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Tie-ins, Reciprocity, and the Leverage Theory

Part II*: Tie-ins, Leverage, and the American Antitrust Laws**

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I. Introduction

Tie-ins are agreements which condition contractual obligations between a seller and a buyer of one product on the execution of transactions between the same parties acting in the same capacities on a second product. Since 1917,¹ all such agreements involving patented products have been held to be *per se* illegal on the assumption that their exclusive and/or inevitable function is to permit sellers to wield "monopolistic leverage,"² leverage that is intended to and inevitably does "result in economic harm to competition in the tied product market."³ This assumption and conclusion have been progressively extended first to cover tie-ins involving sellers of dominant products,⁴ and most recently to cover tie-ins involving sellers who have merely a competitive advantage when selling one of the goods in question to the buyer concerned.⁵

In this article, I will determine whether and under what circumstances tie-ins violate the American antitrust laws. My analysis will be divided into two parts. In Section II, I will examine the leverage theory of tie-ins in its various forms. At the outset, I will demonstrate the unsatisfactory character of the Court's attempt to account for the supposed ability of tie-ins to injure tied-product competition by showing that both premises of the Court's leverage theory are incorrect. Next, I will disprove the conclusion of the exclusive leverage theory (that the sole function of tie-ins is to injure tied-product competition) by demonstrating that such agreements can perform twelve functions other than reducing tied-product competition. Finally, I will undermine the conclusion of the inevitable leverage theory (that all tie-ins inevitably reduce tied-product competition) by showing that the profitability of tie-ins does not depend on their increasing their employer's returns by injuring tied-product competition.

In Section III, I will analyze the standards established by the

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

2. This article will not be concerned with the possibility that some tying agreements—*viz.*, those that function *inter alia* by concealing illegal price discrimination, contract or tax fraud, and/or maximum or minimum price regulation violations—may be void under the common law of contracts as *contra bonos mores*.

3. Times-Picayune Publishing Co. v. United States, 345 U.S. 594, 614 (1953). See also cases cited in Markovits, *Tie-ins, Reciprocity, and the Leverage Theory* (henceforth Part I), 76 YALE L.J. 1397 (1967).

4. See, e.g., Times-Picayune Publishing Co. v. United States, 345 U.S. 594 (1953).

5. See Fortner Enterprises, Inc. v. United States Steel Corp., 394 U.S. 495 (1969).

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American antitrust laws and the legality of tie-ins under them. As we shall see, although these laws are far more ambiguous than has previously been realized, most tie-ins would undoubtedly be legal under any plausible interpretation of the statute in question. In fact, under the most plausible rendering of the Sherman and Clayton Acts very few tie-ins would be found to be illegal for competition in the relevant sense will rarely be reduced by a decision to allow all prospective suppliers of a particular buyer to enter into such agreements with him regardless of the functional type of tie-in most likely to be employed.

Finally, I will compare the results of this analysis with the conclusions generated by the Court's leverage theory. As I have already indicated, the Court's *per se* rule would not be justified under any plausible rendering of the statutes in question. Moreover, those tying agreements that actually violate the American antitrust laws are not distinguishable as the Supreme Court contends by the fact that the tying producers they involve enjoy some competitive superiority in their tying product dealings with individual customers.

II. The Leverage Theory of Tie-ins

The Supreme Court's leverage theory of tie-ins purports to explain why a seller who enjoys a position of competitive superiority⁶ when

6. In its most recent opinion, the majority of the Court explicitly states its belief that general market dominance is not required for the generation of leverage. See *Fortner Enterprises v. United States Steel Corp.*, 394 U.S. 495, 502-06 (1968); quoting *United States v. Loew's Inc.*, 371 U.S. 38, 45 (1962). Unfortunately, however, the Court's articulation of the conditions under which it believes tie-ins to be capable of generating leverage is ambiguous. The Court seems to stress the special "desirability" or "uniqueness" of the product to the customer in question, but its subsequent discussion makes it clear that the supposed capacity of tie-ins to generate leverage might also derive from the seller's ability to provide a suitable tying product to this customer at relatively less cost to himself than tying-product substitutes would cost his tying-product competitors. Thus, in actuality, the Court seems to be arguing that tie-ins can and will generate leverage whenever the seller enjoys a competitive advantage when competing for at least some of the related buyer's patronage in the tying-product market. This advantage need not extend to all of this buyer's tying-product needs. For example, if we assume (1) that all tying-product producers face the same constant cost conditions and (2) that at equal prices the buyer in question would purchase some of the tying product from the tying seller and equal volumes from his various tying-product competitors—i.e., that the buyer prefers variety; the tie-in would still, on the Court's theory, be capable of generating leverage since the tying producer would enjoy an advantage when competing for part of the tying product patronage of the buyer in question, even though he would not be in a generally superior competitive position in the tying-product market. Thus, according to the Court, the capacity of the tie-in to generate leverage might, for example, derive (1) from the ability of the tying producer to provide a tying product which this customer prefers to the alternatives (for at least some of his needs) at the same cost his tying-product competitors must incur to provide these less preferred substitutes; or (2) from his ability to supply the buyer in question a tying product which costs him less than his

marketing one product (A) to a particular buyer sometimes finds it profitable to condition his sale of A on the buyer's agreeing to enter into a transaction with him on a second—or tied—product (B). According to the leverage theory, such tying conditions are inevitably and perhaps exclusively employed to enable such sellers to use their competitive superiority on the tying product to lever themselves into monopolistic positions in the market for the tied product.⁷ Although the Court has not recognized this fact, the correctness of its legal judgment depends on more than the correctness of its economic leverage theory. In particular, the correctness of the Court's legal conclusion depends as well on the soundness of its implicit reading of the American antitrust laws—that is, on its implicit assumption that the legality of a particular tie-in is determined by the competitive impact of allowing the seller it involves to enter into a tying agreement with a particular buyer rather than by the competitive impact of allowing all of the competitors for this buyer's patronage to enter into a tying agreement with him. As we shall see, this difference will be crucial in many tie-in cases. However, throughout Section II, I will analyze the Court's leverage theory on the assumption that it merits the legal significance the Court attributes to it. In Section III, I will drop this assumption. More specifically, after showing why the Clayton Act probably should be interpreted to make the legality of a particular tie-in depend on the competitive impact of allowing all competitors for a particular customer's patronage to enter into such an agreement with him, I will analyze when and how the general availability of such agreements would be likely to have such an anti-competitive impact.

competitors' substitutes cost them but is equally satisfactory to the customer involved; or even (3) from his ability to provide this buyer with a tying product the latter finds inferior to its substitutes at a cost to himself sufficiently lower than the cost of these substitutes to his competitors' to raise his prospective returns from making a sale at a comparatively low enough price to attract the buyer's patronage above what his competitors could earn by taking this sale away from him.

7. This interpretation of the leverage theory is not the only one suggested by the Court's language in various opinions. At times the Court seems quite clearly to have been concerned with tied-product competitors rather than with tied-product competition—*i.e.*, with the supposed tendency of tie-ins to place tied-product competitors at a disadvantage in their dealings with some prospective buyers for reasons unrelated to social efficiency and not with the alleged ability of such agreements to injure tied-product competition. In the text, however, I will continue to use the competitive impact rather than the unfair competition version of the leverage theory, since only on that interpretation would the theory's conclusion have the legal significance (under the Clayton and Sherman Antitrust Acts) the Court has attributed to it. In Appendix B, I will investigate whether tie-ins do tend to give their employers an unfair competitive advantage.

Tie-ins, Reciprocity, and the Leverage Theory

A. *On Generation and Other Gaps: A Critique of the Leverage Theory*

Although the leverage theory concludes that tie-ins enable their employers to increase their market power in the tied-product market, its explanation of the way in which these agreements produce this effect is entirely unsatisfactory. As we saw, the Court traces this alleged ability of a tie-in to the seller's competitive advantage in his dealings with the buyer in question in the tying-product market—that is, to the fact that the cost to the tying producer of providing a tying product of suitable quality to this customer is relatively less than its counterpart for his competitors; or more generally, to the fact that the returns the tying producer could realize by obtaining this customer's patronage will exceed their counterparts for his tying-product competitors regardless of the offer these competitors make.

According to the Court, the seller uses the tie-in to transfer and extend this advantage to the tied-product market: instead of raising his price sufficiently high to deprive his customers of any but a marginal gain from dealing with him on the tying product, the tying seller reduces his price for the tying product and allows his customers to realize part or all of the additional profits (in comparison with those of his competitors) his superior position could have enabled him to earn on the tying-product *on condition that* these buyers promise to purchase some other product from him on certain specified terms. In effect, then, according to the Court's account, the seller exchanges part or all of the profits he could have earned as a result of his superior position in the tying product market in dealings with these particular customers for their promises of patronage at specified terms on the tied product—that is, according to the Court, the seller has in effect offered these buyers what amounts to a discount on the tied product below the latter's nominal price under the tie-in. The value of this discount is equal to the amount of surplus or profits the seller has (without necessity) allowed buyers to retain on the tying good. Now, of course, this discount might be predatory⁸—that is, it might represent an attempt to drive out tied-product competitors in the hope of establishing a monopolistic position in this market. A tie-in entered into with this intent might involve a straightforward § 2 violation, but the Court clearly is arguing that its *per se* rule does not depend solely on this possibility. Thus, the

8. In general, predatory competition is undoubtedly far less common than many suppose. See, e.g., McGee, *Predatory Price Cutting: The Standard Oil (N.J.) Case*, 1 J. OF LAW & ECON. 137 (1958).

Court states that a discount of a given size which would be legal if given on the tied product itself, might be illegal if administered through a tie-in.

[T]he offer of any . . . tying product on advantageous terms . . . may be viewed as a form of price competition in the tied product [However, the seller can engage in such competition] without extending his economic power, by simply reducing the price of the product itself.⁹

How does the Court account for this alleged special capacity of tie-ins to generate leverage that will injure competition in the tied-product market? Although its argument is not always fully articulated, the Court's "justification" for its conclusion in both its inevitable and exclusive forms seems to be the following syllogism:

(1) Tie-ins involving a product on which and a buyer in relation to whom the seller enjoys a competitive advantage always enable their employers to increase their returns by extending to the tied-product market any competitive superiority they may have in their relations with the customers in question in the tying-product market;¹⁰ (2) any such generation of leverage will necessarily injure tied-product competition; therefore, (3) any such tie-in necessarily will injure tied-product competition.¹¹ Unfortunately, however, the Court does not substantiate either of its argument's premises. It simply asserts the first proposition and ignores the second. In fact, neither premise is correct.

Let's begin with the initial premise of the Court's argument—*viz.*, the proposition that tie-ins involving one or more goods which the seller is in a position to distribute at a competitive advantage to the buyer in question always enable such sellers to increase their returns by extending their advantage to the other goods involved. By definition, for a tie-in to extend a seller's competitive advantage from the tying (A)

9. *Fortner Enterprises, Inc. v. United States Steel Corp.*, 394 U.S. 495, 508 (1969).

10. According to the minority in *Fortner Enterprises*, the leverage theory traditionally promulgated by the Court required market dominance or power in the tying product and asserted the ability of the tie-in to extend such power directly to the tied-product market. Two of the refutations I will offer against the initial premise of the majority's theory will also undermine this minority version. In particular, the minority version can be refuted (1) by showing that it implies that any seller of one monopolized good and at least one other good to a given buyer will always find a tie-in more profitable than independent offers on the two products and (2) by offering a counter-example in which a tie-in could produce no such result—indeed, by offering the same counter-example I will use to refute the majority theory in the text.

11. I will continue to consider the competitive-impact version of the leverage theory. The unfair-competition version would consist of premise (1) and the conclusion that any tie-in (involving a tying product in whose distribution to the buyers involved the seller enjoys a competitive advantage) must necessarily place tied-product competitors at a disadvantage that is unrelated to their social efficiency.

to the tied (B) product, it must increase the returns he can earn by selling the tied product to the buyer in question on terms of any given attractiveness to the latter. In other words, (1) the returns the seller can earn under a tie-in involving B of any given attractiveness to the buyer in question *minus* (2) the returns he could realize under an independent contract¹² on the tying-product A (on which he possessed a competitive advantage) *must exceed* (3) the returns he could realize by selling the tied-product B to the buyer in question on terms which would be equally attractive as the tie-in concerned. Accordingly, a tie-in will not be able to extend a seller's competitive advantage from the tying to the tied product unless the "cost"¹³ to the seller (X) of giving the buyer (Y) a particular discount on the tied-product B below its nominal price¹⁴ under the tying agreement exceeds the "cost" he would have to incur to give an equivalent discount on B independently. The Court's position, therefore, must be that X's enjoying a competitive advantage in his dealings with Y on A guarantees the ability of the tie-in to reduce the "cost" of granting such a discount.

In order to see why this contention is incorrect, let's assume, for example, (1) that X is a monopolist on some product A which he sells to some buyer Y,¹⁵ (2) that X also produces another good B which Y might be interested in purchasing, and (3) that B is also produced by other sellers who face the same costs as X so that on independent sales of B to Y, X's position would be identical to that of his competitors. According to the Court's initial premise, X should always be able to obtain a competitive advantage on B in this situation by conditioning his sale of A on Y's agreeing to purchase some or all of his requirements of B from him as well—that is, according to the Court's initial premise, the "cost" to X of granting Y a given discount below B's nominal price through a tie-in in which A's price is reduced will always be less than its counterpart for an equivalent discount granted directly on B.

Our question, then, is whether it will always "cost" a seller less to give a given discount on a product on which he enjoys a competitive

12. Where profitable tie-ins could also be arranged with products other than B, term (2) should be replaced with "the returns he could realize under the most profitable tie-in he could arrange without employing B."

13. By "cost to the seller" I refer to the number of dollars by which the seller's returns would be reduced if he gave Y the more favorable terms on A contained in the tie-in despite the fact that he could have obtained Y's patronage on B at that product's nominal price.

14. By "nominal price," I mean the unit price the buyer is actually charged for the product under the tying agreement.

15. I have adopted this strong assumption to make the argument apply equally as well to the market-dominance version of the leverage theory.

advantage in his dealings with the buyer in question. In general, the cost to any seller X of granting an individual customer Y an independent unit-price discount expected to be worth any given amount to the latter will be equal to that amount *minus* (1) the profits he would earn if he could obtain the additional sales he makes at the lower price without reducing the average revenue he receives on his original sales and (2) the additional consumer surplus the buyer would realize if he were required to pay the original price for his original purchases but allowed to purchase extra units at the lower price. Thus, if a reduction in any tied or tying product Q's price from \$2.00 to \$1.90 would raise X's sales of Q to Y from 40 to 45 units, the value of the discount in question to Y would be (1) \$4.00 (the sum of the \$.10 less he would have to pay X on each of his original forty purchases of Q) *plus* (2) whatever consumer surplus¹⁶ he would realize on the five additional units of Q he purchased at the lower price—henceforth β . On the other hand, such a reduction would cost X an amount equal to the difference between (3) the \$4.00 less he received from Y on the latter's original forty unit purchases and (4) the profits he would realize at the lower price on his additional unit sales of Q to Y if he could reduce his price on these units without lowering his average revenue on his original sales volume—henceforth, if we let K stand for (3) = (1), the cost to X of granting a discount of any given size $(K + \beta)$ on a particular product will be equal to $\frac{K - \delta}{K + \beta}$

$(K + \beta)$, which will be directly related to $\frac{K - \delta}{K + \beta}$ for any $(K + \beta)$.

Accordingly, the Court's initial premise resolves into the assumption that $\frac{K - \delta}{K + \beta}$ will always be lower for goods on which the seller enjoys a competitive advantage when dealing with the customer in question than it will be for goods on which the seller does not enjoy such an advantage. I have already examined the general determinants of this ratio—previously denoted the $\frac{\text{seller surplus minus}}{\text{buyer surplus plus}}$ ¹⁷ ratio—in great

16. By "consumer" or "buyer surplus", I refer to the amount of dollars the buyer in question would have been willing to pay in addition to what he did pay to obtain the goods he purchased. Accordingly, β equals the absolute difference between \$9.50 ($5 \times \1.90) and the number of dollars Y would have been willing to pay for the forty-first through forty-fifth units he purchased.

17. For the definition of "buyer surplus," see note 16 *supra*. "Seller surplus" equals the difference between the seller's variable costs and the revenues he obtains from the transactions in question. See also Part I at 1403.

detail in Part I of this article.¹⁸ For present purposes, it will be sufficient to develop a counter-example to the Court's contention.

Let's assume (1) that Y's demand curve for A below the independent price X would find most profitable for this product is completely inelastic—that is, that X, who is a monopolist of A, faces a completely inelastic demand curve below his independent profit-maximizing price, (2) that Y's (full requirements) demand curve for B is somewhat elastic throughout and (3) that the nominal price of B under X's optimal tie-in involving both A and B exceeds B's marginal cost by more than any contemplated price reduction on that product. In this situation, and in many others with far more common characteristics,¹⁹ X could not reduce the cost of granting Y a given discount on B by tying its sale to A's and reducing the latter's unit price despite the fact that he enjoys a competitive advantage on the latter but not on the former product, for

$\frac{K - \delta}{K + \beta}$ will always be higher on A than it will be on B. In particular, it will always be equal to one on A and less than one on B. Thus, since Y's demand for A is completely inelastic over the relevant range, reducing the price of A will not increase Y's purchases; δ and β will therefore both equal zero; and $\frac{K - \delta}{K + \beta}$ on A will therefore equal one. And

since Y's demand for B is somewhat elastic over the relevant range, reducing the price of B will increase Y's purchases of this product; δ will be positive since price is assumed to exceed marginal cost; β will be non-negative since price is always less than or equal to the demand price for goods actually purchased; and $\frac{K - \delta}{K + \beta}$ will therefore be less

than one. Thus, the cost to X of granting a given discount to Y on B by reducing that product's price will in the situation described be less than its counterpart for a tied-price reduction on A. The Court's initial premise must therefore be rejected: the fact that a tie-in involves a product on which and a buyer in relation to whom the seller enjoys a competitive advantage does not in itself guarantee the ability of the agreement in question to improve the seller's competitive position in the tied-product market.²⁰

18. For a discussion of the determinants of these amounts, see Part I at 1416-23 and the text of this article following note 30 *infra*.

19. This conclusion will hold whenever $\frac{K - \delta}{K + \beta}$ is higher on A than on B. This result can obtain in a large variety of situations. See Part I at 1416-23 and p. 212 *infra*.

20. This conclusion assumes that the fact that a seller enjoys a competitive advantage

This result should not come as a surprise. It accords with our everyday experience that sellers who enjoy a competitive advantage on some sales of one product to a particular customer frequently sell other products to such buyers independent of any tie-ins, even where such arrangements are not illegal. If we make the assumption that sellers price to maximize profits, this fact is incompatible with the Court's initial premise which asserts the inevitable profitability of employing tie-ins in the situation described.²¹

Admittedly, however, this refutation of the Court's initial premise does not disprove its conclusion. If the leverage theory's second premise were correct, the conclusion that tie-ins always reduce (tied-product) competition would follow from the assumption that producers price to maximize profits, for all tie-ins that are actually profitable will improve their employer's competitive position in the tied-product market since profitable tie-ins will always raise the returns their employer can realize by selling the tied product to the buyer in question on terms which enable the latter to realize any given amount of consumer surplus. In fact, this result is simply a tautology: the statement that a tie-in is profitable implies that (1) the returns the seller can realize under the agreement in question exceed the sum of (2) the profits he could earn on his optimal independent contract on the tying-product A *plus* (3) the returns he could realize by selling the tied-product B to the buyer in question on terms that would be equally attractive as the tie-in concerned and hence that (1) *minus* (2), or the returns he could realize under the tie-in on the tied-product B, *exceeds* (3), the returns the seller would realize if his customer accepted an equally attractive independent offer on B.

Accordingly, if the Court were correct in focusing on the competitive impact of allowing the actual tying seller to enter into a tie-in with the buyer in question rather than on the competitive impact of allowing all prospective suppliers of this buyer to enter into such agreements with him, the legality of tying agreements under the Clayton Act's competition test would indeed turn on the truth-value of the second premise of the Court's leverage theory—*viz.*, on the contention that individual

on a particular product does not guarantee the ability of a tie-in involving that product to reduce the cost of giving a discount by performing the other functions I will discuss in section II B. The validity of this assumption will become obvious in the course of my treatment of that subject.

21. Admittedly, we normally assume only that sellers *try* to maximize profits. The fact that sellers market two products separately to the same buyer would obviously not be incompatible with the Court's initial premise on *this* assumption since some sellers might simply not be aware of the profitability of tie-ins.

tie-ins that improve the seller's competitive position in his tied-product dealings with the buyer in question (*i.e.*, all the tie-ins that are profitable) necessarily reduce tied-product competition. Unfortunately for the Court's conclusion, this second premise is also incorrect.

An example should be sufficient to demonstrate this point. Thus, a tie-in that improved its employer's tied-product position would clearly intensify—not reduce—short and long-run competition for Y's patronage on B if it made it profitable for X to try to sell B to Y in a situation in which X would not otherwise have found it in his interest to do so—that is, in a situation in which X's position in independent dealings with Y over B would have been so inferior that given the offers that other producers of B or its substitutes would have made in his absence, it would not have been profitable for him to seek Y's patronage on B if he were constrained to make independent deals on this product. In fact, where the sellers involved produce both goods in question, tie-ins may also intensify long-run competition generally throughout the tied-product market by making it profitable for certain sellers to remain in this market in situations in which they would have otherwise found it more profitable to withdraw. Examples could be multiplied, but the conclusion should be clear: the Court's second premise must also be rejected, even if we adopt the Court's focus on the competitive impact of the individual tying agreement.

In short, the Court's leverage theory cannot withstand analysis. The Court has simply failed to justify its conclusion that the inevitable (or the exclusive) function of tie-ins is to reduce competition in the tied-product market.

B. *The Non-Leverage Functions of Tie-ins: A Critique of the Exclusive Leverage Hypothesis*²²

As I have already indicated, the Supreme Court has in the past²³ asserted that the exclusive function of tie-ins is to permit the sellers they involve to wield monopolistic leverage²⁴—that is, to raise their profits

22. Much of the positive microeconomic analysis of this section was presented in more detail in Part I. Some additional possibilities have been delineated, however, and the relations among several of the arguments presented there have been clarified. Where appropriate, I have simply included portions of Part I here, after making minor adjustments for the different focus of the present argument.

23. Thus, according to the Court, "tying agreements serve hardly any purpose beyond the suppression of [tied-product] competition." *Standard Oil Co. of California v. United States*, 337 U.S. 293, 305-06 (1949).

24. In practice, the Court seems to have limited this contention to tie-ins that involve a dominant or unique product (or a product which the seller concerned distributes at a competitive advantage to the buyer in question). In the text I will not distinguish such tie-ins from tying agreements which do not involve products or sellers with the

by reducing tied-product competition. In fact, in its most recent majority opinion on tying agreements, the Court seems to have adopted a position which is really indistinguishable from the exclusive leverage hypothesis just delineated—*viz.*, the position that all the non-leverage functions of tie-ins could be performed equally well by less “suppressive” devices.²⁵ In this section, I will demonstrate the invalidity of this claim by delineating twelve²⁶ non-leverage functions that tie-ins can and often do perform better than any alternative pricing system their employers could adopt.²⁷ Since tying agreements that buyers have arranged will tend to perform different functions from those initiated by sellers, I will divide tie-ins into two categories—seller-arranged and buyer-arranged—and discuss the various functions with which we will be concerned from the perspective of the related agreement’s more probable initiator. It should be emphasized at the outset that this assumption is not in fact material. It has been adopted primarily for expositional reasons—even the discussion of leverage requires a place to stand—but also because some commentators have taken positions which imply its legal relevance.

1. *The Non-Leverage Functions of Seller-Arranged Tie-ins*

Tying agreements that sellers are more likely to arrange are capable of performing at least nine functions other than reducing competition in the tied-product market. In particular, such agreements may (1) re-

characteristics in question. However, since there is obviously no reason why tie-ins that do not involve products that are dominant or unique or sellers who have the relevant competitive advantage should be less adept at performing the non-leverage functions I will describe than those that do involve such products and/or sellers, a general demonstration that tie-ins can perform several non-leverage functions will apply as well to the type of agreement to which the Court has in practice restricted its exclusive leverage hypothesis. Although this fact is not germane to the present inquiry, it should be noted that the functions described can also be performed by tying agreements that do not involve products or sellers with some or all of the characteristics in question. Since this proposition will prove useful at a subsequent point in the analysis, I will attempt to establish its validity in footnotes accompanying the discussion of each of the non-leverage functions of tie-ins.

25. See *Fortner Enterprises v. United States Steel Corp.*, 394 U.S. 495, 503 (1969).

26. Admittedly, only nine of these functions are clearly distinct: the three functions I have attributed to “buyer-arranged” tie-ins parallel three of the functions of what I will call “seller-arranged” tie-ins.

27. Although in the vast majority of cases, tie-ins are initiated by sellers who condition their sale of the product at a stipulated lump-sum and/or unit price on their customer’s agreeing to purchase another product from them as well on certain specified terms (or by sellers who offer a package of products at a single, combined price), such agreements are also sometimes arranged by buyers who condition their purchase of one product at some stated price on their supplier’s agreeing to sell them another product on terms that are stipulated in the agreement. Although, as we shall see, tie-ins will often increase both the seller’s and the buyer’s returns, usually (though perhaps not always) only one party to the transaction will have enough information to conceive and arrange a suitable agreement.

duce the cost of implementing a policy of non-marginal cost pricing on durable products or patented processes or ideas—that is, of meter pricing; (2) reduce the extent to which any given amount of the seller's non-marginal cost pricing lowers his returns (in comparison with those of an efficient integrated producer) by reducing his unit sales below the volume at which the demand curve he faces intersects his marginal cost curve; (3) reduce the extent to which the seller's non-marginal cost pricing lowers his returns (in comparison with those of an efficient integrated producer) by reducing his customers' promotional activities below what would be optimal for an integrated concern; (4) reduce the costs the seller incurs as a result of the risk he and his customer bear under their agreement; (5) reduce the information costs the seller must incur to practice price discrimination with some relevant degree of accuracy; (6) reduce the costs the seller must sustain to prevent or allow some relevant amount of buyer arbitrage; (7) increase the profitability of price competition, price discrimination and/or price regulation violations by lowering the costs associated with the possibility that such activities may provoke prosecution, civil damage suits, increased bargaining by non-favored customers, and/or competitive retaliation—that is, by lowering the seller's certainty equivalent prosecution, retaliation and bargaining (PRB) costs; (8) reduce the costs of concealing to some relevant extent the seller's tax and contract frauds; and (9) reduce the cost of preventing buyers from using some relevant amount of inferior complements.

a. *Reducing the Cost of Implementing a Policy of Non-Marginal Cost Pricing on Durable Products or Patented Processes or Ideas*

As we shall see, in certain circumstances tie-ins will be able to reduce the cost of implementing a system of non-marginal cost pricing on durable products or patented processes or ideas. Such pricing is usually called meter pricing since it is frequently implemented by actual meters attached to the machines in question. Although the ability of tie-ins to reduce the cost of implementing such non-marginal cost or meter pricing could obviously be demonstrated without analyzing the functions of such pricing, I will begin this section with a general discussion of meter or non-marginal cost pricing in order to correct the current assumption that the sole function of such pricing is to produce price discrimination.

(1) *The Functions of Non-Marginal Cost Pricing*

In two ways, non-marginal cost pricing will tend to reduce a seller's returns below what he would realize if he could resell, use, or consume

his own product as productively as his actual customers: first, by reducing his sales of the good in question below the volume at which the demand he faces intersects his marginal costs; and second, by reducing his customers' promotional activities below what would be optimal for an integrated concern (by reducing his customer's returns from a marginal sale of his product below the profits that an efficient integrated concern would realize on the transaction in question).

Nevertheless, almost every producer who faces a downward-sloping demand curve will find it profitable to charge his customers more than his marginal costs for their marginal purchases, for although the alternative to this policy—pure lump-sum pricing²⁸—will not lower such a seller's returns in either of the two ways just described, *ceteris paribus*, it will reduce his profits below those of an efficient integrated concern (1) by increasing the sum of the risk costs he and his customers must bear in connection with their uncertainty about his customers' future demand for his product,²⁹ (2) by increasing the probable costs he will incur as a result of his own or his customers' undue pessimism about their demand for his product,³⁰ and (3) by increasing the costs he must expect to incur to prevent or allow buyer arbitrage.³¹

In general, the lower a seller's risk and risk aversion in comparison to his customer's, the greater his ignorance about his customer's future demand, the more pessimistic his customers about their future demands, and the smaller the cost of transferring his product, the more profitable non-marginal cost pricing will be. In fact, in some cases—particularly

28. An example of this would be charging a lump-sum fee plus a unit price equal to the seller's expected marginal cost.

29. By reducing the dependence of his customers' payments on their actual demand, lump-sum marginal cost pricing will shift this risk from the seller to his customers. Since these customers (1) will often face greater risk in connection with this uncertainty (since their demand will depend on their respective shares of the resales of the good in question as well as on its total sales while the demand the seller faces will depend only on the second of the two factors in question), (2) will often be less able to reduce the risks in question through diversification, and (3) will often be more averse to taking risks than their supplier, this shift will normally raise the sum of the risk costs of the seller and his customers.

30. By reducing the dependence of his customers' payments on their actual (quantity) demand, lump-sum marginal cost pricing will increase the losses the seller will sustain if he or his customers underestimate their demand for his product. This effect of lump-sum pricing will be manifest (1) in the seller's incurring higher market research costs in order to reduce the probability that he will underestimate the demand in question, (2) in his losing more profits whenever he is unduly pessimistic, (3) in his incurring higher bargaining costs in order to persuade his customers that they are being unduly pessimistic about their future demands, and (4) in his losing more profits whenever he fails to dissuade his customers of their undue pessimism.

31. By raising the seller's average lump-sum plus unit price above his unit price, lump-sum pricing will give his customers an incentive to engage in arbitrage by reducing the price they pay for their marginal purchases below the average sum that others would have to pay to purchase his product from him.

when the sales to an individual customer (e.g., a final consumer) are small—the seller may even find it profitable to save the cost of preventing arbitrage and arranging and executing a long-term contract by eliminating his lump-sum fee altogether and engaging in conventional single pricing.

In short, despite its tendency to reduce the seller's profits below those of an efficient integrated concern (1) by lowering his unit sales below the volume at which the demand curve he faces intersects his marginal cost curve and (2) by reducing his customers' promotional activities below what would be optimal for an integrated concern, non-marginal cost pricing is almost always practiced by sellers in non-perfectly competitive markets (1) to increase the dependence of their revenues in their customers' actual demands (i.e., to reduce the sum of their own and their customers' risk costs as well as the cost to them of their or their customers' undue pessimism) and (2) to reduce their customers' incentive to engage in arbitrage.³²

(2) *Meter Pricing as Non-Marginal Cost Pricing*

If we conceptualize an outright sale of a durable machine (or of the right to use a patented process or idea) as the sale of a right to use the machine at the seller's marginal cost (zero), the equivalence of such sales

32. In equilibrium, the short-run profit-maximizing firm will charge a lump-sum fee if and only if the lump-sum which cannot be exceeded without sacrificing a more profitable marginal unit price increase exceeds the cost of arranging and negotiating the related long-term agreement by more than the profits the seller could earn by raising his unit price to the conventional "profit-maximizing" level. As we have seen, in some cases, particularly when small repeated sales to final consumers are involved, this condition will not be met—i.e., the seller will find it most profitable to abandon his lump-sum fee altogether. When no lump-sum fee is charged, the short-run profit-maximizing seller will normally charge his customer the price at which his conventional marginal revenue curve (indicating marginal revenue from the buyer in question) intersects his marginal costs curve from above (although a higher or lower price might be more profitable if it prevented buyer arbitrage). In some cases, however, the seller will find it profitable to charge a lump-sum fee in addition to his unit price. In such situations, the seller will find it profitable to reduce his lump-sum fee (from the highest he could charge in addition to his marginal cost unit price) to the point at which the certainty equivalent profits that he expects to be generated by the unit price increases that a further marginal (say \$ 1) reduction in his lump-sum charge would permit are just equal to \$ 1. If we assume for simplicity that reseller promotion is not important for the product in question, the certainty equivalent profits the seller will expect to realize by raising his unit price sufficiently to reduce his customer's certainty equivalent expected returns by \$ 1 will equal

$$(1) \left(\frac{SS +}{BS -} \text{ over the relevant range of the demand curve in question} \right) \text{ times } (\$ 1 + \text{ the}$$

associated decrease in Y's risk costs) *plus* (2) the savings the seller achieves as a result of the unit price increase's tendency to reduce the customer's incentive to engage in arbitrage, *minus* (3) the associated increase in the seller's own risk costs. Since, *ceteris paribus*, it will always cost the seller \$ 1 to reduce his lump-sum fee \$ 1, (1) + (2) + (3) will always equal \$1 in equilibrium for the short-run profit-maximizer who finds it profitable to charge a lump-sum fee.

with pure lump-sum pricing should be apparent. Similarly, if we conceptualize meter pricing as the sale of a service (the service provided by an intended use of the machine) whose marginal cost is zero, its equivalence with non-marginal cost pricing becomes patent. Thus, meter pricing performs the same functions for producers of durable products or ideas that non-marginal cost pricing performs for manufacturers of less durable commodities. In particular, by making Y1 . . . N's payments depend on how often they use his durable product or idea, meter pricing may be able to reduce the losses X sustains through his own ignorance and uncertainty as well as through his customers' pessimism, uncertainty and practice of arbitrage. It should be noted that although meter pricing may be more profitable when different customers have different demands for the seller's product (since the amount the seller's ignorance about these demands would otherwise cost him may tend to be greater in such circumstances), meter pricing may also be profitable where no such differences exist—that is, where the seller has only one customer or where all his customers have the same demand for his product, in short where meter pricing would not produce price discrimination.

