

*E*xclusionary bundling

BY BARRY NALEBUFF*

I. INTRODUCTION

This article introduces the concept of “exclusionary bundling.” Under exclusionary bundling, a firm with market power in good *A* and facing actual (or potential) competition in good *B* prices an *A-B* bundle in a way that makes it impossible for equally-efficient one-good rivals selling *B* to compete. Exclusionary bundling has a foreclosure effect similar to that of predatory pricing, but the two practices have important differences. Unlike traditional predatory pricing, the exclusionary behavior need not be costly to the firm. The intuition is that under predation, the firm actually has to charge a price below cost and thus loses money that it later has to recoup. Under exclusionary bundling, the firm has only to threaten to raise its unbundled prices if the bundle is not bought. All customers are led to buy the bundle and so the threat never need be carried out.

The evidence from antitrust cases suggests that the practice of exclusionary bundling leads to other undesirable effects. When bundle discounts are offered, they are less likely to be passed on to consumers.

* Milton Steinbach Professor, Yale School of Management, New Haven, CT.

AUTHOR'S NOTE: This article has benefited enormously from conversations with Dennis Carlton, Joseph Farrell, Joshua Gans, Scott Hemphill, David Majerus, Doug Melamed, Ben Polak, Joseph Stiglitz, John Thorne, Jean Tirole, and Gary Zanfagna. Al Klevorick and David Sibley were especially generous in sharing their insights. The opinions expressed herein are those of the author.

This is because the bundle discount typically takes the form of a lump-sum price reduction and thus does not lead to lower prices on the margin. Second, buyers find it difficult to compare a bundled price with à la carte offerings. This is especially true when the buyer's demand is uncertain. The reduction in pricing transparency can lead to inefficient choices and low-cost foreclosure, especially when the seller is better informed than the buyer about future demand.

While the formalization of exclusionary bundling is new, the courts have adopted variants of this approach for several decades. Exclusionary bundling is the horizontal analog of a vertical price squeeze. After presenting the theory, this article uses the lens of exclusionary bundling to reexamine the antitrust cases of *SmithKline v. Lilly*,¹ *Ortho Diagnostic v. Abbott Labs*,² and *LePage's v. 3M*.³

II. HOW BUNDLING AND TYING ARE DIFFERENT FROM PREDATORY PRICING

The standard test for predatory pricing is a price below cost and the potential for recoupment. According to Laffont and Tirole: "[P]redation corresponds to a sacrifice of short-term profits in order to boost long-term gains by forcing rivals out of the market. Predation can be profitable only if it leads competitors to exit the market enduringly."⁴ Bundling and tying provide an opportunity to get the gains from foreclosure without suffering the losses.⁵ In that sense,

¹ *SmithKline Corp. v. Eli Lilly & Co.*, 575 F.2d 1056 (3d Cir. 1978).

² *Ortho Diagnostic Sys. v. Abbott Labs.*, 920 F. Supp. 455 (S.D.N.Y. 1996).

³ *LePage's Inc. v. 3M*, 324 F.3d 141 (3d Cir. 2003) (en banc), cert. denied, 124 S. Ct. 2932 (2004).

⁴ JEAN-JAQUES LAFFONT & JEAN TIROLE, *COMPETITION IN TELECOMMUNICATIONS* 163 (2000).

⁵ I include bundling and tying together. Under pure bundling, two goods, *A* and *B*, are only sold together. Under tying, one of the goods, say *A*, is available on its own, but the other is available only when purchased with *A*. In this article, I will emphasize the case where a discount on *A* is contingent on buying all of the customer's demand for *B* from the same firm. This may require monitoring customer purchases.

exclusionary bundling is part of the larger class of exclusionary behavior. But it is different from traditional exclusionary practices where rivals may be foreclosed as a byproduct of an otherwise profitable strategy. Here, foreclosure is not a byproduct, but rather the object of the pricing.⁶

To set the stage, consider a firm that has a monopoly in good *A* and faces a competitive market for good *B*. Customers see the *B* goods as undifferentiated. For simplicity, I will assume the competitive price of *B* is sufficiently low that absent bundling all *A* consumers would buy some amount of *B*. I will refer to the *B* market as the adjacent market to *A*. The adjacency comes from having a common set of customers and a monopolist that is interested in connecting the two purchases.

These assumptions will be met if *A* and *B* are perfect complements so that *A* is valuable only when consumed along with *B*. Think here of hardware and software. Another possibility is that both *A* and *B* are essential inputs in some larger operation, for example, two drugs used in a hospital. It is also possible that the two goods are substitutes, though not perfect substitutes.

In these scenarios, it is possible to foreclose competition in the *B* market via a naked tie. The monopolist could say, "If you want to buy my *A*, you must also buy my *B*." As the competing *B* goods are perfect substitutes, the customers have no reason not to buy *B* from the monopolist. The naked tie results in the elimination of rivals in the *B* market at no cost.

Rarely do firms engage in tying with such a heavy hand. For a firm with market power, such a naked act of tying would be *per se* violation of U.S. antitrust law.

Instead of refusing to sell *A* unless the customer buys its *B* good, the monopolist can achieve the same result via its pricing strategy. The

⁶ See Laffont & Tirole, *supra* note 4, at 161, 163. ("We will define *exclusion* as the incumbent's denying access to rivals through nonprice methods . . . Exclusion is an instrument, not a goal, because it is not intended *per se* to hurt rivals, even though it actually does so . . . [E]xclusion increases the operator's profit while it is practiced.")

monopolist could offer to sell *A* at an à la carte price that is so high no one would ever pay it. For example, the à la carte price of *A* could exceed the bundled price of *A* and *B*. While at extreme prices for *A* the effective naked tie would be obvious, at other prices, the exclusion would be more subtle. How can we tell if a bundle discount is simply a procompetitive price cut or if it has, in effect, created a tied sale? Answering this question is what leads to the concept of exclusionary bundling.

Let the monopoly price of *A* be denoted by m and the competitive price of *B* by c . An economic tie can be accomplished in two distinct fashions: underpricing the competitive *B* good and overpricing the monopolized *A* good; or threatening to raise the price of the monopolized *A* good *unless* the competitive *B* good is also purchased from the firm.

We consider each of these tactics in turn.

A. Underpricing the adjacent good

This tactic is easiest to illustrate when *A* and *B* are bought in fixed proportions, for example, one to one. If the firm with a monopoly in *A* prices its *B* good at $c - \epsilon$ and *A* at $m + \epsilon$, then all customers will be indifferent. The total package price is $m + c$ in both cases.

While the monopolist is charging a price below cost in *B*, it is recouping that loss immediately in the *A* market and thus suffers no loss. Rivals are at a disadvantage in that they can't play the same game.

The problem is that the rival firms can't compete at any price below c . They don't have a way to recover the below-cost pricing by charging more for some other product—as they have no other product for which they can raise the price.

Note that in this example, no tie is required. The monopolist need not require that customers buy its *A* and *B* goods together. As the firm is the only source of the *A* good, it will capture the entire *A* market by default. As the firm has the lowest price of the *B* goods, it will capture this entire market as well. The assumption that the goods are used in a fixed proportion ensures that there is no distortion caused by the mispricing in the components. Total

demand depends on the combined price, $m+c$, and this price maximizes the monopolist's profits.⁷

For an example of this practice, consider the software market. Imagine that Microsoft's optimal monopoly price for *A* (Windows) is 100 and that there is some complementary *B* software package that has a competitive price of 5. (The price is above zero reflecting marginal costs of distribution and customer support.) All *A* customers also buy *B* and spend a total of 105. In this initial scenario, Microsoft is only one of several sellers in the *B* market.

Consider what would happen if Microsoft were to cut the price of *B* to 0 while raising the price of *A* to 105. Microsoft would earn the same profits as in the previous outcome. Anyone who was willing to buy Windows at 100 and *B* at 5 would also be willing to buy Windows at 105 when *B* is free. The only difference is that now Microsoft captures all of the *B* market.

Although rivals are excluded, there is no immediate harm to consumers, as they are paying the same price and do not place a value on product variety. By the same token, it might also appear that there is no gain for the monopolist from this foreclosure. While that is true in the short run, the changed market structure may confer long-run benefits. The elimination of *B* rivals may help protect the *A* monopoly. If potential entrants into the *A* market need a good *B* to make their package whole, they will now be at a disadvantage as the competitive complements market will have disappeared. It might also be possible that the *A* monopolist will gain power in the *B* market. If entry is costly, then rivals may not reappear after exiting, especially if they anticipate that the *A* firm can repeatedly drive them out via a costless cross-subsidy.

B. Making threats

There is a second way that the firm with market power in *A* can engage in costless foreclosure. It can raise the price of *A* unless the

⁷ In this example, the analogy with the vertical price squeeze is even closer. Instead of the producer using the monopoly product *A* as an essential input into the production of some final good, the consumer requires good *A* as an essential input into the production of utility from good *B*.

customer buys its *B*. Assume that prior to the threat, the monopoly price of *A* is m and the competitive price of *B* is c . The firm can say to its customers, "The new à la carte price of *A* is $m+\epsilon$, unless you agree to buy all of your *B* demand from me at price c , in which case the price reverts back to m ."⁸ Note that for any value of ϵ , the customer is better off buying the *B* good from the monopolist. Even the smallest price increase for an à la carte purchase of *A* is enough to exclude equally efficient rivals.

Although the à la carte price of *A* is *above* the monopoly price, there is no loss to the firm, as it does not expect to make any sales at the inflated price. In equilibrium, all customers buy their *B* from the firm and thus are able to buy *A* at the profit-maximizing price of m . Rivals are excluded, as it would appear to the customer that buying the rival's *B* product is the but for cause of having to pay an extra ϵ for good *A*.⁹

In contrast, for the firm to engage in predatory pricing in the *B* market, it would have to charge $c-\epsilon$, and lose ϵ on each sale. With the tied sale strategy, the monopolist suffers no losses. The increase in the à la carte price of *A* is a threat that does its job and thus never has to be carried out.

The assumption that all *A* consumers are indifferent about the rival *B* goods is a simplification. If this were not the case, then the firm might actually have to raise the price of *A* to some of its customers who reject the deal. Thus it is worth noting that for small ϵ , the threat is almost costless to carry out. If the à la carte price of *A* were raised to $m+\epsilon$, the cost would almost entirely be borne by the consumer. The increase in the price of *A* imposes a first-order cost on the consumer (the cost is proportional to ϵ), but only a second-order cost to the firm, as m is the optimal price.

⁸ Note that the customer might not have any demand for *B*. In this case, the customer can still agree to the bundle and buy *A* at an à la carte price of m .

⁹ The cost of buying both *A* and *B* from the monopolist is (m, c) , while the cost of buying *A* from the monopolist and *B* from the competitive market is $(m+\epsilon, c)$. How much of a discount rivals would have to offer in *B* to offset the increase in the price of *A* depends on the ratio of consumption of the two goods and the loss from reduced consumption in response to higher prices.

Unless single-product rivals have greater efficiencies that allow them to discount their *B* product to offset the threatened price increase in *A*, they will be foreclosed from the market. Once again, there is no immediate loss to consumers from this exclusion.¹⁰ But, as before, eliminating rivals in the *B* market can make subsequent entry harder in either *A* or *B* and thus prolong the incumbent's market power as well as create the potential to use market power in *B*.

The difference between tying and predation is that with predation the firm actually has to charge a price below cost and thus lose money. With tying, the firm can either recoup that cost immediately (by raising the price of *A*) or achieve the exclusion at no cost at the start by threatening to raise the *à la carte* price of *A*, while maintaining the optimal price if the customer accepts the tied sale.

Foreclosure via tied or bundle pricing is the horizontal equivalent of a vertical price squeeze. In a vertical price squeeze, a monopolist has control of an essential input. The price of that input is raised to a level above the monopoly price. This forecloses other firms from using that good as an input and thus also forecloses them from the output market.

