

CASE 13

Unfit to Be Tied: An Analysis of *Trident v. Independent Ink* (2006)

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INTRODUCTION

The case of *Illinois Tool Works, Inc. and Trident, Inc. v. Independent Ink, Inc.*, 547 U.S. 28 (2006), generated a good deal of controversy. The Supreme Court used this case to overturn a longstanding per se rule against tied sales by a firm with a patent. Henceforth, market power will have to be demonstrated, whether or not the firm has a patent. Upon demonstration of market power, a tied sales contract will still be a per se antitrust violation.

At one level, the Court's decision reflected an obvious truth: A patent alone does not demonstrate market power. At a deeper level, this case concerned why firms engage in metering and tying, and what is the antitrust issue with these practices. While the courts have often focused on the leveraging of market power, this case suggests a different concern: With complementary goods (such as a printer and ink), tying is used to engage in price discrimination via metering. The antitrust issue is that consumers will be harmed. This is because the firm, by metering, is able to be a more effective monopolist and thereby extract more of the consumer surplus.

*According to Winston Churchill, "History is written by the victors." If so, I should not be the one writing this chapter. Together with Ian Ayres and Lawrence Sullivan, I had the opportunity to present an amicus curiae brief to the Supreme Court in this case (Nalebuff et al. 2006). In early 2006, the U.S. Supreme Court rejected our arguments by a vote of 8-0. Justice O'Connor had just stepped down from the bench, thus sparing us from a 9-0 result. This chapter was helped by feedback from Ian Ayres, Dan Bromberg, Barry Brucker, Walter Grimes, Alan Horowitz, Kathleen Sullivan, Lawrence Sullivan, and the editors John Kwoka and Lawrence White.

Thus, the more difficult questions raised by this case are the following:

- Is a metering contract by itself evidence of market power? Is price discrimination compatible with competition?
- Does price discrimination via metering harm consumers and efficiency?
- What is the potential efficiency loss of prohibiting metering via tied sales (for firms with market power)?

BACKGROUND

Trident, a subsidiary of Illinois Tool Works, is a leading manufacturer of piezoelectric printheads. These components are used in high-speed industrial inkjet printers that print bar codes, graphics, and other text onto blank cartons as they move along a production line. Printer manufacturers obtain Trident's patented printheads under license agreements. The agreements provide for the ongoing exclusive purchase of ink from Trident, and the exclusivity agreement extends to the ultimate buyer.¹

Independent Ink is a small manufacturer of ink whose product is compatible with Trident printheads. Independent Ink's equivalent product sells for between \$125 and \$189, a steep discount to Trident's charge of \$325. This price discount attracted manufacturers to use Independent Ink's ink, in violation of their exclusivity agreement.

Trident responded by threatening to cut off printer suppliers and to sue the end-use customers. Then, in 1997, Trident sued Independent Ink for patent infringement in Illinois. The case was dismissed for lack of personal jurisdiction as Independent Ink had little commercial presence in that state. In 1998, Independent Ink sought a declaration that its inks did not infringe Trident's patents and that Trident's patents were invalid. Trident counter-sued for patent infringement, and Independent Ink then amended its complaint to include claims of monopolization and illegal tying.

The Federal District Court for Central California dismissed Trident's patent infringement claim.² At the same time, the district court granted summary judgment for Trident denying Independent Ink's antitrust claims. The basis for the summary judgment was that Independent Ink had not provided a traditional economic analysis demonstrating that Trident had market power. Independent Ink relied on a *per se* rule based on the presumption of market power in tying cases involving a patent. The district court rejected Independent Ink's submission that Trident "necessarily [has] market power

¹The agreements are described in Trident's 1998 annual report (<http://sec.edgar-online.com/1998/12/21/14/0000914039-98-000485/Section2.asp>). This history of the case is drawn from Independent Ink's brief and the Supreme Court decision.

²*Independent Ink, Inc. v. Trident, Inc.* 210 F. Supp. 2d 1155 (2002).

in the market for the tying product as a matter of law solely by virtue of the patent on their printhead system, thereby rendering [the] tying arrangements *per se* violations of the antitrust laws (at 1159)."

The Court of Appeals for the Federal Circuit agreed with the district court that a patent does not necessarily confer market power but also recognized that this conclusion was contrary to the prior six decades of Supreme Court precedents, from *International Salt*³ (1947) and *Loews*⁴ (1962) to *Jefferson Parish*⁵ (1984).⁶ While it was critical of those precedents, the court of appeals argued that it was not the role of the district court to overturn the Supreme Court. That was the job of the Supreme Court. This reversal of the summary judgment motion was appealed to the Supreme Court, which decided to hear the case.

Ultimately, the Court decided that it would overturn its own precedent. At the same time, it recognized that Independent Ink had reasonably relied on these precedents when making its case for a *per se* violation. Thus, Independent Ink was given an opportunity to demonstrate that Trident did indeed have market power and thus violated §1 of the Sherman Act through its tying contracts.