(3) *Tie-ins as Means of Reducing the Cost of Implementing Meter-Pricing Systems*

In many situations, non-marginal cost pricing systems can be implemented on durable products simply by attaching a meter to the machine X sells. But even in the best of circumstances, meters may be tampered with and for many products (*e.g.*, riveting machines) and most patented or secret processes or ideas, meters will be unsuitable. When they are, tie-ins may be more efficient than other metering devices such as endproduct royalties. Thus, if X's machine is used in fixed proportions with some other input B, X may find it profitable to convert this input into a counting and rent-collecting device by requiring his customers to purchase their full requirements of B from him as well at some margin (equal to the effective meter rate, assuming one unit of B is used each time the machine or idea is employed) above its prevailing market price, for it will often be less expensive to determine whether Y1 . . . N are purchasing B from other suppliers than to determine whether they have reported their sales accurately, particularly where the tying seller can alter his variant of B to facilitate its identification.⁸³

83. Where X's B can be readily identified, he will be able to detect Y's violations without involving Y in the process at all simply by spot checking all of Y's final output. It should be noted that the function discussed in this section can be performed by tie-ins that do not involve a product that is dominant or unique or a good that the seller in

- b. *Reducing the Extent to Which the Seller's Non-Marginal Cost Pricing Lowers His Returns (in Comparison with Those of an Efficient Integrated Concern) by Reducing His Unit Sales Below the Volume at which the Demand Curve He Faces Intersects His Marginal Cost Curve.*

In appropriate circumstances, a given seller may be able to increase his profits by using tie-ins to reduce the extent to which his non-marginal cost pricing lowers his returns by reducing his sales below the volume at which the demand curve he faces intersects his marginal cost curve. In Part I, I analyzed this possibility by investigating the ability of tie-ins to increase the rate at which unit price increases can be expected to convert buyer into seller surplus (the $SS+ / BS-$ ratio) on the assumption that the ultimate sales of the goods involved were not responsive to reseller promotional activities.³⁴

question could distribute independently to the buyer involved at a competitive advantage. Assume, for example, that X produces a standardized durable machine A; that his sales of A represent an insignificant percentage of that product's total sales; and that the cost to X of furnishing Y with A is not lower than the cost his competitors would have to incur to perform the same function. In this situation, X may find it profitable to underbid his competitors for Y's patronage on A—at least when this bid can be made through a tie-in that will enable him to reduce the cost of meter pricing.

34. In what follows, the phrase (certainty equivalent) "expected seller surplus" will connote (1) the seller's weighted average expected total revenue *minus* (2) the weighted average variable costs he expects he will have to incur to produce, promote, and/or distribute the output *minus* (3) the costs he must bear as a result of his uncertainty about his customer's demand for the product in question. As defined, a seller's (certainty equivalent) expected seller surplus on his dealings with a particular customer will differ from his certainty equivalent expected profits on these transactions by the amount of pricing costs he expects to incur—i.e., (1) by the costs he and his customer must incur to devise their offers and arrange the related agreement, (2) by the certainty equivalent costs he expects he will have to incur to prevent or allow buyer arbitrage, (3) by the certainty equivalent costs he expects he will have to incur to enforce or not enforce his customer's promise of patronage, and (4) by the certainty equivalent costs he expects to bear in connection with the possibility that the transaction in question may provide retaliation by competitors, intensified bargaining by non-favored customers, and/or government or (treble) damage suits by the relevant parties concerned. The phrase (certainty equivalent) "expected buyer surplus" connotes (1) the total revenue or dollars worth of satisfaction the buyer expects to obtain as a result of his use, resale, or consumption of the product in question *minus* (2) the risk costs the buyer bears in connection with his uncertainty about his demand for this good *minus* (3) the total variable costs he expects to incur in connection with the product concerned (if we assume that the buyer does not intend to engage in arbitrage or to break his promise of patronage). The sum of "expected seller surplus" and "expected buyer surplus" was termed "expected transaction surplus" in Part I. As defined, "expected transaction surplus" will equal the weighted average expected returns of an efficient integrated concern if and only if marginal cost pricing is practiced. The tendency of non-marginal cost pricing to reduce the seller's sales and returns below those of an efficient integrated concern was therefore reflected in the analysis of Part I in its tendency to reduce the transaction surplus generated by the dealings of the parties in question with each other. Relatedly, since $(BS -) = (SS +) + (TS -)$ for super-marginal cost pricing, the ability of tie-ins to reduce the effect of this tendency was manifest in our earlier analysis as an ability to reduce the ratio of $(TS -)$ to $(BS -)$ for any given $(BS -)$ —i.e., was manifest as an ability to increase the ratio of $\frac{SS +}{BS -}$ for any given amount of super-marginal cost pricing, for any given $(BS -)$. See Part I at 1414-23.

In suitable situations, tie-ins will be able to accomplish this result by shifting the locus of the seller's non-marginal cost pricing from his tying product to another good that is potentially more suitable for this technique. In order to arrange such a tie-in, the seller in question (X) will offer to sell his customers (Y1 . . . N) his tying-product A on more favorable terms than would otherwise be in his interest on condition that they agree to purchase their full requirements of some other product B from him as well for more than its prevailing market price. Y1 . . . N will normally be indifferent between such a tie-in and the straight-forward offer of the tying product they would otherwise have received, for they will anticipate gaining as much from the unit price reduction they obtain on A as they expect to lose from the concomitant increase in both B's unit price and the risk they must bear. Nevertheless, such an arrangement may increase X's profits if the $\frac{\Delta SS +}{\Delta BS -}$ ratio (the ratio of seller surplus gained to buyer surplus lost as a result of a given change in unit price, the analogue for what we previously denoted $\frac{K - \delta}{K + \beta}$)³⁵ is higher over some relevant range of the demand curve he faces when selling B to Y1 . . . N under full requirements contracts ($DD_{XBY1 \dots N}^{RO}$)³⁶ than $\frac{\Delta SS -}{\Delta BS +}$ (previously denoted $\frac{K - \delta}{K + \beta}$) over the relevant range of Y1 . . . N's normal demand curve for A ($DD_{XAY1 \dots N}$), for where this condition prevails X will be able to realize more buyer surplus by eliminating any given amount of his customers' surplus through increasing the unit price of B (above the unit price that would have been optimal for X under an independent [untied] full-requirements contract on B)³⁷ than he loses by giving Y1 . . . N back the same amount of surplus on A by lowering that product's unit price (below X's non-tie-in optimal unit price for A)—that is, it will "cost" X less to give Y a price reduction worth $(K + \beta)$ by reducing A's unit price below its

35. See text preceding note 17 *supra*.

36. $DD_{XBY1 \dots N}^{RO}$ represents the demand curve X faces when selling B to Y under a full-requirements contract. For a graphic representation, see Part I at 1423.

37. In equilibrium, the profit-maximizing firm employing such a tie-in will lower A's

unit price and raise B's until $\frac{\Delta SS +}{\Delta BS -}$ for further increases in B's unit price just equals

$\frac{\Delta SS -}{\Delta BS +}$ for further decreases in A's—assuming, of course, that such changes have an equal or perfectly offsetting effect on the sum of the seller's and buyer's pricing costs and on the amount of transaction surplus destroyed by the tendency of non-marginal cost pricing to reduce Y's promotional expenditure below what would be optimal for an integrated firm.

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optimal untied level than by reducing B's unit price below its optimal level under a full requirements tie-in.

In general, $\frac{\Delta SS +}{\Delta BS -}$ on DD_{XBY}^{RC} above the optimal price X could charge Y under an independent requirements contract on B will exceed $\frac{\Delta SS -}{\Delta BS +}$ below X's optimal independent unit price for A to the extent that (1) X's unit sales of B under this independent contract exceed his sales of A under his optimal independent arrangement on this product, (2) the slope of DD_{XBY}^{RC} above the price in question exceeds the slope of DD_{XAY} below its optimal untied unit price, (3) the difference between X's optimal untied unit price for A and its related marginal cost exceeds its counterpart for X's optimal feasible untied unit price for B, and (4) the signed slope of MC_{BX} (the marginal cost of B to X) to the left of X's optimal untied unit sales of B exceeds its counterpart for MC_{AX} (the marginal cost of A to X) to the right of X's optimal untied unit sales of this product.³⁸

Ceteris paribus, $\frac{\Delta SS +}{\Delta BS -}$ over the relevant portion of DD_{XBY}^{RC} and hence the gross gains generated by the tie-in will increase with the competitiveness of industry B, for the more competitive this market, the lower X's optimal feasible unit price for this product under an independent requirements contract and the lower this price, (1) the higher the associated unit sales of B, (2) the smaller the amount by which the price exceeds X's marginal cost (when he produces B himself)³⁹ and perhaps

38. $\frac{\Delta SS +}{\Delta BS -}$ for the relevant range of B will (1) be directly related to (a) the slope of DD_{XBY}^{RC} between the prices in question and (b) X's unit sales of B under his optimal untied full requirements contract on this product and will (2) be inversely related to (a) the signed slope of MC_{BX} over the range in question and (b) the gap between price and marginal cost under X's optimal untied full requirements contract on B. Similarly, $\frac{\Delta SS -}{\Delta BS +}$ for unit price reductions below X's optimal untied unit price for A will (1) be directly related to (a) the slope of DD_{XAY} between the prices in question and (b) X's unit sales of A to Y under his optimal untied contract on this product and will (2) be inversely related to (a) the signed slope of MC_{AX} to the right of the quantity in question and (b) the gap between A's optimal untied unit price and X's corresponding marginal cost. See Part I at 1414-23.

39. Tie-ins can perform the function I am now discussing even when X is a monopolist of B, for since X can charge lump-sum fees in addition to his unit price, $\frac{\Delta SS +}{\Delta BS -}$ may well be positive above X's optimal untied unit price for B even if he is a monopolist on this product. In Part I, I mistakenly reached the opposite conclusion by assuming implicitly and erroneously that X would not charge any lump-sum fee on B. On this assumption, the tie-in could not perform the function with which I am now concerned if X were a monop-

as well (3) the steeper the slope of the relevant portion of DD_{XBY}^{RO} . The gross gains achieved by such a tie-in are likely to be particularly high when product B—in addition to being produced under competitive

conditions—is resold in a tightly oligopolistic market, for since DD_{XBY}^{RO} will tend to be vertical over the relevant range in such a situation,

$\frac{\Delta SS +}{\Delta BS -}$ for unit price increases on B will very often approach or equal

one (*i.e.*, unit price increases will very often not reduce unit sales) over a considerable range of the relevant portion of this demand curve in these circumstances.⁴⁰ Obviously, however, tie-ins will also be able to shift the locus of X's non-marginal cost pricing to a product on which

$\frac{\Delta SS +}{\Delta BS -}$ is higher in situations that are less ideal than those we have just

described. For example, as I showed in Part I, tie-ins will also be able to reduce the extent to which a seller's non-marginal cost pricing lowers his returns (in comparison with those of an efficient integrated concern) by reducing his sales below the volume at which the demand curve he faces intersects his marginal cost curve whenever the seller is in a position to condition the sale of his product (A) at a reduced unit price on his customer's agreeing to purchase at a higher price than he would otherwise be willing to pay another good (B) which he uses in variable proportions to A and which the seller would market (if he would do so at all) at a lower percentage mark-up over his margin costs than he would apply in an independent contract on A.

Thus, in many situations, tie-ins may be able to increase the profitability of non-marginal cost pricing by reducing the amount of transaction surplus it destroys through lowering the seller's sales below

olist since $\frac{\Delta SS +}{\Delta BS -}$ will always equal zero at a monopolist's optimal unit price if he cannot charge any lump-sum fee (*i.e.*, at the monopolist's conventional "profit-maximizing" price). See Part I at 1414-15.

40. DD_{XBY}^{RO} will equal MR_{YBZ} (the marginal revenue curve Y faces when selling B to final consumer Z) if the only marginal expenses Y incurs when distributing B are costs-of-goods-sold. (The same argument will also apply if Y's non-cost-of-goods-sold marginal costs are constant over the relevant range.) Since in a tight oligopoly, the demand curve the seller faces (DD_{YBZ} in this case) may often be kinked at the prevailing market price, $MR_{YBZ} = DD_{XBY}^{RO}$ (on our assumptions) may very well be vertical or discontinuous when

B is sold in a tightly oligopolistic market. If it is, increases in the unit price X charges Y for B will reduce neither his sales nor the transaction surplus they generate and $\frac{\Delta BS +}{\Delta SS -}$ will therefore equal one.

the volume at which the demand curve he faces intersects his marginal cost curve.⁴¹

c. *Reducing the Extent to Which the Seller's Non-Marginal Cost Pricing Lowers His Sales and Returns (In Comparison with Those of an Efficient Integrated Producer) by Reducing His Customers' Promotional Activities Below What Would Be Optimal for an Integrated Concern*

So far, we have assumed that the type of tie-in with which we have been concerned would not affect the reseller's profits by increasing Y's incentive to promote the sale of A (by lowering its unit price to the reseller) and decreasing his incentive to promote the sale of B. However, to the extent that X cannot without cost counteract the tendency of his super-marginal cost unit pricing to reduce his customers' promotional expenditures below what would be optimal for an integrated firm,⁴² this assumption will not be justified. Thus if X's profits on A are more responsive to Y's promotional activities than are his profits on B, he may be able to reduce the extent to which his non-marginal cost pricing lowers his sales and profits below those of an efficient integrated concern (by reducing his customers' sales efforts) by shifting its locus from A to B. Since, as we have seen, tie-ins are most likely to perform function (2) when B is produced in a competitive market—that is, when B is a standardized product—the function with which we are now concerned will usually complement its immediate predecessor, for the demand for such standardized products will tend to be less responsive to reseller promotion than the demand for highly differentiated goods like A.⁴³

41. See Part I at 1430-35. Once more, the performance of the function discussed in this section does not depend on the presence of a dominant or unique product or a seller with a competitive advantage in the independent distribution of one of the products involved to the buyer in question. Nothing I have said presupposes that X be dominant in the market in which A is sold. Nor need X have a competitive advantage when selling A to Y to obtain the latter's patronage on this product. Finally, the requirement that DD_{XAY} be negatively sloped can be satisfied by a non-unique or undifferentiated product, regardless of whether Y is an ultimate or intermediate purchaser, below the price at which Y could obtain some of his patronage.

42. In some cases, the seller may be able to counteract this tendency at a relatively low cost—for example, by incurring the cost of arranging and enforcing (through inspections) a requirement that his customers give his products a certain amount of shelf-space.

43. Here again the performance of the function discussed in this section does not depend on the presence of a dominant or unique product or a seller with a competitive advantage in the independent distribution of one of the goods involved. Obviously, the condition that A's sales be more responsive to reseller promotion than B's does not require A to be dominant or X to enjoy a competitive advantage in its distribution to Y. Admittedly, this condition will tend to be satisfied more often when A is a differentiated product. However, the sales of even a standardized good produced by many sellers may

d. *Reducing the Costs the Seller Incurs in Connection with the Risk He and His Customer Bear as a Result of Their Uncertainty About the Latter's Demand for the Goods in Question*

For several reasons,⁴⁴ business owners tend to prefer more certain to less certain returns. To the extent, therefore, that a firm is uncertain about the returns it expects to realize, its certainty equivalent returns (the sum of money for which it would trade its future uncertain profits) will be less than its weighted (by the probability of each possible profit outcome) average expected profits. Obviously, then, a seller's certainty equivalent returns will be inversely related to any risk costs the transaction in question imposes on him. And since in the situations with which we are concerned,⁴⁵ the seller will always have to compensate his customers for any risk costs they incur in connection with their dealings with him, his certainty equivalent returns will also be inversely related to the risk costs his customer incurs as a result of his uncertainty about the demands in question. In fact, the amount by which such uncertainty reduces the seller's certainty equivalent returns will be inversely related to the sum of the costs it imposes on him and his customer.

In general, by lowering the price of A and raising the price of B, full requirements tie-ins will (1) increase the seller's uncertainty about his returns on B (by increasing his margin on this product), (2) decrease the seller's uncertainty about his return on A, (3) increase the buyer's uncertainty about his returns on A, and (4) decrease the buyer's uncertainty about his returns on B. Normally, the net effect of these changes will be to increase the sum of the buyer's and seller's risk costs—and hence the amount by which his and his customer's uncertainty about the relevant demands reduces the seller's certainty equivalent returns.⁴⁶

However, when DD_{XAY} and DD_{XBY}^{RO} are expected to be inversely related—that is, when deviations from the seller's weighted average expected sales of A are expected to be in the opposite direction from their counterparts on B—full requirements tie-ins may increase the

be very responsive to reseller promotion in some situations—e.g., in situations in which such a good has just been introduced into the market by the various sellers in question.

44. See p. 294 *infra*.

45. The seller will have to "pay" the buyer an additional dollar for each dollar of risk costs the latter incurs unless (1) the cost of executing a lump-sum agreement and preventing or allowing the associated arbitrage would have made it unprofitable for the seller to reduce his customer's weighted average expected surplus even if he would not have been prevented from doing so by the risk costs this buyer could bear under such an agreement and (2) the amount of excess surplus the buyer would have expected to realize had he not had to incur risk costs in connection with his uncertainty about the relevant demands would be at least as great as the costs in question. Since we are concerned with situations in which contracts will always be drawn, condition (1) will never be fulfilled.

46. See Appendix A *infra*.

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seller's returns *ceteris paribus* by reducing such uncertainty costs by increasing the extent to which deviations from his weighted average expected profits on A and B are expected to cancel each other out. This result will be particularly likely to obtain when the seller would not have sold B independently of the tie-in since in such a case the agreement will actually have created an offset for the seller (for all outcomes in which the two demands are expected to be inversely related) when none would have existed in its absence.⁴⁷ Obviously, the same argument will also apply when deviations from X's untied profits on B—though positive—are expected to be significantly smaller than their counterparts on A. Although these reductions in X's own risk costs will normally be somewhat offset by the effect of the tie-in on the risk costs Y bears in connection with his uncertainty about the demands in question, the net effect of these changes will usually be to reduce the extent to which X's and Y's uncertainty lowers the former's certainty equivalent returns.⁴⁸ Thus, in some situations, sellers may employ tie-ins *inter alia* to reduce the costs they incur as a result of their own and their customers' uncertainty about the latter's demand for the goods in question.⁴⁹

e. *Reducing the Information Costs the Seller Must Incur to Practice Price Discrimination with Some Relevant Degree of Accuracy*

Normally, a seller who wants to practice price discrimination will have to determine what value each of his customers place on each of the products in question. However, in some circumstances, tie-ins may

47. If the associated deviation from X's expected weighted average profits on B exceeds its counterpart under the tie-in for A by more than twice the associated untied deviation on A, the tie-in may still increase the risk associated with the outcome in question. However, this result will not obtain unless $(2Q-1) \%_A < \%_B$; where Q equals the ratio of X's untied margin on A to the reduction in the price of A associated with the tie-in; $\%_A$ equals the percentage deviation in A's sales associated with the outcome in question; and $\%_B$ equals the percentage deviation in B's sales associated with the outcome in question. Since Q will always be greater than or equal to one—since otherwise A's tied price would be below its marginal cost to X—tie-ins will probably tend to reduce the costs uncertainty imposes on X in the situation described. For a more detailed analysis, see Appendix A *infra*.

48. I have not in the text analyzed the effect of such tie-ins on the costs X must bear as a result of their effect on the risk his customer sustains in connection with his own uncertainty about the demands in question. When the relevant demands are inversely related, the agreement's effect on Y's risks—like its effect on X's will depend on the percentage of anticipated outcomes for which it will bring the associated deviations closer together. In general, the net effect of such changes will probably be to increase Y's risk costs, but normally this will be more than outweighed by the fall in X's risk costs in the type of situation described. For a more detailed analysis, see Appendix A *infra*.

49. The various conditions under which tie-ins can perform the function described in this section can be met by agreements that do not involve dominant or unique products or sellers who would enjoy a competitive advantage in the independent distribution of one of the goods concerned to the buyers in question.

enable a seller to engage in price discrimination without identifying which buyers place what value on his individual products. Thus, whenever a seller knows that customers who place a relatively high (average) value on one or more products (or on the right to purchase one or more products at a certain unit price) will tend to place a relatively low value on some other good (or on the right to purchase at a stipulated unit price some other good) they can also use—that is, whenever he knows that the value that his customers place on some group of products taken together (or on the right to purchase several products at stipulated prices) is more homogeneous than the value they place on the individual products (or rights) taken separately—he will be able to approximate the effect of charging them different prices for the same product without incurring the cost of making such discriminations by requiring them to take this package of products (or rights) at the same price.

Although in its unadulterated state such a policy would result in the seller's (1) charging some customers less for the package than they would be willing to pay, (2) supplying some buyers with products they value at less than his marginal costs,⁵⁰ and (3) losing the patronage of some customers who would have been willing to pay more than his marginal costs but less than his optimal package price, its ability to reduce his market research expenses might still make it more profitable than any alternative.⁵¹ Of course, even when such uniform package pricing is not profitable, a seller may find it to his advantage to engage in individual discrimination on the package of products or rights in question rather than on the individual products, for since discrimination on the package can also be practiced without identifying what values the customers in question place on individual products, package pricing may reduce the information costs the seller incurs in his dealings in such situations as well. Thus, tie-ins can be used to reduce the costs that sellers must incur

50. This problem will not arise in one common type of package-pricing tie-in—*viz.*, the type in which a seller ties the sale of a particular product at a given price with an offer to sell some "inferior good" at less than its normal market price, for buyers to whom this inferior good is worth less than its cost to the seller will simply not accept the tied offer. This type of tie-in will be profitable, for example, to the extent that (1) poor people who place a lower-than-average money value on the seller's tying product place a higher-than-average value on the right to purchase the "inferior good" at the discount in question and (2) the seller cannot without cost determine who is and is not poor and/or cannot openly engage in price discrimination in favor of the poor without losing good will. The tied product in such arrangements is really the right to purchase the inferior good at less than its market price. This right can be conveyed either in terms of an offer or in the form of a coupon entitling the holder to a discount.

51. Such a policy may also be recommended by its greater ability to reduce the costs the seller must expect to incur as a result of Robinson-Patman prosecution, competitive retaliation, and/or increased bargaining by non-favored customers (by decreasing the apparency of his discrimination).

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to practice price discrimination with some relevant degree of accuracy whenever the values different customers place on individual products or rights are less homogeneous than the value they place on a package of the products in question.⁵²

f. *Reducing the Cost of Preventing Some Relevant Amount of Buyer Arbitrage*

Whenever a seller (X) engages in lump-sum pricing or price discrimination—that is, whenever a seller (without cost justification) charges one of his customers a unit price that is less than the average lump-sum fee plus unit price he wishes to charge another—he runs the risk of having his profits reduced by buyer arbitrage. Thus, unless the cost of transferring his product (A) is prohibitive, a seller who engages in pure or mixed lump-sum pricing must confront the possibility that customers who pay him a lump-sum fee may prevent him from collecting such a fee from others by reselling some or all of the A they buy for more than the additional charge they have to pay for their incremental purchases⁵³ but less than the average (lump-sum plus unit) price these other buyers would have to pay to purchase the same goods from X.

Similar problems will face any seller who wishes to engage in price discrimination (*inter alia* by charging different customers different unit prices) regardless of whether he charges his customers any lump-sum fee at all. Thus, even when no lump-sum fee is exacted, the seller who wishes to engage in such price discrimination takes the chance that buyers who are charged the lower unit price may prevent him from obtaining his higher profit-maximizing price from other customers by reselling the goods they have purchased to the buyers in question. Ob-

52. In general, an individual seller (X) of a particular product (A1) will not be able to discriminate against a particular buyer (Y) on this good unless (1) his product is unique or (2) his costs are sufficiently below their counterparts for other producers of this good for his discriminatory price to be less than the lowest price at which any other producer could profitably supply A1 to Y or (3) other producers of A1 also discriminate against Y on this product. When condition (2) or (3) is fulfilled, the function described above will be able to be performed by a tie-in involving non-unique products. When condition (1) or (3) is met or when X's competitive advantage over other sellers of A1 does not extend to producers of close substitutes of A1, this function may be performed by a tie-in involving a seller who would not possess a competitive advantage in any independent transactions with the buyer in question. Regardless of whether any of the above conditions are met, the ability of a tie-in to reduce the information costs a seller has to incur to practice price discrimination will not be related to his general market position. Thus, in various circumstances, tie-ins that do not involve a unique product or a seller who dominates one of the markets in question will be able to reduce the information costs he must incur to practice price discrimination with some relevant degree of accuracy.

53. Pure lump-sum pricing is equivalent to charging the buyer a declining unit price whose height equals the height of his demand curve at the quantity in question.

viously, *ceteris paribus*, sellers in either situation will find it profitable to reduce the costs they must incur to prevent or allow their customers' arbitrage.

Tie-ins can perform this function in two ways: (1) by shifting the locus of the seller's non-marginal cost pricing to a product which is more likely to be arbitrated, other things being equal, or (2) by forcing buyers who wish to engage in arbitrage by reselling one of the seller's products to incur the cost of storing and/or retransferring another good every time they practice arbitrage.⁵⁴

By lowering the unit price of A and conditioning its sale on Y's agreeing to pay a higher unit price for B than he would otherwise be willing to pay, X can reduce this customer's incentive to resell B at the cost of increasing his incentive to engage in arbitrage on A.⁵⁵ Although, as we shall see, the net effect of these changes for most full requirements tie-ins that actually are executed will be to increase the extent to which the possibility of arbitrage reduces X's returns below those of an efficient integrated concern,⁵⁶ there certainly will be situations in which the opposite result obtains—that is, in which X finds it profitable to reduce his arbitrage-related costs by arranging a tie-in which *inter alia* shifts the locus of his non-marginal cost pricing to a product on which the associated reduction in arbitrage-incentive is more valuable.

Ceteris paribus, sellers will find it profitable to increase the costs that their customers must incur to engage in arbitrage. In some circumstances, tie-ins may enable a seller to achieve this result at little or no cost to himself. Thus, if X's customers also use some other product B in approximate proportion to A, X may be able to reduce their incentive to engage in arbitrage by requiring them to purchase a proportionate

54. Once more, the function I have just described can be performed by tie-ins that do not involve a unique product or a seller who either dominates one of the markets in question and/or enjoys a competitive advantage when selling one of the goods concerned to the buyer in question. As we have already seen, the requirement that the seller be in a position to practice price discrimination against a particular buyer does not preclude this result. Nor would the alternative requirement that the seller be in a position to practice lump-sum pricing. The profitability of lump-sum pricing depends on nothing more than the seller's facing a downward-sloping demand curve. Although the requirement implies that the function with which we are now concerned cannot be performed in perfectly competitive industries, it does not preclude this function's being performed by tie-ins that involve sellers who neither dominate the market in question nor are best placed to serve the buyer in question since such sellers obviously can sell to such buyers in markets that are not perfectly competitive. Nor does this requirement imply that the tied product must be unique, for unless the market for A is perfectly competitive, DD_{XAY} will be downward-sloping in almost all cases below the price at which X can obtain part of X's patronage on this good.

55. I ignore for simplicity the possibility that Y may wish to purchase A and/or B from other customers of X even if he has paid his lump-sum fee.

56. This result follows from the fact that B's untied price will usually equal the normal market price for the good in question.

amount of B at its prevailing market price whenever they purchase A, for although such a tie-in will not affect Y's returns when he purchases A for his own use, it will force him to incur the extra cost of reselling and retransferring B whenever he participates in arbitrage on A. Since X can simply order Y's normal source of supply to deliver the B in question to his low-price or lump-sum customers, it will cost him virtually nothing under this arrangement to reduce his customers' incentive to engage in cross-selling A by an amount equal to the cost of retransferring or storing a proportionate volume of B.

g. *Increasing the Profitability of Price Competition, Price Discrimination and/or Price Regulation Violations by Lowering the Costs Associated with the Possibility that such Activities May Provoke Prosecution, Civil Damage Suits, Increased Bargaining by Non-Favored Customers, and/or Competitive Retaliation—i.e., by Lowering the Seller's Expected "PRB" Costs*⁵⁷

So far, I have ignored several types of costs that sellers may have to incur in connection with their pricing of an individual product to a given buyer or group of buyers. In particular, I have not yet considered (1) the possibility that the price a seller charges one customer may affect his relations with other buyers by inducing them to intensify their bargaining and/or by inducing sellers of competitive goods to make retaliatory price cuts or (2) the possibility that various pricing decisions may result in the seller's being prosecuted and/or sued civilly (perhaps for treble damages) for violating anti-predatory pricing or anti-price discrimination statutes or maximum or minimum price regulations. In practice, of course, the costs associated with such risks—which we will

57. Those tie-ins that reduce PRB costs by concealing actual price regulation violations may be void as *contra bonos mores* and prosecutable under various price regulation statutes even if they do not violate the antitrust laws. However, different plaintiffs, forums, and legal consequences will normally be associated with the adjudication of these independent issues.

Like all the others I have discussed, this function can also be performed by tie-ins that do not involve a unique product or a seller who either dominates one of the markets in question or enjoys a competitive advantage in his dealings on one product with the buyer in question. As we will see, tie-ins will probably be able to reduce a seller's PRB costs whenever he wishes to engage in price competition, to engage in price discrimination (for and/or against a particular buyer), or to violate a maximum and/or minimum price regulation in some relevant combination on two or more products he sells to a particular buyer. (Indeed, tie-ins may even be able to perform this function if such behavior is engaged in on only one product.) Sellers of non-unique products who fit the above description may wish to engage in price competition, to discriminate in favor of a particular buyer, and/or to violate a minimum price regulation. I have already shown that such sellers may also be able to price discriminate against a particular buyer. See note 52 *supra*. The same argument used to demonstrate this possibility will also apply *mutatis mutandis* to maximum price regulation violations.

call PRB (prosecution retaliation, and bargaining) costs—may be substantial.

In various situations, sellers will be able to use tie-ins to reduce such PRB costs (1) by decreasing the apparent extent of their price competition, price discrimination,⁵⁸ and/or price regulation violations or (2) by shifting the apparent locus of such pricing activities to products on which the related PRB costs are expected to be lower.⁵⁹ In this section, I will investigate the way and circumstances in which tie-ins may enable a seller to reduce his expected PRB costs.⁶⁰ Although tie-ins that reduce their employer's PRB costs may involve either specific quantities of both goods in question or the buyer's full requirements of one of the goods involved and as much as he wants of the other, I will assume throughout that quantities are not specified.⁶¹

(1) *Reducing the Certainty Equivalent PRB Costs the Seller Expects to Incur by Concealing All or the Extent of His Price Discrimination, Price Competition, and/or Price Regulation Violations*

In four different types of situations, a seller will be able to reduce his PRB costs by using a tie-in to conceal all or the extent of his price discrimination, price competition, and/or price regulation violations—*viz.*, (1) when the seller is considering discrimination in favor of and against the same customer on different products; (2) when the seller is considering violating maximum and minimum price regulations on different products in his dealings with the same customer; (3) when the

58. This effect will be equally important when the seller is not in fact discriminating but believes that competitors, customers, and/or governmental authorities will mistakenly conclude that he is and that it will be difficult and/or expensive to prove the non-discriminatory character of his pricing (for example, by establishing a cost justification).

59. Whenever a tie-in reduces in either of the ways just mentioned the PRB costs a seller expects to incur in connection with his price competition or price discrimination, its impact will be increased by its tendency to raise the probability that non-favored customers and competitors who detect the seller's price reductions will realize the limited extent of such reductions and their restriction to buyers who are in a position to make them more profitable for the seller in question than such discrimination would normally be for such non-favored customers or competitors.

60. I treat this function of tie-ins separately both (1) because its performance is more likely to make profitable tie-ins that would not otherwise be advantageous (since unlike, for example, the ability of tying agreements to reduce the amount of transaction surplus any given amount of the seller's non-marginal cost pricing will destroy by lowering the buyer's incentive to promote the products in question, their ability to reduce the employer's PRB costs will not be directly related to their ability to reduce the amount of transaction surplus any given amount of the seller's non-marginal cost pricing will destroy by reducing his sales below the volume at which the demand curve he faces intersects his marginal cost curve), and (2) because an analogous function of reciprocity may well provide the rationale for many reciprocal trading agreements.

61. I will make this assumption both because full requirements tie-ins provide the more general case and because such tie-ins are more suggestive of an analogous function of reciprocity.

seller is considering charging the same buyer more than his normal (average lump-sum plus unit) price on one product but less than the legal minimum (average lump-sum plus unit) price for another; and (4) when the seller is considering charging the same buyer less than his normal (average lump-sum plus unit) price for one product but more than the legal maximum price for another. In what follows, I will discuss the way in which tie-ins can be used to lower the PRB costs X will anticipate incurring in each of these situations.

(a) *Reducing the Seller's Certainty Equivalent PRB Costs by Concealing All or the Extent of His Discrimination Against and in Favor of the Same Customer on Different Products*

Sellers who engage in price discrimination⁶² will have to bear various types of PRB costs. In particular, by discriminating in favor of a particular customer the seller creates the risk (1) that his competitors will retaliate,⁶³ (2) that his nonfavored customers will intensify their bargaining or bring civil damage suits against him,⁶⁴ and/or (3) that the relevant antitrust enforcement authorities will prosecute him or sue him civilly for violating some applicable price discrimination statute. Although discrimination against a particular customer—for example, by refusing him the concession below list prices normally offered others—will never provoke retaliation, its discovery may result in the seller's being prosecuted or sued civilly by the government or customer in question. Sellers, therefore, will *ceteris paribus* find it profitable to conceal all or the extent of their discrimination whenever possible. In some situations, sellers may be able to use tie-ins to accomplish this result.

62. In the conventional situation in which no lump-sum fees are charged, a seller's terms are said to be discriminatory if the unit price he charges differs from his normal unit charge and no cost justification can be established for the difference in question. In the text that follows, I will not assume that X charges Y no lump-sum fee for A and B. Accordingly, terms will be said to be discriminatory if the weighted average revenue (average lump-sum plus unit price) the seller expects to receive on each unit he sells to the customer in question differs from the weighted average revenue he normally expects to receive and the difference in question does not reflect the atypicality of the cost of dealing with the buyer involved.

63. Retaliation is in fact related not to discrimination (*i.e.*, to charging a particular customer less than the seller's normal price) but to stealing a customer from a position of competitive inferiority. However, although this relation is obviously not inevitable, offers that enable sellers to undercut their competitive superiors normally are discriminatory in the sense defined in note 62 *supra*.

64. In the text, I will assume that "non-favored" customers will tend to intensify their bargaining if and only if they discover that their supplier has been willing to accept a lower per unit return from another customer than from themselves. In practice, however, it is possible that buyers will also intensify their bargaining if they discover that their supplier has accepted a lower percentage of his and some other customer's joint returns—a result that will depend on the discriminatory character of the seller's price only if all buyers place an equal average value on the units of the good in question.

Let's suppose then that X is considering selling A to Y for more than its normal expected average lump-sum plus unit price and selling Y (his full requirements of) B for less than that product's normal expected average lump-sum plus unit price—that is, that X is considering practicing what we shall call inverse discrimination against Y on A and in favor of Y on B. In any such situation, X will be able to conceal all or the extent of his discriminatory pricing by agreeing to furnish Y with all the A Y desires at a lower—that is, less or non-discriminatory—expected average lump-sum plus unit price than X would otherwise be willing to accept on condition that Y agree to purchase his full requirements of B from X at a higher—that is, less or non-discriminatory—expected average lump-sum plus unit price than Y would otherwise be willing to pay.

