explained in Part I, the effect of an all-units discount is similar to the effect of the loyalty discounts analyzed in articles by Elhauge and Elhauge and Wickelgren.[70] However, the precise mechanism is different. In their models, the incumbent firm's commitment to offer a given discount on a fraction of its sales forces the incumbent firm to choose between pricing aggressively to capture the entire market or "passively" to compete for only a fraction of the market. Recognizing the choice the incumbent has forced upon itself, the entrant can then charge a high price and be confident that it will be able to obtain a significant market share. In the analysis in this section, the roles are reversed. It is the entrant that has to choose between passive pricing aimed at only a portion of the competitive segment and aggressive pricing to capture the entire competitive segment. Having designed its contract to force such a choice on the entrant, the incumbent can be confident that the entrant will price passively even if it (i.e., the incumbent) sets a high price.

Table 9 summarizes the results across the different pricing schemes for the numerical example.[71] In the example, simple pricing is the worst outcome for

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more than $95. The constraint is that if the entrant charges half the incumbent's price, the purchaser must not get more surplus by buying 20 from the entrant and 0 from the incumbent than it gets from buying 10 from the entrant and 90 from the incumbent. Because a price of $95 satisfies this constraint with "room to spare," the incumbent can in theory charge slightly more than $95. Second, the optimal threshold is not 90. However, the difference reflects two offsetting effects that leave it near 90. If the incumbent chooses a lower threshold, it reduces the entrant's benefit from undercutting and allows the incumbent to charge a higher price. However, it gets that price for a smaller quantity. Alternatively, it can impose a higher threshold and sell a greater quantity. For a given price, however, an increased threshold gives the entrant a greater incentive to undercut the incumbent's price, so the cost to the incumbent of imposing the higher quantity is that it needs to charge a somewhat lower price.

[69] The surplus of $600 includes $100 that arises from the differentiation advantage that the entrant's product has for 10% of purchases.

[70] See Elhauge, supra note 38; Elhauge & Wickelgren, supra note 38.

[71] We can adapt the model to allow for constant marginal costs simply by interpreting the willingness to pay as a willingness to pay above marginal cost and the prices as price-marginal cost margins. For example, if production cost is $20 per unit, then assume that the customer is willing to pay $120 per unit of the incumbent's good (rather than $100) and that a customer's willingness to pay for the entrant's good ranges uniformly from $100 to $140 (rather than $80 to $120) over the contestable segment. Given these assumptions, the model results are price-cost margins. The actual prices would be $20 higher.

Adding fixed costs to the model would be simple and would facilitate an analysis of the common allegation that all-units discounts exclude entrants by denying them adequate scale. An entrant's ability to cover fixed costs depends, however, on the revenues it can generate net of production costs, not the quantity sold per se. Because the model predicts that an entrant earns

the purchaser and the best for the entrant. It is also the worst from the standpoint of the incumbent as it forgoes any profits in the competitive segment. The result illustrates the potential harm from limiting an incumbent from competing aggressively (within the limits of *Brooke Group*) just for the portion of demand for which it faces competition. At least with these parameter values, doing so segments the market and allows the two firms to charge their monopoly prices within their respective segments. In contrast, while the two pricing structures that allow for competition on the margin do nothing to bring down prices in the monopolized segment, pricing in the competitive segment is much more competitive with the purchaser receiving substantial benefit from the competition. In contrast, the all-units discount results in substantially higher average pricing and less purchaser surplus. As the example illustrates, while it might seem like a trivial detail whether the quantity discount applies to all units or just to marginal units, the economic consequences can be quite different.[72]

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higher profits when the incumbent uses all-units discounts than it would under some alternative pricing formulas, adding fixed costs to the model would not necessarily formalize the allegations that all-units discounts are exclusionary.

In some cases, the entrant might need to incur fixed costs to expand the contestable portion of the market. An example would be a drug manufacturer that has FDA approval for its drug to treat some but not all of the conditions for which the incumbent has FDA approval. Under such circumstances, an incumbent's all-units discount could make it unprofitable for the entrant to incur these additional fixed costs; such an effect would be exclusionary.