The general interest in this case went well beyond the conflict between Trident and Independent Ink. The larger question concerned the ability of a firm to exercise and extend market power via tying. By *tying* we mean that customers were forced to accept a contract to buy some other good B along with the firm's good A. Prior to this case, the law had two strands. According to the first, a tying contract was a *per se* antitrust violation for a firm with market power.⁷ According to the second strand, a tying contract was a *per se* antitrust violation for a firm with a patent. The law presumed that a patent conferred market power. Now there is just one strand: Market power must be established, patent or no patent. Going forward, even the first *per se* rule is under attack. Critics such as Evans (2006) and Wright (2006) argue that *Jefferson Parish* should be overturned and all tying contracts should be evaluated on a rule-of-reason basis.

We first review the arguments presented by the two sides. This leads us to analyze the motivations for a tying contract with an essential complement (e.g., a printer and ink). Tying creates an opportunity to meter usage and thereby increase profits through price discrimination. Although quality assurance, cost savings, and risk sharing might provide additional justifications, none explains why this type of contract is forced on the customer. This leads

³*International Salt Co. v. U.S.*, 332 U.S. 392 (1947).

⁴*United States v. Loews, Inc.*, 371 U.S. 38 (1962).

⁵*Jefferson Parish Hosp. Dist. No. 2 v. Hyde*, 466 U.S. 2 (1984).

⁶*Independent Ink, Inc. v. Illinois Tool Works, Inc. and Trident, Inc.* 396 F.3d 1342 (2005).

⁷For a firm with market power, a forced tie violates the Sherman Act (§1) and the Clayton Act (§3) and is unfair competition under §5 of the Federal Trade Commission Act.

to the conclusion that price discrimination is the true motivation. We then show that contrary to the Court's finding, this type of price discrimination should be viewed as evidence of market power. Such price discrimination will generally harm consumers and, contrary to the conventional wisdom, may also reduce overall efficiency. This suggests that tied contracts do create an antitrust concern and argues for the preservation of the per se rule against tying by firms with market power, at least where tying is used for metering.

ARGUMENTS

Trident, with the support of a brief filed by the U.S. solicitor general, argued that a patent, by itself, was not evidence of market power. On this point there was little controversy. Most patents are of no economic value. Since a patent does not ipso facto imply market power, this suggests that market power must be demonstrated in all tying cases.

Trident also argued that maintaining the per se rule in the case of patents would lead to a significant number of nuisance cases, imposing a burden on defendants.⁸ In his oral argument before the Supreme Court, the U.S. deputy solicitor general emphasized that the presumption that a patent creates market power in antitrust was based on a similar presumption in the patent code. But that presumption no longer exists.

Congress, in 1988 in the Patent Misuse Reform Act . . . held that there cannot be patent misuse in the absence of an actual showing . . . of market power. So the rationale and underpinnings of Loew's have been entirely repudiated . . .

Eliminating the presumption of market power in the case of antitrust would harmonize the patent law with the antitrust law.⁹

Independent Ink countered that Congress had an opportunity to remove the presumption from the antitrust laws but did not do so. As Independent Ink explained during the oral argument:

And while congressional inaction might not always be a good guide to what Congress is thinking, here the Senate actually placed legislation in

⁸This argument is questionable. Given the per se injunction, very few firms with patented products were willing to engage in a forced tie. Indeed, the *Trident* case was so unusual because the firm imposed the tied sale in such a clear and open fashion in spite of the existing law. A better objection would be that firms won't be able to engage in tied contracts for legitimate purposes. We address this concern in the text.

⁹The 1988 Patent Misuse Reform Act makes it clear that absent a demonstration of market power, a patent holder may condition the sale of the patented product on the purchase of a separate product. Note, however, that *Trident's* requirements tie for ink extended for the life of the printhead, not just the life of the patent. This specific type of requirements tie could be viewed as evidence of market power and a misuse of the patent.

the bill that was sent to the House to remove the presumption from the antitrust laws as well, and the House took it out and the Senate acquiesced.

Here the Supreme Court sided with Trident in regard to the interpretation of the new patent law (U.S.C. § 271(d)(5)). According to the decision:

[The amended code] makes it clear that Congress did not intend the mere existence of a patent to constitute the requisite 'market power'. . . . It would be absurd to assume that Congress intended to provide that the use of a patent that merited punishment as a felony would not constitute 'misuse.' Moreover, given the fact that the patent misuse doctrine provided the basis for the market power presumption, it would be anomalous to reserve the presumption in antitrust after Congress eliminated its foundation.¹⁰

Even if the mere existence of a patent did not imply market power, Independent Ink argued that only the cases in which the patent did convey market power would lead to litigation. Thus, there should be a rebuttable presumption of market power. This argument was developed in an amicus brief (Scherer 2006). While most patents are worthless, a small number confer great market power. In the case of the valueless patents, the patent holder has no ability to leverage the patent, and the market will not see tying contracts. The only tying cases that will come to court are those in which the patent was one of the cases in which market power was present. "Results from a study of German patents show that patents in litigation are between 11.2 and 42.6 times more valuable than other patents, all else equal" (Scherer 2006, p. 2). Defendants would be given the opportunity to prove that theirs was not a case in which the patent conferred market power. The presumption would be against them, but they could still escape a violation by demonstrating a lack of market power.