Such a tie-in will always reduce the seller's PRB costs, though its effectiveness and manner of operation will depend on whether its terms on A and B appear to be non-discriminatory or merely less discriminatory than they are in fact. Thus, if the tie-in's terms on B appeared to be non-discriminatory, the agreement would reduce the PRB costs X should expect to incur in connection with his discrimination in Y's favor on this product (1) by reducing the probability of X's being sued civilly or prosecuted by the government for his discrimination on B as well as the probability of his losing any such cases that are brought (a) by making it appear both to the relevant antitrust authority and the judge or jury that Y was in fact paying the normal price for these products and (b) by making it impossible to prove X's discrimination in Y's favor on B without demonstrating that X would otherwise have discriminated against Y on A; (2) by reducing the probability of X's being sued civilly by his nonfavored customers (or competitors) on B (a) by posing the same problems of discovery and proof for them as it does for the antitrust agencies themselves and (b) by reducing the probability that they will be able to rely on the results of earlier suits instituted by the government; (3) by reducing the probability that X's non-favored customers on B will intensify their bargaining to any given extent (a) by making it less likely that they will discover X's discrimination and (b) by suggesting the possibility that Y's other relations with X may enable X to grant Y concessions at less cost to himself than would otherwise be possible;⁶⁵ and (4) by reducing the probability that X's

65. X might even inform such customers directly of the special facts—*viz.*, his discrimination against Y on A—that reduce the cost to him of discriminating in favor of

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competitors on B will retaliate to any given extent (a) by making it less likely that they will discover X's discrimination and perhaps (b) by suggesting to them that Y's other relations with X might enable him to grant Y such concessions for less than similar reductions would cost them.⁶⁶

Indeed, tie-ins can also reduce the PRB costs the seller must expect to incur in connection with his discrimination in favor of a particular buyer by reducing without eliminating the apparent extent of such discrimination. Thus, a tie-in which simply reduced the apparent extent of X's discrimination in Y's favor on B would still lower the associated certainty equivalent PRB costs (1) by reducing the probability of prosecution or civil damage suits by making the discrimination seem less important and (at least in theory) increasing the difficulty of demonstrating the required probability of injury to competition, (2) by reducing the probable size of any fines that may be levied or damages awarded, (3) by reducing the probable extent of retaliation by reducing the apparent extent of X's competition and by making it appear that Y is more of a "natural" customer of X than he actually is, and (4) by reducing the extent to which non-favored customers increase their bargaining by raising their focal points.⁶⁷ In precisely the same way tie-

Y on B. In so doing, X takes the risk that these customers will inform Y that he is being discriminated against on A.

66. X might even inform such competitors directly of the special facts—*viz.*, his discrimination against Y on A—that reduce the cost of such discrimination to him. In so doing, X takes the risk that his competitors on B will inform Y that he is being discriminated against on A. Such information might, of course, result in Y's intensifying his bargaining or suing for (treble) damages (if he can show an injury to competition) and/or suggesting a related suit to the responsible enforcement body.

67. However, the tie-in will probably not reduce and may even increase the likelihood that Y will discover that he is being discriminated against on A. Thus, the tie-in will not reduce Y's ability to deduce the fact of X's discrimination against him on A from knowledge of the other agreements in which X is involved unless A's other purchasers are also required to purchase B as well at the price Y is charged under the tying agreement—an arrangement which would probably not be profitable unless they would have been willing to purchase B at this price in any case. If this condition is not met, Y will obviously realize that unlike these buyers he obtained his "concession" below A's best price only by promising to purchase another product on worse terms than he would otherwise have demanded. In fact, as we have seen, to the extent that X tries to prevent retaliation or increased bargaining by his competitors or non-favored customers on B by telling them of the special circumstances that reduce the cost of his discrimination in Y's favor on this product, the probability that Y will discover that he is being discriminated against on A will be increased. The effect of the tie-in on the probability that the relevant antitrust enforcement authorities will discover X's discrimination against Y on A is rather uncertain. On the one hand, to the extent that the tie-in increases the likelihood that Y will discover his position, it increases the probability that he will inform the relevant authorities of X's behavior toward him on A. On the other hand, by making it appear that he is receiving the same "concession" as other customers, it will reduce the probability that the antitrust authorities will discover X's discrimination on their own.

ins can reduce the PRB costs X must expect to incur in connection with his discrimination against Y on A.

Although the extent to which a seller will find it profitable to reduce his PRB costs in this way will depend (1) on the degree to which he can effect the necessary shifts in his pricing by reallocating his lump-sum fees and (2) on the extent to which additional shifts—brought about through changes in the locus of his non-marginal cost pricing—would lower his profits in other ways, there can be little doubt that sellers who wish to discriminate on one product against a buyer in whose favor they wish to discriminate (in a full requirements contract) on a second product will frequently find it profitable to employ tie-ins *inter alia* to reduce the PRB costs associated with such inverse discrimination. In fact, since tie-ins with apparently non-discriminatory terms may very well reduce the seller's PRB costs discontinuously (in comparison with agreements with less but still apparently discriminatory terms), sellers in situations in which such costs are likely to be high may even find it profitable to allow their customers to retain more surplus than they would be willing to accept in order to preserve the apparently non-discriminatory character of the agreements in question.

(b) *Reducing the PRB Costs the Seller Expects to Incur in Connection with His Maximum and Minimum Price Regulation Violations on Sales of Different Products to the Same Customer*⁶⁸

In general, sellers who commit maximum and/or minimum price regulation violations will have to reckon with incurring a significant amount of PRB costs even if their behavior does not involve discrimination against and/or in favor of the buyer in question, for maximum price regulation violators may be prosecuted or sued civilly by the government or the buyer directly involved while minimum price regulation violators may be prosecuted, sued civilly by the government or producers of competitive goods, and/or retaliated against by the competitors in question (where the illegally low price is also less than the industry's norm). Accordingly, whenever a seller is considering charging some buyer Y more than the legal maximum (average expected lump-sum plus unit) price for some product A and less than the legal minimum price for some product B, he may be able to use tie-ins in precisely the same way we have just delineated to increase his returns by reducing

68. In order to isolate the present case, I will assume that the price regulation violator will not incur any PRB costs in connection with his pricing's possible discriminatory character.

the certainty equivalent PRB costs entailed in his inverse price regulation violations. Indeed, in certain respects, such agreements will tend to be even more effective in these circumstances than when inverse price discrimination is involved, for it will always be possible to arrange tie-ins which are marginally acceptable to Y without charging openly illegal prices.⁶⁹ Such tie-ins will reduce the certainty equivalent PRB costs created by inverse price regulation violations discriminators must expect to incur—*viz.*, (1) by reducing the probability that X will be sued civilly or prosecuted by the government for his price violations on A and B as well as the probability that he will lose any such cases that are brought by making it appear to the relevant executive and judicial decision-makers that X's prices to Y were within the legal limits and by making it impossible to prove that X's actual (average lump-sum plus unit) price on one product violated the legal limit in one direction without proving that his price on the other would have violated its legal limit in the opposite direction; (2) by reducing the probability that X's competitors on B will sue him civilly by posing the same problems of discovery and proof for them as it does for the antitrust agencies themselves; and (3) by reducing the probability that X's competitors on B will retaliate by making it less likely that they will discover his price reduction as well as by suggesting to them that X's other relations with Y make it more profitable for him to reduce his price to Y on B than it would be for them.

- (c) *Reducing the PRB Costs the Seller Expects to Incur in Connection with His (1) Minimum Price Regulation on One Product and Discrimination Against the Buyer in Question on Another or (2) Maximum Price Regulation Violation on One Product and Discrimination in Favor of the Buyer in Question on the Other*

The same argument that I have just delineated in connection with inverse price discrimination and inverse price regulation violations will apply as well when the seller wishes to charge the same customer more than the legal maximum for one product and less than his regular price

69. Thus, if a tie-in in which A's price is set at the legal maximum and B's at the legal minimum is just attractive enough for Y, these terms can be included in the agreement. On the other hand, if such an offer is more attractive than necessary, B's price can be raised above the legal minimum; and if it is insufficiently attractive, A's price can be set below the legal maximum. Of course, in some situations—*viz.*, when there

are relevant discrepancies between $\frac{\Delta SS +}{\Delta BS -}$ on DD_{XAY} and DD_{XBY} respectively—X may find it more profitable to charge Y prices under the tie-in which do violate the regulations in question though by smaller amounts than his optimal independent prices for the same goods.

on another or less than the legal minimum for one product and more than his normal price for another.

(2) *Reducing the Certainty Equivalent PRB Costs the Seller Expects to Incur by Transferring the Apparent Locus of His Price Regulation Violation or Price Discrimination to a Product on Which the Related PRB Costs Are Expected to Be Lower*

So far, we have been concerned with tie-ins that reduce their employer's expected certainty equivalent PRB costs by concealing the extent of his discrimination and price regulation violations. However, tie-ins may also be able to reduce their employer's PRB costs when such concealment is not possible—that is, when the seller wishes to discriminate or violate a price regulation on only one product⁷⁰—by transferring the locus of his discrimination or price regulation violation to a product on which the related PRB costs are expected to be lower. Earlier, I noted that the PRB costs associated with any given amount⁷¹ of price discrimination or any given size⁷² price regulation violation will be determined by a large number of factors. Differences in these factors will often raise the PRB costs associated with discrimination or price regulation violations on one product (A) above their counterparts for such activities on another (B). In the case of discrimination in favor of a particular customer, for example, this result will obtain if (1) the antitrust enforcement agencies concerned are more interested in the market for A than for B, (2) discrimination in this customer's favor on A is (or seems) more likely to injure competition than discrimination in his favor on B, (3) X's competitors on A are more likely to retaliate than are producers of substitutes of B, and/or (4) non-favored buyers of A are in a better bargaining position than are non-favored buyers of B.⁷³ Accordingly, if X were considering discriminating in Y's favor on A and selling B to Y at its normal (average lump-sum plus unit) price, he might find it possible to transfer the apparent locus of his discrimination from A to

70. Tie-ins may even be able to conceal the seller's price discrimination or price regulation violation in this case if the seller does not market the tied product independently of the tying agreement. In such circumstances, the seller will be able to charge a higher or lower than normal price for the tied product in the tying agreement without engaging in discrimination. Such an agreement will usually be too transparent to deceive the seller's competitors, non-favored customers, or governmental supervisors.

71. In the text, I will implicitly measure the amount of price discrimination by the amount of buyer surplus involved.

72. In the text, I will implicitly measure the size of any price regulation violation by the amount of buyer surplus involved.

73. Where price regulation violations are concerned, the most relevant factors will be the assiduousness of the relevant enforcement agencies and the relative size of the penalties incurred.

B by conditioning his sale of B at a subnormal average lump-sum plus unit price on Y's agreeing to purchase his full requirements of A from him as well at a higher (average lump-sum plus unit) price than he would otherwise have been willing to pay (presumably at that product's normal average lump-sum plus unit price). Such an arrangement might reduce the seller's PRB costs (1) by making it difficult for the government and X's non-favored customers to prove (as well as to discover) the actual locus of his discrimination, (2) by deceiving X's competitors and non-favored customers on B, and/or (3) by suggesting to these parties the possibility that X's ability to transfer the apparent locus of his discrimination from B to A may make his discrimination on B in Y's favor more profitable for him than such discrimination would otherwise be either for him or for his competitors on the good in question. In similar ways, tie-ins may also reduce the seller's expected certainty equivalent PRB costs (1) by making his discrimination in favor of a particular customer on A appear to be a minimum price regulation violation on B, (2) by making his discrimination against a particular customer on A appear to be an act of discrimination or maximum price regulation violation against this buyer on B, (3) by making his maximum price regulation violation on A appear to be a maximum price regulation violation or an act of discrimination against this buyer on B, or (4) by making his minimum price regulation violation on A appear to be a minimum price regulation violation or an act of discrimination in favor of this buyer on B.

*h. Concealing the Seller's Tax and/or Contract Fraud*⁷⁴

Tie-ins can perform an analogous function for sellers who wish to commit contract or tax fraud. Thus, when the taxes, royalties, and/or franchise fees due on X's profits on or revenues from A exceed their counterparts for some other product B that his customers also use, X may be able to reduce his apparent obligations by conditioning his sale of A at a reduced price on Y's purchasing B from him as well for more than its prevailing market price—that is, by using a tie-in to transfer the apparent locus of his profits and sales from A to B. Of course, X could use other methods of obscuring his actual sales of and profits on A, but the tie-in may increase the probability that X's fraud will not be detected by providing him with invoices to substantiate his bookkeeping entries.⁷⁵

74. See note 57 *supra*.

75. This argument does not require A or B to be unique or X either to dominate

i. *Reducing the Cost of Preventing Customers from Using Some Relevant Amount of Inferior Complements*

In many situations, X's individual distributors will find it profitable to use complements of A which reduce X's returns by injuring A's reputation and lowering the returns of its other distributors, for since the effect of the individual proprietor's decision on other outlets' sales is external to him, he will not consider this consequence of his own decisions. Indeed, in some cases, X's distributors may—out of ignorance—even use complements that reduce their own as well as X's returns. If X wants to prevent such decisions, he will have to require his outlets to use complements of specified quality. Although X could simply send his customers detailed specifications for the complements they use, he will often find it more profitable to require his customers to purchase all such complements (B) from him.

Such an agreement can reduce the extent to which X's customers use inferior complements in two different ways. First, quality-control tie-ins may make it easier for X to detect Y's use of inferior complements from subsequent inspections by enabling him to label the B he supplies to facilitate its identification. Second, since X will often be able to estimate quite accurately Y's requirements of B from knowledge of his purchases of A, his use of tie-ins will either or both raise the probability that he will be able to detect Y's use of inferior complements from circumstantial evidence when Y does not try to camouflage his use of such products by purchasing and retransferring what would be his full requirements of B from X and/or force Y to incur the cost of retransferring the B he purchases from X in order to remove the circumstantial evidence of his contractual violations. For the same reasons, quality-control tie-ins will also increase X's ability to detect Y's use of unduly superior complements, other things being equal.

In many situations, the related gains for X will be substantial. Since the additional costs associated with the tie-in's employment—(1) the cost of arranging for the supply of B (which may amount to the price of a phone call), *plus* (2) the cost of labelling B more clearly, *plus* (3) the cost of inspecting Y's performance under the tie-in, *minus* (4) the cost establishing and communicating standards to Y, *minus* (5) the cost of inspecting under a non-tie-in system—will often be very small, tie-ins will often be able to increase the profitability of quality-control regard-

one of the markets in question or to enjoy a competitive advantage when selling A and/or B to Y.

less of whether they influence the competitiveness of the tied-product market.⁷⁶

2. *The Non-Leverage Functions of Buyer-Arranged Tie-ins*

In general, buyers arrange tie-ins less often and for fewer purposes than sellers. Thus, although monopsonistic buyers may sometimes arrange tie-ins to enable themselves to prevent seller arbitrage or practice price discrimination without identifying relevant differences in their suppliers' supply curves, most of the relatively small number of the tie-ins buyers are likely to arrange are probably devised to conceal the buyer's tax or contract fraud.

a. *Reducing the Cost of Preventing Some Relevant Amount of Seller Arbitrage*

In an extremely small number of cases, monopsonistic buyers may employ tie-ins to reduce their suppliers' incentive to engage in arbitrage. Let's assume (1) that monopsonist Y buys product A from producers X1 and X2; (2) that Y knows that X1's supply curve is more elastic than X2's at his most profitable uniform price—that is, that Y knows that if arbitrage were impossible and perhaps even if it were not, he would find it profitable to pay X1 a higher unit price for A than X2; (3) that Y can also make use of some other product B which X1 produces in approximate proportion to his production of A, most likely because B is produced (perhaps among other methods) as a by-product of A; and (4) that the cost of transferring B to Y from X2 or some other producer via X1 exceeds the cost of moving B to Y directly from these sellers. To the extent that the differences in the relevant transfer costs for B are significant, Y may be able to prevent arbitrage in such a situation by conditioning his purchase of A from X1 on this producer's supplying him directly with B at its prevailing price in amounts equal to the quantity of this product that X1 would produce if he manufactured all the A he sells to Y himself. When Y is able to devise a relatively inexpensive method of detecting whether the B he receives has passed directly through X1's hands,⁷⁷ such a tie-in will be a relatively inexpensive means of decreasing the profitability of arbitrage by an amount equal to the cost of making the additional transfer of B.

However, although some buyers may use tie-ins for this purpose, the

76. This argument does not require A to be unique or X either to dominate the market for A or to enjoy a competitive advantage when selling A to Y.

77. In general, it is probably less expensive to determine that a product has passed through a given supplier's hands than to determine that it has not.

importance of this function should not be exaggerated. Each of the conditions discussed must be fulfilled for such a tie-in to be profitable. Thus, unless differences in transfer costs are sizeable, the tie-in will not have a deterrent effect, and unless X1 can furnish Y with the B he must supply in conjunction with his sales of the A he produces himself without incurring additional costs—that is, unless X1 produces B in approximate proportions to A—any gains from reduced arbitrage will be offset by the effects of the associated fall in X1's own supply curve. Since pure monopsony of this kind is itself quite rare, these additional conditions make it highly improbable that buyers often use tie-ins to reduce seller arbitrage. Still, a limited number of such agreements may very well be explicable in these terms.⁷⁸

b. *Decreasing the Information Costs the Buyer Must Incur to Practice Price Discrimination with any Given Degree of Accuracy*⁷⁹

It is also possible that buyers with monopsonistic power may on some occasions use tie-ins to enable themselves to practice price discrimination without incurring the cost of identifying relevant differences in their suppliers' individual supply curves. If such a monopolist cannot determine the cost of individual products to each of his suppliers without incurring considerable expenses but knows that sellers who would be willing to supply him with one product at a relatively low price would demand a relatively high price for another product he uses, he will be able to duplicate the effects of paying different suppliers different prices for the same individual products by offering to pay them all the same price for the two products taken together. So long as (1) the buyer in question could not fill his requirements of either product with the output of its low-cost producers and (2) differences in the total supply prices of different producers are not too great, such package buying may be more profitable than normal price discrimination based on the results of expensive market research—particularly when jointness and high transfer costs enable such tie-ins to prevent seller arbitrage as well. Moreover, even when uniform package buying is not profitable, a buyer may find it more profitable to discriminate on a package of products than on each individually. Thus, a buyer may employ tie-ins for this purpose if he faces a situation in which (1) he

78. Once more, this function can be performed by tie-ins that do not involve a unique product or a dominant or best-positioned seller. In fact, tie-ins can prevent seller arbitrage only when the product is not unique and the seller is not dominant.

79. Once more, this function can be performed by tie-ins that do not involve a unique product or a dominant or best-positioned seller.

needs two products in quantities that exceed the amount that could be supplied by their low-cost producers among suppliers of both goods, (2) where the two products in question have joint costs so that the highest cost of any one product to a producer of both is still below its cost to most or all of the manufacturers who do not also produce the other, and (3) when locations, productive processes, or most likely managerial talents (since these would be most expensive to identify) that are relatively advantageous for one product are relatively disadvantageous for the other. Admittedly these conditions will not be met very often, but some buyers undoubtedly do arrange tie-ins to enable themselves to reduce the information costs they have to incur to practice price discrimination with any degree of accuracy.

c. Concealing the Buyer's Tax or Contract Fraud

In precisely the same way that tie-ins can enable a seller to reduce his apparent tax or contract obligations, they may make it possible for buyers to accomplish the same objective. Thus, if the marginal tax or royalty rates applicable to some buyer Y's sales of or profits on some product A (or the product in which it is incorporated) exceed their counterpart for some product B, Y may be able to conceal his actual obligations by offering to purchase A for more than he would otherwise have to pay on condition that the supplier also furnish him with B or one of its components for less than its prevailing market price (or by offering to purchase B or one of its components for more than its prevailing market price on condition that his supplier also furnish him with A for less than the price he would otherwise have had to pay). Clearly, the information necessary to realize the profitability of such an arrangement will also be in Y's possession. Of course, Y could use other methods of obscuring his actual sales of and/or profits on A, but since the tie-in may increase the probability that his fraud will not be detected by providing him with invoices to substantiate his bookkeeping entries, he will be quite likely to propose tying agreements for this purpose.⁸⁰

* * * * *

In short, the assertion that the sole function of tie-ins is to exert leverage in the tied-product market is simply incorrect. Regardless of whether they involve a dominant or unique product or a product which the seller in question markets at a competitive advantage to the buyer

80. The uniqueness of the product or the dominance or relative position of the seller is irrelevant to the ability of a tie-in to perform this function.

involved, individual seller-arranged and buyer-arranged tie-ins can perform several functions other than reducing competition in the tied-product market which in various circumstances cannot be performed as well by any other pricing system.

C. *The Profitability and Possibility of Non-Leverage Tie-ins: A Critique of the Inevitable Leverage Hypothesis*

Demonstrating that tie-ins can perform non-leverage functions would not affect their legal status if (1) the legality of each individual tie-in depended on its individual impact rather than on the competitive impact of allowing all potential suppliers of the buyer in question to enter into tie-ins with him and (2) such individual agreements always increased their employer's returns *inter alia* by reducing tied-product competition. In this section, I will consider the inevitable leverage theory that tie-ins always have an anti-competitive effect. I will divide the analysis into two parts. In the first, I will show that the inevitable leverage theory cannot be established through a *res ipsa loquitur* argument derived from the proposition that the profitability of tying agreements depends on their reducing tied-product competition. In the second, I will use the previous analysis of the exclusive leverage theory to show that there are very good reasons to suppose that tying agreements will not inevitably reduce tied-product competition, regardless of whether they involve a dominant or unique product or a product on which the seller merely enjoys a competitive advantage in his dealings with individual buyers.

1. *A Demonstration that the Profitability of Tie-ins Does Not Depend on Their Exerting Leverage or Their Reducing (Tied-Product) Competition*

Since we normally assume that sellers price to maximize their profits, the inevitable leverage hypothesis could be established by a kind of *res ipsa loquitur* argument for any type of tie-in whose profitability could be shown to depend on its reducing tied-product competition. Hence, it may be useful to begin the analysis of this hypothesis by demonstrating that each of the various types of tie-ins that can be distinguished on functional or other grounds⁸¹ can be profitable without reducing tied-product competition. In what follows, four general func-

81. In developing its inevitable leverage hypothesis, the Court has distinguished between tie-ins that do and do not involve a dominant or unique product and/or a seller who could have enjoyed a competitive advantage in independent transactions with the buyer in question on at least one of the products involved.

tional types of tie-ins are distinguished:⁸² (1) package-pricing tie-ins, (2) pure quality-control tie-ins, (3) meter-pricing tie-ins, and (4) non-marginal-cost price-shifting tie-ins. As we shall see, each of these types of tying agreements will frequently be able to increase a seller's profits without raising his returns by reducing tied-product competition.

a. *The Profitability of Non-Leverage Package-Pricing Tie-ins*

Package-pricing tie-ins are agreements in which a seller promises to provide a specified quantity or package of different products at a single total price⁸³ or an unlimited number of such packages at a specified price. Package-pricing tie-ins that sellers are more likely to arrange can enable sellers (1) to reduce the information costs they incur in practicing price discrimination with any given degree of accuracy (when the seller knows that customers who place a relatively high value on one of his products will place a relatively low value—which is almost never significantly below his marginal costs—on one or more other products); (2) to reduce the costs they incur to prevent or allow buyer arbitrage (when the buyer in question uses the product concerned in fixed proportions and storage or transference costs are relatively high); (3) to reduce the PRB costs they incur in connection with price discrimination and/or price regulation violations on the products in question; and/or (4) to reduce the taxes or royalties they have to pay on their profits or sales.

Even when a package-pricing tie-in performs only one of these functions, the savings achieved will often exceed the associated costs, for since specific quantities of both products are involved, the tying seller will have no full requirements promise to enforce. The only expense the tie-in creates will be the cost of instructing another supplier to deliver the tied product to the buyer in those cases in which the latter would not otherwise have purchased this good from the seller in question. In practice, however, package-pricing tie-ins will often perform more than one of the functions described above. Thus, package-pricing tie-ins that reduce the information costs the seller must incur to practice price discrimination with any degree of accuracy may also be able to reduce his certainty equivalent PRB costs as well.

Buyers are more likely to arrange tie-ins that operate (1) by reducing the information costs they must sustain to practice price discrimination

82. Although the functions of each type of tie-in may sometimes overlap, each is normally employed for significantly different reasons.

83. The total price may or may not be broken down into "component" parts.

with any degree of accuracy, (2) by reducing the costs they must incur to prevent or allow seller arbitrage, and/or (3) by reducing the visibility of their tax or contract frauds. Although buyers may sometimes use non-marginal-cost price-shifting tie-ins to perform the third of these functions, most buyer-initiated tie-ins undoubtedly involve a single or unlimited number of packages of goods and all are at least functionally analogous to the package-pricing tie-ins already discussed. Obviously, the same arguments that established the potential profitability of non-leverage package-pricing tie-ins will also apply when package-buying tie-ins are concerned.

b. *The Profitability of Non-Leverage Pure Quality-Control Tie-ins*

As we have seen, a seller will frequently find it profitable to control the quality of goods his customers use in conjunction with his own products, for buyers will sometimes find it profitable to use or overestimate the profitability of using inferior complements that reduce their supplier's long-run returns. Of course, some degree of quality-control can always be achieved without using tie-ins—for example, by specifying the character of complementary goods and inspecting performance—but tie-ins will often increase the profitability of quality control by reducing the cost of obtaining some relevant degree of compliance.

Thus, by obligating a buyer (Y) of some product (A) to purchase at its normal price from a particular source his full requirements of a complementary good (B) of suitable quality, pure quality-control tie-ins will often increase the profitability of quality control (1) by enabling the seller (X) at virtually no cost to himself to make it more costly for Y to keep secret the fact that he has purchased less than what would be his full requirements of acceptable complements by forcing Y to take delivery and to retransfer an acceptable complement each time he uses an unacceptable one (Y could otherwise obtain receipts for acceptable complements without actually taking delivery of them) and/or (2) by enabling X to reduce the cost of his detecting violations through actual inspections by giving him an opportunity to label and make more identifiable the complements provided.

Since, then, quality control will often be profitable without tie-ins and tie-ins will often increase the profitability of quality control, the profitability of pure quality-control tie-ins cannot be said to rest on their reducing competition in the tied-product market.

c. *The Profitability of Non-Leverage Meter-Pricing Tie-ins*

Meter-pricing tie-ins are agreements in which a seller conditions his sale of a durable product or of the right to use his patented or secret

process or idea on his customers' agreeing to purchase from him as well for more than its normal price their full requirements of some other good which must be used in fixed amounts each time the tying product or idea is employed. As I have already suggested, sellers would frequently be able to increase their returns by using such tie-ins to implement non-marginal-cost unit-pricing systems—quite apart from any effect such agreements might (but as we shall see in Section III usually do not in fact) have on competition in the tied-product market. Such tie-ins will often be able to increase the profitability of meter pricing which would in any case be profitable (or which would in any case not generate losses that exceeded the gains associated with the tying agreement's adoption). Especially when the tied product can be labelled in ways that make it easy to identify, tie-ins will frequently be the most profitable means of implementing meter-pricing policies, since the cost of discovering and redressing violations of the buyer's promise of patronage on the tied product will often be lower than the cost of metering through end-product royalties—*viz.*, the cost of determining whether the buyer has reported his sales accurately—or through actual metering devices—*viz.*, the cost of the meter with its anti-tampering components, the related installation costs, and subsequent inspection costs. Indeed, for several products and all patented or secret processes or ideas, actual meters will be totally impracticable.

Clearly, the gains from employing tie-ins for this purpose will often outweigh any losses that meter pricing might otherwise produce, for such pricing would in many cases be profitable even if tie-ins could not be employed and even if (as it does not in fact) such pricing would not reduce the competitiveness of the tied-product market. Thus, the profitability of meter-pricing tie-ins does not depend on their reducing competition in the seller's tied-product market.

d. *The Profitability of Non-Leverage Non-Marginal-Cost Price-Shifting Tie-ins*

Non-marginal-cost price-shifting tie-ins are agreements in which a seller reduces the unit price he charges his customers for one product (A) on condition that the latter promise to purchase from him at a higher unit price than they would otherwise be willing to pay their full requirements of a second (or second and third) product (B) which is not used in fixed proportions with the first. Such agreement can perform all of the functions we have just described except implementing a meter-pricing system. However, tie-ins of this type normally operate primarily by decreasing the amount of transaction surplus any given amount of

the seller's non-marginal cost pricing destroys (1) by reducing his unit sales below the volume at which the demand curve he faces intersects his marginal cost curve and (2) by reducing his customers' promotional activities below what would be optimal for an integrated concern.

Sellers who employ the type of tie-in with which we are now concerned might not otherwise find it advantageous to enter into either or both a supply contract on A and/or a full-requirements contract on B for the period in question. Accordingly, the profitability of such tie-ins cannot be determined by comparing the returns their employer will realize under the agreements in question with the profits he would earn under his optimal independent supply and full-requirements contracts on A and B respectively, for the gains associated with a switch from such independent contracts to the tying agreement may be more or less offset by the amount that such independent contracts would reduce their employer's returns.

However, let's begin our analysis of the potential profitability of non-marginal-cost price-shifting tie-ins that *ex hypothesi* do not affect tied-product competition by examining how X's profits would be affected if he shifted from his optimal independent supply and full-requirements contracts on A and B respectively to a tying agreement of the type we have just described. In order to simplify the presentation, we will also assume (1) that such a switch will not make it profitable for X to change the amount of buyer surplus he removes through non-marginal cost pricing⁸⁴ and (2) that the tie-in in question does not affect X's profits by controlling the quality of related inputs, by reducing his PRB costs, by reducing the information costs he has to incur to practice price discrimination with some relevant degree of accuracy, or by enabling him to practice tax or contract fraud.

On these assumptions, X's profits under his optimal tie-in would equal the sum of his returns on an independent supply contract on A and an independent full-requirements contract on B *plus* (1) the amount by which the tie-in would reduce the sum of transaction surplus X's non-marginal cost pricing destroys by lowering his sales below the volume at which the demand curve he faces intersects his marginal cost curve if the agreement in question affected neither reseller promotion nor (as we are assuming) the absolute amount of non-marginal cost pric-

84. In the text that follows, I will adopt the convention of measuring the various types of surplus with which I will be concerned along the demand curves that X would face if he and Y promoted the products in question to the extent they would under the former's optimal independent contracts on A and B. Unless otherwise stated, DD_{XAY} and DD_{XBY}^{RO} will refer to these demand curves as well.

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ing practiced,⁸⁵ *plus* (2) the amount of seller surplus the tie-in would preserve from being destroyed by the tendency of X's non-marginal cost pricing to reduce reseller promotion, *plus* or *minus* (3) the amount by which X would be able to increase or would have to reduce his lump-sum fee⁸⁶ as a result of the tie-ins tendency to decrease or increase (a) the profits Y realizes by promoting the products in question and (b) the risk costs Y sustains,⁸⁷ *plus* or *minus* (4) the amount by which such a tie-in would decrease or increase the risk costs X sustains,⁸⁸ *minus* (5) the amount by which such a tie-in would increase the cost to X of allowing or not allowing Y to engage in arbitrage by reselling A to other potential customers, *minus* (6) the cost to X under the tie-in of enforcing or not enforcing Y's promise to purchase his full requirements of B from X, *minus* (7) the amount the tie-in reduces the protection X's non-marginal cost pricing gives X against his and Y's pessimism.

In practice, the type of switch with which we are concerned will usually make it profitable for X to increase the amount of buyer surplus he removes through non-marginal cost pricing and will often perform other functions from those we have just considered. In general, then, X's certainty-equivalent profits under his optimal tie-in will equal his certainty-equivalent returns from his optimal independent supply and full-requirements contracts on A and B respectively *plus* or *minus* the net sum of (1)—(7), *plus* (8) the amount of additional returns X can realize under the tie-in by increasing the amount of buyer surplus he removes through non-marginal cost pricing, *plus* (9) the amount by which the tie-in (a) increases the profitability of the discrimination or price regulation violations he could have practiced under independent contracts by reducing the associated PRB and/or information costs and (b) increases his returns by making it profitable for him to engage in additional discrimination or price regulation violations for the reasons just advanced, *plus* (10) the amount by which the tie-in increases his

85. The amount of transaction surplus preserved in this connection will be equal to $(BS +)$ for the related decrease in B's unit price and the difference between $\frac{SS -}{BS +}$ on DD_{XAY} for the price change in question and $\frac{SS +}{BS -}$ on DD_{XBY}^{RO} for the associated decrease in B's unit price.

86. I assume either (1) that X would not find it profitable to allow Y to retain any excess surplus under independent contracts on A and B or (2) that the ability of the tie-in to reduce the PRB and information costs X must sustain to engage in price discrimination of price regulation violations does not make it profitable for him to reduce Y's surplus—i.e., that the switch with which I am concerned will not change Y's certainty equivalent surplus.

87. See Appendix A *infra*.

88. *Id.*

returns by reducing the likelihood that his tax or contract fraud will be detected. Since, as we have seen, X might not find it profitable to enter into independent supply and requirements contracts on A and B covering the same period as his optimal tie-in, (1) any losses he would have to sustain to arrange such independent contracts would have to be subtracted from the net sum of (1)-(10) in order to determine the effect of such a tie-in on its employer's profits.

Obviously, the relative size of the various items listed above will vary from situation to situation. However, in general, (1) will be smaller for X than it would be for someone who did not also sell A to Y since these other relations will always enable X to take advantage of economies of scale in contracting and may also result in the full-requirements contract's achieving some valuable quality control as well. In any case, the losses that X would have to sustain to enter into such independent contracts will usually be quite small. In contrast, in suitable circumstances, such tie-ins may enable the seller to make substantial gains in other respects. For example, when manufacturers of a highly differentiated product (A) sell to individual retailers who operate in small local markets and distribute one or more standardized goods (B1 . . . N) in addition to the manufacturer's own product, tie-ins of the type we have been considering may be able to reduce substantially the amount of transaction surplus the seller's non-marginal cost pricing will destroy—that is, items (1) and (2) will be both substantial and positive. Thus, (1) since such standardized goods will often be produced under competitive conditions but distributed in local markets by tight oligopolies,

$\frac{SS+}{BS-}$ will frequently be much higher along the relevant portion of DD_{XBY}^{RC} than will $\frac{SS-}{BS+}$ along the relevant portion of DD_{XAY} and (2)

since the sales of such standardized goods will often be less responsive to reseller promotion than will the sales of the manufacturer's highly differentiated good, more transaction surplus will be gained by increasing the reseller's incentive to promote the former than by decreasing his incentive to promote the latter. As we saw in Part I, item (1) is also likely to be substantial and positive when A and B are related inputs used in variable proportions with each other. Thus, there can be no doubt that in many situations non-marginal-cost price-shifting tie-ins will be able to increase their employer's returns without raising his profits by reducing tied-product competition.

* * * * *

In short, all functional types of tie-ins can raise their employers' returns without increasing their profits by reducing tied-product competition. Clearly, then, the inevitable leverage hypothesis cannot be established by a kind of *res ipsa loquitur* argument derived from the assertion that the profitability of such agreements depends on their raising their employers' returns by reducing (tied-product) competition.