For example, imagine that Coca-Cola has a monopoly in cola syrup and that a unit of syrup can be turned into a unit of cola via a competitive process at cost c . Further assume that syrup has zero marginal cost and that were cola to be monopolized it would be sold at a unit price of m . The syrup monopolist can achieve the full monopoly profits by selling syrup at a price of $m-c$. The syrup monopolist can also price syrup at a level higher than $m-c$, while converting its own syrup to cola and selling it at a price of m . In so doing, the firm will continue to earn the full monopoly profits and will also achieve a monopoly in the output market. Equally efficient rival firms will not be able to enter the cola market—the market price of cola is m , an essential input costs more than $m-c$, and that leaves rivals with less than c to convert syrup to cola.¹¹

¹⁰ Consumers can lose out and social welfare can fall from the exclusion of *less* efficient rivals if their departure leads to inefficient monopoly pricing or an inefficient change in R&D incentives.

¹¹ Note that the analogy between vertical and horizontal bundling is close, but not perfect. Call the syrup good *A* and the conversion from syrup to cola good *B*. In the vertical model, there is no direct advantage to

III. EXCLUSIONARY BUNDLING

The simple examples of foreclosure are the motivation for a definition of when a bundle discount is exclusionary. A bundle discount leads to foreclosure if even the *monopolist* could not afford to sell *B* at a large enough discount to offset the loss of the bundle discount. More formally, I refer to this type of bundle pricing as exclusionary bundling.

Exclusionary bundling arises when a firm has market power in product *A* and faces competition in product *B*. A firm engages in exclusionary bundling when the incremental price for an *A-B* bundle over *A* alone is less than the long-run average variable costs of *B*.

The *A-B* bundle discount is measured relative to the à la carte prices of *A* and *B*. The discount could be offered for buying *A* and *B* together in a bundle or in return for an agreement to purchase all of the customer's needs for *B* from the monopolist.¹²

Recall the two motivating examples. In the first case, the *B* good is underpriced at $c-\epsilon$ and *A* is overpriced at $m+\epsilon$. The bundle is still priced at $m+c$, and the incremental price for an *A-B* bundle over *A* alone is $c-\epsilon$. This is an exclusionary bundle as the monopolist cannot make a profit selling good *B* at a price of $c-\epsilon$. In the second case, the monopolist sells *A* at m if the customer agrees to also buy its *B* good and otherwise at a price of $m+\epsilon$. Here, too, the incremental price for an

having a monopoly in both goods *A* and *B*. In contrast, in the horizontal case, a monopolist can generally make more money by having two monopolies. (The exception is when the two goods are perfect complements, but in that case, there is little distinction between the horizontal and vertical relationships. If one thinks of the consumer as requiring *A* and *B* to produce utility, then the vertical relationship is just shifted from production to consumption.) The obvious difference is that in the horizontal case, there are two markets to be monopolized rather than one. In both cases, the monopolist in *A* might want to foreclose firms in the *B* market so as to preserve its *A* monopoly. In the vertical case, the monopolist might worry that *B* firms would be able to backward integrate. In the horizontal case, firms might worry that *B* would be the launching pad for entry into *A*.

¹² In some cases, the exclusivity agreements allow the buyer to obtain some small percentage of its *B* goods from other firms.

A - B bundle over A alone is $c-\epsilon$. This is again an exclusionary bundle as the monopolist cannot make a profit selling good B at a price of $c-\epsilon$.

The intuition behind the test is that exclusionary bundling forecloses equally efficient rivals. While this is straightforward to determine in a one-good environment, extending the definition to include multi-good sales is more challenging in that one has to correctly measure both price and cost.

MEASURING PRICE Even when the monopolist lists separate prices for goods A and B as part of the bundle, these prices may not correspond to the true economic prices. The correct price to attribute to good B is how much more the customer would have to pay to buy both A and B from the monopolist compared to A alone. If the customer loses a discount on A as a result of buying B elsewhere, that loss should all be attributed to an implied discount on B . Thus, the true cost of B depends on the expected quantity purchased. An example of how this calculation is done can be seen in the “shampoo” excerpt from the *Ortho v. Abbott*¹³ case discussed below.

MEASURING COST Just as we measure price by looking at the incremental spending by the consumer to buy both A and B rather than A alone, we should measure cost in a similar fashion. The long-run average variable costs associated with selling B are those that the monopolist incurs by selling B given that it is already selling A .¹⁴ In

¹³ *Ortho Diagnostic Sys. v. Abbott Labs.*, 920 F. Supp. 455 (S.D. N.Y. 1996).

¹⁴ In practice, measuring long-run average variable costs is a challenge. Which costs are variable and which costs are fixed is often a matter of perspective. Einer Elhauge, *Why Above-Cost Price Cuts To Drive Out Entrants Are Not Predatory—and the Implications for Defining Costs and Market Power*, 112 *YALE L.J.* 681 (2003) helps clarify this debate. In the context of predatory pricing, he emphasizes that what should be considered fixed and what should be considered variable depend on the time period of predation:

[F]or purposes of predatory pricing law, one should thus not distinguish between sunk, fixed, avoidable, and variable costs with general definitions about whether they are escapable in a limited period, or need to be incurred to produce any output or to produce anything beyond the first unit of output. Rather, the question of whether (and what) costs to consider should depend solely on

that sense, to the extent that the monopolist is able to take advantage of any economies of scope, it can attribute all those economies to *B*. An equally efficient rival would have to have the same economies of scope from some other operation or be sufficiently more efficient to have the same production costs. When there are economies of scale in the tied product, then only one firm may end up producing, but the rival has an equal opportunity—a monopolist would not be able to automatically exclude a rival with the same scale economies.

As the measurement of price and cost should make clear, the definition of exclusionary bundling is not meant to imply that a monopolist has a duty to maintain competition. It need not reduce its efficiency or charge inflated prices to create a price umbrella for inefficient rivals. I only require that the firm not engage in strategies that exclude equally efficient rivals.

Of course, there is always a practical problem in determining if a rival firm is equally efficient or not. This problem is compounded for the monopolist who is looking for a bright line test to know whether its bundled pricing might be exclusionary or not. The solution to both these problems is to pick the monopolist itself as the equally efficient rival. If the monopolist loses money as a result of its bundled sale compared to selling the same quantity of *A* at its à la carte price, then we may conclude that equally efficient rivals are excluded.

It is easy for the monopolist to see if it is violating the test: do the incremental profits from selling *B* justify the reduced profit from the discount on *A*? In performing this comparison, the monopolist uses the quantity of *A* sold in the bundle.¹⁵

If the quantity demanded for *A* is exogenous, then the test perfectly reflects what the customer expects to pay in the bundle and

whether they could be varied during the time period of the alleged predation. . . . I will thus call a cost "variable" if it could be altered during the period of alleged predatory pricing, and "fixed" if it could not be altered during that period.

Id. at 707-10.

¹⁵ As discussed below, it is the quantity of *A* the customer expects to purchase at the time the contract is signed, not what the customer ends up buying *ex post*, nor what the monopolist expects to sell.

when buying *à la carte*.¹⁶ When demand is variable, then using the bundle sales quantity in the test will overstate the extent of foreclosure.

The issue can be seen in the following stylized example. Set the *à la carte* price of *A* at \$100 and the bundle prices at \$50 for *A* and \$50 for *B*. Furthermore, imagine that at \$100, demand for *A* is 0, while at the bundle prices, demand is 1 for each of *A* and *B*. According to the test, the implied price of *B* is 0, as there is no incremental cost of buying the bundle over one unit of *A* alone. Provided *B* has any costs, a monopolist offering these prices would be engaged in exclusionary bundling.

But that conclusion overstates the extent of foreclosure. Imagine that consumers as a group value *A* at \$60. In that case, the purchasing customers' loss in having the price rise from \$50 to \$100 is not \$50 but only \$10. Hence a rival that could sell *B* for less than \$40 would not be foreclosed. This is the sense in which the exclusionary bundling test can overstate the extent of foreclosure.

Although I raise this issue, I do not see this as a problem with the test. In the example above, the monopolist has no legitimate business justification for charging \$100 as the *à la carte* price. Charging \$60 or \$100 both choke off all demand. A monopolist that charges a price of \$100 for *A* is really not offering a legitimate *à la carte* price and, in that sense, is engaging in a forced tie. The firm is only making its *A* available if the customer also buys its *B*. A monopolist that wants to avoid this charge must lower the *à la carte* price of *A* to below \$60.

¹⁶ A potential consistency problem arises with exogenous demand in a monopoly market: why doesn't the monopolist charge an infinite price? The reason is that demand is exogenous conditional on purchasing the good. If the price is too high, then the customer might decide to forgo all consumption or to create an alternative. For example, if a patented drug is put on a formulary, then its use is exogenously determined by the number of patients requiring the treatment. But if the pharmaceutical company charges too high a price, then the drug may be kept off formulary and there may be little or no demand. Even with essential products, demand may be all or nothing. For example, the monopolist who charges too high a price could lose out to import substitution. It is interesting to note that many of the court cases on bundling have involved drugs or hospital supply products.

The more general case arises when demand for *A* is continuously variable. For illustrative purposes, let there be a single customer with a demand curve represented by $Q = 100 - P$. If costs for *A* are zero, then the monopoly price is \$50, which we take as the à la carte price. How should we treat a bundle where *A* is priced at \$40 and *B* at \$15?

With the lower bundle price, demand for *A* rises from 50 to 60. According to the test, an extra \$10 on 60 units implies a sacrifice of \$600 by giving up the bundle. For simplicity, let the demand for *B* be inelastic and equal to 100 units. Under the exclusionary bundling test, the implied price for *B* is then \$9—the \$15 list price minus the \$600 savings on *A* divided by the 100 units of *B*.¹⁷ Thus, the bundled price offer is exclusionary if the monopolist's long-run average variable cost of producing 100 units of *B* exceeds \$9 per unit. In this case, the test may overstate the extent of exclusionary bundling as not all 60 units would be bought at a price of \$50 and hence a rival need not undercut the price of good *B* by \$600.¹⁸

There are two alternative ways to calculate the implied price of *B*. One option is to look at the quantities purchased at the à la carte prices. But, as discussed above, those quantities could be zero if the à la carte price is designed as a threat. Even when the quantities are not zero, using the expected demand associated with the à la carte prices will always understate the extent of foreclosure.

A second option is to look at the lost consumer surplus. In our example, a price increase for *A* from \$40 to \$50 reduces consumer surplus by \$550—the \$500 extra paid on the 50 units still purchased at \$50 plus the loss of \$50 of consumer surplus on the ten unpurchased units valued between \$40 and \$50. As giving up the bundle sacrifices \$550 of surplus, a rival would have to offer *B* at a price below \$9.50 to

¹⁷ More formally, the cost of buying the *A-B* bundle is $(\$40 \times 60 + \$15 \times 100)$. The cost of buying *A* alone is $\$50 \times 60$. (Note that we hold the quantity of *A* fixed.) Thus the incremental cost of buying the bundle is $(-\$10 \times 60 + \$15 \times 100)$ or \$9 on a per-unit basis.

¹⁸ As discussed below, this approach may not lead to an overstatement if buyers employ the bundled sales quantities in a rule of thumb calculation when comparing the bundle discount to the à la carte offerings.

be competitive with the bundle.¹⁹ Using this measurement, the bundle price would be exclusionary if the monopolist's long-run average variable cost for *B* exceeded \$9.50.

While the consumer surplus measurement is the theoretical ideal, it may not be practical or accurate, even if feasible. It is hardly practical for a rival firm selling good *B* to estimate the demand curve for the monopolized good *A* in order calculate the required discount to offset the lost consumer surplus. Even the customer is unlikely to have that level of sophistication.

Consider the challenge for LePage's when competing for Sam's Club business against a bundle discount from 3M. It appears that Sam's would have given up \$264,000 of its volume rebate from 3M if it bought generic tape from LePage's.²⁰ To get Sam's business, LePage's would have had to offset that loss with \$264,000 savings on its tape products. Whether that is really right depends on how the sums were calculated. If Sam's chose LePage's tape and thus expected a lower rebate, it might have priced its goods differently. Unless the courts did a full analysis of demand elasticity at Sam's for 3M's full product line, we don't know how much less Sam's would have made.