This author's amicus brief offered a complementary perspective. The Court did not have to reach a conclusion about all patent cases, only the one in *Independent Ink*. Here the tying contract was of a very specific nature; it was for an essential complementary product (ink) that must be used with the patented product (printhead) in order to get the patented product to provide the output for which it was purchased. Thus, the relevant question is whether a patent-protected firm that engages in a forced tie to complementary aftermarket products has market power.

In these situations, the imposition of a requirements tie is strongly indicative that the patent holder does have significant market power, thus justifying a rebuttable presumption that favors the challenger to the tie. The basic argument is that a requirements tie for an essential complementary good to a patented product should be presumed to reflect market power because its primary purpose is price discrimination via metering. Such price discrimination is possible only when a firm has market power.

¹⁰*Illinois Tools Works Inc. v. Independent Ink Inc.*, 547 U.S. 28 (2006) at 42.

The Court addressed the question of whether a patent plus price discrimination should create the (rebuttable) presumption of market power. This position was debated during the oral argument and ultimately rejected in the decision. Following Baumol and Stanson (2003) and Levine (2002), the Court concluded that price discrimination is possible in competitive markets and thus there was no reason to presume that market power was a prerequisite for metering.

The process of overturning the per se rule against tying with a patent began when the district court made the observation that a patent did not automatically confer market power. The next logical step in this chain would be to conclude that tying does not automatically hurt consumers and thus should be subject to a rule of reason rather than a per se rule. The Court took the deputy solicitor general down this path during the oral argument. The antitrust rationale behind the per se rule against tying is suspect. The historical argument is that tying is used to leverage monopoly into the tied market. But, as *Independent Ink* makes clear, the motivation for tying, at least for complementary products, is more naturally price discrimination.

Thus, the most important antitrust question in this case concerns the potential harm caused by price discrimination, specifically metering. If this practice is viewed as benign, then there is no reason to prohibit tying contracts such as those required by Trident, even if Trident had market power. (Trident's brief argued that most tying arrangements are economically beneficial.) Conversely, if this practice is seen as harmful to competition and to consumers, then maintaining the per se rule is appropriate. This was the question that focused attention on this case.

Several commentators felt that the Court took a step in the right direction but missed the bigger opportunity to correct the bigger anomaly in the law; see Evans (2006) and Wright (2006). This is the issue to which we now turn. We provide an antitrust rationale for maintaining the per se rule against tying, even when it is used for price discrimination.

WHAT IS METERING?

Metering is a practice under which a customer is charged a price based on his or her use of the product. This allows the seller to raise its profits by charging more to high-value customers while still making sales at lower prices to low-value customers. It has long been understood that metering can be a useful price discrimination tool; see Bowman (1957).

Metering can be done directly or indirectly through a tied sale. Under direct metering, the customer is charged a per-use or metered fee. For example, Monsanto charged a per-acre technology use fee for its patented Roundup ready seeds. Summit charged doctors a per-use fee for its patented laser eye surgery device.

Under indirect metering, the fee is based on the use of a complementary product, as with printers and toner or ink. For example, lessees of an A.B. Dick mimeograph machine were required to purchase all of their ink from A.B. Dick.¹¹ Similarly, IBM required its tabulating machine customers to purchase its punch cards.¹²

There are three salient features of a requirements tie used for indirect metering. First, the two products are essential complements in that the original product is of no value without the tied product. A mimeograph machine without ink is of no value. Second, the value of the original product is related to its intensity of use as measured through consumption of the complement. A customer who made more mimeograph copies would have generally placed a higher value upon the mimeograph machine and required more ink. A customer who did more tabulating would have generally placed a higher value upon the tabulating machine and thus have had a greater need for punch cards. More frequent use requires more complementary products, thereby allowing the seller to charge more to and earn more from high-value customers.¹³

The final ingredient of indirect metering is that the tied aftermarket product is sold at a price premium. The price premium is how the firm profits from additional usage. As a result, the customer would prefer to buy the tied product elsewhere but is prevented from doing so either by contract, technology constraints, or lack of alternatives.

The potential for metering to increase profits is illustrated by the following example: Suppose that there are two consumers, each interested in a printer. All prints are valued at \$2/copy. Customer 1 wants to make ten copies, while customer 2 wants to make only six. Absent a requirements tie, copies can be made at a competitive price of \$1/copy (equal to the cost of the ink). Consumer 1 will make ten copies that he values at \$2/copy. Thus, consumer 1 expects to get a surplus of \$1/copy and is therefore willing to pay up to \$10 for the printer. Consumer 2 will make six copies that he values at \$2/copy. Thus, consumer 2 is willing to pay up to \$6 for the printer.

Without an option to engage in a tied sale or metering or the possibility of directly discriminating by charging \$10 for the machine to customer 1 and \$6 to customer 2, the monopolist maximizes profits by charging \$6 for the machine, sells two machines, and earns profits of \$12 (assuming zero production cost). When a requirements tied sale is possible, however,

¹¹See *Henry v. A.B. Dick Co.*, 224 U.S. 1 (1912).