2. *A Demonstration that Tie-ins Can Be Profitable (for Non-Leverage Reasons) Without Concomitantly Reducing (Tied-Product) Competition*

I have now shown (1) that both seller and buyer-arranged tie-ins can perform several functions other than reducing competition in the tied-product market and (2) that the profitability of none of the various types of tie-ins described depends on their increasing their employers' returns by reducing tied-product or any other type of competition. Of course, advocates of an inevitable leverage hypothesis could admit both of these facts and still maintain that in practice all tie-ins always reduce tied-product competition. However, although alternative explanations of phenomena can never refute hypotheses concerning them, plausible accounts do shift the burden of persuasion. As we have seen, the Court's arguments cannot bear any such burden. In fact, regardless of whether we continue our present focus on (1) the effect of the individual tie-in actually executed or shift our focus to (2) the impact of allowing all competitors for the patronage of the buyer in question (Y) to enter into tie-ins with him, the inevitable leverage hypothesis must be rejected—even if it is restricted (as the Court at least claims to have done) to situations in which the tie-in actually executed involves a seller (X) who would have a competitive advantage when marketing at least one of the products (A or B) concerned to the buyer in question (if neither he nor his opponents could offer this buyer a tie-in agreement).

As we have seen, on our current interpretation, the Court's restricted inevitable leverage hypothesis asserts that every profitable individual tie-in executed by a seller who would have been best-placed to make an independent sale to Y of at least one of the products concerned must reduce the intensity of (price-variable-input tied-product) competition for that buyer's patronage. Unfortunately, even this restricted version of the inevitable leverage hypothesis must be rejected: indeed, even if we grant that (price-variable-input) competition will be decreased by any event that increases the competitive advantage that some seller has when dealing with a particular buyer (*i.e.*, even if we agree to measure the intensity of such competition for any buyer Y's patronage according

to the profits his best-placed supplier could have earned by obtaining his patronage on terms equally attractive to Y as those he actually received),⁸⁹ a profitable tie-in executed by a seller who would have been best-placed to sell A and/or B independently to Y may not reduce such competition, for such sellers would often not have been best-placed if they had been forbidden to use tie-ins while one or more of their competitors had been allowed to arrange such agreements.

Thus, even if X would be best-placed to sell both A and B independently if neither he nor his competitors could use a tie-in, he might very well have to operate from a position of competitive inferiority if he were forbidden to use tie-ins in a situation in which at least some of his competitors for Y's patronage were allowed to arrange profitable tying agreements. In fact, although we are now assuming that X would have an advantage on independent sales of both A and B to Y, X might even be in a competitively inferior position if he (and at least some of his competitors) were allowed to enter into tie-ins with Y, for such an agreement may be less advantageous for him than for one or more of the other suppliers in question.

Clearly, then, a decision to allow a firm in X's position to tie his sale of A and B to Y will not always decrease competition for Y's patronage by increasing the competitive advantage of the firm(s) best placed to serve him. This result should be obvious for those cases in which X would not be best placed even if he could use a tie-in, for in such situations the tie-in can only have increased competition by making it more likely that X would undercut Y's best-placed supplier. Indeed, competition could even have been increased by a tie-in that did leave X best placed to supply Y, for X's margin over his nearest competitor(s) when he is allowed to employ a tie-in might still be smaller than its counterpart for the firm that would have been best placed had X been forbidden to execute such an agreement with Y. Accordingly, even if we adopt the Court's most recent version of its hypothesis—that is, its restriction of its hypothesis to tie-ins involving sellers who would have been best placed to sell independently at least one of the goods involved to the buyer concerned—the inevitable leverage hypothesis must be rejected in its application to the individual tie-in actually executed.

Nor will this hypothesis fare any better if its focus is shifted to the impact of allowing all suppliers of a particular buyer to offer him tying agreements (even if it is restricted to those cases in which the actual tying seller would have been best placed to supply this buyer with at

89. I will in fact adopt this standard in the text that follows.

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least one of the products involved on an independent basis). In fact, the argument against the inevitable leverage hypothesis holds *a fortiori* in this case, for the availability of tying agreements to the actual tying seller (X) and his competitors may even have deteriorated X's position since such agreements may have been more profitable for them than for him.

In short, our analysis suggests that there are no good reasons for believing the inevitable leverage hypothesis to be true and very good reasons for believing it to be false. Thus, whether or not it is restricted to tie-ins that involve a unique tying product, a seller who dominates the tying-product market, and/or a seller who enjoys a competitive advantage when marketing the tying product to the buyer in question, both premises and all variants of the conclusion of the leverage theory simply cannot bear analysis. The legality of such agreements must therefore be re-examined.

III. Tie-ins and the American Antitrust Laws

A. *The Relevant Standard of Legality*

1. *The General Focus: Competitive Impact*

In what follows, I am going to analyze the legality of tie-ins under the relevant American antitrust laws—*viz.*, § 3 of the Clayton Act and § 1 of the Sherman Act—assuming that the statutes in question obligate the courts to focus on the competitive impact of such agreements. Section 3 of the Clayton Antitrust Act refers to “competition” explicitly and there is considerable evidence that the framers of Section 1 of the Sherman Act intended to make competitive impact crucial there as well. As you will notice, I will usually not discuss the Court's position on the various interpretive issues with which this section on the relevant standard of legality is concerned. For the most part, such omissions reflect the fact that the Court has not taken any position on these issues, being unaware of both the inconsistencies among the various tests it says it employs and the various sorts of ambiguities the statutes themselves contain.

I want to make it clear at the outset that my decision to focus on the competitive effect of tie-ins does not rest on any assumption that the competitive impact test is the best that could be chosen for the regulation of such agreements or indeed of any of the other types of contracts, combinations, or activities governed by the American antitrust laws—that is, I want to make it clear at the outset that I do not believe that the social desirability of any tie-in (or merger for that matter) depends on

whether its execution will reduce competition in one or more of its aspects. I also want to make it clear that I realize that the Court seems at times to be applying a different sort of test in tie-in cases—*viz.*, a test that would make the legality of such agreements depend primarily on whether they give the sellers they involve an “unfair” competitive advantage (*i.e.*, on whether they improve these sellers’ competitive positions in their [tied-product] dealings with the buyers involved without improving their social efficiency).⁹⁰ It should be noted that although the Court may not realize this fact, such an “unfair” competition test would produce substantially different results from a test that focused on the competitive effect of the agreements in question.

I should like to emphasize as well that my selection of the competitive effect focus is also not based on any belief in its social superiority to the “unfair” competition test just described. In fact, if I could put aside my virtually conclusive doubts about the desirability of regulating tie-ins at all, I would probably find such an “unfair” competition test the more desirable of the two, if it were properly applied.⁹¹ In short, I am employing a competitive effect criterion because I think the statutes obligate the courts to employ such a test and not because I would support its being adopted by a legislature.⁹² For those who disagree (1) with my assumption about the intent of the framers, (2) with my implied standards for statutory interpretation, and/or (3) with my evaluation of the desirability of the courts’ exceeding their authorization in the cases at hand, as well as for those who are merely curious, an analysis of the permissibility of tie-ins under the type of unfair competition test I have just described has been included in Appendix B.

2. *The Rubric’s Content*

Obviously, the focus I have just adopted is not sufficiently specific—that is, I have not yet established what sort of a reduction in what sort of competition the statute proscribes. Since the Clayton Act seems to be far more specific, I will try to establish these conditions by focusing on its language rather than on the Sherman Act’s reference to “contracts . . . in restraint of trade.” Unfortunately, even the Clayton Act’s test—lessening competition in any line of commerce in any section of

90. The permissibility of tie-ins under such an “unfair competition” test is analyzed in Appendix B *infra*.

91. The rationale for this conclusion is delineated in Appendix C *infra*.

92. I should probably add that I also think that the difference between the “welfare” effects of the two tests is probably too small for me to believe that a court ought to exceed its authorization in such cases.

the country—does not give us much help in this regard. Indeed, in a significant proportion of those cases in which tie-ins may reduce some aspect of competition, there will be no non-arbitrary way of determining whether a particular tie-in that has changed conditions in some known manner has violated the Clayton Act's terms. In part, this difficulty arises from the fact that the statute would produce results that are unfair, inconsistent with other legislation, and economically undesirable if it were interpreted literally so as to authorize the Court to investigate the impact of allowing the individual seller engaged in the tie-in under investigation to enter into such an agreement with the buyer in question rather than to investigate the impact of allowing all prospective suppliers of this customer to enter into such an agreement with him; in part, from the fact that the concepts of variable-input competition, investment competition, and overall competition or competition on balance for a buyer's patronage are themselves operationally ambiguous; and in part, from the Clayton Act's failure to specify the respect in which competition must not be reduced.

According to its literal terms, the Clayton Act would seem to authorize the courts to adjudicate the legality of individual tie-ins by determining whether competition would be decreased by a decision allowing the seller they involve (X) to enter into such an agreement with the buyer concerned (Y). In practice, such an authorization would obligate the courts to grant or deny the right to employ tie-ins to offset or undercut the legitimately obtained and otherwise unimpeachable advantages of established firms to deal with particular buyers—that is, would obligate the courts to use tie-ins to operate a parimutual system⁹³ handicapping their potential employers, for since—as we shall see—the intensity of price-variable input competition for a particular buyer's patronage will be inversely related to the size of the competitive advantage of the seller who is best placed to deal with him, the competitive impact of an individual seller's tie-in (examined in isolation) will depend on his original competitive position. Accordingly, even if giving all potential suppliers of a particular buyer the right to arrange tie-ins with the customer in question would not increase the competitive advantage of the best-placed seller over any of his competitors (even where, for example, such agreements would be equally profitable to him and his competitors), the best-placed seller's tie-in could still violate the literal terms of the statute while his competitors' would not, for his would reduce competition for the patronage of the particular buyer involved

93. The phrase is Professor Baxter's.

by raising his competitive advantage while theirs would increase competition by lowering his advantage. Clearly, however, such a policy would be both unfair and likely to misallocate resources (since it would reduce the probability that the firm that is socially best placed to supply Y would actually obtain his patronage). In any case, such a policy would be at least somewhat inconsistent with another provision of the Clayton Act that also relates to tying agreements—Section 2, which regulates price discrimination, for this section would seem to allow a firm that enjoyed a competitive advantage to use a tie-in to increase the profitability of price discrimination so long as the discrimination resulted from a good faith attempt to meet the offers of other competitors who would presumably also be employing tying agreements. For these reasons, then, I will proceed on the assumption that when the Clayton Act speaks of “the effect of a tie-in on competition,” it is really referring to the effect of allowing all prospective suppliers of a particular buyer to enter into a tying agreement with him. Correlatively, when investigating competitive impact, I will focus on the consequences of allowing all competitors for a particular buyer’s patronage to enter into tying agreements with him.

Unfortunately, however, even if we had no doubts about the focus or coverage of the decision whose competitive impact we were to investigate, the legality of many tie-ins could not be resolved on the basis of information concerning their positive effects. As we have already noted, at least in part, this conclusion can be attributed to the fact that the intensity of each type of competition could be measured in ways that differ sufficiently from each other so that the actual definition selected would in some cases determine whether a given event had increased or decreased the intensity of competition as defined. However, since I intend to examine this problem elsewhere in some detail, I will assume here that allowing all competitors for a particular buyer’s patronage to enter into tying agreements with him will always affect the intensity of each type of competition unambiguously. In particular, in the text that follows, I will assume (1) that whenever the availability of tie-ins increases the short-run⁹⁴ profits the best-placed seller or sellers of some good or goods could or would earn by matching the offer some buyer actually would accept⁹⁵ under the conditions in question, such agree-

94. By “short-run,” I refer to the period before industry investment adjusts.

95. For example, this will occur whenever the short-run profits the best-placed seller for arranging a tie-in with Y on A and B could or would earn by inducing Y to accept a tie-in equally attractive as the agreement Y would actually make if tie-ins were allowed (or more generally raises the sum of these profits and those that would be realized by

ments can be unambiguously said to have decreased the intensity of price-variable-input competition and (2) that whenever the availability of tie-ins increases the long-run rate of return realized by the firms participating in the industry in question, such agreements can be unambiguously said to have decreased investment competition.

Unfortunately, however, even on this assumption, several ambiguities remain. As I have already noted, § 3 of the Clayton Act proscribes all tie-ins that seem reasonably likely to lessen competition⁹⁶ in any line of commerce in any section of the country. To see why and how this criterion would still be ambiguous even on our assumptions, I need only delineate the different ways in which the availability of tie-ins could reduce competition in one respect without reducing it in some other. For our purposes, it will be useful to distinguish at least seven different aspects of competition: (1) price-variable input or investment competition for the patronage of one buyer; (2) competition "on balance" for the patronage of one buyer; (3) competition on balance within a given geographic segment of some market; (4) competition throughout a given geographic segment of some market; (5) competition on balance within some market; (6) competition throughout a given market; or (7) competition on balance in the economy as a whole. Significantly, regardless of the way in which the various balances in question are struck, a tie-in could reduce any aspect of competition placed higher in this list without reducing any placed lower. Thus, since the availability of tie-ins could decrease price-variable input competition and increase investment competition for the patronage of some

the firm that would supply #1 and hence Y with B under the tie-in where the #1 in question does not produce this good himself) exceed the sum of the profits the best-placed firm or firms for making independent sales of A and B to Y could or would earn by matching the offers Y actually would accept if tie-ins were prohibited.

96. In economics, the term "competition" refers to the process of rivalry between two or more business enterprises to secure the patronage of one or more prospective buyers. In the most general case, sellers will be able to compete for the patronage of a particular buyer in three different ways: (1) by lowering their lump-sum fees and/or their unit prices—*i.e.*, by engaging in price competition; (2) by increasing the quantity and/or quality of their variable inputs—*i.e.*, by engaging in variable input competition; and (3) by increasing the quantity and/or quality of the fixed inputs they use when selling their products—*i.e.*, by engaging in fixed input or investment competition (a) by increasing their capacity (and hence average speed of service where demand fluctuates through time), (b) by increasing the number and/or improving the location of their distributive outlets (and hence reducing the average time their customers have to travel to purchase their goods or services), (c) by increasing the physical attractiveness of their distributive outlets at the cost of raising their fixed investment per unit of distributive capacity, and/or (d) by increasing the number or attractiveness of their product variants at the cost of raising their average research, design, and/or fixed promotion costs. For most analytic purposes, it is useful to combine the first two types of competition described above. In what follows, I will adopt this practice and refer to price-variable input competition on the one hand and investment competition on the other.

buyer or vice versa,⁹⁷ allowing such agreements could reduce (1) without reducing even (2) much less (3) through (7) and since the availability of tie-ins could reduce competition for the patronage of some buyers in a given market and increase the intensity of competition for the patronage of other buyers in the same or in a different market,⁹⁸ a decision to permit such agreements could reduce (2) without reducing (3), (4), (5), (6), or (7); (3), without reducing (4), (5), (6) or (7); (4), without reducing (5), (6), or (7); (5), without reducing (6) or (7); or (6) without reducing (7). Accordingly, in at least some cases, the legality of entering into tie-ins with a particular buyer or buyers will depend on which of these seven aspects of competition is decided to be crucial under the statute. Unfortunately, the statute itself is not very helpful in this regard. Under the most literal interpretation of the statute's language, (3) [or (4) if "in" is thought to imply "throughout"] would probably be the critical aspect but this result seems inconsistent with what I take to be the concern underlying the antitrust laws in general and the other relevant statute (the Sherman Act) dealing with tie-ins in particular—that is, that tie-ins and other agreements and practices might reduce the competitiveness of the economy. On this basis, (7) would seem to be crucial: the use of tie-ins would be proscribed only if their availability reduced the competitiveness of the whole economy on balance. But clearly this result does not follow from the language of § 3. Admittedly, several of the distinctions I have just delineated may not be very important empirically. As we shall see, however, at least one may very well be crucial in many cases. In particular, since the anti-competitive impact that a decision allowing tie-ins to be used with a particular buyer or buyers could have will usually be restricted to the rivalry for a limited number of buyers' patronage, the legality of such agreements may depend on whether § 3's proscription relates to tie-ins that reduce competition throughout

97. For example, a tie-in (or the use of tie-ins by the established firms in a particular market) might increase price-variable input competition by reducing the competitive advantage of the best-placed firms to deal with particular customers (when such agreements tend—for no related reason—to be more profitable for second-best placed firms than for best-placed firms) and simultaneously reduce investment competition by raising barriers to entry (because tie-ins happen to be more profitable for the established firms than for potential entrants into the market in question). For a fuller explanation of these possibilities, see section III B. 1. *infra*.

98. Thus, a tie-in that produced a change in the firm that was best placed to deal with a particular customer might increase competition for his patronage (if the advantage of the new best-placed firm were smaller than the advantage previously enjoyed by the firm he replaced) while reducing competition for the patronage of some other buyer in the same market (if the displaced firm had previously been second best placed in regard to the latter and the shift in position induced the displaced firm to leave the market in question).

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a given market (whatever that means) rather than to tie-ins that reduce competition on balance to any extent in a given market (whatever that means).

Only one problem remains to be discussed. Unlike its predecessors, this difficulty has been noted before by both the commentators and the courts—though solely in the context of § 7's anti-merger provision. According to its literal text, § 3 proscribes all tie-ins that reduce competition in its relevant aspect (1) regardless of whether this reduction is caused by the tie-in's ability to increase the social efficiency of its employer and (2) presumably regardless of whether this improvement in social efficiency (and/or associated reduction in private costs) outweighs the tie-in's anti-competitive impact so that the tie-in is itself more attractive to the buyer involved than the untied offer it replaced. Since, as we have seen (and as I discuss in more detail in Appendix B), many tie-ins operate primarily by improving their employer's social efficiency, the literalness with which § 3 is interpreted may determine the legality of a significant proportion of the few cases in which the availability of such agreements may reduce the intensity of competition. In § 7 cases, the Court has adopted the literal interpretation of the text just described, justifying its action with the argument that Congress foresaw the possibility that economies of scale might not be obtained without sacrificing competition and decided to opt for the latter in cases of conflict.⁹⁹ In fact, nothing indicates that Congress ever foresaw this possibility, but even if we grant the Court's conclusion in § 7 cases, § 3 cases may still be distinguishable on two grounds, each of which relates to the fact that the social economies that tie-ins generate are not economies of scale—*viz.*, (1) on the ground that a less anti-competitive but equally efficient means of achieving the same economies is more likely to be available in § 7 horizontal¹⁰⁰ merger cases (internal expansion¹⁰¹) than in § 3 tie-in cases and (2) on the ground that since the

99. See, e.g., *Brown Shoe Co. v. United States*, 370 U.S. 294, 316 (1962), citing *inter alia* at n.28 Learned Hand's opinion in *United States v. Aluminum Co. of America*, 148 F.2d 416, 429 (2d Cir. 1945).

100. This argument applies most readily to horizontal mergers since unlike their vertical and conglomerate counterparts, they would often be anti-competitive even if no social efficiency resulted. Although it is true that the Court made its pronouncements on efficiency in a vertical integration case, it was clearly operating on the largely mistaken assumption that vertical integration was also likely to be anti-competitive for reasons unrelated to social efficiency.

101. This alternative is likely to be especially viable when demand is increasing. The fact that the merging firm has chosen to achieve the economies in question through merger rather than through internal expansion does not suggest that the social economies could not have been achieved equally efficiently by the latter method since, as I have just noted, the merger would produce additional private benefits by concentrating the market still further.

social economies produced by tie-ins are not usually scale economies they are less likely to reduce competition in the long run. In short, there are good reasons for treating § 3 differently from § 7 in this regard—that is, for adopting a non-literal interpretation of § 3. However, as I have already indicated, in what follows, I will analyze the legality of tie-ins on the assumption that the intensity of price-variable input competition should be measured according to the best-placed seller's matching profits—even where an increase in such profits is not accompanied by a decrease in the buyer's real income and/or is caused by an increase in the seller's social efficiency.¹⁰²

B. *The Impact of the General Availability or Tie-ins on the Intensity of Competition for the Patronage of One of More Individual Buyers*

Of course, the analysis I have just completed would not be necessary if making tie-ins available to all competitors for a particular buyer's patronage could never reduce the extent of business rivalry for his or someone else's business. In fact, however, although allowing tie-ins will usually not reduce competition in any respect,¹⁰³ the general availability of such agreements may have such an effect in a number of specific situations. In this section, I will first describe the general processes by which the availability of tie-ins of all descriptions can reduce the intensity of price-variable input and/or investment competition for the patronage of one or more buyers. I will then analyze the possible anti-competitive consequences of allowing all prospective suppliers of a particular buyer to employ the various functional types of tie-ins we have already delineated.

102. One other problem deserves some consideration. The competitive effect of an individual tie-in will usually be limited to the rivalry for the patronage of one or a very limited number of customers. If each individual tie-in is judged separately, none might therefore violate the statute if some *de minimus* criterion were applied even if all of the tie-ins executed by the sellers in question would affect competition for a large enough volume of sales to violate the statute's (assumed) terms. Accordingly, in the text that follows, I will assume that a group of sellers' tie-ins—like an individual seller's mergers—can be analyzed collectively under the relevant antitrust acts. Cf. *Brown Shoe Co. v. United States*, 370 U.S. 294, 318, n.32 (1962).

103. I continue to assume that the antitrust laws do not authorize the courts to offset legal competitive advantages by denying the right to use tie-ins to some competitors while granting it to others in situations in which such agreements would not be more profitable for the former than for the latter. If a contrary assumption were made, all profitable tie-ins arranged with buyers in relation to whom the seller in question enjoys a competitive advantage would probably tend to decrease the intensity of price-variable input competition for the patronage of the buyer concerned.

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1. *The Competitive¹⁰⁴ Impact of Allowing Tie-ins to Be Executed with a Particular Buyer: A General Analysis of Processes and Circumstances*

a. *The General Availability of Tie-ins and Price-Variable-Input Competition*

As we shall see, allowing all prospective suppliers of a particular buyer (or buyers) to employ tie-ins may reduce the intensity of price-variable input competition either directly by changing the relative positions of one or more established firms in their dealings with particular customers or indirectly by reducing the intensity of investment competition in some individual market—that is, or indirectly, concomitant to their reducing the number of product variants or the speed of service offered consumers and perhaps the number of sellers operating in some market as well. Since the possible impact of allowing sellers to employ tie-ins on the intensity of investment competition will be explored in its own right in a subsequent section, I will confine myself here to investigating the circumstances and ways in which the general availability of such agreements can reduce price-variable input competition directly and in the short run by improving the competitive position of the best-placed firm to deal with a particular customer.

For expositional reasons, I will deal in the first instance with the case in which allowing all prospective suppliers to enter into a tie-in with a particular buyer will improve the competitive position of the firm that is best placed (henceforth #1) to deal with this customer (henceforth Y1) by increasing his competitive advantage over some effective established competitor for that buyer's patronage—that is, over some competitor who seems likely either (a) to induce #1 to offer Y1 a more attractive price-variable input combination by posing a threat of undercutting and/or (b) to actually undercut the offer of the best-placed firm in question—without decreasing his advantage over any other of his competitive inferiors. I will divide this subsection into two parts. In the first, I will demonstrate that the intensity of price-variable input competition will be reduced by any event that increases #1's competitive advantage over some competitive inferior (#γ) and in the second, I will show that a decision allowing tie-ins to be executed with a particular buyer or buyers may in some situations increase the competitive advantage of some such #1.

104. I continue to assume that tie-ins that reduce competition in any respect can be classified as "anti-competitive" under § 3.

(1) *The Intensity of Price-Variable-Input Competition and the Absolute Advantage of the Best-Placed Firm Over Any Competitor of Given Rank*

In general, the actual margin that #1 will try to obtain will be inversely related to the probability that any given offer will induce one or more of his competitors (#2. . .N) to try to undercut him. Each such competitor will decide whether or not to undercut by comparing the immediate profits he can realize by beating #1's offer to the customer in question with the certainty equivalent long-run costs #1's concomitant retaliation will impose on him. Accordingly, the general availability of tie-ins may reduce the competitive influence of established competitors either by lowering the immediate returns they will realize by stealing a customer from #1 and/or by increasing the retaliation costs some member of the set #2. . .N will have to reckon with sustaining if he does try to steal one of #1's customers.

In practice, whenever making tie-ins available to all possible suppliers of a particular customer will increase the best-placed firm's¹⁰⁵ competitive advantage over one or more of his competitors for some buyer's (henceforth Y1's) patronage, a decision legalizing such agreements will tend to reduce this competitor's contribution to competition in both these ways. First and most obviously, such a decision will reduce competition by lowering the immediate profits the disadvantaged competitor (# γ) can earn by undercutting any offer of given profitability to X1—that is, by reducing the probability that any offer of given profitability he makes to Y1 will be undercut (by # γ).¹⁰⁶ Second, though perhaps less obviously, such a decision will also reduce competition by increasing the retaliation costs # γ (and in some circumstances all or some other members of set #2. . .N as well)¹⁰⁷ will have to reckon with sustaining whenever he (or they) do undercut #1's offer to Y1. Indeed, in some circumstances, allowing tie-ins to be executed by all such suppliers may

105. The firm in question need not be best placed with regard to any other customers than the one with which we are specifically concerned.

106. The importance of this tendency will be directly related to the amount by which the tie-in has increased #1's advantage over # γ and inversely related to the number of firms who are at a smaller disadvantage than # γ on Y1 (since the smaller this number, the greater the probability that # γ would undercut #1's offer to Y1 in circumstances in which no other member of set #2...N would have done so—i.e., the greater the extent to which the tie-in would reduce the risk that any given offer of #1's would be undercut).

107. This increase in #1's incentive to retaliate against # γ may even conceivably raise the retaliation costs other members of #2...N must expect as well if they undercut #1's offer to Y1. By increasing the profitability of retaliating against his average undercutter, such a tie-in will also increase the probability that #1 will investigate any possible instance of undercutting.

also affect the retaliation costs associated with γ 's or anyone else's undercutting $\#1$'s offers to the other customers ($Y2. . . M$) whom $\#1$ was originally best-placed to serve. In part, this result reflects the tendency of such agreements to increase $\#1$'s incentive to try to discover and retaliate against competitive inferiors who undercut his offer to $Y1$ and in part, their tendency to increase his ability to detect such secret price cuts to $Y1$ and in some cases to $Y2. . . M$ as well.

Let's examine each of these possibilities in turn. First, even if making tie-ins available in this situation would not affect $\#1$'s ability to identify undercutting competitive inferiors, its assumed tendency to deteriorate γ 's position would increase $\#1$'s incentive to engage in retaliation (1) by increasing the future returns that any amount of deterrence would generate and/or (2) by raising the extent to which any given amount of retaliation would deter future undercutting by γ —that is, by reducing the amount of (costly) retaliation $\#1$ will have to engage in to secure any amount of future profits from future undercutting by firms in γ 's relative competitive position.

Thus, to the extent that the deterioration in γ 's position induces $\#1$ to raise his present and future prices to $Y1$, it will also raise the future profits he can expect to realize by deterring such competition from firms in γ 's relative competitive position in the future. And to the extent that the associated increase in $\#1$'s present and future prices to $Y1$ is smaller than the increase in his competitive advantage over γ , the availability of tie-ins to all $Y1$'s suppliers will raise the probability that any amount of retaliation will succeed (through posing a threat of a similar amount of retaliation to future price cutting) by lowering the immediate profits γ will be able to realize by undercutting $\#1$'s offer to $Y1$. Admittedly, neither of these arguments indicates that allowing a tie-in to be executed with $Y1$ in these circumstances will necessarily increase the effectiveness of marginal acts of retaliation but since many of the costs of retaliating do not increase with the extent of such behavior, our analysis does suggest that the type of tie-in with which we are concerned will increase the probability that $\#1$ will find retaliation on any scale profitable at all—that is, will increase the probability that $\#1$ will in fact retaliate. Accordingly, even if a decision that deteriorated γ 's position by allowing him and his competitors to enter into tie-ins with $Y1$ could not affect $\#1$'s ability to detect secret price cutting, it would tend to raise the amount of retaliation costs γ should expect to bear if he engages in such activities. Such an increase will obviously reduce independently the probability that γ will try to undercut any given offer $\#1$ makes $Y1$ and will therefore

tend to raise the actual margin #1 tries to achieve on this account as well.

Of course, as I have already suggested, whenever a decision to allow Y1 to enter into tie-ins involving products A and B increases his best-placed supplier's competitive advantage over some firm #y, it will also increase #1's ability to detect secret price cutting. Thus, in those few cases in which the general availability of tie-ins to Y1's prospective suppliers increases substantially #1's advantage over his closest competitor for Y1's patronage (#2), legalizing such agreements will tend to increase the retaliation costs anyone who cuts prices to Y1 should anticipate by increasing #1's ability to infer undercutting by competitive inferiors from the mere fact that he has lost Y1's patronage, for the larger #1's competitive advantage over any other competitor, the lower the probability that a spontaneous change in taste could deprive him of his best-placed position for dealing with Y1. Obviously, this relationship will result in the availability of such tie-in's deterring undercutting by #2 regardless of the ease with which #1 can identify Y1's new supplier. And to the extent that this identification is costly, the retaliation costs #3. . . N should expect to incur will be increased as well (since the deterioration in #2's position will make #1 suspicious if they steal Y1 from him—that is, will make it less likely that #1 will mistake undercutting by some member of #3. . . N for a taste shift by Y1 that left #2 best placed to deal with him).

Admittedly, however, a firm that considers itself to be best placed with regard to a particular customer will not generally be able to infer undercutting by competitive inferiors merely from the loss of this buyer's patronage, for in most cases spontaneous changes in taste are too likely to be responsible for such a shift. But this fact does not undermine our conclusion, for the efficiency of the process through which best-placed sellers discover price cutting will also be improved by a deterioration in any effective competitor's position.

As I have just noted, sellers will not usually be able to infer undercutting from the loss of a former customer. Nor will the type of firm with which we are dealing usually have direct evidence of such behavior, for (1) since individual bargains are the norm in the type of situation with which we are dealing, undercutters need not and will not make their price concessions openly and (2) since a buyer who has a reputation for revealing the offers he receives (in the hope of obtaining a still better offer from his original supplier) will be unlikely to obtain concessions in the future (since the retaliation costs a prospective undercutter must expect will increase to the extent that he anticipates that

his competition will be revealed), the recipient of the price cut will be unlikely to reveal the terms he has received as well. Accordingly, in the situations with which we are dealing, best-placed sellers will usually have to rely on circumstantial evidence to discover undercutting and identify the firm that is undercutting them. Normally, such sellers will be able to obtain the circumstantial evidence in question by establishing through experience probability distribution estimates (1) of the repeat sales they would expect to make to old customers, (2) of the initial sales they would expect to make to buyers who have newly entered the market, and (3) of the initial sales they would expect to make to former customers of their competitors (whose tastes have changed in their favor) if no undercutting took place—that is, if they obtained the patronage of all customers in relation to whom they were in the best competitive position. Each of these estimates will be uncertain, for although the seller will realize that he would lose some of his former customers (through spontaneous changes in taste, etc., that would place him at a competitive disadvantage) even if no price cutting took place, he will not be able to predict just how many such changes would occur spontaneously during the period in question. However, if his sales drop sufficiently, the firm will be able to infer the existence of secret price-cutting by competitive inferiors since he will know that the probability that he would lose so many customers without such price cutting having taken place is very low. Naturally, any such firm will also be able to draw the same kind of inference from information concerning its sales to new buyers in the market and to former customers of its competitors or better still from information concerning all such potential customers.¹⁰⁸ Of course, in the most general case (in which the seller in question does not automatically know to whom he has lost particular customers), he will still have to identify the competitor who has been engaging in secret price cutting, but often the necessity of doing so will not make retaliation unprofitable.¹⁰⁹ In fact, in many cases the seller will at least be able to determine who is now supplying his former customers at virtually no additional expense. This will be the case in many of the situations with which we will be concerned since, as we have seen, tie-ins often involve branded products and buyers who are contacted at their place of business by seller's representatives. Accord-

108. For the original, excellent discussion of this subject, see Stigler, *A Theory of Oligopoly*, 72 J. POL. ECON. 44-61 (1964).

109. This is especially true since #1 need not try to identify his customer's new suppliers (*i.e.*, the price cutter) until after he ascertains that it is very possible that some competitor has been undercutting him.

ingly, any event that increases the ability of best-placed sellers to infer the existence of secret price cutting from the type of evidence just described will tend to reduce competition by increasing the retaliation costs #2. . . N will have to reckon with bearing.

Tie-ins that increase the competitive advantage of the best-placed seller to deal with some customer Y1 over one of his effective competitors for that buyer's patronage will have precisely this effect. As we have seen, sellers like #1 will be able to discover undercutting by competitive inferiors by comparing their actual customer losses with a probability distribution estimate of the number of losses they would expect to sustain if no undercutting were done by competitive inferiors. If their old customers' new suppliers can be costlessly identified, such estimates and the comparison in question will be made for each of their competitors. If, however, the cost of identifying new suppliers is substantial, aggregate (for all customers) sales data, sales estimates, and comparisons will be collected and made respectively. In either case, the relevant probability distribution can be drawn with the probability of the best-placed firm's losing his position on a given number of customers on the vertical axis and the number of customers in question on the horizontal axis. Assuming as we do that the probability of any given change in taste will be inversely related to its amplitude, the type of tie-in with which we are concerned will clearly shift the curves in question down all along the X-axis by lowering the probability that the deteriorated firm will be converted into the best-placed firm for the buyer in question by a spontaneous alteration in the latter's taste. In order to determine the effect of such a shift, let N_C^B and N_C^A stand for the greatest number of customers #1 can lose without his suspicion being aroused before and after the tie-in is executed; N_S stand for the number of customers actually stolen; and P_N^B and P_N stand for the probability that spontaneous changes in taste would deprive #1 of his best-placed position in relation to any given number of customers before and after the tie-in is executed. Obviously, the probability that #γ in the first case or #2. . . N in the second will be able to steal any given number of customers from #1 without the latter's suspicion's being aroused equals the probability that the number of spontaneous changes in his position will be less than or equal to $N_C - N_S$. Accordingly, before the tie-in is executed, the probability of escaping with N_S customers will equal

$$\int_0^{N_C - N_S} P_N^B dN;$$

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on the other hand, after the tie-in in question, the probability in question will be

$$\int_0^{N_C^A - N_S} P_N^A dN.$$

We have just seen that tie-ins that deteriorate the relative position of #2 will reduce the probability of any given number of natural defections.

Accordingly, $N_0^B > N_0^A$ (since the tie-in will reduce the probability that any given number of losses could have occurred spontaneously) and

$P_N^B > P_N^A$. Clearly, then,

$$\int_0^{N_C^B - N_S} P_N^B dN > \int_0^{N_C^A - N_S} P_N^A dN$$

for any N_S . Stated another way, the tie-in will reduce the probability that any given number of the customers for whom a seller is best placed can be stolen from him without his suspicion being aroused. Accordingly, tie-ins that increase #1's competitive advantage over #2 will tend to reduce competition by increasing the retaliation costs non-best-placed competitors will expect to incur if they undercut #1 through raising #1's ability to infer the existence of price cutting from circumstantial evidence. It should be emphasized that whenever the cost to #1 of determining who is now supplying his former customers is sufficiently high to induce him to use an aggregate distribution, this tendency will affect the incentive to undercut all members of #2. . . N and not just of # γ and that the decrease in incentive will in any case relate not only to the particular customer in relation to whom # γ 's position has been deteriorated (YI) but to all customers for whom #1 is best placed and # γ is in a position to deal.