It does not appear that Sam's went through the exercise of reoptimizing its prices to estimate the true cost of losing part of the volume rebate. According to LePage's brief to the Third Circuit, "Sam's Club did the math for missing the target in one product line and realized that its rebate would decrease 'from \$441,000 to \$176,000, a penalty of \$264,000.'"²¹ Buyers may follow the simple rule of looking at expected sales under the bundle prices and ask how much more they would have to pay if they lost the discount.

Not only is the consumer surplus calculation complicated, it is correct only if the consumer actually uses this approach when deciding which offer to accept. If the customer holds volumes fixed

¹⁹ The \$9.50 is the \$15 price for *B* charged in the bundle minus the \$550 surplus lost (because of the higher price for *A*) divided by the 100 units of *B*.

²⁰ See *LePage's Inc. v. 3M*, 324 F.3d 141, 154 (3d Cir. 2003).

²¹ Brief for Appellees at 12, *LePage's v. 3M*, 324 F.3d 141 (3d Cir. 2003) (No. 00-1368).

and thus overestimates the increased cost of moving to à la carte pricing, then this is the appropriate calculation to determine whether the rival is foreclosed or not.

The goal of the exclusionary bundling test is to see if the monopolist itself could afford to sell *B* on an à la carte basis when competing against its own bundle. In performing this calculation, we take the customer as it is, not as it should be in an ideal world.

While the issue of variable quantities introduces some theoretical issues, the good news is that they are of second-order. To the extent that the price discounts are small, the change in consumer surplus is closely approximated by the change in expenditure using the quantities at the chosen prices.

It may help clarify the definition of exclusionary bundling by comparing it to the two-pronged test proposed by the district court in *Ortho v. Abbott*:

[T]his Court holds that a Section 2 plaintiff . . . must allege and prove either that (a) the monopolist has priced below its average variable cost or (b) the plaintiff is at least as efficient a producer of the competitive product as the defendant, but that the defendant's pricing makes it unprofitable for the plaintiff to continue to produce.²²

The first part of the test would be equivalent to the exclusionary bundling test *if* prices and costs were calculated in a way that reflected the true economics of the bundle pricing. But, as the court makes clear in its discussion of shampoo and conditioner pricing, the price referred to is the price listed as part of the bundle. Indeed, the court provided an example of how package pricing could lead to foreclosure even though the listed price of each component in the bundle is above the component's cost.

Assume for the sake of simplicity that the case involved the sale of two hair products, shampoo and conditioner, the latter made only by A and the former by both A and B. Assume as well that both must be used to wash one's hair. Assume further that A's average variable cost for conditioner is \$2.50, that its average variable cost for shampoo is \$1.50, and that B's average variable cost for shampoo is \$1.25. B therefore is the

²² *Ortho Diagnostic Sys. v. Abbott Labs.*, 920 F. Supp. 455, 469 (S. D. N.Y. 1996).

more efficient producer of shampoo. Finally, assume that A prices conditioner and shampoo at \$5 and \$3, respectively, if bought separately but at \$3 and \$2.25 if bought as part of a package. Absent the package pricing, A's price for both products is \$8. B therefore must price its shampoo at or below \$3 in order to compete effectively with A, given that the customer will be paying A \$5 for conditioner irrespective of which shampoo supplier it chooses. With the package pricing, the customer can purchase both products from A for \$5.25, a price above the sum of A's average variable cost for both products. In order for B to compete, however, it must persuade the customer to buy B's shampoo while purchasing its conditioner from A for \$5. In order to do that, B cannot charge more than \$0.25 for shampoo, as the customer otherwise will find A's package cheaper than buying conditioner from A and shampoo from B. On these assumptions, A would force B out of the shampoo market, notwithstanding that B is the more efficient producer of shampoo, without pricing either of A's products below average variable cost.²³

While the listed price of shampoo is \$2.25 when bought as part of the package, the true economic price is \$0.25. This example is useful in that it demonstrates the logic of incremental pricing and the potential to leverage market power.²⁴ Indeed, the court shows just how the package pricing would be a case of exclusionary bundling. The incremental price of the bundle over the à la carte price of conditioner alone is \$0.25, which is less than the monopolist's costs.²⁵

²³ *Id.* at 467.

²⁴ This example is not, however, a case of no-cost exclusion. Charging bundle prices of \$3 for the conditioner and \$2.25 for the shampoo leads to profits of \$1.25. If, instead, the conditioner monopolist charged \$1.50 for the shampoo, \$3.75 for the conditioner and made these prices available on an à la carte basis, profits would remain at \$1.25, but the competitor would no longer be excluded. Going further, the monopolist could charge \$1.40 for the shampoo (\$0.10 below cost) and \$3.85 for the conditioner (for the same total price of \$5.25) and still make \$1.25. The more efficient rival could sell its shampoo at \$1.40 (or even \$1.39), leaving the monopolist to sell only the conditioner at \$3.85. The result leads to increased profits of \$1.35. Because the two goods are perfect complements and are consumed in fixed proportions, exclusion of a more efficient rival will lead to lower profits.

²⁵ This conclusion is not without controversy. For an opposing view, see PHILLIP AREEDA & HERBERT HOVENKAMP, *ANTITRUST LAW: AN ANALYSIS OF ANTITRUST PRINCIPLES AND THEIR APPLICATION* 509 (2d ed. 2001). Areeda and Hovenkamp provide two arguments to justify a bundle where the overall

The idea of the exclusionary bundling test is to calculate the true economic cost to the customer of buying the competitive good from the monopolist and then to compare that with the monopolist's economic cost of producing that good. Thus the exclusionary bundling test would calculate the price of the shampoo as \$0.25, not the listed \$2.25.

The second part of the court's proposed test comes close to this approach, but is still different on several accounts. The first difference is that the court looks to see whether the defendant's pricing makes it unprofitable for the *plaintiff* to continue to produce. The exclusionary bundling test asks whether the defendant's pricing makes it unprofitable for the *defendant* to sell the competitive good on an à la carte basis. There is always the question of what equally efficient means, both in theory and in practice. But there can be no argument that the monopolist is equally efficient to itself.

Parts (a) and (b) of the *Ortho* test²⁶ can be translated into the exclusionary bundling test as follows:

price exceeds cost. First, they interpret an exclusionary bundle as a discount on the monopoly product. This is illustrated by reference to *Multistate Legal Serv. v. Harcourt Brace Jovanovich*, 63 F.3d 1540 (10th Cir. 1995). Here, Harcourt had 80% of the full service bar exam prep market and then added a supplemental Multistate Bar Exam ("MBE") course for free. Since the incremental price of the MBE course was zero, I classify this as exclusionary bundling. Areeda and Hovenkamp see this as a quality improvement (or price discount) on the original bar exam product. I would agree *if* Harcourt had continued to offer the original full service course at a discounted price relative to the "improved" bundle. But they didn't. They only offered the monopoly product as part of a package deal. Areeda and Hovenkamp's second point is that the lower price can lead to increased sales and profits that more than offset the subsidy. In their example, Harcourt adds a \$15 supplemental test (for free) to its original \$500 full course and thereby increases its sales from 100 units to 150 units. If this were indeed profitable, then they could equally well have discounted their regular course without the supplemental test to \$485 while keeping the bundled offering at \$500. This should lead to at least 150 sales of the regular course (as the bundle at \$500 is still available and thus all customers who bought the bundle should now buy either the bundle or the regular course on an à la carte basis). But, now, equally efficient rivals can sell the supplemental course at \$15 and are no longer foreclosed from the market.

²⁶ *Ortho v. Abbott*, 920 F. Supp. at 469.

- (a) the monopolist in *A* has set the incremental price for an *A-B* bundle over *A* alone below its average variable cost for *B*; or
- (b) that the defendant's pricing makes it unprofitable for the defendant to sell the competitive good at a price that would lead the customer to forgo the bundle.

With this translation, both conditions are the same test. If the monopolist does not engage in exclusionary bundling, then an equally or more efficient plaintiff operating at the same scale as the monopolist will not be foreclosed.

The shift from plaintiff to defendant's profitability helps highlight a second difference between the exclusionary bundling test and the *Ortho* test: the exclusionary bundling test does not consider the size or capacity of the rival.²⁷ Take the case where the monopolist offers a \$100 rebate if the buyer takes all of its *A* and *B* demand from the monopolist. For simplicity, imagine that the buyer's expected demand for *B* is 100, so that the lump-sum discount translates into \$1 per unit. Assume that the \$1 discount does not lead to a price below cost so that this is not a case of exclusionary bundling.

Now consider a plaintiff that is equally efficient in producing *B*, but has a capacity limit of 10 units. In this case, the buyer would have to give up the \$100 rebate in order to buy just 10 units from a rival (and 90 units from the monopolist). That would require the plaintiff to discount each item by \$10, rather than \$1. Assume that a \$10 discount does lead to a price below cost. One interpretation of the *Ortho* test is that the monopolist's pricing makes it unprofitable for the rival to continue to produce its 10 units.

This example shows how an "equally efficient" rival might not be able to profitably sell against a bundle discount even though the monopolist is not engaging in exclusionary bundling. In that sense, exclusionary bundling is a weaker test. Of course, there are interpretations that harmonize the two approaches: one could say that the rival—because of its capacity constraint—is not equally

²⁷ I thank Laura Cole for bringing up this point. See Laura Cole, *Bundled Rebates Under LePage's v. 3M—A Sticky Situation* (December 9, 2004) (unpublished undergraduate essay, Yale University)(on file with the author).

efficient at producing the same quantity as supplied by the monopolist.

It is an interesting question whether the test should protect a firm with limited capacity from being foreclosed. On the one hand, an incumbent monopolist would have no way of knowing the size or capacity of potential rivals. Even a small bundle discount could be exclusionary if a rival has a tiny capacity. On the other hand, such foreclosure would only be caused by an exclusivity or near-exclusivity clause in the bundle discount. If the bundle discount had a sliding scale based on how much *B* was bought, then equally efficient, but small, rivals need not be excluded.

The exclusionary bundling test sidesteps the issue of capacity constraints by using the economics of the monopolist. If a \$100 rebate on *A* translates to a \$1 per unit discount on *B*, and that discount leads to a price below long-run average variable cost, then we have a case of exclusionary bundling whether the plaintiff rival has 1 unit of capacity or 100.

A third and important difference is that the *Ortho* test is not explicit on how to handle variable quantities. Let me be clear on how the exclusionary bundling test proceeds. Assume that the à la carte price of *A* is ϵ more than the bundle price of *A*. Furthermore, assume that a customer purchases quantities q_a and q_b of *A* and *B* at the bundle prices. Define the discount δ by $\delta \times q_b = \epsilon \times q_a$. If good *B* at discounted price $p_b - \delta$ is below the monopolist's cost then we have a case of exclusionary bundling for that customer. The reason is that a rival equally efficient to the monopolist could not afford to offer the customer a price of $p_b - \delta$ and thereby induce the customer to forgo the bundle discount. When consumer demand is heterogeneous, we can order customers by their ratio q_a/q_b . Set r^* so that the monopolist's long-run average variable cost is equal to $p_b - \epsilon r^*$. The set of customers with a ratio q_a/q_b above r^* is the part of the market that will be foreclosed.²⁸

²⁸ This assumes that all consumers are given the same price option. Bundle discounts may be negotiated with each consumer, in which case the calculation is made consumer by consumer.

Variable demand can increase the attractiveness of bundled discounts to a monopolist. Imagine that à la carte prices are $p_a = 50$ and $p_b = 10$. Let demand for good A be represented by $Q = 100 - P$ and demand for good B be fixed at 20. For simplicity, we assume this demand comes from a single customer and that marginal costs for A are 0 and B are 10. If the monopolist offers to sell A at 49, demand increases to 51. Profits only fall by 1 ($50 \times 50 - 49 \times 51$), but the buyer is at least 50 better off. Hence, the monopolist could attract this customer with a bundle offer where the price of A is 49 and the price of B is 11. (The price reduction from 50 to 49 is conditional on the customer buying all of its B demand at a price of 11.) The customer saves at least 50 on A and gives back 20 on B for a net savings of at least 30. To persuade the customer to forgo the discount on A , the à la carte price of B would have to fall below 8.5; and this is below cost and hence exclusionary.