[72] One possibility to consider is that all-units discounts might have an exclusionary effect in a dynamic model. Suppose, for example, that the size of the competitive sector in future periods is an increasing function of sales in the current period. As Barry Nalebuff has argued, increasing the threshold for an all-units discount above the short-run, profit-maximizing threshold would have only a second-order effect on an incumbent's short-term profits while yielding first-order future benefits. *See* Barry Nalebuff, *Bundling as an Entry Deterrent Device*, 119 Q.J. ECON. 159 (2004); Nalebuff*, supra* note 36, at 334. While this argument is true as far as it goes, it is not clear that the effect is more pronounced with cliff discounts. With segment pricing, for example, the dominant firm would rationally compete more aggressively in the competitive sector in light of how current sales affect future sales. Of course, an entrant would also take such factors into account. Indeed, dynamic exclusion would be more prevalent with more aggressive pricing. As Richard Gilbert and David Newbery showed, an incumbent's incentive to protect its monopoly profits exceeds an entrant's incentive to attack it as long as the monopoly profits exceed the duopoly profits (as we should generally expect to be the case). *See* Richard J. Gilbert & David M.G. Newbery, *Preemptive Patenting and the Persistence of Monopoly*, 72 AM. ECON. REV. 514 (1982). The more aggressive pricing is in the competitive segment, the greater the incumbent's incentive to protect its turf and the lower the entrant's incentives to encroach upon it. The price umbrella created by cliff-discounts may reduce the profits the incumbent loses from erosion of its protected share and increase the profits an entrant can capture from increasing the competitive segment.

TABLE 9:
SUMMARY OF RESULTS

Type of Pricing	Incumbent			Entrant		Purchaser	
	Monopoly Segment Price	*Competitive Segment Price*	*Profits*	*Price*	*Share*	*Average Price*	*Surplus*
Simple	$100.00	$100.00	$ 8000	$ 80.00	20.0%	$ 96.00	$ 400
Segment	$100.00	$ 30.00	$ 8225	$ 25.00	12.5%	$ 85.38	$1,556
Incremental unit discounts	$101.25	$ 20.00	$ 8300	$ 20.00	10.0%	$ 85.00	$1,600
All-units discounts	$ 95.00	$ 95.00	$ 8550	$ 95.00	10.0%	$ 95.00	$ 750
For an explanation of results, see the discussion in Part III.A ("Simple" pricing), Part III.B ("Segment" pricing), Part III.C ("Incremental unit discounts" pricing), and Part IV ("All-units discounts" pricing).							

V. ANTITRUST IMPLICATIONS

What antitrust rules should govern a dominant firm that faces competition for part but not all of its market? Should it be able to adopt pricing strategies (perhaps in conjunction with other strategies such as product offerings) that target the competition and, if so, what are the limits on how aggressive it can be? These are the questions the Supreme Court addressed in *Brooke Group*. Faced with competition from discount cigarettes, it was legal for the major tobacco companies to offer discount brands of their own as long as their prices covered the relevant notion of incremental cost.[73]

One can imagine antitrust rules that would ban such "fighting brands." Such a policy would lead to more entry but, as the model in Part II illustrates, it would come at the expense of higher prices. The likely harm would not be limited to higher prices by the dominant firm. The umbrella created by the restrictions on the dominant firm would allow entrants to charge high prices as well.

The models in Part III explore pricing strategies in which competition between the incumbent and entrant results in lower prices for consumers. The *Brooke Group* standard is easy to apply in such settings. With segment pricing, the incumbent's price must at least equal the relevant measure of its incremental costs. The same principle applies to the discounted price when the incumbent offers discounts on marginal units.

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[73] Brooke Grp. Ltd. v. Brown & Williamson Tobacco Corp., 509 U.S. 209, 223 (1993).

As others—both economists and courts—have pointed out, matters are more complicated with bundled discounts, and the complications with bundled discounts also apply to all-units (or market share) discounts on a single product. The Supreme Court declined in *Brooke Group* to label above-cost predation as a violation of Section 2 of the Sherman Act because it did not want to discourage price reductions. But discounts and price reductions are not equivalent. Suppose a firm initially charges $100/unit but then raises its list price to $150 and simultaneously offers a $50 discount. The price has not dropped, and there is no economic reason to fear discouraging such behavior.