In short, whenever the general availability of tie-ins increases #1's advantage over any effective competitor, a decision allowing such an agreement to be executed with a particular buyer will increase the retaliation costs the disadvantaged competitor and perhaps all others as well will have to expect both by increasing #1's ability to detect secret price cutting and by raising the probability that #1 will retaliate against any price cutter he does identify.¹¹⁰ Accordingly, the availability

110. Such tie-ins will not generally increase #1's ability to identify which of his competitors is actually undercutting him once he has determined that some competitive inferior has engaged in secret price cutting. In fact, such agreements will normally have no practical effect on this ability whatsoever, for when the type of sellers with which I am concerned—*viz.*, sellers who make large individual sales—suspect that they are being undercut by competitive inferiors, they will usually identify the culprit by determining

of tie-ins in such circumstances will reduce the long-run profitability of undercutting by the affected firms even more than it reduces the short-run returns they can realize by engaging in such activities. To the extent, then, that a decision allowing tie-ins to be executed with a particular buyer Y1 deteriorates any effective though inferior competitor's position, it will reduce competition for at least Y1's patronage and perhaps for Y2. . . M's patronage as well¹¹¹ both directly by lowering the immediate returns the deteriorated firms can earn by undercutting #1 and indirectly by increasing the retaliation costs that firm and perhaps all other members of #2. . . N as well will have to reckon with incurring when considering undercutting #1's offer to any of the buyers in question.¹¹² Of course, as I have already noted, this result need not be confined to situations in which a decision allowing a tie-in to be executed with a particular buyer increases the competitive advantage of #1 over some members of #2. . . N and does not decrease his advantage over any other. Thus, the above analysis will also apply where such a decision improves #1's competitive position in dealings with Y1 on balance

who his former customers' new suppliers are. Admittedly, however, in some situations the cost of obtaining such information may be sufficiently high to induce #1 to choose the subject of his retaliation by educated guesswork. He may retaliate against the party who seems most likely to be undercutting, particularly when one competitor seems far more likely to be undercutting than his colleagues. Although corporate personality may affect this matter as well, the likelihood that any given firm is the actual undercutter will undoubtedly be inversely related to the number of firms better situated to capture the patronage of #1's lost customers. In general, #1 will not be able to single out one firm as the actual undercutter unless some competitor is significantly better placed in relation to these lost customers than any of #1's other rivals. Accordingly, the effect of any tie-in on #1's ability to identify the actual undercutter will depend on whether it reduces or increases the distance between the second-best-placed firm (whose actual identity may have been changed by the tie-in) and his closest rivals for the patronage of the buyers in question. Hence, to the extent that #1 does rely on such educated guesswork, tie-ins that deteriorate the positions of #3...N will tend to increase #1's ability to identify undercutters while agreements that deteriorate #2's position will have a more uncertain effect.

111. In fact, tie-ins that improve the best-placed firm's competitive position on balance may even reduce the intensity of competition for the patronage of customers for whom that firm is not best placed by inducing other firms to exit (by lowering the profits they will make on Y1...M by undercutting from a position of competitive inferiority) and thereby removing the competitive pressure they would have otherwise created in rivalry for the patronage of the other buyers for whom they were effective though inferior competitors (or for whom they were best placed in a ranking in which competition between them and their inferiors would have been stronger than its counterpart for their closest competitor and his inferiors). The exit of such a firm will also increase competition for those customers for whom he was #1 if #2...N would have put more pressure on him had he not exited than #3...N put on the original #2 (the new #1) after the original #1's exit. Such tie-ins may also increase competition for the patronage of such customers by inducing the best-placed firm to remain in business when it would otherwise have exited by increasing the profits it can make in dealing with Y1...M.

112. One qualification is necessary. A tie-in that improves #1's competitive position on Y1 may actually increase competition for the patronage of Y1 and Y2...M as well if (1) #1 would otherwise have exited and (2) the competitive pressure #2...N place on him is greater than the pressure that #3...N would place on the original #2 if the original #1 did in fact exit.

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though it decreases his advantage over some competitive inferiors of given rank.

(2) *The General Availability of Tie-ins and the Absolute Advantage of the Best-Placed Firm Over Any Competitor of Given Rank*¹¹³

In this subsection, I will investigate when and why a decision allowing all prospective suppliers of a particular buyer to enter into tie-ins with him may increase the competitive advantage the best-placed firm enjoys over one or more of its competitive inferiors in dealings with the buyer in question (Y1)—that is, may increase the difference between the returns #1 can earn by obtaining Y1's patronage on certain terms and the profits one or more members of #2. . . N can realize by supplying Y1 with the products in question (A and B) on terms equally attractive to the latter. For expositional reasons, it will be useful to divide the analysis into two parts. In the first, I will examine the circumstances in which #1's competitive position will be improved by the availability of tie-ins involving only one good that the sellers in question produce in non-perfectly competitive markets; in the second, the circumstances in which #1's position will be improved by the availability of tying agreements involving at least two goods which some of the sellers in question produce in non-perfectly competitive markets.

(a) *#1's Position and the Availability of Tie-ins to All Prospective Suppliers of a Particular Buyer where All the Sellers in Question Produce Only One of the Goods in Question in a Non-Perfectly Competitive Market*¹¹⁴

Under what circumstances, then, will the availability of tie-ins to sellers who produce only one of the goods in question in a non-perfectly competitive market increase the competitive advantage of the #1 firm for a particular buyer's patronage over one or more of his competitive inferiors? As we shall see, the availability of such tie-ins may improve the competitive position of the best-placed firm to supply (1) the buyer directly involved in the agreement in question (Y1), (2) the possible customers of that buyer (Z1. . . N), or (3) the possible customers of the firms that either do supply Y1 with B indirectly through the tie-in or

113. "Rank" is used here to refer only to sellers' position in relation to one individual buyer and not to "their positions in the market as a whole," however that expression may be understood.

114. I will proceed by analyzing the competitive consequences of tie-ins that increase #1's advantage over some of his inferiors without reducing his advantage over others. All of the results obtained may also apply in situations in which the availability of tie-ins does reduce his advantage over some of his inferiors.

would supply Y1 with B if Y1 were prohibited from entering into any such agreements involving B.

Let's begin by analyzing when and how the availability of such agreements will improve the competitive position of the firm or firms that are best placed to supply Y1 with A. Since, as we have seen, profitable tie-ins operate by enabling their employers to realize higher returns by supplying Y1 with A and B under the agreement than they could have earned by supplying this customer with either or both commodities separately, such agreements can really be said to increase the profitability of selling each by the same amount that it increases the profitability of selling both. Accordingly, to the extent that for example the firm that is best placed to sell A to Y1 independently can increase its returns through entering into a tie-in with Y1 involving A and B by more than one of its competitive inferiors on A can increase its returns by entering into a similar agreement, the availability of such agreements will improve the competitive position of the best-placed firm to supply Y1 with A.

Although, clearly, there is no reason to suppose that this result will generally obtain, tie-ins will certainly be more profitable for #1 than for various members of #2. . . N on some occasions. As we have seen, the profitability of individual tie-ins depends at least in the first instance on their performing one or more of the functions just described. Since there is obviously no reason why these functions should be equally important for all the potential employers of the tie-ins, such agreements need not be equally profitable for #1. . . N. Thus, since the demand curve faced by one seller of a given product may be less suitable for non-marginal cost pricing than its counterpart for suppliers of a variant of this good, tie-ins that reduce the amount of transaction surplus non-marginal cost pricing destroys by reducing unit sales may be more profitable for him than for his competitors. Similarly, since the importance of controlling the quality of complements may vary among product variants, some members of #1. . . N may find it profitable to use tie-ins to reduce the cost of such control in situations in which others do not find it profitable to control the quality of their product's complements at all. Examples could be multiplied, but the conclusion should by now be obvious: the general availability of tie-ins may change the relative positions of #1. . . N in their dealings with any given buyer. Of course, as I have already indicated, there is no reason to suppose that #1. . . N's ability to employ tie-ins will either always or even generally improve (either exclusively or on balance) the competitive posi-

tion¹¹⁵ of the firm that is best placed to deal with the customer in question. However, there clearly will be cases in which this result does obtain.

Of course, the availability of tie-ins may also increase the amount by which one firm is best placed to serve a particular customer in situations in which such agreements are not more profitable for the firm that would be best placed to deal with this buyer in an independent transaction involving the good in question. For example, the profitability of a tie-in to some firm that would be a competitive inferior in an independent transaction might exceed the profitability of such an agreement to the firm that would be #1 absent tie-ins by more than twice the latter's original advantage over the former (in circumstances in which the remaining firms would be no better placed in relation to the firm that is #1 with tie-ins than they would have been in relation to the firm that would have been #1 if tie-ins could not be used).¹¹⁶ Once more, examples could be multiplied—particularly if we concerned ourselves with the more general case in which the general use of tie-ins could reduce competition by shifting the relative positions of established firms even where they did decrease the absolute disadvantage under which one or more competitive inferiors were operating. However, these additional possibilities do not alter our basic conclusion that although the availability of tie-ins may sometimes increase the amount by which one firm is best-placed to deal with a particular customer, this result will not obtain more often than its opposite.

So far, I have restricted the analysis to the possibility that the general availability of tie-ins to all competitors for a particular buyer's (Y1's) patronage may affect the intensity of price-variable input competition for that buyer's business by changing the relative competitive positions of the sellers in question. In fact, however, the availability of such agreements may also affect the intensity of price-variable input competition (independent of its impact on investment) for the patronage of other groups of buyers. To begin with, regardless of whether we focus on the effect of allowing tie-ins to be arranged with Y1 on the one hand or with Y1. . .N on the other, the availability of such agreements

115. Although #1's position should be unaffected on balance, his advantage over some of his competitors will almost certainly be reduced if, as I would suppose, the relative profitability of tie-ins for #1...N is uncorrelated with the relative positions they would hold absent these agreements.

116. Tie-ins may decrease competition by changing the relative positions of established competitors even when they do reduce the gap between #1 and one or more of his competitors of given rank. The qualification contained in the text is therefore far too simplistic for the actual purpose at hand.

may affect the intensity of price-variable input competition for the patronage of those buyers for whom Y1 or Y1 . . . N respectively do or might compete (Z1 . . . N) by changing the relative prices Y1 . . . N pay for A and B and concomitantly (1) Y1 . . . N's relative marginal costs, (2) their relative competitive positions, and (3) the intensity of the price-variable input competition they wage for Z1 . . . N's patronage. Moreover, to the extent that a decision to allow X to enter into tie-ins with certain buyers changes the rate at which X, his competitors on A, his supplier of B, or Y's untied supplier of B utilize their capacities, it may affect the marginal or incremental cost to these sellers of supplying other buyers—and concomitantly the intensity of the price-variable input competition for the patronage of such buyers as well. I will now examine each of these possibilities in turn.

As we have seen, to the extent that it changes Y1's competitive position to sell to any of his prospective customers (Z1 . . . N), a decision to allow Y1's prospective suppliers to enter into tie-ins with him will affect the intensity of the price-variable input competition for Z1 . . . N's patronage. In most cases, such a decision will tend to generate such an effect by changing the unit prices Y1 pays for the A and B he purchases and concomitantly the marginal cost to him of buying and reselling these goods or of producing some other product with them. To be specific, such a decision may bring about such a shift in unit prices and marginal costs in five different and frequently offsetting ways: (1) by enabling all of Y1's prospective suppliers to increase the attractiveness of the terms they offer—and presumably *inter alia* and *ceteris paribus* to reduce the unit prices of the goods involved—without reducing the profitability of obtaining his patronage; (2) by decreasing or increasing the profits his actual supplier earns on his purchases—and presumably *inter alia* and *ceteris paribus* the unit prices he charges—by raising or lowering the intensity of the price-variable input competition for his patronage; (3) by increasing or decreasing the relative amount of lump-sum prices he pays—and correlatively *ceteris paribus* by decreasing or increasing the unit prices he pays; (4) by shifting the locus of the non-marginal cost pricing to which he is subjected; and/or (5) by making it profitable for his actual suppliers to discriminate in favor of or against him or to violate a minimum or maximum price regulation that relates to the transaction in question. Obviously, however, although the change in Y1's position produced by these processes will no doubt reduce the intensity of competition for the patronage of one or more of his prospective customers on at least some occasions, there is no reason to expect any general tendency in this direction. In fact, if we shift our

focus—as we probably should—from the effect of allowing tie-ins to be arranged with a particular buyer to the impact of allowing tie-ins to be arranged with *all* buyers (Y1. . .N) operating in a particular market, the percentage of cases in which the availability of such agreements throughout the market in question would reduce the intensity of price-variable input competition for one of Y1. . .N's potential customers would probably be quite low, for the first four processes described above will usually have very similar effects on the absolute marginal costs of all members of Y1. . .N who actually enter into tying agreements. For this reason and for reasons of space as well, in all future discussions of this subject, I will assume that the availability of tie-ins will affect the intensity of the price-variable input competition for one or more of Y's possible customers only if such agreements make it profitable for X and/or his competitors to discriminate (or to increase the extent to which he discriminates) in favor of or against Y1 or to violate (or to increase the extent to which he violates) minimum or maximum price regulations that relate to his transactions. Put another way, I will assume *inter alia* that when determining the impact of tie-ins on the market in which Z1. . .N buy from Y1. . .N, one should focus on the consequences of allowing X1. . .N to enter into such agreements with all of their prospective customers.

As I have already suggested, the availability of tie-ins (either to all suppliers of a particular buyer or to all suppliers of all buyers operating in a particular market) may affect the marginal or incremental costs to various sellers of supplying one or more other buyers—and concomitantly their competitive positions and the intensity of competition for these buyers' business—by changing the rate at which they utilize their capacities. Thus, even if the availability of tie-ins to all of Y1's prospective suppliers would not change the identity of his actual supplier(s)—X and the firm (S) that supplies X with B when he does not produce this good himself—it might affect X's (and S') ability to compete for other prospective customers by changing the amounts of A and B purchased by Y1 and concomitantly the rates at which he (or they) utilized his (their) capacity to produce these products. When the availability of such agreements changes the identity of Y1's ultimate suppliers—either or both by changing the firm that supplies him with A and/or by changing the firm that supplies him with B, the probability that a decision allowing tie-ins to be employed will significantly influence the competitive positions of Y1's new and old suppliers in relation to other buyers will be far more substantial—though once more there will be no general tendency for competition to be reduced. In fact, if—

as undoubtedly makes sense—we shift our focus from the competitive impact of allowing all suppliers to enter into a tie-in with a particular buyer to the consequences of allowing them to enter into such agreements with all their prospective customers, the changes in capacity utilization I have described will probably tend to be offsetting. For this reason and for reasons of space as well, I will for the most part limit my future discussion of how the availability of tie-ins may reduce competition for the patronage of particular customers by changing the rates at which their prospective suppliers utilize their capacities to situations in which such agreements increase the extent of quality control their actual employer exercises.

Accordingly, although the general availability of tie-ins involving only one good their employers produce in non-perfectly competitive markets is most likely to affect the relative competitive positions of (and hence the intensity of short and long-run price-variable input competition among) the prospective suppliers of Y1, a decision allowing such agreements to be executed with a particular buyer or set of buyers may also affect the intensity of price-variable input competition for various other firms' patronage by changing the competitive positions of (1) Y1's prospective suppliers of A in their dealings with them, (2) of Y1 himself, and/or (3) of the firms that indirectly supply Y1 with B through X under the tie-in or would supply Y1 with B directly if tie-ins were prohibited.

(b) *#1's Position and the Availability of Tie-ins to a Buyer's Suppliers Where At Least Some of the Sellers in Question Produce Both Goods Involved in Non-Perfectly Competitive Markets*

Now that we have analyzed the circumstances in which the position of some best-placed firm would be improved by a decision to allow all sellers of one of the goods in question to enter into a tie-in with a particular buyer, we should be able to determine the respects in which the analysis will have to be altered where at least some of the sellers in question produce variants of both goods involved in the tie-in in non-perfectly competitive markets. As we shall see, although none of the "results" will be changed, the circumstances in which (and assumptions under which) the general availability of tie-ins will improve the competitive position of the best-placed firm to serve individual buyers will be somewhat more complicated.

Before proceeding, however, it will be helpful to clarify the meaning in this context of the phrase "the impact of the availability of tie-ins on the competitive advantage of the best-placed firm or firms to supply Y1

with A and B over any competitive inferior of given rank.” If we assume that the firm or firms best placed to supply Y1 with A and B when tie-ins are available do employ a tie-in for this purpose,¹¹⁷ the effect of the availability of such agreements on the competitive advantage of the firm (or firms) best placed to supply this customer can be determined by comparing (1) the difference between the joint profits this firm (or these firms) will earn on a tie-in of any given degree of attractiveness to the buyer involved and the returns any competitor or competitors of given rank can realize by offering either independently or through a tie-in one or both of the products in question at terms equally attractive to the buyer concerned and (2) the difference between the sum of the profits the firm or firms that are best placed to make independent offers to Y1 on A and B respectively could realize by doing so and the sum of the returns that their inferiors of corresponding rank could earn by obtaining Y1’s patronage through equally attractive offers. Whenever (1) exceeds (2), the availability of tie-ins can be said to have increased the competitive advantage of the firm (or firms) best placed to supply Y1 with A and B over a competitive inferior of given rank—and for reasons I have already adduced, concomitantly to have decreased the overall intensity of the price-variable input competition for Y1’s patronage on these goods.

With the meaning in this context of the concepts with which we will be dealing clarified, we should be able to proceed with the analysis. Let’s assume at the outset that (1) all producers of one of the products involved produce variants of both of the goods in question; (2) that sellers of both goods will never find it profitable—either directly or indirectly—to enter into tie-ins involving only one of their products; (3) that the competitive rank of each seller for independent sales to Y1 is the same on both A and B; and (4) that each seller would find it equally profitable to replace his best independent offers on A and/or B to Y1 with a tie-in involving these products. Clearly, under these assumptions, the availability of tie-ins will have no effect whatsoever on the competitive advantage that #1 enjoys over any inferior of given rank. Equally clearly, however, if we drop one or more of these assumptions, this conclusion will also disappear.

117. Since I am concerned with the possibility that tie-ins may decrease competition by increasing the competitive advantage of some best-placed firm, I need investigate only those cases or firms in which this assumption is fulfilled. Unless the firm(s) best placed to supply Y1 with A and B when tie-ins are available finds it profitable to employ a tie-in for this purpose, the availability of such agreements can only decrease his or their competitive advantage over one or more competitive inferiors—*i.e.*, over those inferiors who do find it profitable to employ such agreements.

For example, if we maintain assumptions (1)—(3) and relax assumption (4), the availability of tie-ins will increase #1's competitive advantage over any inferior of given rank for whom such agreements are less profitable than they are for him and will decrease his competitive advantage over any such firm for whom such agreements are more profitable than they are for him (assuming, of course, that the identity of #1 has not been changed by the availability of tying agreements). Accordingly, when assumptions (1)—(3) are met, the availability of tie-ins may very well improve the competitive position of the #1 firm by increasing his competitive advantage over one or more inferiors. Once more, however, there is no reason to expect any tendency in this direction where the assumptions in question are in fact fulfilled, for there is no reason to assume that the profitability of tie-ins will correlate in any way with the competitive rank of their employer on independent offers of the goods involved.

Indeed, in certain cases—for example, if assumption (3) as well as assumption (4) are not fulfilled—the tendency (though admittedly not the inevitable result) of a decision allowing tie-ins to be used will probably be in the opposite direction. That is to say, if assumptions (1) and (2), though not (3) and (4), are fulfilled, the availability of tie-ins will probably tend to reduce the competitive advantage of the best-placed firm. This result derives from two facts. First, since the competitive ranks of any seller on independent transactions involving each of the products concerned will be far from perfectly correlated with each other,¹¹⁸ the competitive advantage over any competitive inferior of given rank of the firm best placed for selling both goods through an ineffectual tie-in (whose terms duplicate those of the seller's optimal independent offers) will tend to be smaller than the sum of the competitive advantages of the firms that would be #1 on each good independently over competitive inferiors of the rank in question.¹¹⁹ Second, since the profitability of a tie-in will probably not be correlated with

118. Some positive correlation probably will exist since (1) the efficiency of a firm (relative to its competitors) in producing one good will probably correlate positively with its efficiency (relative to these same competitors' efficiency) in producing another good; (2) the desirability of its geographic location (relative to that of its competitors) for selling a particular customer one product will probably be highly correlated with the desirability of its geographic location (relative to that of the same competitors) for selling the same customer another product; and (3) the relative amount of good will its sales representatives and managers have in their dealings with a particular buyer on one good will obviously correlate with its counterpart in dealings with the same buyer on another good.

119. This result reflects the law of large numbers—that is, the fact that, for example, the difference between the sums achieved by rollers of a die will tend to increase less than proportionately as the number of rolls rises.

the competitive ranks its employer would have in independent transactions with the buyer in question, the same result will obtain *a fortiori* in relation to the competitive advantage of the #1 firm for arranging an effectual rather than an ineffectual tie-in with the buyer involved. Of course, individual sellers who have a high rank on one good and a low rank on another may find that their best course is to make an independent offer on their high-ranked variant—that is, such sellers may find that the amount by which they can increase the profitability of selling both goods to Y1 by employing a tie-in is smaller than the losses they would have to sustain to make Y1 indifferent toward purchasing their other variant independently. Clearly, however, the availability of profitable tie-ins to producers of both goods will also deteriorate the competitive positions of high-ranking sellers who find this course the more profitable. Accordingly, whether or not the sellers in question employ tie-ins, to the extent that high-ranking sellers of one product have no general tendency to be high-ranking on the other, the availability of such agreements will tend to reduce the competitive advantage that the firm that is best placed to deal with the buyer concerned has over his competitors. Admittedly, this fact is perfectly consistent with the availability of tie-ins improving #1's competitive position in some cases in which assumption (3) and (4) are not fulfilled: all I have demonstrated is that no general tendency in this direction can be established and therefore that under the assumptions we have made, the short-run consequences of tie-ins that involve buyers who are supplied by some firms that produce both goods involved in non-perfectly competitive markets do not justify any presumption against their legality.

In fact, this conclusion will also apply even when assumption (2) as well as (3) is not fulfilled—that is, even when some sellers of both goods find it profitable to enter into tie-ins involving only one of their products¹²⁰—for in this situation as well the availability of tie-ins will have no tendency to reduce price-variable input competition by improving #1's competitive position. Indeed, relaxing assumption (2) does no more than lower the probability that the availability of tie-ins will intensify competition by making it profitable for firms that produce products with different ranks to tie their sale to each other. Once more, however, unless the profitability of such agreements increases with the rank of the products employed, the availability of tie-ins will have no

120. Presumably this result will obtain on at least some occasions despite the costs that the sellers will have to incur to negotiate with each other and the possible (unjustified) damage to the reputations of the variants they produce but do not include in the agreements in question.

general anti-competitive tendency in these circumstances. There will still be cases in which a decision allowing such agreements will improve #1's competitive position—as, for example, when (1) the #1 firms on A and B respectively are more adept at working together than are their close competitors in the usual case in which (2) #1's advantage over his closest competitors has more influence on the intensity of competition than his advantage over his more distant competitors—but the opposite result will clearly be more typical.

Even if we relax assumption (1)—that is, even if some sellers produce only one of the goods involved—our conclusion will not have to be altered, for obviously for present purposes such firms are not differentiable from producers of both goods which do not find it profitable to try to tie the sale of both their products together—that is, who make one variant that is so unsatisfactory to Y1 or so costly in comparison with substitutes that are equally satisfactory to this buyer that the amount by which tie-ins can increase the profitability of selling both to the buyer is smaller than the losses that the seller in question would have to sustain to sell the second to Y1 independently. As before, then, the availability of tie-ins may reduce the intensity of price-variable input competition by improving #1's competitive advantage over one of his inferiors, but they will have no general tendency in this regard. In fact, the availability of tie-ins may not even deteriorate the position of single-product firms for such a seller may very well be able to enter into a tie-in with a high-ranking producer of the other product who may not produce a variant of the first firm's product at all or who may produce a very low-ranked version of the product in question.¹²¹

Accordingly, regardless of which of our assumptions one makes, there are no grounds for believing that the availability of tie-ins to a buyer's potential suppliers will be reasonably likely to reduce the intensity of the (short-run) price-variable input competition for that buyer's patronage—even where at least some of the suppliers in question produce both of the products involved in non-perfectly competitive markets. Hence, a decision to prohibit the use or attempted use of such agreements cannot be justified on the ground that they will tend to decrease the intensity of short-run price-variable input competition unless very specific and unusual information is obtained concerning their probable

121. This fact will become important when I discuss the effect of allowing tie-ins involving two products that at least some sellers produce in non-perfectly competitive markets on the height of the barriers to entry into the markets in question.

impact, whether or not some suppliers produce variants of both goods involved in non-perfectly competitive markets.

b. *The General Availability of Tie-ins and the Intensity of Investment Competition*

A decision allowing tie-ins to be executed with a particular buyer may reduce the intensity of investment competition either by decreasing the ability of the established firms in some market to restrict their own investments in a situation in which additional restrictions would not generate new entry and/or by reducing the likelihood that some relevant amount of such restrictions will induce a potential entrant to enter the market in question. I will now investigate each of these possibilities in turn.

(1) *Tie-ins, the Intensity of Investment Competition, and the Ability of Established Firms To Cooperate in Restricting Their Own Investments*

In general, the profitability of any established firm's expanding its own investments in a market in which it is already operating will be equal to (1) the returns it would realize on the new investment itself if its expansion did not provoke retaliation from its established competitors *minus* (2) the losses it will sustain as a result of whatever retaliation its expansion does provoke *minus* (3) the losses it sustains as a result of its new investment's reducing the demand for its pre-expansion products. Although not very important empirically, the execution of tie-ins may in some cases reduce the profitability of such expansions and hence increase the ability of established firms to restrict their own investments by inducing an established concern to leave the market in question.

(a) *The Exit of an Established Firm and the Ability of the Established Producers to Restrict Their Own Investments*

Obviously, the exit of an established firm would not in itself reduce investment in the long run if other things were equal, for if the exit did not change any of the original equilibrium's underlying determinants, it would either produce a mere transfer of the assets in question to another producer or induce some other firm to restore the original investment equilibrium by entering or expanding its own investment. However, in practice, such an event will tend to reduce investment by increasing the extent to which the established firms in the market in question could restrict their own investments if entry were precluded by reducing the profits any such firm will expect to realize on an expan-

sion beyond any given level of industry investment. The departure of an established concern will tend to produce this result for two reasons. First, it will tend to raise the retaliation costs an expanding firm must anticipate. Second, it will tend to increase the losses he must expect to incur as a result of his new product's reducing the demand he faces for his old.

The exit of a competitor will tend to increase the retaliation costs¹²² an expanding established firm will incur by decreasing the extent to which its other competitors' retaliation will fall below the level that would be optimal for that group taken as a whole. Unlike price competition, any act of investment competition will normally affect more than one seller simultaneously. In particular, it will normally reduce the demand for more than one of the products previously offered in the market. Correspondingly, except to the extent that an individual act of retaliation can induce this or some other expanding firm to locate any new product or service he should introduce in the future¹²³ further away (in product space) from the retaliator than would otherwise have been profitable, the benefits from an individual's retaliation will be shared by all those who would have been injured by the deterred future investment competition—that is, will not accrue solely to the retaliator itself. Obviously, the generation of such monetary externalities will tend to reduce the amount of retaliation below what would be optimal for its possible beneficiaries taken as a group.

The exit of an established firm will tend to reduce this gap in two ways: first and primarily, by decreasing the amount of such externalities acts of retaliation generate and second, though only conceivably, by increasing the ability of injured competitors to induce each other to retaliate more than would otherwise be in their individual interests. To see why the departure of an established firm may reduce the amount of externalities retaliation generates, let's assume—contrary to the conclusion reached above—that after the departure of their compatriot, the remaining firms restored the pre-existing level of industry investment either by purchasing the assets of the existing firm or by themselves bringing new assets into the industry in question. Since fewer firms will be operating in the market post-exit than pre-exit, the restoring units

122. By "retaliation costs," I refer to the losses a seller sustains as a result of his competitors' retaliations against him—e.g., by stealing customers in relation to whom he is best placed to deal. See p. 221 *supra*.

123. Since investments by their nature are fixed, the firm that retaliates against investment competition cannot expect an immediate cessation of the competition in question.

of investment will now impose greater losses on the non-expanding firms than the same units of investment imposed on their pre-exit counterparts when they were originally made, for assuming that the last units of investment were not originally brought in by a new entrant, the market shares of the original non-expanding firms would have been smaller than those of their post-exit counterparts. And as we have seen, as each individual firm comes to bear an increasingly large share of the total costs an investing firm imposes on his competitors, it will also come to receive a correspondingly larger share of the total benefits its retaliation generates for the non-expanding firms in question. Since, then, the internalities produced by retaliation to any attempt to restore the previous level of investment post-exit will be larger than their counterparts when the exited investment (or some part of the last units of investment totalling that size) was originally made or renewed, the retaliation costs an established firm will face will presumably be higher post-exit than pre-exit and the pre-exit level of investment will presumably not be restored by investment competition among the established firms—that is, the exit will presumably reduce the amount of investment competition among the established firms in the market in question by reducing the amount of external benefits retaliation will generate.¹²⁴ As I have already suggested, in practice, this result may be reinforced by the tendency of the departure of an established firm to improve the ability of those remaining to cooperate in deterring competitive investments through retaliation. Although this possibility is probably not very important, established firms may in some circumstances try to bind each other to retaliate more than would otherwise be in their individual

124. Some qualification is necessary. Since retaliation is less likely to deter an established firm from renewing his investment than from expanding it, the relevant comparison may be between the retaliation costs faced by a firm considering expanding its own investment post-entry and their counterparts for the firm(s) that actually raised industry investment from its post-exit to its pre-exit level before the departure of the firm in question. The argument that such costs will be higher for the former than for the latter rests on the assumption that fewer firms will be operating post-exit than were operating pre-exit at the level of industry investment in question or more precisely that the individual shares of the investing firm's competitors will be higher post-exit than they were for their pre-exit counterparts. Unfortunately, at least in one case, this assumption will not be correct—*viz.*, when the last units of investment totalling the size of the exiting firm had been brought into the industry by a new entrant. This assumption is consistent with the rest of this analysis (which supposes only that the established firms would take advantage of any increase in their ability to restrict their investments), since the firm that entered may have been better placed than any of his contemporary counterparts. However, even in this case, one would expect industry investment to decline unless potential or kinetic entry prevented it from doing so, for the fact that the last investments were made by a new entrant implies that the established firms could and did actually restrict their own investments pre-entry to the post-exit level and there is obviously no reason to suppose that the substitution of the last new entrant for the exiting firm will affect their abilities in this regard.

interests. Obviously, for the same reasons we have just discussed, the smaller the group in question, the greater its ability to produce such retaliation by retaliating against those who refuse to retaliate. In fact, the same result will also obtain where parallel action does not suffice—that is, where actual concert is required—for the smaller the group, the lower the costs of organizing retaliation and the lower the probability that any such illegal concerted action will be discovered. Accordingly, the departure of an established firm may also raise expected retaliation costs by raising the probability that established firms will be able to cooperate in this manner.

So far, I have shown that the departure of an established firm may by raising retaliation costs increase the extent to which the remaining concerns in any market can cooperate in restricting their own investments. In practice, such an exit will also raise established-firm investment restrictions by increasing the losses one or more of the remaining firms will impose on themselves if they expand by reducing the demand for their original products. Once more, let's investigate this possibility by comparing the amount of such costs the expanding firms will impose on themselves post-entry with their counterparts for those firms that actually did raise industry investment from its post-exit to its pre-exit level in the past. Obviously, unless these last units of investments were all made by a firm that was then entering the market, these costs will be higher post-exit than they were originally, *ceteris paribus*, for since fewer firms will be operating at the later date than at the former, the size of each firm's pre-expansion market will be larger as will the loss to each from any given expansion. (Indeed, as already noted, even if all these last investments were originally made by a firm that was entering the market, our conclusion—that the departure of an established firm will reduce investment unless further restrictions are precluded by potential or kinetic entry—will still obtain).¹²⁵ Accordingly, the departure of an established firm will always increase the extent to which the established firms will restrict their own investments by raising the costs each firm's expansion would impose on itself as well as by increasing the retaliation costs each must expect to incur.

In short, whenever this result is not precluded by potential competition, the departure of an established firm will lead to a permanent reduction in investment in the industry in question, other things being equal. Where the industry's investment was not originally raised from

125. See note 123 *supra*.

its post-exit to its pre-exit level by new entry, the departure of an established firm will generate this result by reducing the profits each individual firm can realize by expanding its own investment. And where these last units of investment were made by new entrants, such an exit will reduce industry investment by returning the industry to a lower level of investment beyond which the established firms would not have expanded themselves but to which they could not return alone (since dynamic economies of scale tend to make replacing deteriorated investment more profitable than expanding one's original investment). Hence any tie-in that induces the exit of an established firm will reduce the intensity of investment competition whenever such a reduction is not precluded by potential competition.

(b) *Tie-ins and the Exit of an Established Producer*

i. *Where No Seller Produces Both Goods Involved in Non-Perfectly Competitive Markets*

As I have already suggested, the execution of tie-ins may induce one or more firms to leave the markets in which they were operating. Thus, if tie-ins are less profitable to some particular seller than to his competitors, their availability may very well deteriorate his competitive position sufficiently to induce him to exit. And if tie-ins are more profitable to some particular buyer than to his competitors (*e.g.*, if tie-ins induce his suppliers to grant him discriminatory price concessions), their availability may conceivably improve his competitive position sufficiently to induce one or more of these competitors to exit. Finally, if quality-control tie-ins induce the buyer involved to shift his patronage away from a third-party supplier of one of the products in question, their execution may conceivably result in his leaving the market in which he operates. Accordingly, there can be no doubt that the availability of tie-ins may induce the exit of one or more established producers in the situations described.

ii. *Where at Least Some Sellers Produce Both Goods Involved in Non-Perfectly Competitive Markets*

As we have just seen, the availability of tie-ins may also deteriorate the position of one or more established producers where some firms produce both goods involved in non-perfectly competitive markets. Conceivably, then, a decision allowing such agreements to be employed may induce one or more firms to exit. Once more, of course, this result is not more likely than its opposite. In fact, even in those cases in which

some firms do not produce both of the products involved, no tendency in this direction will exist both (1) because the position of single-product firms may not be injured by the availability of tie-ins since they may also be able to enter into such agreements either with another one-product concern member or with a two-product firm which produces one low-ranked variant and (2) because the single-product firms whose positions are reduced may have been less marginal than the two-product firms whose positions have been correspondingly improved.