¹²See *IBM v. United States*, 298 U.S. 131 (1936).

¹³Observe that these conditions do not hold in other tying cases such as *United States v. Loews, Inc.*, 371 U.S. 38 (1962). In that case, a movie theater that wanted to exhibit the studio's popular movies was also required to exhibit its less popular movies. In contrast to metering, here two goods are not essential complements. A movie theater can benefit from screening one film without screening the other films in the tied sale. Secondly, the two tied goods come in a fixed proportion, and thus there is no differential intensity of use of good B.

the monopolist can force the buyers to use its overpriced ink. The ink is marked up to \$2/copy, so that the monopolist earns \$1/copy. Consumers are just willing to pay \$2/copy but only if the machine is free as they earn no surplus. In this case, the monopolist can give away the machine for free and still earn higher profits. Customer 1 will make ten copies, and customer 2 will make six, leading to total profits of \$16.

Note that the low user, customer 2, pays the same amount in both cases. For that customer, the reduction in the machine price is equivalent compensation for the increased cost of the tied good. However, customer 1 is now paying \$10 rather than \$6. That customer receives no equivalent compensation and hence is worse off, though not so much worse off as to reject the purchase of the machine.

This example illustrates that a monopolist charging a single price in the market does not fully exercise its market power. The use of a requirements-tied sales contract allows a seller to exercise its market power more fully.

There has been some confusion in both economics and the law as to whether tying can ever lead to additional monopoly profits. In *Grappone, Inc. v. Subaru of New England, Inc.*, the appeals court stated:

If the seller does have, and has been fully exercising, market power, it also cannot force buyers to take a more expensive or less desirable Product B, unless it provides buyers equivalent compensation by lowering the price of Product A . . .¹⁴

To the extent that this statement suggests that a monopolist cannot obtain more profits via a tied sale, it misreads the Chicago School one-monopoly profit argument.¹⁵ That argument assumes that all consumers purchase identical quantities of good B, and thus there is no opportunity to engage in price discrimination via metering (Director and Levi 1956).

In our example, the monopolist increased its monopoly profits via the metering arrangement. There is still only one monopoly profit, but the size of that monopoly profit is variable based on the firm's ability to engage in price discrimination. The monopoly profit under a single price was \$12, while the monopoly profit under price discrimination rises to \$16. While the monopolist does lower the price of the printer, *the end result is not equivalent compensation for all buyers*. The high-volume users, who had the most surplus, end up worse off under the metering contract.

As a result, aggregate consumer welfare is reduced by the metering contract. This is to be expected. The reason why consumer surplus typically falls is that those consumers with the highest value and the highest surplus are the ones who end up paying the biggest increase in price. The ability to

¹⁴858 F.2d 792, 795 (1st Cir. 1988).

¹⁵See the discussion below and Bork (1984).

price discriminate does expand the market, but the new customers are the ones with the smallest surplus to begin with, and they keep little of it. The largest source of increased profits is the transfer from consumers to the producer.

To the extent that a firm is given a legal monopoly via a patent, that monopoly power is expanded when the firm is allowed to engage in tied sales for the purpose of metering. The expansion does not arise because of power in the complementary market. Rather, the increased power comes in the original market.¹⁶ While profits rise, consumers lose.

It is worth emphasizing that if the market for printers were competitive, such metering contracts would not be sustainable. Consider the position of the incumbent who is giving away printers with the requirement that its ink be purchased at a price of \$2/copy. A rival would enter with an offer to sell an equivalent printer at \$5 and let the customer buy ink at the competitive price of \$1/copy. This rival would steal away both customers. The rival is best able to attract the most profitable customers by allowing those customers to use the machine most efficiently. This leads to selling the complementary good at its cost.¹⁷

Is Metering Evidence of Market Power?

It would appear from our example that the ability to engage in price discrimination via metering is evidence of market power. When a firm is able to price discriminate, it follows that some of its customers are more profitable than others. In a perfectly competitive market, such results are not possible. A rival firm that chose to undercut the price to the most profitable customers would gain all of those customers. Thus, even if firms are earning zero profits in aggregate, a firm could make money by targeting the most profitable segment of the market.

In the case of Independent Ink, customers who were the largest volume users of the inkjet printers were the most profitable. Were a rival to have offered an equivalent printer at a higher price combined with ink sold at marginal cost, this would have been attractive to the large-volume customers. The fact that a firm could profitably enter with a single-price contract (but none did) is evidence that Trident was exercising market power.

¹⁶One could interpret the passage in *Grappone* to say that a one-price monopolist is not fully exercising its monopoly power. The ability to price discriminate via metering allows a monopolist to exercise its power more fully. The point that this misses is that the court dismisses the view that customers lose as a result of being forced to buy the overpriced tied good. Here we see that this is the likely result.

¹⁷Later we discuss other potential motivations for metering, such as quality control. These arguments do not explain why the tying contract is required rather than optional and why the complementary good is priced well above its cost.