What is particularly intriguing about this example is that the exclusion was accomplished with an increase in profits. The increased revenue on B (\$20) much more than offsets the \$1 reduced profit on A . The B good is used to achieve a two-part tariff and this reduces the inefficiency of a monopoly.²⁹

Based on this insight, Greenlee, Reitman and Sibley (GRS)³⁰ developed an antitrust test to evaluate bundled pricing. They observe that if the monopolist creates a bundle discount starting from a position with à la carte prices, the result will lead to an improvement in consumer welfare. The reason is straightforward: lower prices benefit customers.³¹ This leads GRS to object only to a bundle discount that is

²⁹ The potential to leverage monopoly power across markets via bundle pricing is explored in much greater depth in Frank Mathewson & Ralph A. Winter, *Tying as a Response to Demand Uncertainty*, 28 RAND J. ECON. 566 (1997); PATRICK GREENLEE, DAVID REITMAN & DAVID SIBLEY, AN ANTITRUST ANALYSIS OF BUNDLED LOYALTY DISCOUNTS, Economic Analysis Group Discussion Paper EAG 04-13 (Oct. 2004), available at <http://ssrn.com/abstract=600799>; and BARRY NALEBUFF, *Bundling as a Way to Leverage Monopoly*, YALE SCH. OF MGMT. Working Paper No. ES-36 (2004), available at <http://ssrn.com/abstract=586648>.

³⁰ Greenlee, Reitman & Sibley, *supra* note 29.

³¹ And the monopolist can also make higher profits, too, as seen in the example above.

achieved via an increase in the à la carte prices. (They note that this was the case in *SmithKline*.) Their test does not appear to consider the size of the discount. In contrast, the exclusionary bundling test is based on the size of the discount and does not distinguish between a threat to raise the à la carte price of *A* and an offer to lower the bundle price.

While it is true that with variable demand an exclusionary bundle discount can improve social welfare, the gains arise from reducing the inefficiency of a monopolist. The problem is that the bundle discount also allows a firm to leverage its monopoly from one market to another. A monopolist can exclude an equally efficient competitor, where the rival has all of the same economies of scale and scope in production. The rival is only missing the ability to reduce inefficient monopoly pricing in an adjacent market. To the extent that exclusionary bundling allows a monopolist to profitably disrupt competition in a large number of adjacent or even unrelated markets, this vastly increases the potential harm caused by a monopoly.

The fact that welfare rises is not a sufficient justification to engage in exclusionary bundling. It does not demonstrate that the welfare gains could not have been achieved in a different manner without causing foreclosure. If a monopolist seeks to engage in a two-part tariff, it should do so directly by charging a lump-sum fee rather than requiring that the consumer purchase its complementary good at an inflated price. One could argue that the ability to use an adjacent good to engage in price discrimination or to extract a lump-sum fee is an economy-of-scope efficiency that the rival does have. My response is that the monopolist must find some other way to capture those efficiencies without distorting competition in other markets. If a lump-sum charge is less opaque to consumers and thus harder to implement, that is not a sufficient excuse to foreclose equally efficient rivals.

A similar issue arises when the bundle discount is used as a price discrimination tool.³² The bundle discount increases the monopoly profits and at the same time may foreclose competitors.³³ A potential

³² I am particularly grateful to Doug Melamed for his challenges on this point.

³³ See Barry Nalebuff, *Bundling as an Entry Deterrent Device*, 119 Q.J. ECON. 159 (2004).

entrant into *B* has two choices. It can price the rival *B* good in a way that, combined with the incumbent's good *A* price, undercuts the bundle. But this may not cover its cost. Or, it can price *B* higher and limit its sales to customers who are interested in buying *B* and not *A*. But there may not be enough of these customers to achieve minimum efficient scale or to justify entry.

The application of exclusionary bundling in the context of price discrimination bundles is discussed in the appendix. While bundling for the purposes of price discrimination is an interesting theoretical possibility, it may be of limited relevance to the bundling cases seen in the courts. This follows for two reasons.

First, there may not be any meaningful set of customers who might buy good *B* and not *A*. In cases of medical products (both *SmithKline v. Lilly* and *Ortho v. Abbott*), there were no customers who would buy only *B*. Even in *LePage's*, it is not clear that any office supply store would be willing to forgo carrying Scotch tape (at the *à la carte* price). If everyone is buying the bundle, then the relevant question is what is the bundle price. There are two ways to buy the bundle. One option is to pay the bundle price from the monopolist. The second is to make a mix-and-match package using the monopolist's good *A* and the rival's *B*. This is the approach taken by the exclusionary bundling test.

Second, price discrimination is a response to the inefficiency caused by having one price to all customers. In the case of business-to-business transactions, each customer can be given an individualized price. (This was the case in *LePage's v. 3M*.) With individualized pricing, there is little to be gained from bundling.³⁴ With different prices charged to each customer, the exclusionary bundling test can be applied on a customer-by-customer basis.

One final question to consider is whether the adoption of the exclusionary bundling test might lead firms to change their behavior

³⁴ The exception to this conclusion arises when the customer value is unknown. In that event, the seller doesn't know what price to charge and the situation is similar to the one-price-to-all case. More generally, the gain from bundling declines when the seller is better informed about the customer's valuation for *A* and *B* and has the ability to charge different prices across customers.

in a way that undermines or manipulates the test. A monopolist that is selling a bundle could costlessly lower its à la carte prices and thereby avoid failing the test.³⁵ But this is exactly the desired outcome in that the monopolist would no longer be foreclosing equally efficient rivals. Even if the à la carte prices are still not chosen, the point is that they could now be chosen if an equally efficient competitor enters with a rival *B* product. In contrast, the GRS test relies on observing the monopolist raise its à la carte price. Anticipating this test, a monopolist could start out with high à la carte prices.

Exclusionary bundling is meant to be a necessary, but not a sufficient, test for an antitrust violation. The magnitude of foreclosure to the *B* market should also be considered in determining the existence of a violation. The exclusionary bundling test evaluates whether one-good rivals can successfully compete for customers interested in purchasing *A* and *B*. This does not show what fraction of the *B* market is foreclosed. That depends on the overlap between the customers of *A* and those of *B*. Specifically, rivals will not be foreclosed from the market of customers who buy little or no *A*. Antitrust issues loom largest when almost all customers purchase both *A* and *B* and thus the entire *B* market is subject to foreclosure. A large overlap is possible even when the two products are substitutes rather than complements. For example, in the *LePage's* case, most supply stores carried both Scotch tape (*A*) and generic transparent tape (*B*).³⁶

A last hurdle is to confirm that the monopolist could have reasonably understood that its tie or bundle discount would have the effect of foreclosing rivals. This escape valve is designed to prevent cases where the monopolist can demonstrate that it had no reason to expect that its bundle discount would be exclusionary. Such a defense might arise if the monopolist expected a much larger demand for good *B* than the buyer *and* the monopolist had no understanding of the customer's different perspective. This issue is discussed at length in the next section.

³⁵ The change would be costless so long as no one buys at the à la carte prices.

³⁶ *LePage's Inc. v. 3M*, 324 F.3d 141 at 156, 174 (3d Cir. 2003).

When the foreclosure is significant and the monopolist could have reasonably understood the effect of its pricing, I am in favor employing a per se rule against exclusionary bundling. Unlike the predatory pricing test, there is no need to establish likely recoupment. This is because exclusionary bundling can be done at no cost. The two-part test for predatory pricing is reduced to the first part alone, appropriately adjusted for the correct calculation of price and cost under package or bundled pricing. The price/cost test is much more amenable to a per se rule.

For an antitrust test to be practical, firms must have a bright-line safe harbor. They need to know that if they follow certain pricing rules, they will not be guilty of an antitrust violation. The safe harbor is in the exclusionary bundling test. The monopolist in *A* only needs to establish that it could profitably sell *B* at the implied incremental price that allows the customer to purchase *A* and *B* à la carte rather than via the bundle or tied sale. If the bundle discount is so large that the monopolist could not sell *B* at a price that allows customers to choose the à la carte option, then the monopolist has no safe harbor. If foreclosure is relevant to a significant share of the market and this was in any way predictable, the company would be guilty of an antitrust violation.

Sections IV and V discuss the role of expectations and whether bundle discounts may protect monopolies in other ways. Section VI shows how the exclusionary bundling test could be applied in practice by looking at three antitrust cases: *SmithKline v. Lilly*, *Ortho v. Abbott*, and *LePage's v. 3M*.

IV. THE ROLE OF EXPECTATIONS

In the discussion above, the calculations were simplified by the assumption that demand for *A* and *B* was known with certainty. The exclusionary bundling test becomes more complicated when demand for *A* and *B* is uncertain. Evaluating the true cost of the bundle versus the à la carte prices requires an expectation of demand for both *A* and *B*. This leads to a more complicated bid evaluation problem on at least three counts:

1. Any rival selling *B* has to make forecasts for good *A* sales, even though it may not have experience in the *A* market.
2. The proposed contracts may extend for several years and thus require a long-term understanding of the market evolution.
3. The foreclosure depends on the buyer's expectations, not the sellers' expectations.

For a point of comparison, it is easy to determine if a rival has been foreclosed under predatory pricing: is the price above or below cost? While calculating the appropriate measure of cost is an empirical challenge, there is no need to look at demand forecasts. There is also much less room for mistaken foreclosure. When choosing between a price of \$4 or a price of \$5, the buyer doesn't have to do any fancy calculations to know that the \$4 price is the better offer, even if demand is uncertain. And a rival seeing a bid of \$4 knows if it can afford to match that bid or not.

Compare this to the evaluation process with uncertain demand. Imagine that the monopolist threatens to raise its *A* price from m to $m+\epsilon$ if the buyer does not agree to purchase all of its *B* good demand from the firm at an inflated price of $c+\delta$. Can a rival in the *B* market still sell its product at a price of c ?

Expectations come into play as the buyer compares the package price of $(m, c+\delta)$ to $(m+\epsilon, c)$. Whether it is a good deal to save ϵ on good *A* while paying δ more for good *B* depends on how much good *B* the buyer will demand.

If the demand is fixed at one unit of *A* and one of *B*, then the calculation is simple: is $\epsilon > \delta$ or not? The situation is only slightly more complicated if the demand for *A* and *B* is random but exogenously determined.

To determine which is cheaper, the bundle at $(m, c+\delta)$ or the à la carte pricing of $(m+\epsilon, c)$, denote the expected consumption of *A* by q_a and the expected consumption of *B* by q_b . The bundle will be cheaper if

$$(q_a \times m) + (q_b \times (c+\delta)) < (q_a \times (m+\epsilon)) + (q_b \times c)$$

or

$$(q_b \times \delta) < (q_a \times \epsilon).$$

This calculation is simple once expectations are formed. The hard part is the formation of expected quantities, even if exogenously determined.³⁷ Forming expectations is complicated when the contracts extend over a long term. The buyer has to forecast demand for many years ahead in order to determine which contract is less expensive.

If demand turns out other than expected, the buyer could have chosen the wrong contract and the rival might be foreclosed by mistake. For example, if $\varepsilon = \delta = 1$ and the buyer thinks it will demand more *A* than *B*, then it will choose the bundle. But what if demand turns out to be 3 for *A* and 4 for *B*? At that point, the buyer regrets not having accepted the à la carte option. But it is too late to go back and accept the rival's *B* bid.

The situation gets more interesting when the monopolist has a different expectation about demand than the buyer. In cases where the seller is large compared to the buyer, it would not be surprising to find that the seller has better information about future demand. Furthermore, the seller will often be aware of the buyer's forecasts. In that event, it can identify buyer misconceptions and use those misconceptions to design an even more profitable bundle offering, directing the discounts to products for which the customer overestimates demand.

Buyers may make their forecasts public. In one antitrust case,³⁸ as part of the request for tenders, the buyer provided guidance as to its expected purchase quantities for *A* and *B*. This was part of the normal course of business. Only the incumbent supplier had access to historical demand and without these forecasts other bidders would have been at a serious informational disadvantage when bidding.