(2) *Tie-ins, the Intensity of Investment Competition, and the Height of the Barriers to Entry Faced by Some Effective Potential Entrant(s)*

As I have already suggested, potential competitors will in some circumstances limit the extent to which the established firms in the market they threaten restrict the amount of investment in the industry in question. In this section, I will investigate the possibility that tie-ins may sometimes reduce investment competition by raising the barriers to entry faced by some potential competitor(s).

(a) *The Intensity of Investment Competition and the Absolute Height of the Barriers to Entry Faced by Any Effective Potential Competitor*

Although events that increase the barriers to entry faced by an effective potential competitor are generally held to decrease competition in some respect, the established doctrine¹²⁶ misconceives the process through which such events generate this result, the prerequisites for effectiveness in a potential competitor, and the precise character of the resulting reduction in competition. However, since I intend to examine this problem elsewhere in some detail, I will simply summarize my conclusions here.

In general, potential competitors affect the intensity of competition to the extent that they create a risk that entry will take place if the established firms exercise to their utmost their ability to restrict their own investments below the level at which they can just earn normal returns—given their ability to make non-competitive pricing and variable input decisions. Accordingly, a potential competitor can be said to be effective to the extent that he seems likely either to induce the established firms to prevent his entry by increasing their own

126. The established doctrine is based on limit price theory. For an exposition of this theory, see J. BAIN, *BARRIERS TO NEW COMPETITION* 1-41 (1962).

investments or to enter himself—that is, to the extent that he raises the risk of entry at some level of industry investment that the established firms might otherwise maintain. Hence, the effectiveness of a particular potential entrant will depend (1) on the ability of the established firms to restrict their own investments absent the threat of entry, (2) on the height of the barriers to entry the particular entrant faces, and (3) on the number of other potential entrants that are better placed than he.

Obviously, to the extent that a tie-in raises the barriers to entry faced by any potential entrant, it will reduce his effectiveness—that is, it will reduce the extent of the risk of entry the established firms will have to take when restricting their investments over some relevant range. By so doing, such an agreement will tend to reduce the intensity of investment competition (and derivatively of price-variable input competition as well) by inducing the established firms to restrict their investments and lowering the probability that these restrictions will produce entry. Significantly, this tendency toward a reduction in competition will not be restricted to those customers who are offered the tie-ins in question, for all buyers who might have been interested in the goods that would have been produced with the unmade investments will suffer from the elimination of this source of rivalry for their patronage.¹²⁷

Moreover, although I have restricted the analysis so far to tie-ins that deteriorate the positions of some potential entrants without improving the positions of others, our conclusions will also apply whenever the barriers facing some potential entrants are lowered and those facing others are raised—that is, whenever the net effect of the general availability of tie-ins is to reduce the risk that entry will take place if the established firms exercise their ability to restrict their own investments to some relevant extent.

(b) *Tie-ins and the Barriers to Entry Faced by Potential Competitors*
i. *Where No Seller Produces Both Goods Involved in Non-Perfectly Competitive Markets*

As we saw earlier, tie-ins involving particular customers may be more profitable for some established competitors than for others. The potential competitors of tying sellers are no different from their established counterparts in this respect—that is, the possibility of using tie-ins may also affect the competitive position from which a new entrant

127. As we shall see, however, tie-ins will be as likely to lower as raise the relevant barriers to entry.

would have to compete for the patronage of various buyers in the market in question. Speaking roughly, to the extent that tie-ins appear likely to be more profitable for a potential entrant than for his established competitors, their availability will increase his prospective post-entry returns relative to theirs—that is, will reduce the barriers to entry he faces. Similarly, to the extent that tie-ins appear likely to be less profitable for a potential entrant than for his established competitors, their availability will increase the barriers to entry he faces. Either result is possible and—for reasons I have already suggested—neither seems more probable. Certainly, however, on at least some occasions, tie-ins will be less profitable on balance for one or more effective potential entrants into some tying sellers' market than for their established competitors—that is, the availability of tie-ins to all prospective suppliers of one or more buyers will at least sometimes raise the barriers to entry faced by some effective potential entrant into the tying sellers' market by increasing the (negative) difference between the former and latter's prospective post-entry returns.

In fact, the general use of tie-ins may also raise the barriers to entry faced by potential entrants into other markets as well. Thus, the availability of tie-ins that permit price discrimination in favor of certain buyers may very well deteriorate the prospective position of those potential entrants who would not benefit from such discrimination if they actually entered the market—that is, the general use of tie-ins may very well raise the barriers to entry faced by some of the potential competitors of the buyers involved in the tie-ins in question by increasing the prospective gap between their and these buyers' prospective post-entry returns.

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Indeed, the availability of tie-ins may also raise the barriers faced by prospective entrants into markets in which neither party involved in the agreement in question sells. Thus, a tie-in that increases the extent to which sellers control the quality of the complements their customers

use together with their product will deteriorate the position of potential entrants to the market in which these complements are produced and/or distributed to the extent that these firms are better placed to produce and/or distribute unsatisfactory than satisfactory complements—that is, even when the tying seller merely arranges for the distribution of the complement in question to the buyer involved (does not really produce and/or distribute this good in an economically meaningful sense), his tie-in may very well raise the barriers to entry faced by potential entrants into the market in which this good is produced and/or distributed. Hence, although this possibility is undoubtedly not very important empirically, a decision to allow a buyer to enter into tie-ins may sometimes raise the barriers to entry faced by potential competitors of third parties as well as of the firms actually participating in the agreements in question.

ii. *Where at Least Some Sellers Produce Both Goods Involved in Non-Perfectly Competitive Markets*

The argument that allowing firms to tie two goods they produce in non-perfectly competitive markets will raise the barriers to entry into the markets in question rests on two propositions—*viz.*, (1) that the barriers to entry faced by an individual firm contemplating entry into the two markets will exceed the sum of the barriers faced by two firms contemplating entry into each of those markets separately and (2) that the availability of tie-ins will deteriorate substantially the relative post-entry position of firms that enter into one market where some of their established competitors produce both of the goods involved in non-perfectly competitive markets. If both these propositions were correct, the availability of tie-ins in the situation described would tend to raise the barriers to entry into the markets in question. In fact, however, although the first is probably correct, the tendency of tie-ins in the situation in question to deteriorate the prospective position of one-product potential entrants is undoubtedly far less significant than many have claimed.

For several reasons, it is probably more difficult for one firm to enter into two tied markets than for two firms to enter into one, other things being equal. First, if the second of the two above propositions is correct, the risk costs for the two-market entrant will probably exceed the sum of such costs his one-market counterparts must incur, since his success in each market will depend on his success in the other.¹²⁸ Second, dis-

128. The importance of this argument will be reduced to the extent that no established firm is highly ranked on both products.

economies of scale, either of financing or of organizing a sufficiently large managerial team, will tend to place the two-market entrant in a worse position than his single-market counterparts if other things are equal. Some of these additional costs can be reduced if two firms can engage in a joint venture on the products involved, but no doubt—even in such a case—some will remain. However, as I have already suggested, the availability of tie-ins to some producers who make variants of both products involved will not normally deteriorate the position of single-product producers to any significant degree, whether or not they are new entrants to the market in question, for such firms will probably be able to arrange equally profitable tie-ins either with an established or newly entered single-product producer of the other good involved or with a two-product producer whose variant of one good is not attractive to the buyer in question. Of course, if no single-product producer of a suitable variant of the second product is available, the established producers may be able to cooperate to drive the new entrant out by refusing to enter into tie-ins with him despite the fact that such agreements would otherwise be individually profitable but clearly such a course would be illegal in itself and would have an equally likely analogue if tie-ins were forbidden—*viz.*, a collective refusal to deal on the other product with a customer who purchased the first from a new entrant. Admittedly, such joint tie-ins may tend to be slightly less profitable than their single-firm counterparts since the two sellers must also incur the negotiation costs of striking a bargain between themselves. However, such differences are likely to be comparatively small—particularly where two-product producers have different departments producing each of the products in question, for the compensation that department heads receive will often depend (for very good reasons) on their accounting profits and bargaining will therefore take place within a single firm as well.

Accordingly, although the availability of tie-ins to firms that produce both goods in question in non-perfectly competitive markets may have some slight tendency to raise the barriers to entry into those industries, the tendency is undoubtedly too slight to justify declaring all such agreements illegal in the circumstances in question.

2. *The Competitive Impact of Allowing Tie-ins to Be Executed with a Particular Buyer: A Particular Analysis of the Various Functional Types of Tying Agreements*

Now that I have completed this general analysis of the ways in which tie-ins may affect competition, I should be able to determine

whether and in what circumstances each of the four functional types of tie-ins we described earlier will be likely to reduce competition in some relevant respect. Before proceeding, however, it may be useful to reiterate the assumptions I will continue to make and to delineate the general structure of the analysis itself.

In particular, in the text that follows, I will continue to assume that the laws regulating tie-ins do not authorize the antitrust enforcement agencies to offset the competitive advantages of any particular producer by denying him and granting his competitors the right to employ tying agreements that are not more profitable for him than for them—that is, I will continue to analyze the competitive impact of a particular tie-in by looking at the way the availability of such agreements to the actual tying seller and to all his competitors affect the intensity of competition in the market concerned.¹²⁹ Using this assumption, I will proceed to analyze the possible effects of the four functional types of tie-ins on competition in the markets in which the goods in question (A and B) are either sold to the buyer involved (Y1) or resold (perhaps in changed form) by this firm to his own customer (Z1 . . . N).¹³⁰ In each case, I will attempt to determine the likelihood that the conditions under which tie-ins may reduce competition will be fulfilled. Let's begin, then, by reviewing the conditions in question.

In the previous sections, I showed that the use or attempted use of tie-ins by all or some of the prospective suppliers of a particular buyer

129. Presumably, if this assumption were not made, most tie-ins involving best-placed firms would be illegal since a decision to prevent such a firm from employing tie-ins would in most cases reduce the competitive advantage of the firm that was best placed to deal with the customer in question.

130. Tie-ins may also affect the intensity of competition in whatever other independent markets exist further up and down the production-distribution system in question. Thus, a tie-in that affects the marginal costs and hence competitive positions of the buyers they involve (Y1 . . . N) may also affect the offers these buyers in turn make their customers (Z1 . . . N). When Z1 . . . N are not themselves final consumers, such a change in the offers they receive may obviously affect the intensity of competition among them as well. In fact, a tie-in that increases competition among Y1 . . . N by changing the offers they receive may reduce competition among Z1 . . . N by changing the offers Y1 . . . N make in turn and *vice versa*. However, since the analysis of the impact of any tie-in on the intensity of competition among Z1 . . . N will not differ in any respect from its counterpart for Y1 . . . N, I have decided not to consider this possibility in the text. For similar reasons, I have also omitted any consideration of the competitive impact of tie-ins further up the production line. Any tie-in that affects the competitive positions of X1 . . . N may also change the relative positions of their suppliers W1 . . . N. For example, if a tie-in induces some member of X1 . . . N (Xi) to exit, it may also induce that firm's suppliers (Wi) to leave the market in which he operates. At the least, a decline in Xi's fortunes would tend to affect Wi's competitive position (marginal cost) when dealing with his marginal customers by changing the rate at which he utilizes his capacity. Competition among W1 . . . N may also be affected when a quality-control tie-in changes the product variant (Bi) that Y uses in situations in which Bi's producer distributes to Y through an intermediate. Once more, however, none of the analysis needed to investigate these possibilities differs from its counterparts for the markets in which Y buys and sells. Accordingly, I will ignore these possible ramifications of tie-ins in the text as well.

may reduce competition in the markets in which Y1 buys A and/or B (1) by improving the position of the best-placed firm¹³¹ to deal with Y1, Y2. . .YN (on A and/or B)¹³² or (2) by raising the barriers to entry faced by one or more effective entrants into the markets in question. As we saw, tying agreements can (but will not always or even generally) improve #1's position (a) to sell A and B to Y1 when such agreements are more profitable for some established sellers of the goods in question than for others who are also in a position to employ them¹³³ or (b) to sell B to Y1. . .N when they increase the extent to which a seller controls the quality of the complements (B) his customer uses by inducing the latter to shift his patronage from one third-party (ultimate) supplier of B to another. Similarly, tie-ins may raise the barriers to entry faced by potential entrants into the markets in which Y1 buys A and B both (a) when such agreements are more profitable for the established firms who are in a position to employ them than for one or more potential counterparts and (b) when potential entrants into a market that deals in a complement controlled by a tying agreement are better-placed to produce the unsatisfactory than the satisfactory variety. Accordingly, when I investigate whether and when any functional type of tie-in may reduce competition in the markets in which Y1 and his competitors buy A and B, I will focus (1) on the likelihood that such agreements will be more profitable either (a) for some of the established sellers in a position to use them than others and/or (b) for the established sellers in general than for one or more of their effective potential competitors and (2) on the likelihood that they will induce Y1 to change some complement he employs when at least some established and/or potential competitors were better-placed to produce the product the tie-in dissuades him from using.

For obvious reasons, however, the analysis of the competitive impact of tie-ins in the markets in which Y1 sells will take a different tack. Once more, tie-ins may reduce the competitiveness of the markets in question

131. The seller actually involved in the tie-in under investigation may not be best placed to deal with Y on the goods in question. He may very well have obtained Y's patronage by undercutting a competitive superior.

132. In the text that follows, I will no longer employ the terms "tying" and "tied" products since their use is inextricably bound up with the leverage theory of such agreements. As we have seen, the efficacy of tie-ins depends equally on both products. Similarly, their competitive impact takes place in the joint market they create for both products.

133. Tie-ins cannot reduce competition by changing the actual and potential established tying sellers' relative positions when selling a product to a particular customer when these sellers do not in fact distribute this good in an economically meaningful sense—e.g., they would simply pay a third-party distributor his normal fee for delivering B to Y (though he and they might still in this case receive more than B's normal price from Y).

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in some relevant respect either by improving #1's competitive position vis-à-vis his established competitors and/or by raising the barriers to entry faced by their effective potential entrants. Here, however, #1's competitive position will only be affected to the extent that the tie-in either changes the relative marginal costs of the buyers involved through altering the unit prices they must pay for the products or services in question and/or encourages some such buyers to remain in the market concerned by making it profitable for their suppliers to discriminate in their favor¹³⁴ (or more generally by increasing the general attractiveness of the terms they receive).¹³⁵ The conditions under which tie-ins will raise the barriers to entry facing various potential competitors of Y1 will also be changed in a very similar manner, for tie-ins will produce this effect only when the availability of such agreements is more likely to result in discrimination in favor of Y1 and his established competitors than in favor of their potential competitors, once entered. Accordingly, when I investigate whether and when each functional type of tie-in may reduce competition in the markets in which Y1 resells A and B, I will focus on the likelihood that such an agreement would (1) change the relative marginal costs of the established sellers operating in these markets, (2) induce a firm that was best placed with regard to some customers to remain in the market by improving the general attractiveness of the terms at which he buys A and B, and/or (3) raise barriers to entry by improving the terms Y1 and his established competitors receive from X relative to their prospective counterparts for new entrants to the market in question.

In what follows, I will assume that each tie-in is a functionally pure type. In particular, I will assume (1) that so-called non-marginal cost price-shifting tie-ins will not induce their employers to engage in price discrimination by reducing the associated PRB costs, (2) that quality-control tie-ins will perform no other function than reducing the costs a seller must incur to control to some relevant extent the quality of the complements his customer uses together with his product, and (3) that meter-pricing tie-ins will not affect the extent to

134. The decision of some firm to remain in the market might reduce competition for some buyers' patronage if the remaining firm was #1 for this customer and his advantage over the rest of the field on this buyer exceeded #2's advantage over those correspondingly below him in rank.

135. Although tie-ins may conceivably affect competition by inducing a buyer to exit by making it profitable for a firm to discriminate against the particular buyer in question, this result is even more unlikely than the other we are discussing since sellers will rarely find it profitable to drive their own customers out of business (though admittedly, in some cases, the short-run profits such discrimination yields may be more valuable than the long-run returns it destroys).

which a seller controls the quality of the complements his customers employ. Obviously, since these conditions will not be fulfilled in practice, our various analyses may have to be combined when dealing with real-world tie-ins.

a. *The General Availability of Meter-Pricing Tie-ins and Competition*

Let's begin, then, by analyzing the probability that meter-pricing tie-ins will reduce competition in some relevant respect in the markets in which Y1 buys and sells the goods involved. Assuming that the type of tie-ins in question do not in fact increase the extent of quality control, such agreements will reduce competition in the markets in which Y1 buys A and B only if (1) (a) they increase the profitability of supplying Y1 more for some established competitors than for others and (b) the associated shifts in relative profitability lead to an improvement in the position of the best-placed firm to serve the buyer in question and/or if (2) (a) they are more profitable for the established firms in general than for one or more of their potential competitors who (b) are effective forces in the markets in question. Since, as we shall see, neither of these results is probable, pure meter-pricing tie-ins are unlikely to reduce the intensity of competition on A and/or B.

For condition (1) (a) to be met, either (i) alternative metering devices must be less suitable for some of the product variants in question than for others for reasons that do not affect the absolute efficiency of meter-pricing tie-ins—that is, either tie-ins must increase the profitability of metering the use of some variants by more than they increase the profitability of metering the use of others—and/or (ii) meter pricing through the most advantageous means other than tie-ins (and perhaps through tie-ins as well) must be unprofitable for some of the variants in question without being equally unprofitable for all others. Since the problems associated with collecting endproduct royalties (obtaining honest sales reports) will usually be specific to the customer rather than to the product variant in question, (i) will be fulfilled only when endproduct royalties are less profitable than actual meters and some product variants can be more cheaply fitted with a meter than others.¹³⁶ Similarly, since the factors that determine the general profitability of meter pricing—viz., the extent of the buyer's uncertainty about his own demand for the service in question, the difference between the seller's

136. When more than one type of meter exists, there may be a trade-off between the cost of the meter itself, its installation and servicing costs, and its susceptibility to tampering.

and buyer's risk positions and risk aversion, the amount of seller ignorance and buyer pessimism, and the likelihood that the buyer will resell the services of the machine—will also relate more to the customer in question than to the specific product variant he is sold, condition (ii) is also unlikely to be fulfilled. Accordingly, although meter-pricing tie-ins may sometimes increase the profitability of supplying Y1 more for some established competitors than for others, this result is unlikely to obtain in the vast majority of cases.

Indeed, as I have already suggested, even when condition (1) (a) is fulfilled, there is no reason to suspect that competition for Y1's patronage will be decreased on this account—that is, that condition (1) (b) will be fulfilled as well. In fact, all such shifts in relative profitability that tie-ins effect will be as likely to increase the intensity of the competition for Y1's patronage as to decrease it, for there is obviously no reason to expect that the firm that would be best placed to deal with a particular customer absent tie-ins will also gain more than his competitors from employing such agreements in his dealings with the buyer in question.

Similarly, since a tie-in involving any particular customer will be (a) as likely to be more profitable as less profitable for potential competitors than for the original established sellers where the latter produce only one of the goods involved in a non-perfectly competitive market and (b) only insignificantly less likely to be more profitable as less profitable for potential competitors than for the original established firms where at least some of the latter produce both of the goods involved in non-perfectly competitive markets, condition (2) will be fulfilled only to the extent that potential competitors would on balance tend to sell post-entry to customers for whom meter-pricing tie-ins were less advantageous than average—a most unlikely result at best.¹³⁷

Accordingly, although pure meter-pricing tie-ins may sometimes reduce the intensity of competition in the market in which Y1 buys, this result is highly unlikely to obtain. Certainly, without further information concerning the various conditions I have described, we could not say that the probable effect of such an agreement would be to reduce competition in the market in which Y1 buys A and B.

Indeed, although such a result is somewhat more probable, meter-pricing tie-ins are also unlikely to violate the antitrust laws by reducing

137. This result might obtain, for example, if after their entry the present potential competitors would be more likely to sell to customers who could be trusted more than most to report their sales accurately under an endproduct royalty scheme.

the intensity of some relevant aspect of competition in the markets in which Y resells A and B.¹³⁸ As I have already noted, tie-ins are unlikely to induce an established buyer to exit by discriminating against him (since sellers will rarely find it profitable to drive their own customers out of business). Accordingly, such agreements will reduce competition only (1) (a) if they drive some buyer out of business by deteriorating his position in relation to one or more customers by inducing the tying sellers in question to increase the extent to which they discriminate in favor of one or more of his competitors who would otherwise have left the market in question when (b) the firms whose exit the tie-in thus induced contributed more to the intensity of the relevant aspect of competition¹³⁹ than the firms the tie-ins induced to remain, and/or (2) (a) if they change various buyers' relative marginal costs in ways which (b) improve the competitive position of one or more of those firms (Y1 . . . N) that are best placed to deal with some member of Z1 . . . N. As we shall see, although both these results are possible, neither is particularly likely.

First, although the discrimination usually associated with meter-pricing tie-ins¹⁴⁰ may in fact enable some non-intensive users to stay in a market which they would otherwise have to leave, the probability that their remaining would deteriorate competition by inducing the exit of other, more important competitors is quite clearly very small.¹⁴¹ And

138. In the text, unless otherwise stated, I will attribute any price discrimination that may be associated with a meter-pricing tie-in to the agreement in question. In fact, however, in many cases, the elimination of the tie-in would not reduce the associated discrimination but would merely result in the substitution of another less profitable though equally discriminatory type of metering device. However, since such an alternative arrangement would also be regulated by the antitrust laws—*viz.*, by the Robinson-Patman Act—and would (with one exception) be judged by the same standards that the statutes make applicable to tie-ins, I can ignore this possibility without sacrificing much of consequence. In fact, the only difference I can perceive in this context between the Robinson-Patman Act and § 3 relates to the possibility that a metering arrangement involving a tie-in that reduces competition in the market in which Y sells B by changing his marginal costs relative to those of his competitors might also have been made in good faith to meet the equally low offer of a competitor. Although presumably this fact would exempt the arrangement in question from the coverage of the Robinson-Patman Act, it would appear to have no such impact under a literal interpretation of § 3. Accordingly, in these circumstances, the arrangement's legality might in fact turn on whether the elimination of the tie-in (and substitution of another metering system) would increase competition by reducing the extent of the discrimination effectuated.

139. Cf. p. 220 *supra*.

140. I would expect, however, that such discrimination cannot really be attributed to the tie-in—*i.e.*, that such buyers could convince their suppliers to discriminate in their favor in a lump-sum transaction as well by threatening quite realistically to leave the market if they did not receive concessions.

141. On our definition (which corresponds to normal usage), a firm's remaining in a market would be said to reduce competition for the patronage of those customers (a) in relation to whom the seller in question was best placed when (b) his competitive position as #1 is superior to its counterpart for the firm that would be #1 if he were eliminated. The problem associated with this possibility is analogous to the problem posed by an

second, although meter-pricing tie-ins will normally be associated with economic price discrimination—that is, will normally involve buyers whose average lump-sum plus unit price payments exceed their suppliers' average incremental costs by different amounts—most such agreements will not change these buyers' relative marginal costs, for the unit price of B will normally be the same for all buyers involved in meter-pricing tie-ins and the agreements in question will therefore raise all such customers' marginal costs by the same amount unless different buyers use the machine in question with different frequencies to produce the same amount of product. Indeed, for reasons I have already suggested, even when Y1 and his competitors do use A in varying proportions,¹⁴² the tie-ins in question will be as likely to deteriorate as improve the position of those firms among Y1. . .N who are best placed to deal with the various members of Z1. . .N. Accordingly, although meter-pricing tie-ins may sometimes reduce established firm competition in the markets in which Y buys and/or sells A and B or the products he produces with them, this result will certainly not obtain very often.

But what of the effect of such agreements on the height of the barriers to entry faced by Y1's potential competitors? Once more, although meter-pricing tie-ins could conceivably deteriorate the relative prospective post-entry positions of one or more potential entrants (P) into the

event that reduces competition by increasing (reducing) the attractiveness of the best-placed seller's product by more (less) than it increases (reduces) his costs—i.e., that increases #1's competitive advantage without affecting the efficiency of his competitors. In practice, such cases will be made even more troublesome (if you assume that judges operate under different contextual normative constraints from legislators) by the fact that the associated increase in the actual margin of the best-placed firms will tend to exceed the increase in his efficiency (the increase in his competitive advantage) for reasons we have already explored.

142. For a discussion of a case in which different employers of a machine used it in different proportions to their output, see Professor Baxter's discussion of a case involving shrimp peeling machines in his article on *Legal Restrictions on Exploitation of the Patent Monopoly: An Economic Analysis*, 76 YALE L.J. 267, 289-90 (1966). According to this account, since different shrimp canners had access to shrimps of different sizes, the number of times the canners having access to small shrimp used the shrimp-peeling machine in question to produce a given weight of canned shrimp exceeded its counterpart for canners of large shrimp. Clearly, in this situation the discrimination associated with the non-marginal cost pricing of the machine's use will raise the former group's marginal costs more than the latter's, if the nominal terms of their agreements are the same. However, as my analysis has shown, the shift in relative positions associated with these divergent changes in marginal costs (per weight of peeled shrimp) is just as likely to increase as decrease the intensity of competition for individual buyers. In particular, the discrimination in question would be likely to intensify competition for those customers for whom the small-shrimp canners were originally better placed (so long as their original competitive advantage exceeded half the difference between the amount by which the discrimination raised their marginal costs and the amount by which it raised the large-shrimp canners' marginal costs) and would be likely to reduce competition for the patronage of those buyers in relation to whom the large-shrimp canners were originally better placed.

market in which Y1 acts as a seller by increasing the actual amount of discrimination practiced in favor of firms against whom P must compete, this result is not likely to obtain very often and will not obtain more frequently than its opposite. Clearly, then, unless very specific and unusual information is obtained suggesting that one or more of the sets of conditions we have described is likely to be fulfilled, such agreements should not be held to violate the American antitrust laws.

b. *The General Availability of Pure Quality-Control Tie-ins and Competition*

As we have seen, quality-control tie-ins operate in the first instance by reducing the costs their employer must incur to control to some relevant extent the quality of the complements (B) his customers use together with one or more of his products (A). In this section I will investigate the likelihood that tie-ins that perform this (and only this) function will reduce competition in some relevant respect—more particularly will reduce seller competition in the markets in which Y1 and his competitors purchase A on the one hand and its complement B on the other. In order to simplify the exposition, I will assume the most general case in which X and his competitors produce variants of A themselves but do not produce or distribute variants of the complement B in any economically meaningful sense.

Let's begin, then, by analyzing the likelihood that and circumstances in which quality-control tie-ins will reduce the intensity of competition in the market in which Y1 purchases A and B (1) by decreasing the extent of established firm competition among producers of A and/or (2) by raising the barriers to entry faced by some effective potential entrant to their market. Let's take the second possibility first.

Under some circumstances quality-control tie-ins could conceivably raise the barriers to entry faced by some relevant potential competitor P by deteriorating P's prospective post-entry competitive position in relation to one or more buyers operating in the market in question—that is, by reducing his competitive advantage in relations with customers for whom he would otherwise have been #1 (and thereby lowering the profits he can anticipate making in dealings with these buyers) and/or by increasing the competitive disadvantage at which he would operate in relations with other customers for whom he would not in any case have been best placed (and thereby lowering the returns he can expect to make by stealing one or more of these customers from his competitive superiors). And, as we have seen, to the extent that tie-ins did generate such a deterioration, they would reduce the competitiveness of investment in the market in question (and deriva-

tively the intensity of price-variable input competition as well) by an amount determined by the ability of its established firms to restrict their own investments below the level at which entry would otherwise have been forthcoming. As we shall see, however, in practice quality-control tie-ins are unlikely to deteriorate the prospective position of any prospective entrant P. In general, quality-control tie-ins will not be able to deteriorate the competitive position of some potential entrant P in dealings with any buyer Y1 unless (1) such agreements increase the profitability of quality control more for the established firms than for the potential entrants in question and/or (2) quality control through the most attractive alternative means would have been unprofitable for P without being equally unprofitable for his established counterparts. Clearly, quality-control tie-ins are unlikely to deteriorate (or improve for that matter) the prospective position of potential entrants on the first of these two accounts, for both the cost of specifying quality and inspecting the complements actually used (*i.e.*, of controlling complement quality without using tie-ins) and the cost of arranging for the delivery of suitable complements (*i.e.*, of controlling complement quality through tie-ins) will usually be the same for all potential suppliers of any given buyer. Admittedly, however, in a limited number of cases, such agreements may deteriorate P's position for the second reason stated above, for there will certainly be some situations in which a potential competitor will be contemplating entry with a product variant (1) which reduces the need for controlling the quality of complements to such an extent that (2) such control (though not so unprofitable for others) would be significantly unprofitable for him if tie-ins could not (and perhaps even if they could) be used for this purpose.¹⁴³ With this exception, however, the availability of quality-control tie-ins will not raise the barriers to entry faced by potential entrants by deteriorating their prospective positions in dealings with customers from whom they might otherwise have expected to obtain some profits. And even when this exception applies, such agreements will be as likely to reduce the relevant barriers to entry as to increase them, since in general complement quality control is as likely to be more important for potential entrants as it is to be less important. Clearly, then, quality-control tie-ins will not generally violate the American

143. The effect of any quality-control tie-in that raises the barriers to entry some firm P faces by deteriorating its position to deal with Y1 will not be confined to Y1 alone but will relate (1) to all those customers for whose patronage P would have effectively competed post-entry and/or (2) to all those customers whose positions would have been affected by the established firms' additional entry-preventing investments to the extent that such expansion rather than entry would have resulted, had tie-ins not been available.

antitrust laws by raising the barriers to entry faced by potential entrants into the market in which Y1 buys A or its substitutes under the assumptions we have made. In fact, for reasons I have already discussed, this conclusion will also apply where X and/or some of his competitors produce B in a non-perfectly competitive market as well.

For similar reasons, such agreements will also not be likely to violate the Sherman and Clayton Antitrust Acts by reducing the intensity of competition among the original established producers of A. Thus, since tie-ins will usually increase the profitability of controlling the quality of complements by the same amount for all established firms—for the same reasons that they will tend to increase the profitability of such control by the same amount for established and potential competitors, their availability will change the relative positions of the established competitors for any particular buyer's patronage only to the extent that such control would otherwise be more unprofitable for some than for others. Although, as we have seen, this result will obtain in some cases—since B's quality may affect the performance of some variants of A more than of others, competition once more is as likely to be increased by the associated shifts in positions as it is to be decreased. Accordingly, although quality-control tie-ins may sometimes reduce the intensity of competition in the market in which X sells A, such agreements will not normally or even frequently produce this effect.¹⁴⁴

But what of the impact of such tie-ins on the intensity of competition among the established producers of B? As we have seen, to the extent that quality-control tie-ins actually increase the extent to which complement quality is regulated, they may affect the intensity of competition on B both by deteriorating the positions of one or more potential entrants to that market and by changing the relative positions of the

144. In the text, I have ignored one other way that quality-control tie-ins could conceivably affect the intensity of competition for the patronage of one or more of A's potential buyers—*viz.*, by increasing the amount of quality control actually exercised. As we have seen, Y's using inferior complements together with A may very well deteriorate X's position in dealing with some of A's other potential purchasers either (1) because the value of A to them is in fact decreased by Y's use of an unsatisfactory complement—as in the Ho-Jo's example—or (2) because they mistakenly attribute to A Y's dissatisfaction with this product in circumstances in which its poor performance for Y was actually caused by his using an unsatisfactory complement B. Indeed, Y's ignorance of the consequences of his using such an inferior variant of B may result in a deterioration in X's future position in dealing with him as well. To the extent the X's use of quality-control tie-ins increases the actual extent to which he does control the quality of the complements his customers use, their availability will improve his position in dealing with the customers just described. Any such advantage will be more or less offset to the extent that X's competitors' use of tie-ins increases the extent to which they control their customers' complements as well. For present purposes, however, I need only note that the associated shifts in positions might decrease the intensity of competition for the patronage of one or more buyers of A, though there is no reason to suppose that the net effect of this process will be anti-competitive.

established competitors for various buyers' patronage. Thus, when potential entrants are better placed to produce unacceptable than acceptable variants of B, quality-control tie-ins that increase the extent of actual control may reduce the intensity of investment competition (and derivatively of price-variable input competition as well) by raising the effective barriers to entry. Of course, when potential entrants are better placed to produce acceptable variants of B, the opposite result will tend to obtain. Obviously, in practice, one outcome is as likely as the other. Accordingly, no anti-competitive tendency can be ascribed to quality-control tie-ins on this account either.

Admittedly, quality-control tie-ins might still reduce competition by changing the positions of the established producers of B in dealings with particular buyers. Thus, to the extent that tie-ins of this type actually increase complement quality control, they may change the competitive positions of various firms in dealings with particular buyers both in the short run and in the long run: in the short run, by changing the average incremental costs the original and new supplier of the controlled customer would have to incur to supply marginal customers by decreasing and increasing respectively the rates at which they are using their capacities, and in the long run, by inducing the supplier who lost sales as a result of the tie-in to exit and/or by inducing the supplier who gained sales to remain in the market in question. There is no reason to expect, however, that the net consequence of such shifts will be a diminution of the competition for the patronage of any given buyer of B or in the market for B in general. Once more, then, although quality-control tie-ins may reduce competition among the established sellers of B and its variants, this result will not obtain with any significant frequency.

Thus, quality-control tie-ins definitely do not have any general anti-competitive tendencies. Clearly, then, unless very specific and unusual information is obtained suggesting that one or more of the sets of conditions under which this type of tie-in will tend to reduce competition seem likely to be fulfilled, such agreements should not be held to violate the American antitrust laws.

c. *The General Availability of Package-Pricing Tie-ins¹⁴⁵ and Competition*

As we have seen, package-pricing tie-ins can enable a seller to increase the profitability of price discrimination or price regulation violations

145. Since package-pricing tie-ins that buyers are more likely to arrange will never

or to reduce the costs he must incur to prevent or allow buyer arbitrage in general. Fortunately, to gain an understanding of the possible and probable competitive impact of such agreements, I need only refer to the previous analysis of meter-pricing tie-ins.

Let's begin, then, by investigating the likelihood that package-pricing tie-ins will decrease the competitiveness of the market in which Y1 buys A and B. As we have seen, such agreements could produce this result either by shifting the relative positions of the established firms or by deteriorating the prospective positions of some potential entrants. Once more, both results are possible and neither is likely.

The reasons for this conclusion are also unchanged. First, such agreements are unlikely to be more profitable for some established firms than for others or for the established firms in general than for some potential entrant,¹⁴⁶ whether or not some established firms produce both goods involved in non-perfectly competitive markets. And second, any change in positions that does result from the execution of such tie-ins will be as likely to intensify as decrease competition in the markets concerned.

Of course, to the extent that such tie-ins increase the extent to which their employers engage in price discrimination or price regulation violations, they may still affect the intensity of competition in the markets in which Y1 *sells* A and B by changing his marginal costs and relative position or by deteriorating or improving the prospective positions of one or more potential entrants to the markets in question, but clearly any such shift that does take place will be as likely to increase as reduce competition for the relevant parties' patronage.