Theoretically, of course, a dominant firm could raise the undiscounted price and restore it with a discount with either segment pricing or discounts on incremental units, but there is no reason to believe that such a strategy would make any sense. There is good reason to believe that a firm that faces competition for part but not all of its market could use all-units or bundled discounts as part of a strategy to keep prices up. The well-known example from *Ortho*[74] illustrates the point clearly, as does Nalebuff, in *Exclusionary Bundling*.[75] Thus, the mere fact that all the discounted prices in bundled or all-units discount cases exceed incremental cost should not be sufficient to absolve a firm of antitrust liability.

The question of what should be necessary to find antitrust liability is more complicated. In the cases discussed above, the plaintiffs were competitors alleging a violation of Section 2 of the Sherman Act. The model in this article suggests that all-units discounts result in high prices, which is in general a result that the antitrust laws are designed to prevent. But it is not obvious that Section 2 is the relevant provision of the U.S. antitrust laws that is being violated. In the model, competitors are not excluded and they end up with a share that approximately equals (and may even exceed) the share that would result if the purchaser purchases from the entrant the units for which it prefers the entrant's product.

One possible response is that the key parameters that are assumed to be known in the model are never known in real cases, and competition to reveal them is what the antitrust laws are designed to encourage. In the numerical example used throughout this article, I assumed that 20 percent of the market is contestable and that the purchaser prefers the entrant's product for 10 percent of its total purchases.

Alternatively, one might argue that cliff discounts can be an antitrust violation because they violate either Section 1 of the Sherman Act, which bans

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[74] Ortho Diagnostic Sys. v. Abbott Labs., 926 F. Supp. 371, 373 (S.D.N.Y. 1996).

[75] *See* Nalebuff, *supra* note 36.

agreements in restraint of trade,[76] or Section 5 of the Federal Trade Commission Act, which outlaws unfair trade practices. The legal foundation for a suit in Europe is arguably less complicated as the practice can be viewed as an abuse of dominance in violation of Article 102.

If the proper allegation is that an all-units or bundled discount violates Section 1 of the Sherman Act or Section 5 of the FTC Act, or even if one accepts the argument that it violates Section 2 of the Sherman Act, it is not clear that competitors should have standing to sue. In the model, the competitor earns higher profits than it would with segment pricing or discounts on incremental sales, which would not be antitrust violations as long as the dominant firm stayed within the parameters set by *Brooke Group*. Without a reduction in profits, the competitor does not suffer injury.[77]

While bundled and all-units discounts are distinct from predatory pricing, some aspects of *Brooke Group* apply. Bundled and all-units discounts are prevalent practices perhaps because companies and their customers might find it convenient to state prices as a given percentage off list price. Given their prevalence, a safe harbor is desirable. With bundled discounts, the attribution test as implemented in *Cascade Health* is appropriate. There, pricing is within a safe harbor if the incremental payments to the dominant firm from selling the competitive good after attribution of discounts on all products linked to the purchase of the competitive goods are at least equal to the dominant firm's incremental cost of producing the competitive goods. Matters are more complicated with single-product all-units discounts because any such discount on a single product necessarily creates a range that will fail the test. The challenge is to determine when the range over which incremental revenues are less than the company's incremental costs is large enough to warrant antitrust scrutiny.

Before relying on the insights from the above model to judge a particular case, it is important to make sure that the predictions of the model line up with key facts in the case. The facts in *Cascade Health*,[78] for example, do not match the model because the additional discount was for full exclusivity. Similarly, in *LePage's*,[79] the highest discounts did not necessarily require exclusivity, but many of the large retailers did switch their purchases of second/

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[76] The use of Section 1 to challenge an all-units discount would be analogous to the use of Section 1 to challenge tying contracts.

[77] One might reasonably ask why, if the model in this article captures the economic effects of bundled or all-units discounts, competitors complain about them. One possibilty that I discuss below is that the model in this article fails to capture essential features of some of the cases that have arisen. Another is that plaintiffs do not correctly anticipate how competitive pricing might be in a but-for world in which the defendant is forced to use a different pricing structure.

[78] Cascade Health Sols. v. PeaceHealth, 515 F.3d 883, 891 (9th Cir. 2008).