³⁷ If demands were not exogenous, the calculation would be significantly more complicated. The buyer would have to understand its price elasticity and then determine its indirect utility function to see which offer leads to higher utility.

³⁸ See *Australian Competition and Consumer Commission v. Baxter Healthcare Pty Ltd* (2005) FCA 581, available at http://www.austlii.edu.au/au/cases/cth/federal_ct/2005/581.rtf. Baxter was the incumbent supplier and the State Purchasing Authority was the buyer.

To continue our previous example, imagine that the monopolist expects demand for *A* to be 3 and demand for *B* to be 4, while the buyer believes the reverse, that demand for *A* would be 4 and demand for *B* would be 3. Furthermore, the buyer publishes these forecasts so that the monopolist is fully aware of the divergence.

The buyer thinks the bundled offer of $(m, c+1)$ will be \$1 less expensive than the à la carte pricing of $(m+1, c)$. A rival in the *B* market would have to price at $c - 1/3$ in order to win the competition based on the buyer's beliefs. Meanwhile, the seller has foreclosed a rival while increasing its expected profits by \$1.

Whether or not a rival firm is foreclosed from the market entirely depends on the *buyer's* expectations at the time the contract is decided. The seller's expectations regarding demand are irrelevant. The contract will result in exclusionary bundling if the incremental price for the *A-B* bundle over *A* alone (based on the buyer's expected purchase quantities of *A* and *B*) is less than the long-run average variable costs of *B*.

This perspective suggests an advantage of the exclusionary bundling lens. It may be hard to demonstrate what a monopolist believed about demand at the time of its bundled bid. By contrast, it may be much easier to demonstrate what the buyer believed. One can look at the forecasted quantities provided in the request for tenders. One can also look at the calculations employed by the buyer at the time of contract selection. Using these two approaches, one can see if an equally efficient rival firm would have been able to sell its *B* product on an à la carte basis without going below long-run average variable cost.

It is, of course, possible that the monopolist will have engaged in exclusionary bundling by accident. It might believe that its à la carte contract would be less profitable, but the buyer mistakenly picks the bundled contract and thereby excludes rival *B* firms.

Exclusionary bundling is not meant to convey intent. Rather, it is a statement of when rival firms are excluded from the market, intentionally or otherwise. Assuming that the foreclosure is significant, harm to the competitive process has occurred. To complete the picture, we consider whether the monopolist might have reasonably anticipated such harm.

To consider intent or even anticipation, we should look at what the seller believes about the buyer's beliefs. Was it reasonable that the seller would forecast that the buyer would pick the bundled contract?

While one might at first be leery of making conclusions based on beliefs about beliefs, the issue is not as complicated as it might appear. First, the buyer typically provides indications about its beliefs, such as projected quantities given in a request for tender. In these circumstances, the seller can be presumed to have a reasonable understanding of what the buyer was expecting in terms of future demand.

If the seller thinks that the buyer's forecasts are in error and provides no alternative forecasts, then the seller cannot claim ignorance in terms of how it anticipated the offers would be evaluated. In some cases, we can go further. In the Australian antitrust case against Baxter Healthcare, Baxter provided a cover letter along with its bundled and unbundled prices detailing the expected savings from accepting the bundled offer.³⁹ According to the projected savings, the result would be exclusionary bundling. Whether or not Baxter thought that these numbers were accurate, we should presume that it believed that the buyer would use these forecasts in comparing bids. Thus it is possible to conclude that the seller understood the buyer's expectations.

V. PROTECTING THE MONOPOLY

The way that the bundle discount works in practice is often subtler than it may at first appear. The subtlety arises when the bundle discount effectively comes as a lump sum saving and thus represents an inframarginal discount. As a result, the discount is less likely to be passed on to consumers and this may protect the monopoly in *A* from substitution by product *B*.

The cases of *SmithKline v. Lilly* and *LePage's v. 3M* illustrate this effect in practice. Before turning to these cases, I first explain the theory in more detail.

³⁹ *Id.* at ¶¶ 146, 170, 256.

Return to that case where the buyer chooses between a bundle at prices $(m, c+1)$ or à la carte pricing of $(m+1, c)$. For ease of exposition, assume that demand is certain: $q_a = 100$ and $q_b = 50$. Thus the buyer believes it will save 50 by buying the bundle at $(m, c+1)$ rather than paying à la carte prices of $(m+1, c)$.

The question is, how much does the buyer think it is paying for good B ? The buyer would correctly attribute the savings of 100 on A to its decision to purchase B from the monopolist. Thus the buyer should book a cost of good B as $((c+1) \times 50) - 100 = (c-1) \times 50$. It is as if the buyer is only paying $c-1$ for good B . That is the price a rival firm would have to match in order to persuade the buyer to accept the à la carte contract.

On the other hand, the buyer should not price good B as if its cost is $c-1$. The reason is that on the margin, its cost is $c+1$. If demand for good B is unexpectedly high, the buyer will have to pay $c+1$ to get additional units. To the extent that prices in the consumer market reflect wholesale costs, the buyer should base its pricing on a wholesale cost of $c+1$, not $c-1$.

This suggests that the bundle savings may not be passed on to the consumer. The reason is that the discount is really a lump-sum savings. The buyer may amortize the savings over the expected purchase of good B , but that does not lead to the correct marginal cost of B .

The anticompetitive effect of the bundling is thus magnified when there is a possibility of substitution between goods A and B . When the buyer is thinking about whether to take more of good B and less of good A , the incremental cost of B is $c+1$, not $c-1$. The low average price of $c-1$ leads the buyer to take the monopolist's B good, but then the high marginal price discourages the buyer from expanding its use. What makes this effect unusual is that most bundling theory looks at bundles of complementary products; this effect arises for bundles of substitute products.

Mitigating the threat from substitutes was present, though not highlighted, in two well-known bundling antitrust cases. In the *LePage's* case, good A was the Scotch tape, while good B was generic transparent tape. In the case of *SmithKline v. Lilly*, good A was Keflin, a cephalosporin sold by Lilly under patent protection and good B was

Lilly's Kefzol, a cephalosporin that was identical to SmithKline's competing Ancef product. While Keflin and Kefzol were not perfect substitutes, for some treatments, substitution was a possibility.

If Lilly (3M) were simply to have cut the price of their Kefzol (transparent tape) to better compete against SmithKline (LePage's), this would have encouraged the buyer to take more of good *B* and less of good *A*. Indeed, Lilly initially followed this strategy with just these results. But, with the bundle discount, the buyer is deterred from taking the rival's competing product. At the same time, the buyer does not have an incentive to expand the use of *B*, as the incremental cost of *B* has gone up, not down.

Imagine that 3M were to say to Staples:

I know that LePage's will sell you their generic transparent tape for \$1 per roll. Our price is higher at \$2 per roll. Given that you expect to buy one million rolls, that puts us at a \$1 million price premium. We will make that up to you in the following fashion. You expect to buy two million rolls of our Scotch tape. We will give you a \$0.60-a-roll discount on the Scotch tape if you also buy our generic tape.⁴⁰ With the \$0.60-a-roll rebate, you can expect to save \$200,000 by taking our package. You will pay \$1 million more for the generic tape but you will get \$1.2 million back on the Scotch tape.

This bundle offer will be successful in undercutting the generic rival. At the same time, it will not lead the store to sell generic tape at a bigger discount and thereby reduce sales of branded tape in favor of generic. Were the store to cut the price of generic tape, it would have to buy more tape and the incremental price is \$2 per roll, not \$0.80 per roll (taking into account the \$200,000 rebate) or even \$1 per roll. This allows the monopolist to "undercut" the rival while at the same time not get into a price war in *B* that could reverberate into *A*. In contrast, with predation, the price of *B* falls on the margin, even to a level below cost, and this exacerbates the potential threat to *A* when there is some substitutability between the two goods.

In summary, I have shown three differences between exclusionary bundling and predation. The first is that exclusionary

⁴⁰ Alternatively, 3M could say that they won't raise the price of their Scotch tape by \$0.60 if you also buy their generic tape.

bundling only requires the seller to threaten to raise the price of *A*. If the threat is believed, then exclusion can occur without the seller's incurring any cost. In contrast, with predation, the seller loses money that it must later recoup because it actually sells a good below cost. A second difference is that exclusionary bundling relies entirely on buyer expectations. The third difference is that exclusionary bundling may be accomplished via an inframarginal or lump sum discount versus a direct price cut. This reduces the buyer's incentive to pass on the savings or to substitute *B* for *A* when this would otherwise be attractive.

VI. THE APPLICATION OF THE EXCLUSIONARY BUNDLING TEST IN PRACTICE

We turn now to look at three of the antitrust cases on bundling in more detail.

A. *The case of SmithKline Corp. v. Eli Lilly & Co.*⁴¹

One response to the theory of bundling is that it is so new and unsettled that it would be premature for the Supreme Court to rule on this practice. Indeed, this was the argument presented by the Solicitor General of the United States to the Supreme Court in an amicus brief proposing that the Court deny certiorari in the *LePage's* case.⁴² A review of the *SmithKline v. Lilly* case, however, shows that as far back as 30 years ago, the Third Circuit correctly understood the issue of exclusionary bundling. As I discuss below, one can argue with the appellate court's measurement of cost, but the basic approach was sound.⁴³

Lilly was found to have violated section 2 of the Sherman Act for monopolization of the nonprofit hospital market for cephalosporins.

⁴¹ *SmithKline Corp. v. Eli Lilly & Co.*, 575 F.2d 1056 (3d Cir. 1978).

⁴² Brief for the United States as Amicus Curiae Supporting Respondents at 12-14 and 18, *3M Co. v. LePage's Inc.*, 124 S. Ct. 2932 (2004) (No. 02-1865).

⁴³ Indeed, Greenlee, Reitman & Sibley, *supra* note 29, refer to exclusionary bundling as the *Lilly* test.

Lilly leveraged its market power in proprietary cephalosporin products to prevent SmithKline from gaining access to the hospital market with a competing cephalosporin compound.

The particular anticompetitive act was the use of a package purchase rebate. Along with traditional volume discounts, hospitals received an additional 3% back if they hit volume targets on three or more Lilly cephalosporins. This marketing plan was referred to as the Revised Cephalosporins Savings Plan (Revised CSP).

At the time of the case, 1975, Lilly manufactured five different cephalosporin products: Keflin; Keflex; Loridine; Kafocin; and Kefzol.

This was an important business to Lilly. Its cumulative sales exceeded \$500 million. The first four products were unique to Lilly and covered by patents. The fifth product was the compound cefazolin, sold by Lilly under the name Kefzol. The *identical* compound was also sold by SmithKline under the name Ancef.⁴⁴ As Kefzol and Ancef were identical products, most hospitals did not stock both.

SmithKline was first to enter the market with Ancef in October 1973. It positioned Ancef as a substitute for Keflin and priced it at a 5% discount on a recommended daily dose basis. Lilly entered the market with Kefzol in November 1973. Lilly priced Kefzol at 2% below Ancef and SmithKline matched this discount, which created a 7% spread with respect to Keflin.

By the end of 1974, SmithKline had captured more than 40% of the cefazolin market and had annual sales in excess of \$10 million. Lilly found that cefazolin was being used in place of Keflin more than 60% of the time and that Lilly was far short of achieving its goal of attaining 75% share of the cefazolin market. As the replacement rate increased to 80%, Lilly commissioned a task force to develop a response to the threat from Ancef. They came up with the Revised CSP, which was implemented on April 1, 1975.

The Revised CSP was designed to persuade hospitals to purchase Kefzol rather than Ancef. While Lilly sold five different cephalosporin

⁴⁴ Both Lilly and SmithKline made cefazolin under license from Fujisawa.

products, in order to reach the required volume target on three (and thus get the 3% back), the hospital would, in practice, have to purchase Lilly's Kefzol. The way the volume targets were set, hospitals would reach the minimum in Keflin and Keflex and would not typically be able to hit the volume in Kafocin and Loridine. Only if they purchased Lilly's Kefzol over SmithKline's equivalent Ancef, would the three-product target be achieved.