Accordingly, except in very unusual circumstances, package-pricing tie-ins will not violate the terms of the American antitrust laws.

d. *The General Availability of Non-Marginal-Cost Price-Shifting Tie-ins and Competition*¹⁴⁷

As we have seen, non-marginal-cost price-shifting tie-ins are probably the most complicated of all such agreements. Fortunately, however, I

reduce seller competition, I will confine the textual analysis to seller-oriented package-pricing tie-ins.

146. Since (a) discrimination without tie-ins will tend to be equally profitable or—more relevantly—equally unprofitable for the sellers of all variants of some product, (b) the information costs associated with more straightforward discrimination and the extent of the offsets from package pricing will relate more to the buyer in question than to the seller and his product, and (c) the actual amount of arbitrage on A that would otherwise result will also be influenced more by the buyer's location than by the physical characteristics of the variant of A involved.

147. In order to simplify the exposition, I will assume the most general case in which

can continue to analyze their possible and probable competitive impact in precisely the same way as I analyzed their functional analogues above. Our conclusion will also be unchanged—*viz.*, although such agreements may sometimes reduce the intensity of the competition for the patronage of one or more buyers in various markets, this result will be neither usual nor more likely than its opposite.

Let's proceed, then, by analyzing the circumstances in which such tie-ins will tend to reduce competition (1) in the market in which Y1 buys A, (2) in the market in which B is sold by Y1's possible ultimate suppliers, and (3) in the market in which Y1 and his competitors resell A and B to their customers Z1. . . N. Like the other types of tie-ins we have already investigated, non-marginal-cost price-shifting tie-ins may reduce established firm competition for Y1's patronage on A if they are more profitable for some of the established firms than for others. However, in practice, the associated shifts in positions will rarely be significant¹⁴⁸ and will generally be as likely to intensify as decrease the competition for Y1's patronage on A. For similar reasons, such tie-ins are also unlikely to reduce competition in the market in which Y1 buys A by raising the disadvantage under which prospective entrants would operate. Particularly since the profitability of this type of tie-in depends in part on the tied-product market's being highly competitive. Of course, in individual cases, tie-ins of this type may still reduce the intensity of competition for the patronage of some buyers of A or its variants—or indeed for the patronage of some buyers of B or its variants as well—by altering the extents to which their possible ultimate suppliers are utilizing their capacities,¹⁴⁹ but once more such results are neither probable nor more likely than their opposites. Accordingly, except in very special and unusual circumstances, non-marginal-cost price-shifting tie-ins will not violate the antitrust laws by reducing the intensity of competition in the markets in which Y1 and his competitors purchase A and B.

X produces A himself but does not produce or distribute the complement B in any economically meaningful sense.

148. The most important determinant of such tie-in's profitability—the shape of Y's demand curve for A or its variants—will probably depend more on his particular situation than on their special characteristics.

149. In general, this type of tie-in will increase the rate at which sellers of A utilize their capacities in the short-run at least (by reducing the unit price of A and its variants and increasing their unit sales) and will decrease the rate at which sellers of B utilize their capacities in the short-run at least (by raising the unit price of B and its variants and decreasing their unit sales). Such increases or decreases will change the relative positions of different firms in dealing with particular customers to the extent that (1) the size of the increases in question vary within each set of the producers concerned and/or (2) the slope of these producers' marginal cost curves differ over the ranges in question.

One additional possibility remains to be investigated—*viz.*, the possibility that non-marginal-cost price-shifting tie-ins may affect the intensity of competition in the markets in which Y1 and his competitors resell A and B and their variants to their customers Z1. . .N. As we have seen, such tie-ins will change the marginal cost of these products to Y1 and his competitors—more specifically will reduce the marginal cost of A to them and increase the marginal cost of B. Obviously, to the extent that the magnitude of these changes differs among Y1 and his competitors—and/or to the extent that Y1. . .N employ these goods as inputs but in different proportions to their final output, the execution of the tie-ins in question will alter their competitive positions in the markets in which they resell the products concerned. In practice, of course, such differences will usually be small and will generally be as likely to intensify as decrease competition in the market in which Y1 operates as a seller. Thus, non-marginal-cost price-shifting tie-ins have no general anti-competitive tendencies.

IV. Conclusion

Now that I have completed the investigation of the possible and probable competitive impact of the various functional types of tying agreements, I can compare the results of my analysis with the conclusions reached by the Court. By now, it should be obvious that the economic and legal conclusions generated by my analysis differ in every respect from those asserted by the Court. According to the Court, all tie-ins that involve sellers who enjoy a competitive advantage on one of the products concerned will inevitably violate the American anti-trust laws by reducing the intensity of competition in the market for the other product involved through improving their employers' positions in the market for the so-called tied product. On the other hand, if I am correct, (1) tie-ins—or, more precisely, the availability of such agreements to all competitors for a particular buyer's patronage—will improve their actual employers' competitive positions only slightly more often than not; (2) the likelihood that allowing any set of competitors to employ tie-ins will have an anti-competitive impact will be largely independent both of whether the seller in question would have a competitive advantage on one of the products involved if no such agreement could be employed¹⁵⁰ and of whether the actual tie-in arranged with the

150. This conclusion assumes—as we have done all along—that the American antitrust laws do not authorize the courts to offset the otherwise legal advantages of some firms

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buyer involved did individually improve this employer's position (as it always will if it is profitable);¹⁵¹ (3) the competitive effect of tying agreements will take place in the joint market of both products involved and not in the so-called "tied product market" in isolation; and (4) the availability of tie-ins to the competitors for a particular buyer's patronage will only rarely have an anti-competitive impact—that is, will only rarely violate the American antitrust laws. According to my analysis, then, unless very specific evidence is adduced demonstrating the existence of one of the sets of unusual circumstances in which competition is likely to be reduced by the use of tie-ins, such agreements should be declared legal under the American antitrust laws regardless of their functional type.¹⁵²

by denying them and granting their competitors the right to employ tie-ins when such agreements are no more profitable for the former than for the latter.

151. As we have seen, this conclusion does not depend on the assumption delineated in note 150 *supra*—i.e., even if the law authorized the courts to apply the competitive impact test to an individual tie-in rather than to the availability of tie-ins to all competitors for a particular buyer's patronage, one could derive no conclusions from the fact that a particular tie-in was profitable. Cf. p. 242 *supra*.

152. This conclusion is even more universal than Professor Bowman's in his pioneering attack on the Court's leverage theory. See Bowman, *Tying Agreements and the Leverage Problem*, 67 YALE L.J. 19 (1957). In Appendix C, *infra*, I will analyze Professor Bowman's qualification as well as the position taken by one other school of judicial critics.

APPENDIX A

FULL-REQUIREMENTS TIE-INS AND RISK COSTS

For several reasons, business owners will tend to prefer more certain returns to less certain returns, other things being equal. First, stockholders' net money incomes will often be increased less by any given rise in their corporation's earnings above the expected level than they will be decreased when their company's profits fall the same amount below the expected level since (1) to the extent that marginal profits are distributed, they will tend to be subjected to increasingly high individual income tax rates and (2) to the extent that they are retained, they will tend either or both to replace decreasingly expensive loans¹ and/or to permit decreasingly profitable expenditures²—*i.e.*, they will tend to produce decreasing amounts of capital gains (which may themselves be subjected to a progressive tax rate). Second, to the extent that the additional satisfaction that individuals receive from successive units of net money income tends to decline as their net money income increases, stockholders' satisfactions will tend to be increased less by a given rise in their corporation's earnings above the expected level than they will be decreased by an indential fall even if a given increase or decrease in their company's profits affects their net money incomes by equal amounts. Finally, even if a given increase or decrease in profits affects their satisfactions to an equal extent, uncertainty will still reduce their expected satisfaction by making it more difficult for them to plan their expenditures or alternatively by making it necessary for them to arrange their portfolios to reduce the uncertainty in question. In general, then, uncertain returns will be worth less to a business owner than certain returns. Accordingly, businessmen will normally be willing to accept a guaranteed return which is less than the weighted average return contained in their probability distribution estimate of their prospective profits. The difference between this expected weighted average return and the certain return which the businessman finds equivalent (the so-called certainty equivalent return) reflects the risk costs he must bear as a result of his uncertainty.

Obviously, any seller (or buyer) who is considering arranging a tie-in will be interested in the agreement's impact on the risk costs he must bear and since the seller will have to compensate his customer for the risk costs he bears as a result of this transaction, he will be equally interested in the effect of the tie-in on his customer's risk costs. Clearly, then (*ceteris paribus*) the profitability of a particular tie-in will depend on—indeed will be directly related to—its impact on the participants' risk costs.

1. I assume that the rate of interest a corporation has to pay will be directly related to its debt/equity ratio.

2. I assume *inter alia* that a corporation will normally face a declining marginal efficiency of investment curve. Where profits fall considerably below their expected total, the firm may even have to borrow to meet its non-expansionary expenditures.

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Since the value of additional profits to a firm's owners will tend to decline as profits rise, the risk costs entailed in any probable profit distribution will tend to increase with the variance (the sum of the squared deviations from the mean) of the distribution in question and not just with its mean deviation.³ Accordingly, in order to determine the effect of a tie-in on the sum of the buyer's and seller's risk costs and hence on its initiator's profits, we will have to discover its impact on the variance of the probability distribution of the expected overall profits of each of the parties in question.

In the following pages, I will analyze this impact on the plausible assumptions (1) that the tie-in's effect on the variance of the probability distribution of the sum of X's expected profits on A and B—henceforth $\Pi_{(A+B)X}$ —will be directly related to its impact on the variance of the probability distribution of X's overall expected profits— $\Pi_{\Sigma X}$ —and (2) that the agreement's effect on the variance of $\Pi_{(A+B)Y}$ will also be directly related to its impact on $\Pi_{\Sigma Y}$ —i.e., I will assume that both X and Y expect their profits on products other than A and B to be non-negatively related to their profits on these two goods. Obviously, given these assumptions, I can investigate the impact of the tie-in on X's and Y's overall risk costs by examining its effect on the variances of $\Pi_{(A+B)X}$ and $\Pi_{(A+B)Y}$ respectively.⁴

3. An example may help clarify this point. Thus, although the risk costs associated with a probable profit distribution with 100 possible outcomes in which there is a 10% chance of realizing both \$200 more than expected (mean expected return) and \$200 less than expected will *ceteris paribus* be higher than their counterparts for a distribution in which there is a 20% chance of realizing both \$100 more than expected and \$100 less than expected (since the loss of utility to stockholders caused by \$200 lost profits would exceed the gain from \$200 "unexpected" profits by more than twice the amount by which the lost utility from \$100 lost profits would exceed the gain in utility from \$100 unexpected profits—i.e., since the value of additional profits to a firm's owners will tend to decline as profits rise), the mean deviation of the two distributions would be identical. The difference in costs would, however, be reflected in the variance of the two distributions since the sum of squared negative deviations associated with the first outcome would be equal to $20(200)^2 = 800,000$ while its counterpart for the second would be equal to $40(100)^2 = 40(10000) = 400,000$. It should be noted that the use of the simple variance also presupposes that the value of marginal profits decline at a constant rate as total profits rise. However, this assumption is clearly not essential to our analysis.

4. It should be emphasized that the effect of the tie-in on the risks X and Y bear in connection with their uncertainty about Y's demands for A and B respectively does not depend on its impact on the variance of the probability distribution of the parties' expected gains from trading with each other rather than with someone else. Thus, the fact that the expansion of X's and Y's dealings to include product B will create an additional source of uncertainty for Y as far as his returns from his dealings with X are concerned—the size of the losses he will sustain by buying B from X for more than its normal price rather than from some other supplier—is of no importance. (My analysis of this problem in Part I failed to take this fact into consideration. My error can also be expressed in these terms: Part I, I attributed to the tie-in the tendency of deviations from the mean of Π_{BY} to offset deviations from the mean of

Π_{AY} where DD_{XAY} and DD_{XBY}^{RO} were positively correlated. In fact, however, since Y would deal in A and B independent of the tie-in, the associated reduction in Y's risk costs cannot be attributed to the tying agreement—except, as we shall see, to the extent

We should now be in a position to analyze the effect of the tie-in on X's and Y's individual and total risk costs. As we have seen, the tie-in will operate by increasing the unit price Y pays for B and reducing the unit price he pays for A. By so doing, the agreement will reduce the variance of Π_{BY} and increase the variance of Π_{AX} while it decreases the variance of Π_{AX} and increase the variance of Π_{BX} .⁵ As we shall see, the net effect of these changes will depend in a somewhat uncertain way (1) on the relationship between the demands in question, (2) on X's and Y's relative uncertainty about them, and (3) on the relative size of the marginal profits Y (and X) enjoy on A and B respectively.

that the tie-in makes the offsets in question more perfect.) What is important is the tendency of the tie-in to reduce the extent of Y's uncertainty about his returns on B by raising the price he must pay for the product.

5. In general, the higher the price of the product in question, the smaller the range and variance of the probability distribution of the expected profits of the buyer and the larger the range and variance of the probability distribution of the expected profits of the seller. Diagram I has been devised to illustrate this relationship. (My assumption that $P_B = MC_{BX}$ is immaterial: it has been made solely to emphasize the point that X need not even produce the tied product for the tie-in to be profitable). In Diagram I,

DD_{BY}^{RCL} and DD_{BY}^{RCH} represent Y's (lowest and highest) full-requirements demands for A and B respectively. If we assume that Y incurs no risk costs and pays no lump-sum fee, his profits on B (note: not his profits from buying B under the tie-in from X rather than from some other buyer at its normal price) will equal the area between his actual full-requirements demand curve for B and the price he pays for this product.

In Diagram I, P_B indicates the normal price of B and P_B^T indicates B's higher price under the tie-in. As can be seen, the tie-in will decrease the range of the probability

DIAGRAM I

distribution of Y's profits on B from ACDF to ABEF—i.e., by BCDE. Similarly, since it will increase the returns he earns on Y's marginal purchases it will increase the range (and variance) of the probability distribution of X's expected profits on B from zero to EBHG.

Diagram II shows that the tie-in will have exactly the opposite effect on the ranges and variances of Π_{AX} and Π_{AY} —viz., will increase the range of Π_{AY} by BCDE and decrease the range of Π_{AX} by BGHE minus CIJD. (In Diagram II, the area between the relevant

Tie-ins, Reciprocity, and the Leverage Theory

Let's begin, then, by analyzing the effect of the tie-in on Y's risk costs. On my assumptions, this impact will depend on the agreement's consequences for the variance of $\Pi_{(A+B)Y}$ —i.e., on the weighted sum of the squared deviations from Y's average expected return from A and B together. *Ceteris paribus*, to the extent that the tie-in reduces (increases) the squared deviation entailed in any possible outcome—i.e., in any possible actual combination of DD_{XAY} and DD_{XBY}^{RC} , it will reduce (increase) Y's risk costs. Probable profit distribution $\Pi_{(A+B)Y}$ will contain some cases in which DD_{XAY} and DD_{XBY}^{RC} and concomitantly Y's purchases of A and B will deviate in the same direction from their average expected value and other cases in which these deviations will be in the opposite direction. It will be convenient to analyze these two different types of cases separately since the factors that influence the impact of the tie-in on the squared deviation entailed in any given outcome will depend on whether Y's purchases of A and B deviate in the same or in opposite directions from their expected values in the situation in question.

When the deviation in DD_{XAY} and DD_{XBY}^{RC} have the same sign, the direction in which the tie-in will affect the contribution of any given outcome to $\Pi_{(A+B)Y}$'s variance will depend solely on the relative size

demand curves and the prices in question represent profits Y would earn under the circumstances in question from selling X's variant of A.) It should also be noted that the effect of the tie-in on the range and variance of the distribution of the sum of X's and Y's profits on A and B respectively cannot be predicted without making specific assumptions about the slopes of the various demand curves between the prices in question.

DIAGRAM II

of the percentages by which Y's associated purchases of A and B deviate from their average expected value. In particular, the tie-in will decrease the absolute and hence squared deviation entailed in the outcome in question if and only if $\%_B$ is somewhat higher than $\%_A$.⁶ It should be

6. In order to simplify the analysis, I will assume throughout this section that the fluctuations in the demands with which we are concerned will not affect Y's (or X's) average mark-up on the products in question. (This result would obtain, for example, if MC_{AX} were horizontal and equal to AVC_{AX} over the relevant range and none of the prices involved were changed by the demand fluctuations in question.) Given this assumption, the squared deviation from expected $\Pi_{(A+B)Y}$ independent of the tie-in will be equal to $(M_{AY} \cdot D_A + M_{BY} \cdot D_B)^2$ when M_{AY} and M_{BY} represent Y's original margins on A and B respectively and D_A and D_B represent the original deviations in Y's purchase of A and B in the situation in question. If we assume as well that the tie-in does not affect the size of D_A and D_B —i.e., that average expected DD_{XAY} and DD_{XBY}^{RO} have respectively the same

slopes as the particular DD_{XAY} and DD_{XBY}^{RO} curves envisaged in the outcome in question, the squared deviation for this particular outcome under the tie-in will be equal to $(M_{AY} + \Delta M_{AY}) D_A + (M_{BY} - \Delta M_{BY}) D_B$ where ΔM_A equals the change in the price of A under the tie-in and ΔM_{BY} represents the change in the price of B. (It should be noted that ΔM_{BY} will never exceed M_{BY} since Y would simply purchase no B if it did—i.e., since Y would have a negative margin on B under the tie-in if it did. Hence, the second term above will always have the same sign as D_B .) Accordingly, the tie-in will increase the squared deviation entailed in any outcome in set i and hence *ceteris paribus* reduce Y's risk cost if $(M_{AY} \cdot D_A + M_{BY} \cdot D_B + \Delta M_{AY} D_A - \Delta M_{BY} D_B)^2 - (M_{AY} D_A + M_{BY} D_B)^2$ is negative; decrease these costs if it is positive; and leave them unchanged if it is zero. We have assumed that D_A and D_B have the same sign. If D_A and D_B are both negative, the first two terms in the above expression, as well as the expression as a whole, will also be negative and the first expression will be less than the second only if $(\Delta M_A D_A - \Delta M_{BY} D_B)$ is positive. If D_A and D_B are positive, the first two terms as well as the expression as a whole will also be positive and the first expression will therefore be less than the second only if $(\Delta M_A D_A - \Delta M_{BY} D_B)$ is negative. Thus, if D_A and D_B are negative, $\Delta M_{AY} \cdot D_A - \Delta M_{BY} \cdot D_B$ must be greater than zero. Since both of these terms are themselves negative, this result can obtain only if $|\Delta M_{BY} D_B| > |\Delta M_{AY} D_A|$. Similarly, if D_A and D_B are positive, $\Delta M_{AY} D_A - \Delta M_{BY} \cdot D_B$ must be negative. Since both of these terms are themselves positive, this result can also obtain only if $|\Delta M_{BY} \cdot D_B| > |\Delta M_{AY} \cdot D_A|$. Thus, the tie-in will reduce the squared deviation entailed in any outcome in which D_A and D_B have the same sign if and only if $|\Delta M_{BY} \cdot D_B| > |\Delta M_{AY} \cdot D_A|$. For this condition, we can obviously

substitute the condition that $\left| \Delta M_{BY} \cdot S_{BE} \cdot \frac{D_B}{S_{BE}} \right| = \left| \Delta M_{BY} \cdot S_{BE} \cdot \%_B \right|$ must exceed

$\left| \Delta M_{AY} \cdot S_{AE} \cdot \frac{D_A}{S_{AE}} \right| = \left| \Delta M_{AY} \cdot S_{AE} \cdot \%_A \right|$, where S_{BE} and S_{AE} represent the expected

sales of A and B respectively. Now we know that—in the usual case in which the related contractual costs would not make it unprofitable for X to charge Y lump-sum fees in an independent agreement on A — (1) $\Delta M_{AY} \cdot S_{AE}$ minus (2) the loss Y would have sustained by purchasing the extra A he purchases under the tie-in at A's untied unit price [(1) - (2) = (BS +) on A] plus (3) the amount by which the tie-in reduces X's optimal lump-sum fee (by increasing the efficiency of non-marginal cost pricing) must equal (4) $\Delta M_{BY} \cdot S_{BE}$ minus (5) the buyer surplus Y would have expected to realize at B's untied unit price on the purchases of B he no longer will make under the tying agreement [(4) + (5) = (BS -) on B] plus (6) the added risk, information-gathering, negotiating, and contracting costs the tie-in imposed on Y plus or minus (7) the amount by which the tie-in decreases or increases the returns Y will expect to realize by promoting A, B, and/or the products in which they are used. From this information, we should be able to obtain

emphasized that this finding does not imply that the tie-in will reduce the contribution of all cases included in set i if $\%_A$ exceeds $\%_B$ more often than not since the average size of the reduction in variance produced where $\%_A$ exceeds $\%_B$ need not equal its counterpart where this relationship is reversed. In fact, if other things—namely, the size of the original deviation (v) and the change produced (k)—are equal (*i.e.*, do not depend on whether $\%_A$ exceeds $\%_B$), the tie-in will increase the contribution of each case in which $\%_B$ exceeds $\%_A$ to the variance of $\Pi_{(A+B)Y}$ more than it reduces the contribution of each case in which $\%_A$ exceeds $\%_B$.⁷ Hence, in such a situation $\%_A$ would have to exceed $\%_B$ more than half the time where the two deviations have the same sign for the tie-in to reduce the contribution of all cases in set i to the variance of $\Pi_{(A+B)Y}$.⁸ In general, the actual percentage of cases in which $\%_A$ must exceed $\%_B$ for the tie-in to decrease the contribution of set i to the variance of $\Pi_{(A+B)Y}$ will be directly related (1) to the ratio of the difference between the percentage deviations where $\%_A$ exceeds $\%_B$ to the difference that exists where $\%_B$ exceeds $\%_A$ ⁹ and (2) to the ratios of $\%_A$ and $\%_B$ where the former exceeds the latter to their counterparts where $\%_B$ ex-

some data concerning the relative sizes of $|\Delta M_{BY} \cdot S_{BE}|$ and $|\Delta M_{AY} \cdot S_{AE}|$. Thus we have already noted that—particularly where X's tie-in is highly advantageous—(3) will tend to exceed (6) *plus* or *minus* (7). On the other hand, since in the situations with which we are concerned $\frac{SS -}{BS +}$ over the relevant range of DD_{XAY} will usually exceed $\frac{SS +}{BS -}$

over the relevant range of DD_{XBY}^{BC} , the absolute slope of the latter will probably exceed its counterpart for the former, and (2) will therefore tend to be less than (5). Hence, although (1) will probably tend to be larger than (4) in the situations on which we are focusing, the difference will usually be quite small—*i.e.*, $\Delta M_{AY} \cdot S_{AE}$ will probably be slightly larger than $\Delta M_{BY} \cdot S_{BE}$. Hence, $|\Delta M_{BY} \cdot S_{BE} \cdot \%_B|$ will probably exceed $|\Delta M_{AY} \cdot S_{AE} \cdot \%_A|$ —*i.e.*, the tie-in will probably reduce the contribution of the outcomes in set i to the variance of Y's probability distribution if and only if $\%_B$ is larger than $\%_A$ for the case in question.

7. Thus, if you let v be the absolute deviation that the outcome in question would entail independent of the tie-in and k the change in this deviation produced by the tying

agreement (which will equal the reduction in deviation where DD_{XAY} and DD_{XBY}^{BC} deviate in the same direction), the tie-in would increase the variance of $\Pi_{(A+B)Y}$ by $(v + k)^2 - v^2 = 2kv + k^2$ where $\%_B$ exceeded $\%_A$ but would decrease the variance of $\Pi_{(A+B)Y}$ by only $v^2 - (v - k)^2$ (*i.e.*, by $2k^2$ less) where $\%_A$ exceeded $\%_B$.

8. The determinants of the exact percentage of cases in which $\%_A$ must exceed $\%_B$ (in such a situation) for the tie-in to reduce the contribution of all cases in set i to the variance of $\Pi_{(A+B)Y}$ are analyzed in notes 9 and 10 *infra*.

9. The greater the difference between $\%_B$ and $\%_A$ where $\%_B$ exceeds $\%_A$, the greater the amount by which the tie-in will increase the deviation associated with the outcomes in question. Similarly, the greater the difference between $\%_A$ and $\%_B$ where $\%_A$ exceeds $\%_B$, the greater the amount by which the tie-in will reduce the deviation associated with the outcome in question. Hence, the greater the ratio described in the text, the greater the ratio of the average increase in deviation where $\%_A$ exceeds $\%_B$ to the average decrease in deviation where $\%_B$ exceeds $\%_A$ and hence the higher the percentage of cases in which $\%_B$ must exceed $\%_A$ for the tie-in to reduce the contribution of set i to the variance of $\Pi_{(A+B)Y}$.

ceeds $\%_{oA}$.¹⁰ In practice, the effect of the second set of relationships will depend upon the relative size of Y's original average expected gross (of fixed costs) profits on A and B,¹¹ for since (1) $\%_{oA}$ will tend to be slightly

10. The larger $\%_A$ and $\%_B$ where $\%_B$ exceeds $\%_A$, the larger the original deviation in all such cases and hence the greater the amount by which any given increase in this deviation will raise the contribution of the cases in question to the variance of $\Pi_{(A+B)Y}$ —i.e., the larger v and hence the larger $2kv + k^2$. Similarly, the smaller $\%_A$ and $\%_B$ where $\%_A$ exceeds $\%_B$, the smaller the original deviation in all cases and hence the smaller the amount by which any given increase in this deviation will raise the contribution of the cases in question to the variance of $\Pi_{(A+B)Y}$ —i.e., the smaller v and hence the smaller $2kv + k^2$. Accordingly, the larger the ratios of $\%_A$ and $\%_B$ where $\%_A$ exceeds $\%_B$ to their counterparts where $\%_B$ exceeds $\%_A$, the higher the percentage of cases in which $\%_A$ must exceed $\%_B$ for the tie-in to reduce the contribution of set i to the variance of $\Pi_{(A+B)Y}$. If we make the massively simplifying assumption that all cases in which $\%_A$ exceeds $\%_B$ are alike and that all cases in which $\%_B$ exceeds $\%_A$ are also alike, these relationships can be demonstrated in the following way: Let (1) v_B equal the original deviation where $\%_B$ exceeds $\%_A$ and v_A equal its counterpart where $\%_A$ exceeds $\%_B$; (2) k_B and k_A have analogous meanings; and (3) $\%_{A,B}$ stand for the percentage deviation from Y's average expected purchases of A when $\%_B$ exceeds $\%_A$; (4) α stand for the number of cases in which $\%_B$ exceeds $\%_A$; and (5) $(\alpha + \beta)$ stand for the number of cases in which $\%_A$ exceeds $\%_B$. The net effect of the tie-in on the variance of $\Pi_{(A+B)Y}$ will therefore be equal to $(2v_B k_B + k_B^2) \alpha - (2v_A k_A + k_A^2) (\alpha + \beta)$. The percentage of cases in which $\%_A$ must exceed $\%_B$ for the tie-in to have no effect on the contribution of set i to the variance of $\Pi_{(A+B)Y}$ will be that percentage at which the above sum equals zero. There-

fore, to find the determinants of this critical percentage— $\frac{\alpha + \beta}{2\alpha + \beta}$, we must set the above

sum equal to zero and solve. However, since $\frac{\alpha + \beta}{2\alpha + \beta}$ is directly related to $\frac{\beta}{\alpha}$, we can solve for this ratio instead.

$$\frac{\beta}{\alpha} = \frac{2v_B k_B + k_B^2 - 2v_A k_A + k_A^2}{2v_A k_A - k_A^2} = \frac{2v_B k_B + k_B^2}{2v_A k_A - k_A^2} - 1, \text{ which is directly related to}$$

$$\frac{2v_B k_B + k_B^2}{2v_A k_A - k_A^2}. \text{ Hence, the required percentage will be directly related to } \frac{k_B(2v_B + k_B)}{k_A(2v_A - k_A)} =$$

$$\left| \frac{\Delta M_{AY} \cdot D_{A,B} - \Delta M_{BY} \cdot D_{B,B}}{\Delta M_A \cdot D_{A,A} - \Delta M_B \cdot D_{B,A}} \right| \cdot \frac{2M_{AY} \cdot D_{A,B} + 2M_{BY} \cdot D_{B,B} + \Delta M_A D_{A,B} - \Delta M_B D_{B,B}}{2M_{AY} \cdot D_{A,A} + 2M_{BY} \cdot D_{B,A} - \Delta M_A D_{A,A} + \Delta M_B D_{B,A}}.$$

If I substitute $\frac{\Delta M_B \cdot S_{BE}}{S_{AE}}$ for ΔM_A ; $R \cdot \Delta M_A$ for M_{AY} ; $T \cdot \Delta M_B$ for M_{BY} ; and consolidate terms, the above expression will become

$$\left| \frac{\%_{A,B} - \%_{B,B}}{\%_{A,A} - \%_{B,A}} \right| - \frac{(2R + 1) \%_{A,B} + (2T - 1) \%_{B,B}}{(2R - 1) \%_{A,A} + (2T + 1) \%_{B,A}}$$

The relationships just discussed all follow from this result.

$$11. \text{ I.e., on the relative size of } R = \frac{M_{AY}}{\Delta M_A} = \frac{M_{AY}}{\Delta M_B - S_{BE}/S_{AE}} = \frac{M_{AY} \cdot S_{AE}}{\Delta M_B - S_{BE}} \text{ and } T = \frac{M_{BY}}{\Delta M_B} = \frac{M_{BY} \cdot S_{BE}}{\Delta M_B \cdot S_{BE}}. \text{ Hence, } \frac{R}{T} = \frac{M_{AY} \cdot S_{AE}}{M_{BY} \cdot S_{BE}}.$$

higher than average where it exceeds $\%_B$ and significantly lower than average when it is exceeded by $\%_B$ while (2) these relationships will tend to be reversed for $\%_B$ (given that average $\%_A$ is significantly higher than average $\%_B$), $\%_{A.A}/\%_{A.B}$ will tend to approximate the inverse of $\%_{B.A}/\%_{B.B}$.¹² However, in almost all cases, the first relationship will tend to increase the required percentage, for the fact that $\%_A$ will on the average exceed $\%_B$ (since A is a differentiated product while B is not) makes it probable that the difference between the two will be larger where $\%_A$ exceeds $\%_B$ than where this relationship is reversed. Accordingly, the percentage of cases in which $\%_B$ must exceed $\%_A$ for the tie-in to reduce the contribution of set i to Y's risk costs will usually be significantly above 50%. Unfortunately, taken in conjunction with the greater uncertainty of DD_{XAY} , this conclusion implies that the tie-in will almost always increase the contribution of set i to the variance of $\Pi_{(A+B)Y}$ for since average $\%_A$ will be larger than average $\%_B$, $\%_A$ will probably exceed $\%_B$ more often than not.

Of course, some of the outcomes Y envisages may not be included in set i—i.e., Y may believe that deviations from his expected purchases of A and B may be in opposite directions, that some of his possible outcomes may fall into some set j rather than set i. Since the deviations from Y's average expected profits will always offset each other in all such cases, the net deviation associated with any outcome in set j will always be equal to the difference between the absolute deviations from Y's expected profits on A and B respectively. For the same reasons that we have just advanced in connection with set i—viz., the fact that a given increase in the deviation entailed in any outcome will raise the variance of $\Pi_{(A+B)Y}$ by more than an equal decrease in deviation, other things being equal, the tie-in will tend to increase the contribution of set j to the variance in question unless it decreases the deviation entailed in more than half of that set's constituent outcomes.

Once more, however, there is no reason to believe that the tie-in will reduce the deviation entailed in more than half the outcomes in set j. In general, the tie-in will raise the deviation associated with any outcome in which DD_{XAY} and DD_{XBY}^{RO} are inversely related whenever (1) $|M_{AY}D_A|$ (the absolute deviation from Y's expected profits on A) exceeds $|M_{BY}D_B|$ (the absolute deviation from Y's expected profits on B)¹³ or (2) $|M_{AY}D_A|$ is less than $|M_{BY}D_B|$ but by an amount which is less than half the sum of $|\Delta M_A D_A|$ and $|\Delta M_B D_B|$, while it will reduce the deviation in question only if $|M_{AY}D_A|$ is less than $|M_{BY}D_B|$ by an amount

12. $\%_{A.A}$ and $\%_{A.B}$ represent $\%_A$ when $\%_A$ exceeds and is exceeded by $\%_B$ respectively. $\%_{B.A}$ and $\%_{B.B}$ in the next sentence have analogous referents.

13. If the original deviation from Y's expected profits on A exceeds its counterpart for B, the tie-in's tendency (1) to increase Y's margin on A and hence the deviation from his expected profits on A and (2) to decrease Y's margin on B and hence the deviation from his expected profits on B will always increase the difference between these two offsetting deviations.

which is more than half the sum of $|\Delta M_A D_A|$ and $|\Delta M_B D_B|$.¹⁴ Regrettably, at this point, little more can be said without specifying the distributions in question. However, although it is impossible to determine *a priori* the relative sizes of $|M_{AY} D_A|$ and $|M_{BY} D_B|$, there may be some reason to suspect that in many cases the former will not exceed the latter sufficiently often for the tie-in to reduce significantly the contribution of the cases in set *j* to the variance of $\Pi_{(A+B)Y}$.¹⁵

In short, although generalization is difficult, it seems likely that in most cases, the tie-in will increase Y's risk by raising the contribution of set *i* to the variance of $\Pi_{(A+B)Y}$ by more than it decreases (or in addition to increasing)¹⁶ the contribution of set *j* to the variance in question.¹⁷

14. Where the original deviation from Y's expected profits on A is less than its counterpart for B, the tie-in's tendency to increase the deviation from Y's average expected profits on A and reduce the deviation from Y's average expected profits on B will decrease the difference between these two deviations (the net deviation) unless the changes introduced by the tie-in are so large that the post tie-in deviation on A exceeds its counterpart for B by more than the pre-tie-in deviation on A was exceeded by its counterpart for B—i.e., unless the sum of the absolute changes introduced by the tie-in are more than twice the original difference between deviation A and deviation B.