[79] LePage's Inc. v. 3M, 324 F.3d 141, 158 (3d Cir. 2003).

private label tape entirely from LePage's to 3M. In Europe, some of the Intel rebates, such as those to Dell and Lenovo, required full exclusivity.[80] The rebate to HP did not require full exclusivity, but the threshold share for losing the rebate was 95 percent, which may be sufficiently close to 100 percent to be interpreted as effective exclusivity (even assuming that the rebates were large enough that the purchasers did not consider purchasing below the threshold to be a realistic option).

Thus, while the model in this article predicts that it is optimal for the dominant firm to set thresholds that allocate a share to the competitor, not all the thresholds observed in practice do so. When a bundled discount that fails an attribution test induces the customer to purchase the competitive good entirely from the dominant firm, the pricing practice should be deemed tying.[81] Similarly, when the threshold for an all-units discount is 100 percent or sufficiently close to it that the dominant firm is plainly not trying to induce the competitor to accept an allocated share at a high price and when the competitor cannot reasonably compete over the smallest range for which the dominant firm's pricing is at least its incremental cost, the pricing practice should be viewed as exclusive dealing.[82]

While the model in this article does not match the key facts of all the cases discussed above, it is consistent with the key facts in *Eisai*.[83] In that case, the threshold for the large cliff was 75 percent. The 25 percent share left for entrants was substantial. Given that the competitors had gone through the FDA approval process for at least some indications, it is unlikely that Sanofi-Aventis would have considered it practical to exclude them from the market altogether.

Another key fact to consider in deciding whether to apply the above model to a case is whether the competitors in fact priced aggressively. Eisai's prices for Fragmin had a tiered discount structure.[84] While that structure bore a su-

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[80] Case T-286/09, Intel v. Comm'n, ECLI:EU:T:2014:547 (GC June 12, 2014).

[81] Neither the Supreme Court nor Congress has overturned the conditional per se ban on tying that the Court first set in *International Salt v. United States*, 332 U.S. 392 (1947), and reaffirmed (with some modification) in *Jefferson Parish v. Hyde*, 466 U.S. 2 (1984). In the latter case, the Court expressed its reluctance to overturn a longstanding precedent. In so doing, it implicitly acknowledged that it would not choose a per se rule if it were working with a clean slate. Whether or not the legal standard for tying makes economic sense, as a matter of economics, bundled discounts can be structured to create effective ties.

[82] When an all-units discount is in effect an exclusive dealing requirement, it is important to consider whether other firms can in practice compete for the exclusivity. When there are multiple bidders for exclusivity, a buyer might use the prospect of an exclusive contract to negotiate lower prices (by disrupting tactily collusive pricing). As a matter of sound antitrust policy, it is important not to deny purchasers this option.

[83] Eisai Inc. v. Sanofi Aventis U.S., LLC, 821 F.3d 394, 399 (3d Cir. 2016).

[84] *Id.* at 405.

perficial resemblance to Sanofi-Aventis's pricing of Lovenox, it was in fact quite different.[85] For shares of 5–24.99 percent, Eisai offered a 4 percent discount.[86] While the 5 percent threshold did create a "cliff," it was small. The purchaser only needed to achieve a share of 5.2 percent before it had to pay Eisai more than it did for a 4.99 percent share. Eisai was willing to offer a 25 percent discount for at least a 25 percent share and a 40 percent discount for a 50 percent share. Assuming that the 40 percent discount was still above its cost, Eisai's pricing for the shares that it was likely to achieve with most purchasers was not particularly aggressive. The *Eisai* decision does not explain why Eisai did not price more aggressively for shares between 5 percent and 24.99 percent. It is certainly plausible that, recognizing the futility of getting a purchaser to reduce (or even risk reducing) its purchases of Lovenox below the threshold for the large cliff, Eisai decided to take a high margin for the sales it could make.

At least since *LePage's*, there has been substantial controversy over how conditional discounts fit into the antitrust lexicon. There is good reason for this controversy. The issue is complicated and does not have a single answer that is correct for all cases. What is clear is that conditional discounts are different from predatory pricing. But ascertaining what they are in a particular case requires an analysis of the details of the terms as well as their economic effects. In some cases, they can be exclusive dealing or tying. The model in this article suggests that in others, they can be devices to facilitate tacitly collusive pricing (or a "softening" of price competition).

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[85] *Id.* at 406.

[86] The discount was stated as 5%. However, Eisai gave a 1% "discount" for any purchase up to 4.99%.