The key anticompetitive element of the Revised CSP was that buying one good led to an additional 3% discount across all the purchases. Looking at market volumes in 1975, Lilly's market dollar volumes on Keflin, Keflex, and Kefzol were:

Keflin	\$33.97 million
Keflex	\$13.834 million
Kefzol	\$8.355 million ⁴⁵

The other two cephalosporins accounted for \$1.45 million in annual sales.

As a first approximation, it is reasonable to assume that a typical hospital purchase of cephalosporins would be in the same proportion as the overall market. Thus, I assume that the representative hospital is 1% of the entire market.

Consider the marginal cost of buying Kefzol. The hospital knows that it has to spend \$340,000 buying Keflin and \$138,000 buying Keflex (\$478,000 in total), as these are supplied only by Lilly. If the hospital also buys Kefzol, it will spend an additional \$83,500, but then save 3% on its entire purchase, or \$16,800.⁴⁶ Thus the effective cost of Kefzol is $\$83,500 - \$16,800 = \$66,700$. The 3% discount on the package translates into an effective 20% discount on Kefzol.

⁴⁵ Note that the amount given for Keflin combines sales of Keflin and Keflin Neutral. The market breakdown of these two products is \$30.63 million for Keflin and \$3.34 million for Keflin Neutral. See *SmithKline v. Lilly*, 575 F.2d at 1060.

⁴⁶ The discount would have been slightly larger had I also taken into account the purchases of Kafocin and Loridine. The value of this discount would be 3% on \$14,500 or \$430. This would add another 1% to the effective discount on Kefzol, bringing it from 20% to 21%.

The court record confirms this conclusion. Lilly supplied its sales force with calculations showing SmithKline would have to offer discounts of more than 20% to be price competitive. Of course, not all hospitals used the same mix of products. The range of the effective discount was found to be between 16% and 35%.⁴⁷

The Lilly Revised CSP was effective in stopping SmithKline's advances. At the end of 1974, SmithKline had 40% of the Kefzol/Ancef market and sales exceeding \$10 million. After the onset of the plan, SmithKline's sales fell by \$1.5 million.

Prior to the introduction of the Revised CSP, Lilly's pretax return on sales for Kefzol was 17.6%. (SmithKline had higher costs and its pretax return on sales was 4.6%.) Even if SmithKline had been able to achieve Lilly's lower cost structure, it would not have been able to compete with Lilly's Revised CSP.⁴⁸ Factoring in the cost of a 20% discount on Kefzol leads to a negative return on sales for Lilly.⁴⁹

Lilly was a company with a legal monopoly in a category of pharmaceutical products. It had a market share of 89.8% prior to the onset of its package pricing. Lilly used a package discount to leverage its protected market position to gain an advantage in a product where it faced competition. The 20% effective discount it offered on Kefzol for buying its cephalosporin package was more than enough to eliminate any profits on this product and thus made it impossible for SmithKline to compete.

There is one aspect in which this case differs from a standard price squeeze. The drug on which there was competition, Kefzol, was also a substitute for Keflin. This was a significant concern for Lilly, as

⁴⁷ SmithKline v. Lilly, 575 F.2d at 1062.

⁴⁸ As the district court wrote, "[a] 4.6% return on sales does not warrant continued marketing of [Ancef] by SmithKline without the potential for significant improvement in profitability." *SmithKline v. Lilly*, 427 F. Supp. 1089, 1108 (E. D. Pa. 1976).

⁴⁹ Note that the court was using return on sales figures, which are based on average costs, not avoidable costs.

Keflin not only represented the lion's share of sales, it also had lower production costs than Kefzol.

Thus it was especially important for Lilly to prevent competition between SmithKline's Ancef and Lilly's Kefzol from damaging the golden goose of Keflin. This helps explain why Lilly didn't just lower the price of Kefzol by 20%. While that would have been equally effective at keeping SmithKline out of the market, it would have led to more substitution of Kefzol for Keflin.⁵⁰

This is where the package discount strategy was effective at keeping SmithKline out of the market while also preserving Keflin's monopoly. The 3% rebate on Keflin and Keflex contributed 17% of the 20% effective rebate on Kefzol. But that rebate came as a lump-sum amount. If the hospital were to expand its use of Kefzol, it would get only a 3% savings. If the hospital were to replace \$100 of Keflin with \$50 of Kefzol, it would lose a 3% rebate on \$50. Thus, under the Revised CSP, there was a reduced incentive to substitute Kefzol for Keflin.

While the court found a section 2 violation, it did not find that the package discount was an illegal tie-in sale. I disagree with the court's finding that this was not an illegal tie-in. The numbers suggest that for the vast majority of consumers, it was not rational to buy Keflin without buying the bundle.

*B. The case of Ortho Diagnostic Systems v. Abbott Labs*⁵¹

This case was the result of a complaint by Ortho Diagnostic in response to bundle discounting by Abbott Labs in the sale of test

⁵⁰ I note that a truly sophisticated hospital buying agent would recognize that the package discount of 20% on Kefzol would decline to a 3% discount (in the extreme) if Kefzol replaced all the other cephalosporins. In that case, SmithKline would have been able to compete. I suspect that hospital buying agents had a hard enough time understanding the discount program at the status quo purchases. (This package discount was viewed as highly novel at the time.) It is harder to imagine that buying agents would forecast the value of the discount under the scenario where Ancef was able to replace much of Keflin. That substitution was difficult to forecast. This point illustrates the further subtleties of package discount pricing.

⁵¹ *Ortho Diagnostic Sys. v. Abbott Labs.*, 920 F. Supp. 455 (S.D.N.Y. 1996).

products for screening blood. The primary consumers for these blood tests were blood donation centers, such as the Red Cross and members of the Council of Community Blood Centers (CCBC).

There were five different tests. One of these tests screened for HIV (HIV-1/2), two were for hepatitis B (HbsAg and Anti-core), one for hepatitis C (HCV), and one for a virus connected with leukemia (HTLV).

Abbott offered CCBC members advantageous pricing if they purchased a package of four tests from Abbott and an even greater discount if all five were purchased from Abbott.⁵²

Ortho argued that Abbott used its monopoly position in HTLV and HIV-1/2 (and possibly HbsAg) blood tests to create a package price contract that made it impossible for Ortho to sell its competing tests on the market.

While Abbott was the only company that produced all five blood assays, there were competitive products for each of these products manufactured by a third party.⁵³ Still Abbott enjoyed substantial market power in at least two out of the five products:

<i>Test</i>	<i>Unit Market Share</i> ⁵⁴
HTLV	91%
HIV-1/2	86%
HbsAg	75%
Anti-core	70%
HCV	21%

Abbott offered a range of bundled prices (see table).

⁵² The court also considered the question of whether the lower prices offered in the bundle would have led to an increase in demand. Blood testing is primarily dictated by the level of donations of blood and hence the demand for these tests is unlikely to be affected by lower-priced blood tests.

⁵³ Ortho sold HbsAg, Anti-core, and HCV (which it also licensed to Abbott). Ortho had an HTLV test, but it was not yet accepted in the market.

⁵⁴ Dollar market share numbers were similar as were Ortho's market share at plasma centers (although the HCV share was higher at 35%).

Table
Bundled Prices Offered by Abbott

<i>Test</i>	<i>Five Tests*</i>	<i>Four Tests*</i>	<i>Four Tests**</i>	<i>Three (or fewer) Tests**</i>
HCV	\$2.90	\$2.90	\$2.90	\$3.53
Anti-core	\$0.85	\$1.14	\$1.05	\$1.25
HTLV	\$1.03	\$1.18	\$1.09	\$1.57
HIV-1/2	\$1.93	\$2.08	\$1.99	\$2.47
HbsAg	\$0.66	\$0.81	\$0.72	\$1.20
TOTAL	\$7.37	\$8.11	\$7.75	\$10.02

* Includes computer hardware and software for a data management system (DMS).

** DMS not included.

If we accept Ortho's argument that Abbott had a monopoly position in HTLV and HIV-1/2, then consider the customer's options:

Option A. Buy HTLV, HIV-1/2 and HCV from Abbott and Anti-core and HbsAg from Ortho.

As Ortho pointed out, the à la carte price of these three tests from Abbott was \$7.57. That is more than the cost of buying all five tests and the DMS. Since that implies a negative incremental price for Anti-core and HbsAg, this would appear to be a clear-cut case of exclusionary bundling. By definition, a negative price is below cost, however measured. But this was not the only option.

Option B. Buy HTLV, HIV-1/2 and HbsAg from Abbott; buy Anti-core and HCV from Ortho.

Buying these three tests from Abbott would cost \$5.24. To be competitive with the five-good bundle at \$7.37, the maximum combined price for Anti-core, HCV and DMS cannot exceed \$2.13. If we take the market price of the DMS equipment to be the difference between the four-test price with and without DMS, then \$0.36 should be attributed to DMS. Thus the buyer won't pay more than \$1.77 for both Anti-core and HCV.⁵⁵ The critical question is whether Abbott could earn a profit selling Anti-core and HCV at \$1.77.

⁵⁵ The Abbott price for those two drugs in their five-test offering was \$3.75.

Ortho's economic expert, Janusz Ordover, evaluated Abbott's costs. He concluded that Abbott's combined marginal cost for HCV and Anti-core was \$1.49. This suggests that Abbott was not engaging in exclusionary bundling.⁵⁶ It is worth emphasizing that this cost data comes from the plaintiff. The plaintiff found that Abbott would have been able to sell HCV and Anti-core at \$1.49 without losing money. Thus, if Ortho were equally efficient as Abbott, it would have been able to compete against the Abbott bundle, while selling only HCV and Anti-core. Hence, this is not a case of exclusionary bundling.

In fact, there is some evidence to suggest that Ortho was more efficient than Abbott.⁵⁷ As reported by the court, "one Ortho witness acknowledged that Ortho would make money on HCV at \$1.75 per test (Goergen Dep. 105-06), and others noted that Ortho's cost of producing HCV is lower than Abbott's, as Abbott pays Ortho a per test royalty on that assay."⁵⁸

I have considered the case where Abbott sells three products. If one concludes that Abbott had a monopoly in only two products, HTLV and HIV-1/2, then footnote 25 of the decision is especially revealing. The court notes that the unbundled price of HTLV and HIV-1/2 is \$4.04. That leaves a price of \$3.33 for the purchase of Ortho's other three tests. Ortho did not dispute that \$3.33 exceeds its costs for these three tests:

⁵⁶ *Ortho v. Abbott*, 920 F. Supp. at 470 n.21.

⁵⁷ Note that whether Ortho was or was not more efficient than Abbott is relevant to part (b) of the *Ortho* test, but it is not relevant to the exclusionary bundling test. For the exclusionary bundling test, all that matters is whether the defendant Abbott could profitably sell HCV and Anti-core at \$1.49.

⁵⁸ *Ortho v. Abbott*, 920 F. Supp. at 462. Note that Ortho's being able to make money selling HCV at \$1.75 per test does not demonstrate that Ortho was the more efficient producer. Ortho also claimed that Abbott could make money selling HCV and Anti-core at \$1.49. Furthermore, the fact that Abbott pays Ortho a royalty is not evidence that Ortho has a lower cost of producing HCV. Royalty payments should not be included in estimating production costs. The reason is that if Ortho produces HCV, it gives up the royalty payment from Abbott and thus pays an opportunity cost of the lost royalty.

Ortho's tying claim sounds especially hollow. The combined unbundled price of Abbott's HIV-1/2 and HTLV is \$4.04. As its package price for all five tests is \$7.37, Ortho could sell its three competitive assays competitively with the Abbott package at a combined price of \$3.33, which admittedly is above its cost. Hence, Ortho in substance seeks relief under the antitrust laws for business lost as a result of its own refusal to lower its prices sufficiently to meet the competition.⁵⁹

Ortho v. Abbott shows that the exclusionary bundling test can provide a defense as well as an indictment. The hurdle was not passed in the *Ortho* case. Thus the test supports the court's finding that no violation occurred. Even if exclusionary bundling had been demonstrated, the extent of foreclosure was questionable. The contract with CCBCs covered less than half the market. There were also substantial unbundled sales. Abbott sold nearly \$10 million of HIV-1/2 and HTLV blood tests (17% of its sales) at prices above those offered in the three or fewer contract. Finally, the CCBC contract was not imposed on all of its members.