15. $|M_{AX} D_A| = |M_{AX} \cdot S_{AE} \cdot \frac{D_A}{S_{AE}}|$, which equals the product of Y's expected profits on A net of fixed costs (such as the lump-sum fee he pays X) and $\%_A$ while $|M_{BY} D_B|$ equals the product of Y's expected profits on B gross of fixed costs and $\%_B$. As we have already noted, there is reason to believe that $\%_A$ will usually exceed $\%_B$ where full requirements tie-ins are involved, but our analysis provides us with little information about the relative size of Y's average expected profits (gross of fixed costs) on A and B respectively. The fact that Y will tend to earn a higher share of the profits he and his supplier earn on B than on A (since he buys B from a competitor and A from X, who will normally have some competitive advantage in his dealings with him on this product) does not justify any conclusions since (1) this difference may be reflected in the lump-sum fee he pays X for A and not in the ratio of his gross profits (net of fixed costs) to the joint returns in question and (2) we have no information about the size of the profits X and Y realize on Y's purchase and sale of A in comparison with those they realize on Y's purchase and sale of B. However, some conclusions are suggested by the fact that X will probably have to take away from Y an absolutely large amount of surplus on B (after giving him approximately the same amount of surplus on A) if the gains from this shift in the focus of X's non-marginal cost pricing are to exceed the other costs associated with the tying agreement, for the amount of surplus he expects to withdraw from Y on B must be less than Y's expected profits on this product if Y is to continue selling B under the agreement. In short Y's expected gross profits on B will probably have to be substantial for full requirements tie-ins to be profitable. Obviously, no such requirement applies to Y's expected profits on A. Hence, although I do not wish to make too much of this argument, despite the fact that $\%_A$ will normally exceed $\%_B$, there are certainly no grounds for believing that $|M_{AX} \cdot S_{AE} \cdot \%_A|$ will usually exceed $|M_{BY} \cdot S_{BE} \cdot \%_B|$ sufficiently often (*viz.*, substantially more than 50% of the time) for the tie-in to reduce significantly the contribution of the cases in set *j* to the variance of $\Pi_{(A+B)Y}$.

16. The effect of the tie-in on the contribution of set *i* to the variance of $\Pi_{(A+B)Y}$ will be directly related to the ratio of $\%_A$ to $\%_B$ as well as to the ratio of Y's average expected profits on A to his average expected profits on B.

17. Unfortunately, it is not possible to establish *a priori* any relationship between the effect of the tie-in on Y's risk costs and the correlation between DD_{XAY} and DD_{XBY} since the way in which the tie-in will affect the contribution of set *j* to the variance of $\Pi_{(A+B)Y}$ will depend on the relative size of Y's pre-tie-in average expected gross profits

The tie-in will affect X's risk costs in similar ways to those just discussed. Once more, it will be convenient to divide all outcomes (*i.e.*, all combinations of DD_{XAY} and DD_{XBY}^{RO}) envisaged by X into two categories: those in which the two demands deviate in the same direction (those belonging to set i) and those in which they deviate in the opposite direction (those belonging to set j).

Let's begin then with all cases in which DD_{XAY} and DD_{XBY} deviate in the same direction. The direction in which the tie-in will affect the contribution of any given outcome to the variance of $\Pi_{(A+B)X}$ will depend solely on the relative size of the percentages by which Y's purchases of A and B in this outcome deviate from their average expected value. Thus, the tie-in will reduce the absolute deviation from X's average expected profits entailed in the outcome in question if and only if $\%_A$ is greater than, equal to, or no more than slightly less than $\%_B$.¹⁸ Since DD_{XAY} will usually be far more uncertain than DD_{XBY}^{RO} (given that A is differentiated and B is not), average $\%_A$ will normally exceed average $\%_B$, and $\%_A$ will therefore usually exceed $\%_B$ in significantly more than half the cases in question.

Now, in general, the tie-in will have to reduce the deviation involved in only about half the outcomes in set i to reduce the contribution of its constituent cases to the variance of $\Pi_{(A+B)X}$, for although a given increase in deviation will still raise this variance by more than an equal

on A and B respectively. Of course, when the ratio of Y's expected gross profits on A to his expected gross profits on B is almost as small as average $\%_B/\%_A$, the extent to which the tie-in increases Y's risk costs will probably be inversely related to the negative correlation between the demands in question.

On the other hand, the extent to which the tie-in increases Y's risk costs will in all likelihood increase with the ratio and difference between $\%_A$ and $\%_B$. In general, the greater the difference between average $\%_A$ and average $\%_B$, the greater the average ratio of the difference between these two percentages where $\%_A$ exceeds $\%_B$ to the difference between them where $\%_B$ exceeds $\%_A$. And, as we have seen, the larger the ratio of these differences, the greater the extent to which the tie-in will increase the contribution of set i to the variance of $\Pi_{(A+B)Y}$, *ceteris paribus*. Similarly, the greater the ratio of average $\%_A$ to average $\%_B$, the larger $|M_{AX}D_A| = |M_{AX} \cdot S_{AE} \cdot \%_A|$ in comparison with $|M_{BX}D_B| = |M_{BX} \cdot S_{BE} \cdot \%_B|$ and hence, the greater the extent to which the tie-in will increase (the smaller the extent to which it will decrease) the contribution of set j to the variance of $\Pi_{(A+B)Y}$.

18. The tie-in will decrease X's margin on A and increase his margin on B. Hence, it will change the deviation entailed in any outcome from $|M_{AX}D_A + M_{BX}D_B|$ to $|M_{AX}D_A + M_{BX}D_B - \Delta M_A D_A + \Delta M_B D_B|$. Since D_A and D_B have the same sign, this change will amount to a decrease in the associated deviation only if $|\Delta M_A D_A| > |\Delta M_B D_B|$ —*i.e.*, only

if $\left| \Delta M_B \cdot S_{BE} \cdot \frac{D_A}{S_{AE}} \right| > \left| \Delta M_B \cdot S_{BE} \cdot \frac{D_B}{S_{BE}} \right|$ which (since $|\Delta M_A \cdot S_{AE}|$ is slightly larger

than $|\Delta M_B \cdot S_{BE}|$) will occur if and only if $\left| \frac{D_A}{S} \right| = \%_A$ is not more than slightly less than

$$\left| \frac{D_B}{S_{BE}} \right| = \%_B.$$

decrease will lower it (assuming the original deviation to be the same), the average decrease produced by the tie-in will in most cases tend to be larger than the average increase it generates since $\%_A$ will on the average exceed $\%_B$ by more than $\%_B$ on the average exceeds $\%_A$ inasmuch as mean $\%_A$ is greater than mean $\%_B$. Accordingly, the type of tie-in I am now discussing will in general reduce the contribution to X's risk costs made by those envisaged outcomes in which DD_{XAY} and DD_{XBY}^{RO} deviate in the same direction.

The tie-in will also reduce the contribution to X's risk costs of all cases that belong to set j. As we have seen, full requirements tie-ins will reduce the deviation from X's average expected profits on A and increase the deviation from his average expected profits on B. These changes will reduce the deviation involved in any given case if (1) the original deviation from X's expected profits on A ($|M_{AX}D_A| = |M_{AX}S_{AE}\%_A|$) exceeds its counterpart for B ($|M_{BX}D_B| = |M_{BX}S_{BE}\%_B|$) by more than one half the sum of changes the tie-in introduces— $|M_{AX}D_A| + |M_{BX}D_B|$. In practice, both these conditions will almost always be met. First, $|M_{AX}S_{AE}\%_A|$ will almost always exceed $|M_{BX}S_{BE}\%_B|$, for since (1) X will normally either buy B from others or produce it in an extremely competitive market while he will typically have a considerable competitive advantage when selling A to Y, his average expected gross profits on his original expected sales of B to Y ($M_{BX}S_{BE}$) will tend to be non-existent or very small while their counterparts for A ($M_{AX}S_{AE}$) will tend to be quite substantial and since (2) product A will tend to be far more differentiated than product B, $\%_A$ will usually be far in excess of $\%_B$. Second, since $\%_A$ will be larger than $\%_B$ in its own right, in the vast majority of cases, $|M_{AX}D_A - M_{BX}D_B|$ will *a fortiori* tend to exceed $\frac{1}{2} (|M_{AX}D_A| + |M_{BX}D_B|)$.¹⁹ Accordingly, the tie-in will reduce the deviation entailed by the vast majority of outcomes contained in set j.²⁰

19. In order to simplify our exposition, let's assume that absent the tie-in, X would not earn any profits by selling B to Y (because, for example, he does not produce or normally market this good himself). In this case, we must show that $|M_{AX}D_A - M_{BX}D_B| > \frac{1}{2} (|M_{AX}D_A| + |M_{BX}D_B|)$. If we let $Q = \frac{M_{AX}}{\Delta M_A}$ and substitute $\frac{\Delta M_B \cdot S_{BE}}{S_{AE}}$ for ΔM_A , this requirement resolves into a requirement that $Q \cdot \%_A > \frac{1}{2} (\%_A + \%_B)$ or that $(2Q - 1)\%_A > \%_B$. Since Q will always exceed one (since otherwise X would be selling A under the tie-in for less than its marginal cost), this condition will always be met where $\%_A$ exceeds $\%_B$ and, as we have seen, this condition will almost always be satisfied in the circumstances with which we will be concerned.

20. The percentage by which the tie-in reduces any given deviation will increase the closer the associated ratio of $\%_B/\%_A$ to $(Q - 1)$. To see why, let's determine the conditions under which the original deviation will be completely eliminated by the tie-in—i.e.,

in which $|M_{AX}D_A| = |M_{AX}D_A| + |M_{BX}D_B|$. Since $Q = \frac{M_{AX}}{\Delta M_A}$ and $\Delta M_A \cong \frac{\Delta M_B \cdot S_{BE}}{S_{AE}}$,

the above equation resolves into $(Q)\%_A = \%_A + \%_B$ or $(Q - 1)\%_A = \%_B$. Hence, under the tie-in, any outcome in j in which $(Q - 1)\%_A = \%_B$ will contribute nothing to X's risk costs. Obviously, for any percentage reduction, the savings to X will increase the larger the original deviation.

However, despite the fact that a given decrease in the deviation associated with a particular outcome will tend to reduce X's risk costs by less than they will be raised by an identical increase, the percentage of cases in j whose deviations the tie-in will have to reduce in order to reduce the contribution of set j to the variance of $\Pi_{(A+B)Y}$ will be at most only slightly greater than 50%, for the average decrease in deviation caused by the tie-in will normally exceed the average increase.²¹ Accordingly, there can be little doubt that the tie-in will reduce substantially the contribution to X's risk costs of those outcomes in set j .

In short, it seems likely that the tie-in will always reduce the variance of $\Pi_{(A+B)X}$. In general, the greater the negative correlation between DD_{XAY} and DD_{XBY}^{RO} —i.e., the higher the percentage of cases in set j ²²—

21. Where $k < v$, the decrease will equal k . k will be less than v whenever $|M_{AX}D_A| > |M_A D_A| + |M_B D_B|$ —i.e., whenever $(Q) \%_A > \%_A + \%_B$ or $(Q - 1) \%_A > \%_B$. Since $\%_A$ will on the average be far higher than $\%_B$, this result will frequently obtain. When it does, the absolute reduction in the associated deviation will be equal to the product of X's average expected gross profits on B under the tie-in and the sum of the absolute percentage deviations associated with the outcome in question—i.e., $k = |M_A D_A| + |M_B D_B| = |M_B \cdot S_{BE} \cdot \%_A| + |M_B \cdot S_{BE} \cdot \%_B|$. The average reduction in such cases will probably be quite substantial. On the other hand, where $k > 2v$, the increase in deviation will be equal to $(k - v) - (v) = k - 2v = |M_A D_A| + |M_B D_B| - 2|M_{AX}D_A| = |M_B \cdot S_{BE} \cdot \%_A| + |M_B \cdot S_{BE} \cdot \%_B| - |2Q \cdot \Delta M_B \cdot S_{BE} \cdot \%_A| = |M_B \cdot S_{BE}| (\%_B - [2Q - 1] \%_A)$. As we have seen, this result will obtain only if $(2Q - 1) \%_A < \%_B$. As unlikely as this result is—given the greater average size of $\%_A$, it is even more unlikely that $(2Q - 1) \%_A$ will be sufficiently below $\%_B$ for the associated increase to be substantial. Of course, decreases may also result where k is more than v but less than $2v$ —i.e., where $(Q - 1) \%_A < \%_B < (2Q - 1) \%_A$. Once more, the change in deviation will be to $2v - k = v - (k - v)$, but given the average size of $\%_B$ and $\%_A$, the difference between $\%_B$ and $(2Q - 1) \%_A$ will probably be larger here than before. Hence, even in these cases, the average decrease will tend to exceed the average increase produced. Thus, there seems to be good reason to believe that the average decrease in deviation produced by the tie-in

where DD_{XAY} and DD_{XBY}^{RO} deviate in opposite directions will exceed the average increase the agreement generates in such circumstances.

22. This conclusion will follow if (but not only if) (1) the percentage of cases in set j whose deviations the tie-in reduces exceeds the percentage whose deviations it must reduce to lower the contribution to set j to the variance of $\Pi_{(A+B)Y}$ by more than its counterpart for set i exceeds the required percentage for the result in question and (2) the average reduction in deviation tends to be higher in set j than in set i . Both conditions seem likely to be fulfilled. The first merely reflects the fact that $\%_B$ is more likely to exceed $\%_A$ than it is to exceed $(2Q - 1) \%_A$ where $Q \geq 1$ and average $\%_A$ exceeds average $\%_B$. The second is somewhat more difficult to establish. As we have seen, each reduction in deviation in set i will be equal to $|M_A D_A| - |M_B D_B| = |M_B \cdot S_{BE}| (\%_A - \%_B)$. On the other hand, the size of any reduction in j will depend *inter alia* on whether k exceeds v . If $k < v$, the reduction will be equal to $k = |M_A D_A| + |M_B D_B|$ or $(\Delta M_B \cdot S_{BE}) (\%_A + \%_B)$, which will obviously be greater than the average reduction in i for each $\%_A$ and $\%_B$. On the other hand, where $v < k < 2v$, the size of the associated reduction will be equal to $v - [k - v] = 2v - k = 2M_A D_A - |M_B S_{BE}| (\%_A + \%_B) = 2Q |M_B \cdot S_{BE} \cdot \%_A| - |M_B S_{BE}| (\%_A + \%_B) = |M_B \cdot S_{BE}| ([2Q - 1] \%_A - \%_B)$, which (since $Q \geq 1$) will also exceed the size of the average reduction in i for each $\%_A$ and $\%_B$.

and the more uncertain DD_{XAY} in comparison with DD_{XBY}^{RO} , the greater the extent to which the tie-in will reduce X's risk costs.²³

Obviously, it is extremely difficult to generalize about the overall effects of a tie-in on the sum of X's and Y's risk costs. On the one hand, full requirements tie-ins involving one product the seller does not produce himself or produces only in a very competitive market will probably tend to decrease the sum of X's and Y's variances, for although they will normally raise the contribution of set i to Y's variance by more than they decrease its contribution to X's,²⁴ they will often (at least where the positive correlation between the two demands is not too high and Y's expected gross profits on A do not approximate their counterparts on B) reduce the sum of X's and Y's variances by reducing the contribution of set j to X's variance by substantially more than they increase (or in addition to decreasing) its contribution to Y's variance. On the other hand, in the type of situation with which we are concerned, a given increase in the variance of $\Pi_{(A+B)Y}$ will probably raise Y's costs by more than the same decrease in the variance of $\Pi_{(A+B)X}$ will lower X's.²⁵

In short, this embarrassingly involved (though massively oversimplified) analysis generates very few general conclusions about the effect of the tie-in on the sum of X's and Y's risk costs or indeed about the determinants of the impact in question.²⁶ Certainly, however, we are

23. As we have seen, the greater average $\%_A$ in comparison with average $\%_B$, the greater the ratio of the difference between these two percentages when $\%_A$ exceeds $\%_B$ to its counterpart when this relationship is reversed, and the greater this ratio, the greater the extent to which the tie-in will reduce the contribution of set i to the variance of

$\Pi_{(A+B)Y}$. Similarly, the greater average $\%_A$ relative to average $\%_B$, the greater $\frac{\%_A}{\%_B}$ (*ceteris paribus*) and the greater this ratio, the greater the extent to which the tie-in will reduce the contribution of set j to the variance of $\Pi_{(A+B)X}$.

24. This conclusion is suggested by two facts: (1) the tie-in will increase the contribution of set i to the variance of X and Y unless it reduces the contribution of more than 50% of its constituent cases to the variance in question (in particular, the amount by which the tie-in increases [decreases] the contribution of set i to either variance will increase linearly with the positive [negative] difference between some percentage above 50% and the per cent of cases whose deviation the tie-in reduces) and (2) for any given outcome in set i, the tie-in will increase the deviation for one party and decrease the deviation for the other (or leave both unchanged). The result will be unambiguous where $|M_{AY} S_{AE} \%_A|$ is less than $|M_{BY} S_{BE} \%_B|$ by an amount which is more than half $|\Delta M_A D_A| + |\Delta M_B D_B|$ —a result which will often prevail when Y has little bargaining power on A. The importance of this result will obviously increase with the negative correlation between DD_{XAY} and

DD_{XBY}^{RO} .

25. Hence, even if the tie-in reduced the contribution of set j to the sum of X's and Y's variances, its effect on the sum of their risk costs might still be open to question. Accordingly, no general relationship can be established between the correlation of DD_{XAY}

and DD_{XBY}^{RO} and the profitability of the tie-in.

26. Thus, no general relationship can be established between the profitability of the tie-in (in particular, between the tie-in's effect on the sum of X's and Y's risk costs) and

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justified in proceedings on the assumption that full-requirements tie-ins will not usually (and may not ever) increase the sum of their participants' risk costs sufficiently to render disadvantageous agreements that would otherwise be substantially profitable.

the relative uncertainty of DD_{XAY} and DD_{XBY}^{RC} since the greater $\%_A$ minus $\%_B$ or $\%_A/\%_B$, the larger the amount by which the tie-in will increase the variance of $\Pi_{(A+B)Y}$ and the larger the amount by which it will decrease the variance of $\Pi_{(A+B)X}$.

APPENDIX B

TIE-INS AND UNFAIR COMPETITION

(Unfairness to Competitors)

In the text, I indicated that at times the Supreme Court seems to have based its conclusion that tie-ins are illegal on the assumption that such agreements always give their employers an unfair advantage over their competitors—*i.e.*, on the assumption that such agreements inevitably improve their employers' competitive positions in dealing with the buyers involved without improving their social efficiency correspondingly.¹ Although I do not think that the American anti-trust laws warrant the application of such an unfair competition test, it may be instructive to determine whether the various types of tie-ins we have described do in fact give their employers such an unfair competitive advantage—*i.e.*, do in fact (1) improve their employers' positions (2) without improving correspondingly their social efficiency. Fortunately, the answer can be extracted fairly easily from our previous analysis.

In brief, my conclusion will be (1) that the availability of tying agreements to all of the competitors for a particular buyer's patronage on a given general product will not normally improve the competitive position of the firm that actually does induce the buyer in question to accept its tying agreement and (2) that any such improvement that does result may very well be attributable to a concomitant improvement in that seller's relative social efficiency. Let's examine each of these contentions in turn.

In the text, I argued that the effect of a tie-in on any of its potential employers' positions will not depend on the position he would have had if no firm had been able to employ tying agreements. Admittedly, this fact will not eliminate all connections between the relative profitability of a tie-in² to a particular seller and the likelihood that he will actually make a sale to the buyer in question—*i.e.*, does not prove that the availability of tie-ins to all potential suppliers of a particular customer will have no tendency to improve the competitive position of the firm that actually does enter into a tying agreement with the buyer in question—for (1) the probability that any given seller will actually be able to arrange a tying agreement with any given buyer will increase as his competitive position for offering a tie-in to this buyer improves and (2) the competitive position that such a seller will have for offering such an agreement will improve as its relative profitability for him increases. Clearly, however, the fact that the relative profitability of using tie-ins and of making untied sales are not positively correlated does imply that such agreements will not normally improve—indeed will have only the

1. Cf. note 7, p. 198 *supra*.

2. By "the relative profitability of a tie-in," I refer to the amount by which the seller could increase his profits by making a tied rather than an untied sale relative to its counterpart for the other suppliers operating in the market in question.

slightest tendency to improve—their employers' competitive positions to deal with those customers whom they actually obtain—*i.e.*, that the availability of tie-ins to all competitors for a particular buyer's patronage will not normally improve the position of the firm that actually does make the sale in question (that does enter into a tying agreement with the buyer in question).³

Moreover, to the extent that a tying agreement does improve its employer's competitive position to deal with the customer concerned, this improvement may very well be attributable to a concomitant improvement in his relative social efficiency. As we have seen, the profitability of each type of tie-in depends at least in part on its performing socially useful tasks. In fact, the profitability of pure quality-control tie-ins depends almost entirely on their ability to increase their employers' social efficiency (1) by reducing the amount of resources they have to expend to control quality and/or (2) by increasing the extent to which they actually do control complement quality—*i.e.*, by reducing the amount of personally and socially costly mistakes their customers make in complement selection or (as in the Ho-Jo's example) by improving the allocation of resources through increasing the ability of buyers to predict the quality of the products or services they purchase. It should be emphasized that quality-control tie-ins are not unique in this respect. Thus, the profitability of meter-pricing tie-ins will also depend to a very considerable (though admittedly somewhat lesser) extent on their increasing their employers' social efficiency (a) by reducing the amount of resources they expend in a socially non-productive manner to meter use intensity (where absent such an agreement an actual meter would be installed or more representatives would be sent to check sales reports than would be sent to prevent violations of the tying agreement); (b) by reducing the total risk costs borne by various members of the society by transferring more of the related risks to a party better able to bear them (where absent such an agreement payments would have been less responsive to actual use); and/or perhaps (c) by reducing the amount of resources the seller expends in a socially non-productive manner in order to prevent buyer arbitrage. Similarly, package-pricing tie-ins will operate at least in part by increasing their employers' social efficiency (a) by reducing the amount of resources such sellers would otherwise expend in a socially non-productive way to obtain the additional information necessary to practice ordinary price discrimination and/or (b) by reducing the amount of resources they expend to prevent buyer arbitrage. And at least to the extent that (a) the associated reduction in the sum of the seller's and buyer's risk costs *plus* (b) the asso-

3. Clearly, whatever one thinks of our legal conclusion that the competitive impact test should be applied not to the individual tie-in in question but to the availability of tie-ins to all competitors for this buyer's patronage, one must agree that an unfair competition test would have to be applied in this way since a series of equally profitable tie-ins whose profitability did not reflect their social efficiency would change neither their employers' social productivity nor their competitive positions—*i.e.*, since the unfair advantages produced by all members of such a series would simply offset each other.

ciated reduction in the amount of resources the seller expends to prevent buyer arbitrage exceeds (c) the amount of resources the seller expends to enforce the buyer's full-requirement's promise, the profitability of non-marginal-cost price-shifting tie-ins will depend as well on their increasing their employers' social efficiency. Presumably, then, on the average, (1) almost all of any concomitant improvement in the competitive position of a firm employing a quality-control tie-in will be matched by a comparable improvement in its relative social efficiency; (2) a substantial part of any concomitant improvement in the competitive position of a firm employing a meter or package-pricing tie-in will be matched by an associated improvement in that seller's relative social efficiency; and (3) at least some of any concomitant improvement in the competitive position of any seller employing a non-marginal-cost price-shifting tie-in will be matched by an associated improvement in his relative social efficiency.⁴

Obviously, results will differ among individual tie-ins of any functional type as well as among the various types of tie-ins just described but clearly the Court's universal assumption that the improvements in competitive position produced by tie-ins are unfair—*i.e.*, are not associated with comparable improvements in relative social efficiency—is no more justified than its assumption that making such agreements available to all competitors for a particular buyer's patronage will always improve the competitive position of the firm that actually does enter into a tie-in with the buyer in question.⁵ On both grounds then, one must reject the Court's conclusion that all tie-ins (involving sellers who have a competitive advantage on one of the products involved) would be illegal under the type of unfair competition test just described.

4. It should be noted that where (1) the competitors for Y's patronage tend to produce both A and B and (2) different firms would be best-placed to make independent sales of A and B to Y, the gains in social efficiency reported in the text will tend to be somewhat offset by the tendency of tying agreements to reduce the probability that Y will actually be supplied with both goods by the firm that is best-placed on each to gain his patronage.

5. This fact might very well be crucial for the legality of such agreements if the competitive impact test were qualified to permit tie-ins (or other activities for that matter) (1) that reduced competition by increasing efficiency or (2) that reduced competition by less than they increased efficiency—*i.e.*, that increased consumer surplus while reducing competition. Cf. p. 249 *supra*.

APPENDIX C

COMPETITIVE IMPACT, BUYER REAL INCOME, AND SELLER PROFITS

Although the Supreme Court's leverage theory continues to be accepted by the vast majority of judicial commentators,¹ a few analysts have criticized the Court's conclusion that all tie-ins (that involve sellers who possess a competitive advantage on one of the goods in question) are anti-competitive. In this appendix, I will analyze two of the suggestions such critics have made.

The first of these can be easily articulated and easily criticized. At least impliedly,² several critics have suggested that the legality (and hence, presumably, the competitive impact) of any given tie-in depends on whether the buyer involved opposed the arrangement of the agreement in question—i.e., on whether the individual agreement in question (rather than the availability of such agreements in general) reduced the participating buyer's buyer surplus. In fact, however, even if we assumed *ad arguendo* that these critics' focus on the impact of an individual tie-in is correct, their conclusion would have to be qualified. By definition, any individual tie-in that decreases competition will increase the profits (or seller surplus) #1 could make by just beating his competitors' offers, but this fact does not justify the conclusion that a decision allowing such an agreement to be executed will necessarily decrease buyer surplus, for as we have seen,³ many tie-ins of each functional type will increase significantly the transaction surplus and/or decrease significantly the pricing costs expected to be generated on the sales in question. Accordingly, although no tie-in can reduce the real income the customer in question would have otherwise obtained (though perhaps not from the same supplier) without decreasing competition (since absent such a concomitant decrease, the availability of a tie-in to the supplier in question would not make it profitable for the remaining suppliers to offer less attractive terms), an individual tying agreement may decrease competition without reducing (indeed while increasing) the buyer's real income. Obviously, the same qualification would also be necessary if I shifted my focus to the competitive impact of allowing tie-ins to be executed by all prospective suppliers of a particular buyer, for once more although the availability of tie-ins cannot reduce the buyer's real income without decreasing competition (since absent such a decrease, the availability of tie-ins would not make it profitable for the suppliers in question to offer less attractive independent terms on the goods involved), a decision allowing the buyer con-

1. See, e.g., Turner, *Conglomerate Mergers and Section 7 of the Clayton Act*, 78 HARV. L. REV. 1313, 1387 (1964).

2. I say "impliedly," because most such suggestions have been made in relation to the parallel practice of reciprocity. See, e.g., Handler, *Emerging Antitrust Issues: Reciprocity, Diversification and Joint Ventures*, 49 VA. L. REV. 433, 437 (1963).

3. See Appendix B *passim*.

cerned to participate in such an agreement with any of his suppliers might decrease competition without reducing his real income by raising transaction surplus or reducing pricing costs at least as much as it increased seller surplus.

The second suggestion I will consider is based on a far more sophisticated and intelligent analysis. Nevertheless, it is also fundamentally misguided. In his path-breaking article,⁴ Professor Bowman seems to have concluded that so far as he could tell one type and only one type of tying agreement should be held illegal because of its anti-competitive impact on tied-product competition—*viz.*, non-marginal-cost price-shifting tie-ins involving complementary goods used in variable proportions (henceforth complementarity tie-ins). At various points in his article, he justified this conclusion in three different ways—in particular by arguing that all such tying agreements but only such tying agreements as a class will always (1) reduce the output of the tied product B for use with A below its non-tie-in level;⁵ (2) enable their employer to earn higher profits in dealings with the customer in question than he could earn if he employed independent offers and his competitors were allowed to use tying agreements;⁶ and (3) produce a result which is indistinguishable from the result that would have obtained had the seller in question had a monopoly of the tied-product B as well by raising the profits a monopolist can realize from dealing with the customer in question.⁷ Professor Bowman seems to be focusing on the competitive impact of the individual tie-in actually executed but as we shall see, regardless of how he is interpreted in this respect, each of these contentions is incorrect and none would—in any case—justify Professor Bowman's economic/legal inference. Let's proceed, then by examining each in turn.

Professor Bowman's attempt to justify his conclusion that only complementarity tie-ins as a class always reduce competition by arguing that all such tie-ins and only such tie-ins as a class always reduce B's output is incorrect, regardless of which focus he is interpreted to be taking, for even if the availability or individual use of only this type of tie-in al-

4. Bowman, *Tying Arrangements and The Leverage Problem*, 67 YALE L.J. 19 (1957).

5. "When product complementarity is involved . . . , output of B for use with product A is less than any output of product B for such use which would exist by manipulation of the price or output of product A when product B is competitive." *Id.* 25.

6. Thus, according to Professor Bowman: "Leverage did not exist in the [meter pricing] case because the same result could have been obtained by metering the first product with no control over the second . . . (I)n the complementarity case, control over B is essential to securing revenue which could not be realized from A alone." *Id.* 27.

"The distinction between . . . (the complementarity example and the foregoing 'metering' example resolves itself into this question: does the monopoly over the tied product, or part of it, add any profit over what could be achieved by manipulating the price of the tying product, in absence of control over the tied product." *Id.* at 25, n.18.

Admittedly, at least as construed, these quotations are inconsistent with Professor Bowman's earlier listing of circumstances in which tie-ins "might give rise to an increased return." *Id.* 21.

7. "The [complementarity] tie-in . . . yields the equivalent of monopoly by a single seller over both A and B." *Id.*

ways would produce this effect, this fact would imply nothing about competitive impact—*i.e.*, would imply nothing about the way in which the availability of tie-ins to the actual supplier of the buyer in question or to him and his competitors would affect the returns the best-placed firm(s)⁸ to supply this buyer (or any other buyer for that matter) could have earned had he obtained the patronage of the customer in question on terms that matched the attractiveness of the offer that buyer actually accepted. A decision to allow all of Y's suppliers to offer him a "complementarity" tie-in that would reduce B's unit output would clearly not reduce the intensity of competition for Y's patronage on A and B—for example—if such an agreement would be equally profitable for each of X's actual and potential competitors for Y's patronage, for the availability of such tie-ins in such circumstances would not (1) improve the competitive position of the firm that was best-placed to deal with the particular buyer involved; (2) raise for independent reasons the retaliation costs any undercutting competitive inferior would have to anticipate; and/or (3) raise the barriers to entry faced by any potential entrant to the market in question. Obviously, the same conclusion would also obtain if I shifted my focus to the competitive impact of a decision to allow the seller actually involved to offer Y such a tying agreement. Accordingly, even if the availability or individual use of only complementarity tie-ins would always reduce B's unit output, Professor Bowman's conclusion would not be justified regardless of the focus he is interpreted to be taking. In fact, although it is true that of the various functional types of tie-ins we described only individual non-marginal cost price-shifting tie-ins will always reduce the unit output of one of the products involved (while increasing the unit output of the other),⁹ the availability of such agreements to all Y's potential suppliers need not have such an impact since in some cases the universal tendency of all such individual tie-ins to raise B's unit price may be offset by a tendency on the part of such agreements in general to make both products' prices more attractive by preserving transaction surplus without increasing profits.

Professor Bowman's second justification for his conclusion—*viz.*, that only complementarity tie-ins will always increase their employer's profits—must also be dismissed regardless of the focus he is interpreted to be taking. Thus, if I assume him to be focusing on the competitive impact of the individual tie-in actually executed, his contention would be both incorrect and irrelevant since (1) as we have seen, each individ-

8. The plural will be necessary when the best-placed firm for arranging a tie-in with Y finds it profitable to purchase elsewhere the B he includes in the agreement in question. In such a case, the relevant profit comparison will be between (1) the sum of the returns #1 would have earned on the tie-in in question and the profits the firm that supplied him with B would have made on these sales and (2) the sum of the profits that the firms who would have been best-placed to make independent sales of A and B to Y would have realized at the terms in question.

9. Obviously, individual specimens of other types of tie-ins may also have this effect. Thus, tie-ins that increase the extent of discrimination against a particular buyer on some product will presumably decrease his purchases of this product.

ual tie-in that is executed—and not just “complementarity” tie-ins—will presumably increase its employer’s expected returns in comparison with those he could anticipate realizing on independent offers if his competitors could employ tying agreements themselves¹⁰ and (2) the competitive impact of an individual tie-in will depend in any case not only on its profitability to its employer but also on the competitive position that the seller in question would have had if he had been prevented from employing such an agreement with the buyer involved. Indeed, even if I assume Professor Bowman to be focusing on the competitive impact of allowing all suppliers of the buyer in question to offer him tying agreements, his second contention would be both incorrect and irrelevant, since (1) the impact of the availability of tying agreements on the profits that the actual employer of the agreement in question realizes will depend not (a) on whether the individual agreement is more profitable for him than independent pricing but (b) on whether it is more profitable for him than its counterparts are for his colleagues, and since (2) the competitive impact of the availability of tying agreements will depend not only on (a) whether it increases its actual employer’s profits (*i.e.*, improves his competitive position) but also on (b) what his competitive position would have been in independent dealings for the patronage of the buyer in question.

Professor Bowman’s third rationale—*viz.*, that only complementarity tie-ins as a class will always raise the returns of the monopolistic firms that employ them—differs from its predecessors only in its false assumption that this type of tie-in is employed only by monopolists. However, although Professor Bowman’s conclusion is therefore unjustified regardless of the focus he is assumed to be taking, two questions remain: (1) whether the availability of tie-ins will increase an employer X’s returns—*i.e.*, “the returns that the best-placed potential supplier(s) of A and B to Y will be able to earn (at least in the short run before investment adjusts) by obtaining Y’s patronage on terms that give Y the same amount of real income he actually obtained”—whenever X is a monopolist and the individual tying agreement is profitable to him¹¹ and (2) whether such an increase—when it results—should be considered to manifest a decrease in competition.

The answer to the first question cannot be unconditional, for although a tie-in that is profitable to a monopolist would enable him to increase his returns if he could be constrained in his pricing only by producers of goods that were substitutes for his product in the sense that they fulfilled the same needs as his good—*i.e.*, by producers who by definition did not exist in his case, in practice such a monopolist will be constrained by “competition” from producers of non-substitutes in the above sense—*i.e.*, from producers (say Q) of those goods which this

10. Thus, meter-pricing tie-ins will be used instead of an actual meter only if they are a more profitable metering device—*e.g.*, if the cost of administering and enforcing such a tie-in is less than the cost of buying, installing, and inspecting a meter.

11. Obviously, the tie-ins in question might be different functional types.

buyer would purchase (to fulfill different needs) if he did not buy A. Accordingly, the availability of tie-ins to all producers—and not just to conventional competitors—will enable a monopolist like X to increase his returns only if he finds it more profitable to arrange a tie-in with Y than Q. This result can and should be made consistent with our textual analysis by interpreting “competitors” as used there to refer to producers of all economic substitutes rather than just to producers of goods that fulfill roughly the same needs.

The answer to the second question should therefore be clear:¹² whenever the availability of tie-ins in general does enable a monopolist to increase his profits by increasing his advantage over his established competitors (in this broader sense), the agreement in question will in fact violate the American anti-trust laws’ competitive impact test.

12. It should be noted that every such increase in (short-run) profits will not denote a decrease in price-variable input competition, for such an increase could also result—for example—from a supplier’s raising a price that was originally lower than the price that would maximize his profits.

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