Is there a difference between market power as used in economics and market power as used in antitrust?¹⁸ With some degree of product differentiation, a firm is able to charge a price above marginal cost. Does that mean that the local barber has market power when he charges a price above marginal cost? Yes, but barely. The barber has only a small amount of power in a local market. This tiny amount of power is irrelevant for antitrust. The markup is small, and no one would define the street corner as the relevant market for haircuts. The degree of market power is evidenced by how much the price rises above marginal cost and the scope of the market. It is also evidenced by how the firm is able to maintain its position.

In *United States v. E. I. du Pont de Nemours & Co.*, the Court defined market power as "the power to control prices or exclude competition."¹⁹ The metering contract is evidence of both. Trident was not able to charge a high price for its ink because the ink was differentiated or superior in quality. Customers wanted to purchase ink from Independent and were prohibited from doing so by their contract. Indeed, some customers were buying ink from Independent in spite of their contract.²⁰ Metering is not possible if the firm does not have the power to exclude competition.

Consider the experience of Wizard International. This company pioneered a machine to automate mat cutting for picture framers. When the machine initially came out, stores could rent it at a monthly fee and pay a charge per corner. Buying the machine was not an option. Wizard wanted to capture as much surplus as possible from high-volume users. But that approach created an opportunity for a competitor to enter the market. It could target Wizard's most profitable customers by offering a fixed-price contract. Indeed, as Wizard faced competition, it changed its contract terms so that users could purchase its machine at a fixed price and pay no per-corner fees.

Technological innovations, often protected by patents, can give the firm market power that allows it to extract more profits by engaging in price discrimination. Such price discrimination leaves the high-profit customers open to competitors. When competitors enter the market, price discrimination is no longer sustainable.

This conclusion is not without controversy. Levine (2002) provides examples that lead him to argue that price discrimination is compatible with competition.²¹ Baumol and Swanson (2003) go one step further and claim

¹⁸The perspective below is influenced by Krattenmaker, Lande, and Salop (1987).

¹⁹351 U.S. 377 (1956).

²⁰This case began when Trident sued Independent Ink for patent infringement over the sale of its rival ink. That case was dismissed as Trident's patent was for the printhead, not the ink.

²¹Levine observes that the price of sirloin exceeds the price of flank steak, and yet one is not more costly to produce than the other as the two are produced together in the form of a cow. Thus, the price differential reflects consumer preferences, not production costs, and is an example of price discrimination in a competitive market. A more careful examination shows that market prices do reflect costs. A firm would like to sell more sirloin and less flank steak. The problem is that a cow

not only that price discrimination is possible, but also that it may be required in some competitive markets.

The case of airlines is illustrative. The airline business would seem to be competitive based on the number of overlapping flights and the low profit levels of the industry. And yet price discrimination is rampant. Advance purchase restrictions and Saturday-night stayover requirements are used to prevent business travelers from taking lower fares. Thus, it appears we have sustainable price discrimination in a competitive industry.

But there are many aspects of the airline industry that indicate market power. Entry is limited by landing rights and gates. This makes it difficult for a rival to enter and attract away the profitable business customers. With the recent expansion of secondary airports, we are witnessing the entry of all-business discount airlines. Between New York to London, Maxjet, Silverjet, and Eos have all substantially undercut the business class fares on British Airways, American, Virgin, and Continental.²²

In other cases, undercutting does not occur because product differentiation gives the incumbent airlines a degree of market power. Some customers are not willing to take the lowest fare regardless of the airline or departure time. The flight variety offered out of an airline's hub—for example, Northwest out of Minneapolis—may be a superior product to a rival's single competing option. Or dedication to a frequent flyer program may be the source of differentiation.

Furthermore, airlines are involved in a complicated repeated interaction. A fare cut on one route may lead to retaliation on another. With limited entry, implicit cooperation allows firms an opportunity to exploit market power.

Thus, one can accept that there is some price discrimination in airline pricing and that it reflects limited entry, product differentiation, and repeated interaction—all departures from perfect competition. It is also important to note that the fact that airlines are not profitable does not contradict the existence of market power. The profits may be captured by pilots and a unionized labor force. This is a case of price discrimination but not an example of a perfectly competitive market.

Does this mean that price discrimination never arises in competitive markets? This conclusion might seem at odds with such everyday practices such as senior citizen discounts at movie theaters. Like the case of the local barber, the extent of price discrimination is quite small and is commensurate with a small degree of market power for a local movie theater.²³

provides fixed proportions of the two steaks. Thus, the true cost of producing more sirloin is the cost of rearing a cow net of the price of the flank steak. The true cost of producing more flank is the cost of rearing a cow net of the price of sirloin. Viewed in that light, the cost of the sirloin is higher than the cost of the flank steak.

²²These entrants fly to Luton and Stansted rather than Heathrow and Gatwick.