C. *The case of LePage's Inc. v. 3M*⁶⁰

In what has become a controversial decision, 3M was found to have violated section 2 of the Sherman Act based on its bundle discount offers. It was undisputed that 3M had a monopoly position in the market for brand-name tape. 3M's Scotch tape had a 90% market share and faced competition primarily from private-label brands, of which LePage's was the primary supplier with an 88% market share. 3M reduced LePage's share of the private label business to 67%.⁶¹ It

⁵⁹ *Id.* at 472 n.25.

⁶⁰ *LePage's Inc. v. 3M*, 324 F.3d 141 (3d Cir. 2003) (en banc), cert. denied, 124 S. Ct. 2932 (2004). For a similar perspective on *LePage's*, see Gary P. Zanfagna, *LePage's v. 3M: A Reality Check*, THE ANTITRUST SOURCE, Nov. 2004, <http://www.abanet.org/antitrust/source/11-04/Nov04-Zanfagna1129.pdf>. Joanna Warren, *LePage's v. 3M: An Antitrust Analysis of Loyalty Rebates*, 79 N.Y.U.L. REV. 1065, 1619 (2004) provides an excellent overview of *LePage's* and related cases.

⁶¹ A troubling aspect of the *LePage's* decision is whether the foreclosure was significant. Even assuming that exclusionary bundling occurred, LePage's still had over two-thirds of the private-label business. Is excluding a rival from one-third of the market sufficient to cause foreclosure?

did this by offering a package or bundle price discount to some of the largest buyers. For example, the office supply superstore Staples got an extra 1% bonus rebate on all of its 3M purchases by purchasing private label tape from 3M rather than LePage's.⁶² 3M's purpose was clear. Even the dissenting opinion recognized that 3M's intent was "to eliminate the private-label category of transparent tape."⁶³

The decision has created uncertainty about the legal standard. One reason for the uncertainty is that neither the courts nor the parties applied the exclusionary bundle test. In its defense, 3M argued (and LePage's did not dispute) that the price of the bundle was above the bundle cost.⁶⁴ But, as recognized in the *Ortho* shampoo example, that fact is irrelevant. 3M's rivals did not have a competing bundle. Whether or not a collection of goods is sold at a profit does not reveal whether one-good rivals were foreclosed.

LePage's provided evidence that it could not profitably compete against the bundle discounts offered by 3M.⁶⁵ It went from earning profits to losing 10% on sales in response to 3M's discounting. But that is not conclusive evidence that 3M's implied price was below LePage's long-run average variable costs. Furthermore, if LePage's was less efficient than 3M, even losses by LePage's do not indicate exclusionary pricing by 3M.

⁶² *LePage's Inc. v. 3M*, 324 F.3d at 157. This suggests a potential difference between *LePage's* and the *SmithKline v. Lilly* case. 3M's bundle discounts came from products in the same market, such as Scotch tape, as well as office supply products not in the same market, such as Post-its. In contrast, all of Lilly's implied discount on Kefzol came from other cephalosporins. On the other hand, while Kefzol was an imperfect substitute for Keflin (just as private label tape is a substitute for brand-name tape), my understanding is that Kefzol was not a substitute for the other three cephalosporins (namely Keflex, Loridine, and Kafocin). In that regard, these other three cephalosporins are more analogous to Post-its—they are part of the bundle, but not really part of the same market. The *Ortho* court, however, considered all five cephalosporins as being in the same market, and the *Lilly* court did not seem to distinguish between bundle discounts that arise from monopoly products in the same market or in adjacent markets.

⁶³ *Id.* at 181.

⁶⁴ *Id.* at 147.

⁶⁵ *Id.* at 161.

As a result of this decision, it is not clear whether bundle discounts need to foreclose an equally efficient competitor in order to violate section 2. As Judge Greenberg wrote in the dissent, "LePage's did not even attempt to show that it could not compete by calculating the discount that it would have had to provide in order to match the discounts offered by 3M through its bundled rebates."⁶⁶ He contrasts this with the evidence in the *SmithKline v. Lilly* case where just such evidence was presented to the court.

3M's primary defense was that its price was above cost and thus legal according to the *Brooke Group* decision.⁶⁷ But the *Brooke Group* decision did not consider the issue of package pricing. Thus, even if one accepts the argument for a single product, the translation to package pricing requires calculating the implied economic prices and costs, as proposed in the exclusionary bundling test.

A problem with its defense is that 3M was ambiguous about how to go about calculating price and cost. It is not enough to show that the price of the bundle exceeded its overall cost. It is not even enough to show that the listed prices for the components of the bundle each exceeded their cost.

Consider the following excerpt from 3M's certiorari petition: "3M argues its conduct was legal as a matter of law because it never priced its transparent tape below its cost.⁵ [Footnote 5 text: 3M states that its pricing was above its costs, however costs are calculated, and LePage's has not contested 3M's assertion.]"⁶⁸

The central fact of the case is presented in a footnote and is not supported by any calculations. It is not clear whether transparent tape refers only to private label or to both private label and Scotch tape. (Scotch tape would be included according to 3M's brief to the Third Circuit: "We refer to all tapes at issue as 'transparent' tape unless otherwise indicated."⁶⁹) If the claim concerns both tapes, then it is not

⁶⁶ *Id.* at 175.

⁶⁷ *Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. 209 (1993). See *Petition for Writ of Certiorari* at 8, *3M Co. v. LePage's Inc.*, 124 S. Ct. 2932 (2004) (No. 02-1865).

⁶⁸ *Petition for Writ of Certiorari*, *supra* note 67, at 7a.

relevant to foreclosure. If the claim is only about private label, the argument is incomplete because it does not address the prior question of how prices are calculated. Is the price of transparent tape the listed price or the implied price?⁷⁰

3M took a step in the right direction in another footnote:

To illustrate LePage's theory within the tape market: If 3M sold \$15 million in tape to a customer—\$11 million Scotch brand, \$3 million Highland, \$1 million private-label—a discount of 2% would reduce the total price to the customer by \$300,000. If the customer, by switching its private-label purchases to LePage's, would lose the total \$300,000 discount, then LePage's, by its theory, would have to offer its private-label tape at \$700,000. LePage's would be making a 30% per-unit discount to absorb what, for 3M, was a 2% per-unit discount. . . . LePage's *accepted* that the \$700,000 figure would remain above 3M's costs (and so could be offered by an equally efficient rival).⁷¹

Note that 3M did not endorse this approach to calculating prices. And the example is based on hypothetical prices. Thus it is hard to know how LePage's accepted the conclusion that 3M had not engaged in exclusionary bundling for these hypothetical numbers.

When it came to the real examples discussed in the case, 3M didn't calculate the implied incremental price of its private label tape. For example, in the case of Sam's Clubs, we are told that Sam's would have lost \$264,000 of its expected volume rebate and that LePage's' prior year sales to Sam's were \$1,078,484.

While it might seem as if \$264,000/\$1,078,484 is the relevant discount, we do not know what price 3M offered before taking the discount into account. Using the notation of exclusionary bundling, we only know the price difference between buying an *A-B* bundle

⁶⁹ Brief of Appellant at 6 n.3, *LePage's v. 3M*, 324 F. 3d 141 (3d Cir. 2003) (No. 00-1368).

⁷⁰ At first reading, I did not interpret the 3M claim to refer to the implied incremental price of its generic tape. However, accepting that interpretation is central to the amicus brief filed by BellSouth and eight other firms in support of 3M's petition for a writ of certiorari. Brief for BellSouth Corp. et al. as Amici Curiae Supporting Appellants at 8, *3M Co. v. LePage's Inc.*, 124 S. Ct. 2932 (2004) (No. 02-1865).

⁷¹ Petition for Writ of Certiorari, *supra* note 67, at 5 n.4.

from 3M and buying *A* and *B* à la carte from 3M. That doesn't reveal the implied incremental price for *B*. The implied price for *B* depends on the comparison used for exclusionary bundling, the price difference between the *A-B* bundle and *A* alone.

If, for example, 3M had matched LePage's' previous price, then 3M would have been offering almost a 25% discount. It is also possible that 3M started from a higher list price and thus offered less than a 25% discount or started from a lower price and thus offered more than a 25% discount. And there may have been other discounts involved. According to LePage's, "3M conditioned a special price on Scotch 'to keep LePage [sic] out of Sam's [Club] even as a test.'" ⁷²

Furthermore, we do not know whether a 25% discount would have led to pricing below cost, either for 3M or LePage's. ⁷³

The absence of this detail and any corresponding claim that 3M was pricing below cost was the thrust of the dissenting opinion. I put the blame on the court for not employing any exclusionary-bundling type calculations in reaching its decision and on 3M for

⁷² Brief for Appellees, *supra* note 21, at 11.

⁷³ In other examples, we learn that the effective discount to Kmart was more than \$450,000 (on 1992 sales of \$2.482 million) and to Staples it was an extra 1%. But, in neither case do we know how this translates into the price LePage's would have had to offer and whether this would have been profitable assuming it was equally efficient as 3M. LePage's claims that 3M's \$1.5 million rebate paid to Staples left no room for them to compete given that its historical sales to Staples were \$1.9 million. 3M denied that it paid anything to Staples for exclusivity. According to 3M: "However, the only evidence about this supposed arrangement is an unsigned, undated and unauthenticated document describing a possible offer. There was no evidence that it was even sent to Staples, let alone that it influenced any purchasing decision." Brief of Appellant, *supra* note 69, at 18 n.15 (citation omitted). LePage's provides a different view: "To become Staples' sole source of tape, 3M offered an 'extra 1% bonus rebate on Scotch,' which was expressly conditioned on eliminating LePage's. 3M's conditional offer also included 'MDF enhancements' . . . , 3M parlance for 'cash,' in exchange for sole supplier status. 3M also customized a 'growth' rebate for Staples that could be met only by converting all the LePage's private label business to 3M." Brief for Appellees, *supra* note 21, at 9 (citations omitted).

not offering anything but hypothetical versions of these calculations in its defense.

While the court decision did not emphasize this point, there are additional reasons to be concerned about the use of bundled rebates. As LePage's explained:

3M painstakingly structured its rebate programs so they "did not benefit consumer[s]." A12. First, 3M designed its programs so rebates were not paid to accounts until after year-end "to encourage distribution to not use that rebate in terms of price in the market" because "if it's delayed until the end of the year, you're probably not going to pass it on to a customer at the time of sale."⁷⁴

The pricing benefits stores over consumers.⁷⁵ A lump-sum discount also helps protect 3M's Scotch tape against substitution by private-label tape, whether LePage's' or 3M's. Simply undercutting LePage's' price might have yielded 3M the private-label tape business, but it would have led to even lower prices for private label tape and thus even more substitution. The bundle discount enabled 3M to displace LePage's while maintaining the price of private label tape.

Instead of applying the exclusionary bundling test, the court relied on the fact that a firm with substantial market power can abuse that power without pricing below cost. Such behavior, for example, might include refusing to deal or conspiring to raise rivals' costs by denying them access to supply.⁷⁶

The court in the *Aspen Ski* case concluded, "[a] monopolist wilfully acquires or maintains monopoly power when it competes on some basis other than the merits."⁷⁷

⁷⁴ Brief of Appellees, *supra* note 21, at 21.

⁷⁵ This effect is amplified when the rebates are paid at the corporate level and not to the stores. And that makes it harder for LePage's to compete against 3M at the corporate purchasing office.

⁷⁶ U.S. tobacco companies engaged in this latter behavior by acquiring and then not using less expensive supplies of tobacco so as to deprive rivals of this source. See *American Tobacco Co. v. United States*, 328 U.S. 781 (1946).

⁷⁷ *Aspen Skiing Co. v. Aspen Highlands Skiing Corp.*, 472 U.S. 585, 605 n.32 (1985).