²³Airlines and movie cinemas share another unusual cost feature: Capacity is fixed, and marginal costs are zero until capacity is reached. Thus, the differential pricing reflects differential opportunity

The general point is that the extent of the price discrimination that a firm can impose is related to its market power. In truly competitive markets (which may be only a theoretical ideal), price discrimination is impossible. In real markets with product differentiation, the degree of market power is indicated by the markup of the tied good and the ability to exclude competitors. Evidence in the case indicated that Trident charged 2.5 to 4 times the price offered by Independent Ink. Competitors, such as Independent Ink, were excluded by the lifetime contract that was required with the print-head purchase. These features demonstrate a substantial and sustainable degree of price discrimination and hence market power.

Assume that market power has been established. This brings us back to the question of whether a firm should be allowed to engage in indirect metering via a tied sale of an essential complementary good. In the application of any per se rule, one has to be concerned about false positives: Legitimate applications of tied contracts will be prevented. Could what looks like a tied contract for metering actually serve a legitimate purpose, such as quality control or risk sharing?

ARE THERE LEGITIMATE REASONS FOR TIED CONTRACTS?

One has to be careful in stating the question. There is an important difference between offering the option of a tied contract and requiring a tied contract. In some cases, offering the option of a tied contract will enhance efficiency. But this will not explain why a customer is *required* to accept a tied contract.

Broadly speaking, there are three efficiency reasons used to justify a tying contract: (1) preservation of quality and reputation, (2) cost savings, and (3) risk allocation. However, quality control and cost savings should be achievable without contractually requiring the tie and do not explain the markup on the complementary good. The risk allocation justification can be accomplished with direct metering.

Preservation of Quality and Reputation

Firms may be motivated to tie for reasons related to quality and safety. For example, if a machine breaks down or the end result is unsatisfactory, the seller will suffer a loss of reputation. Thus, a firm may specify other inputs in order to ensure proper results.

costs. If the senior citizen discount is for the matinee showing, then the firm's opportunity costs are lower for that showing because the cinema is unlikely to be full in the afternoon; see Lott and Roberts (1991).

While this motivation may apply in some circumstances, it has been invoked as an antitrust defense far more often than is likely to be present.²⁴ The courts have usually rejected the quality explanation as a defense in tying cases, although the defense was accepted in the case of automobile spare parts.²⁵

In this case, Trident made the usual claim that Independent's ink was of lower quality and caused damage to printheads, although Trident lacked evidence to support this finding. Chemical analysis showed that the inks were indistinguishable. In any event, industrial users should be able to judge the quality of the output or observe damage to the printheads. Moreover, even if the quality were inferior, the quality might be good enough and the price reduction significant enough that a user would choose to purchase Independent Ink's product.

A basic problem with invoking the quality argument as an antitrust defense is that the compulsion of a tied sale should not be necessary to achieve the professed goal of ensuring quality. If the primary good manufacturer's complementary or aftermarket products truly ensure quality, then customers should choose the firm's products without being forced to do so. To the extent that Trident's price differential reflected quality differences, few customers would be attracted to Independent Ink's product. If the original product fails as a result of using inferior complementary or aftermarket products, the firm can help educate the customer that the failure was caused by other products and not by the original product.

A further problem is that the quality story would not lead Trident to charge a monopoly price for the replacement ink. If the pricing of its ink were comparable with that sold by Independent Ink, few customers would be willing to violate the contract and risk incompatible ink without the promise of substantial cost savings. Were Trident to be selling the ink at near competitive prices, it would not lose substantial profits when sales were diverted to Independent Ink. Thus, the only time the contract is required is when the complementary good is sold at a supracompetitive price.

Cost Savings

A related argument to quality is that the tied sale promotes cost reduction or enhanced efficiency. Evans and Salinger (2005, 2007) have identified many examples of such tying arrangements.

In some of these cases, the tied sale of complementary products can be viewed as one product rather than two. Thus, shoes are sold with shoelaces.

²⁴See Br. for Appellants at 13, 34, *Int'l Salt Co. v. United States*, 332 U.S. 392 (1947); Br. for Appellants at 8-16, *IBM v. United States*, 298 U.S. 131 (1936); Br. for Appellants, Vol. 1, at 221-226, *United Shoe Mach. Co. v. United States*, 258 U.S. 451 (1922); Br. for Appellees at 13, *Henry v. A.B. Dick Co.*, 224 U.S. 1 (1912).

²⁵See *Grappone, Inc. v. Subaru of New England, Inc.*, 858 F.2d 792 (1st Cir. 1988).

It is more efficient for the shoemaker to include laces of the right length with the shoes than to make the purchaser buy the initial pair of shoelaces separately.

The sale of a printer with the *initial* toner or ink cartridge is another such example. The least-cost way of delivering an initial cartridge is along with the printer. Selling printers with an initial cartridge is a contemporaneous tied sale. Unlike the sale of replacement cartridges, it is not a case of metering. All customers get the same number of initial cartridges, namely, one. Furthermore, such a tied sale is *de minimus* in that it affects only a small percentage of the total market. If the average customer purchases twenty cartridges over the lifetime of the printer, the initial sale covers only 5 percent of the market.

The efficiency or one-good arguments generally do not apply to the case of a requirements tie. No one imagines that a lifetime supply of shoelaces is really part of the original shoe and shoelace package. Nor do we imagine that there are cost savings associated with requiring the customer to purchase all future shoelace needs from a specified manufacturer or all of one's future ink requirements from Trident. To the extent that there are cost savings or economies of scale, they should be reflected in lower prices that lead consumers to purchase aftermarket products from the most efficient supplier.

Cost efficiencies thus are not a valid explanation for why a firm would require its customers to make all complementary good purchases from itself or a specified vendor. The efficiency defense of a requirements tie is less compelling than for a contemporaneous tie because there is little danger that dissolving the requirements tie would disrupt an efficient production or distribution arrangement.

Risk Allocation

Trident argued that a requirements tie is efficient because it improves risk allocation. When customers are uncertain about the value of the product, sellers can reduce the risk via a no-lose contract. The buyer pays a small amount up front and pays a price with each use, making the sale more like a lease. In effect, the customer pays for the product only if and when he or she uses it. This type of contract also signals the seller's confidence that the buyer will value the original good. The per-use sales contract is typically done via a requirements tie for a consumable product used with the original item.

Justice Breyer emphasized this point during the oral argument. He posed the following hypothetical:

[T]he person is trying to establish the market for the product. It's a component, and he attaches this tied product as a counting device knowing that

if it's successful, everybody makes money, and if it's not successful, he and everybody else lose.

A seller should be able to accept the risk for an unproven technology. Metering is often the way by which this type of risk sharing arises. Since the world of patents is the world of unproven technologies, if metering were to lead to antitrust violations whenever there was a patent involved, this would create a chilling effect on inventors.

While risk allocation can be an efficient use of tying, it does not appear relevant to this case. Trident's inkjet printheads are no longer new or unproven. If risk allocation were a motivation, then *the customer would be asking for a metering contract*—it would be an option, not a requirement imposed upon the customers. Customers would have the option of buying a printer at one price without a requirements tie or at a lower price with such a tie.

Even where risk allocation requires metering, it does not require the use of a tied sales contract. The metering can be done directly. There is nothing in the law that would prevent Trident from putting a counter in its printheads or requiring printer manufacturers to place such a counter in the printer. Trident is free to charge a price per copy or printout as part of the sale contract.

Historically, it might have been hard to monitor and therefore charge for direct usage. Today, with RFID chips and components connected to the Internet, this type of direct payment seems straightforward. Even without direct monitoring, the printer could stop working after each 1000 copies. The owner could then purchase a code for the next 1000 copies.²⁶

It is worth emphasizing this point. The Court was not asked to outlaw metering or even price discrimination via metering. It was asked only to uphold the *per se* rule against a tied sale for metering where the metering was done indirectly via a separate product. Thus, efficiency loss arises only where risk sharing is desirable but direct metering is impractical.

This raises the question of why indirect metering should be outlawed while direct metering is permitted. The short answer is that metering should not be facilitated because it allows a firm to increase its exercise of market power. We return to answer this question at some length below. First we consider the traditional argument against tied sales to observe that they have little application to *Trident v. Independent Ink*.

²⁶While direct metering is enhanced by technology, it appears to have been feasible in commercial applications for some time. In *Morton Salt Co. v. G.S. Suppiger Co.*, 314 U.S. 488 (1942), the machines were used to add salt to canned food, and thus Morton could have measured how many cans of tuna were produced. As noted earlier, Monsanto, Summit, and Wizard International have implemented systems of direct per-use fees for their products. Trident could have the printer OEMs add a counter to their printers and thereby charge end customers a fee based on the number of cartons printed.

Leveraging Market Power

In our discussion of tying, we have considered a range of motivations with the notable exception of leveraging market power. Yet, the fear of leveraging market power is the most commonly invoked justification for prohibiting tied contracts and the motivation behind most of the Court's early decisions on tying.

It is also controversial. This leveraging motivation for tying has been subject to harsh criticism from academic economists, especially the Chicago School. According to the Chicago School argument, a firm that has a monopoly in good A has only one monopoly profit to earn and thus cannot gain by leveraging its power into a second market for good B.

The flaw in the Chicago School argument is that it takes a static or short-run perspective. Although it is true that the firm that engages in tying may not increase its present one-monopoly profits, that is not the point of the tie. The tied sales are designed to help preserve the original monopoly or to lead to monopolization of the aftermarket product; see Whinston (1990), Carlton and Waldman (2002), and Nalebuff (2004). The tying of one good to another may reverberate back into the market where the firm has power. If the tying arrangement leads to exit in the tied-good market, this in turn may reduce the possibility of entry in the original market.

For example, a likely entrant might come from a firm in the tied-good market. This scenario was central to the U.S. antitrust case against Microsoft.²⁷ There, the PC operating system was the original market, and an Internet browser was the tied market. Microsoft's tied sales made it more difficult for Netscape to compete in the browser market. Even if consumers were no worse off for the loss of competition in the browser market, they may have lost one of the few potential entrants who could have challenged Microsoft's market power in the operating system market.

Tying may also protect monopoly power through the loss of competition in the tied-good market. This becomes a form of raising rivals' costs. Entry is deterred if the tied good is an essential complement to the original product and is no longer available (or is available only at a much higher cost) to a potential entrant.