In the *Grinnell* case, the court laid down a two-part test for section 2 of the Sherman Act:

1. possession of monopoly power in the relevant market and
2. the wilful acquisition or maintenance of that power as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident.⁷⁸

As the court found in the *LePage's* decision: "3M is a monopolist; a monopolist is not free to take certain actions that a company in a competitive market (or even oligopolistic) market may take, because there is no market constraint on a monopolist's behavior."⁷⁹

But post *LePage's*, just what actions are proscribed is not clear.

VII. CONCLUSIONS

The practice of bundle discounts is prevalent, but their effects on competition are not well understood. The early economics literature emphasized price discrimination.⁸⁰ This is one of several potential efficiency advantages. More recent work has suggested the potential for bundle discounts to leverage monopoly.⁸¹

This article has provided a framework for testing whether a bundle discount is sufficiently large to foreclose competition. In effect, the exclusionary bundling test examines whether the bundle discount is so large that the à la carte prices are economically irrelevant. Or, put the other way around, the test determines if the à la carte price of the monopoly good is so high as to make the bundle offer the only economically relevant option. Either way, when a monopolist engages in exclusionary bundling, it might as well require

⁷⁸ United States v. Grinnell Corp., 384 U.S. 563, 570-71 (1966).

⁷⁹ *LePage's Inc. v. 3M*, 324 F.3d 141, 151 (2003).

⁸⁰ See, e.g., Preston R. McAfee, John McMillan & Michael D. Whinston, *Multiproduct Monopoly, Commodity Bundling, and Correlation of Values*, 104 Q. J. ECON. 371 (1989).

⁸¹ See Michael Whinston, *Tying, Foreclosure, and Exclusion*, 80 AM. ECON. REV. 837 (1990); Nalebuff, *supra* note 29 and Nalebuff, *supra* note 33; and Greenlee, Reitman & Sibley, *supra* note 29.

the customer to buy the monopolist's adjacent good *B* as a condition of obtaining any of the monopolized good *A*.

The theory of exclusionary bundling brings together tying and predation. Exclusionary bundling is akin to predation in that when prices and costs are calculated correctly, the implied price of *B* to the customer is below cost. But, unlike predation, an implied price below cost need not imply any actual or even potential profit sacrifice. This is because the implied price is based on the alternative *à la carte* price of *A*, a price that might never be charged to a customer. A threat to charge a high *à la carte* price—a price potentially above the monopoly level—leads customers to buy the bundle and thus the high *à la carte* price is never collected.

The primary difference between exclusionary bundling and predation pricing is that there is no need to establish recoupment. This is because the bundle discount can be based on a threat that is never carried out and hence imposes no cost. In that sense, exclusionary bundling is akin to a naked tie. As bundle discounts may allow foreclosure without the need for recoupment, this practice creates a potential danger of anticompetitive conduct. This issue has arisen in several high-profile antitrust cases, emphasizing the importance of having an appropriate antitrust test.

The exclusionary bundling test was applied to several antitrust cases. Although the courts did not employ the proposed exclusionary bundling test, their approach was similar in spirit; interpreting the evidence in *SmithKline v. Lilly* and *Ortho v. Abbott* suggests that the courts reached the correct decision in both cases. In *LePage's*, the court failed to follow this approach, both in terms of its theory and evidence. Consequently, there was no clear basis for determining whether 3M's bundle discounts were anticompetitive and that explains much of the controversy over the decision.

APPENDIX

Application of the exclusionary bundling test to price discrimination bundles

The early economics literature on bundling emphasized its use as a price discrimination device.¹ In this literature, the firm had a monopoly in both *A* and *B*.² In the discussion below, I focus on the incentive to bundle when there is competition for one of the goods. I illustrate how the price discrimination works and consider the implications for the exclusionary bundling test.

There are two ways a rival can enter the *B* market. The first is to price *B* sufficiently low so as to undercut the bundle price when the customer combines the rival's *B* with the monopolist's à la carte *A*. The second option is to go after a niche market, namely the customers who like *B* but not *A*. The problem is that this may be a small group to start with and is further reduced when the monopolist offers a bundle discount.

Consider a simplified case where there are just two consumer types in the market. Half the consumers are of type I. They value *A* at 15 and *B* at 0. The other half are of type II. They value *A* at 10 and *B* at 10. The monopolist's cost of *A* is 0 and the cost of *B* is 7 for both the incumbent and the rival.

¹ See, e.g., William J. Adams & Janet L. Yellen, *Commodity Bundling and the Burden of Monopoly*, 90 Q.J. ECON. 475 (1976).

² Bundling allows for better price discrimination in a wide variety of cases. The advantages are not just limited to cases where the value of *A* and *B* are negatively correlated, as in the example that follows in the text. As shown in Preston R. McAfee, John McMillan & Michael D. Whinston, *Multiproduct Monopoly, Commodity Bundling, and Correlation of Values*, 104 Q.J. ECON. 371, 375 (1989), bundling is an effective price discrimination tool even when the demand for *A* and *B* are independent. However, if the *B* good is available at marginal cost, then there is no first-order gain from offering a bundle discount when compared to selling *A* at the monopoly price. The reason is that a bundle discount stimulates both *A* and *B* sales at the cost of a single discount. While this is generally better than a discount on *A* alone, here there is no extra gain from incremental sales of *B* because those sales arise at a price below marginal cost. The general advantage of bundle discounts relies on the firm having some market power or cost advantage over its rivals in both markets.

With à la carte pricing, the monopoly price of *A* is 10, as it is better to sell to 100% of the market at a price of 10 than to 50% of the market at a price of 15. But, the monopolist can do better via bundle pricing. Absent competition in the *B* market, the monopolist would charge 15 for *A* and 20 for an *A-B* bundle. This maximizes profits as the type I customers are not interested in a bundle priced at 20 and the type II customers are not interested in *A* alone at 15. The monopolist can do no better as it has captured 100 percent of the consumer surplus.

According to the definition, this is a case of exclusionary bundling. This follows as the incremental price of an *A-B* bundle over *A* alone is 5, which is below good *B*'s variable cost of 7. Thus a rival *B* producer could not profitably attract any of the type II customers to buy its *B* along with *A*.

But, with these prices, a one-good rival is not excluded. If the rival *B* producer simply offered *B* at a stand-alone price of 7, it would attract all of the type II customers. These customers would rather pay 7 for just *B* (and achieve a consumer surplus of 3) than pay 20 for an *A-B* bundle and earn no surplus.

If the incumbent anticipated the presence of a competitor, it would price the *A-B* bundle at 17, as this would protect the monopolist from a *B* good priced at 7. Now the implied incremental price of *B* is only 2. But, a more efficient *B*-good firm could still compete for the type II customers by charging a price just below 7. Type II customers would prefer to buy *B* alone at a price below 7 when compared to an *A-B* bundle at a price of 17. As the type II customers are the only ones interested in *B*, the rival can compete for the entire *B* market.

But the incumbent monopolist won't give up so easily. Even a more efficient *B* good rival can be profitably excluded. Consider the case where the rival's cost of *B* is 6, while the incumbent's cost is 7, so that the rival is the more efficient supplier. In this scenario, the incumbent would maximize profits by pricing *A* at 15 and *A-B* at 16. According to the exclusionary bundling test, the incremental price of *B* is 1, the monopolist's variable cost is 7, and thus we have a clear-cut case of exclusionary bundling.

While exclusion is occurring, this is not the mechanism of action. Type I customers are not at all interested in *B*. Thus the *B* market is limited to the type II customers. The rival can offer these customers a surplus of 4 by pricing *B* at a stand-alone level of 6. The incumbent can match this deal only by cutting into some of the *A* surplus. If the *A* monopolist sells a bundle at 16, this is 6 worse than selling *A* alone at 15. But this is not an option when it comes to the type II customers. In effect, the monopolist is using part of its surplus in *A* to subsidize its cost disadvantage in *B*. This is worth doing as it permits the monopolist to do a better job of price discrimination.³

To emphasize this point, the problem is not that the rival has to charge just 1 so that the customers will buy its *B* along with the incumbent's à la carte *A* at 15. The problem is that the monopolist has 10 units of surplus from the *A* good that are available only to type II customers who buy the bundle. This prevents the rival from attracting those customers who might otherwise buy *B* alone.

The monopolist would rather make 15 on *A* from all the type I customers and 9 on *A* from the type II customers than 10 on *A* from both type I and type II customers. The problem for the *B* good rivals is that they don't have surplus in some other good to use as a competitive tool.⁴

³ In Michael D. Whinston, *Tying, Foreclosure, and Exclusion*, 80 AM. ECON. REV. 837 (1990), the monopolist commits to selling *A* and *B* as a bundle for this very reason. Even if a rival is more efficient in *B*, the monopolist will undercut the rival via the bundle so as to capture its surplus in *A*. To illustrate this point in our case, imagine there were only type II customers and the monopolist sold *A* only as part of an *A-B* bundle. Even if the rival could produce *B* for free, the monopolist would price the bundle at 10 (or $10-\epsilon$) and thereby capture all of the consumers. The monopolist makes 3 in this case (reflecting the 7 cost of *B*). While the monopolist would make more by selling *A* alone, that is not an option in this case, as the monopolist has committed itself to a bundling strategy. Given this commitment, rivals don't enter as they can predict that they can't compete against the monopolist's bundle.

⁴ If the monopolist could monitor purchases, it could do better still by selling *A* at a price of 10 only to those customers who bought the rival's *B* good at 6. The monopolist does not profit from selling the *B* good at a loss and would rather its customers buy the more efficiently produced *B* good. But if such monitoring is not possible, then the monopolist is willing to suffer some production inefficiency in order to continue charging 15 on *A* to the customers who don't value *B*.

Should this case be included with exclusionary bundling? My answer is yes. The underlying reason why the monopolist is able to profitably exclude a more efficient rival is that the monopolist is using the *B* good to engage in price discrimination. In that sense, the monopolist is being a less inefficient monopoly, at least in terms of extracting surplus.⁵ Following Klemperer and Png,⁶ I want to distinguish between efficiency in production and efficiency in pricing.

A firm that earns a monopoly by making a better or cheaper mousetrap should be rewarded. But do we want to allow the mousetrap monopolist to extend its monopoly to cheese even when it is not the most efficient cheese producer, just because that allows it to do a better job exploiting its position as a mousetrap monopolist? If the monopolist can do a better job pricing via a two-part tariff or through some other means, I am not opposed to such strategies. The problem arises only when these pricing strategies interfere with competition in the bundled product market.

Even if one doesn't accept this view, the price discrimination argument provides a limited defense. Preferences must be such that there are customers who are interested in buying *A* and not *B* or *B* and not *A*. And the firm must not be able to price discriminate in other ways, such as charging different prices to different customers. In the cases considered by the courts, price discrimination does not seem to be a relevant factor in explaining the bundled pricing.

While the conclusion that bundling is leading to exclusion may be correct, the exclusionary bundling test is considering only one avenue of entry, what might be called a fill-in-the-bundle strategy. One should also consider whether an equally efficient firm could compete simply by selling *B* alone. In general, such a strategy will attract some group of customers, but whether this customer segment is large

⁵ While price discrimination may lead to increased overall efficiency, this is not the case in our example. Absent bundling, the monopolist would sell *A* at 10 and all customers would be served. Here, the greater pricing efficiency only reflects the monopolist's better ability to extract surplus from consumers.

⁶ See Paul Klemperer & Ivan Png, *Frequent-Flyer Plans: Marketing Device with Insidious Effects—Employers, Price Competition and the IRS Come Up Losers*, L. A. TIMES, June 8, 1986, part IV at 3, 8.

enough to attain minimum efficient scale or to overcome entry costs is an open question. Furthermore, we can no longer use the monopolist's cost function as the comparison point as the sell-to-B-only strategy will not allow the rival to replace all of the incumbent's *B* sales and thus achieve the same scale. Indeed, the mechanism of entry deterrence in this case could be the fact that entrants are left with too little potential market. Although this possibility has not yet been central to an antitrust case, it is clearly a subject worthy of further research.

Copyright of Antitrust Bulletin is the property of Federal Legal Publications Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.