If the firm controls enough of the market for the complementary product, then it may attain a monopoly in that market as well. Depending on the cost of entry and minimal efficient scale in this market, the product A monopolist may then enjoy the fruits of two monopolies. The Chicago School argument assumes that the product B market remains competitive. But, as a result of the requirements tie, the B market may over time become more concentrated or even monopolized.

²⁷See *United States v. Microsoft Corp.*, 253 F.3d 34, 50 (D.C. Cir. 2001) (*en banc*). See also the discussion of this case by Daniel Rubinfeld in Case 20 in this volume.

Although these examples illustrate an important theoretical point, leveraging market power does not appear to be a motivation for the tie in *Independent Ink*. It is unlikely that Trident's exclusion of Independent Ink and others will lead to the monopolization of the ink market or to increased costs for future entrants into the printhead business.

Metering not only is the most powerful explanation for the requirements tie in *Independent Ink* but also appears to be the best explanation for the tying arrangement in many of the tying cases decided by the Supreme Court.²⁸ The courts have been focused on the effects of leveraging when they should have been focused on the effect of price discrimination. This is true for *International Salt*, *Leitch*, *IBM*, *Carbice*, and *A.B. Dick*.²⁹

The common feature of these cases is that firms with a patented product conditioned the sale or lease of that product on the purchase of an essential complementary product. The Court indicated that the purpose of the tying practice in these cases was to extend the firm's monopoly to the tied market. As critics of these decisions have argued, it does not seem reasonable that commodity products such as salt, tar, buttons, punch cards, dry ice, or mimeograph fluid would be monopolized. It is more reasonable that the primary purpose of the tying contracts was to engage in price discrimination via metering. In each of these cases, the intensity of use of the original product was directly related to the consumption of the aftermarket product.

While the price-discrimination argument is the most compelling explanation of many tying contracts, this argument has rarely been invoked in court to justify such conduct. According to Kaplow (1985, at 545), defendants had only twice argued that the tied product sale is used as a metering device, and then only in summary fashion:

This alternative explanation has not appeared in a Supreme Court brief in the past 63 years. In *United Shoe Mach. Co. v. United States*, 258 U.S. 451 (1922), counsel for the appellant-defendant allocated one clause of a single sentence in a 1,562-page brief to the proposition that the tied products might serve as a meter to measure the use of the tying product. . . . In *Henry v. A.B. Dick Co.*, 224 U.S. 1 (1912), counsel for the appellee-defendant similarly argued that the tied product operated as a meter capable of measuring the use of the tying product so as to facilitate the determination of an appropriate royalty.

Most of the early cases preceded the economic theory of metering, and thus it is not surprising that metering is not analyzed in those cases. Modern defendants may be reluctant to raise metering as a defense for fear that the

²⁸See Kaplow (1985).

²⁹See *Int'l Salt Co. v. United States*, 332 U.S. 392 (1947); *Leitch Mfg. Co. v. Barber Co.*, 302 U.S. 458 (1938); *IBM Corp. v. United States*, 298 U.S. 131 (1936); *Carbice Corp. of Am. v. Am. Patents Dev. Corp.*, 283 U.S. 27 (1931); *Henry v. A.B. Dick Co.*, 224 U.S. 1 (1912).

court will see price discrimination as evidence of market power, which would then lead to a per se violation. As the Supreme Court has observed: "If, as some economists have suggested, the purpose of a tie-in is often to facilitate price discrimination, such evidence would imply the existence of power that a free market would not tolerate."³⁰

THE CASE AGAINST TRIDENT

The argument against the tied sale by Trident is not that it will leverage market power to another market. Rather, the argument is that the price discrimination via the tied sales is itself a manifestation of enhanced market power. Although the firm is granted a patent as a reward for innovation, that reward is limited in terms of time and scope. A firm should not be allowed to increase the exercise of its power through indirect metering.

This very issue confronts the lower courts. The Supreme Court remanded the case back to the lower courts, where *Independent Ink* will be given an opportunity to demonstrate that Trident has market power, and Trident will be given a chance to rebut that claim. If Trident is found to have market power, then its tied sales contract will be per se illegal. Why should that be the case? There is no real danger that its tied sales contracts will monopolize the ink market.

Indeed, these issues raised by *Independent Ink* led Evans (2006) and Wright (2006) to propose that the per se rule against tied sales for a firm with market power should be overturned in favor of a rule of reason. Given the facts of this case as presented, Evans argues that under a rule of reason, the benefits from price discrimination would outweigh the costs. (Evans would go even further and suggests that since this conclusion generally holds, tying should be viewed as per se legal.)

This leads us to the question of whether price discrimination is a problem. There is consensus that price discrimination generally hurts consumers. That might be enough. According to Bork and echoed by the Supreme Court in two cases:³¹

The legislative histories of the antitrust statutes, therefore, do not support any claim that Congress intended the courts to sacrifice consumer welfare to any other goal. The Sherman Act was clearly presented and debated as a consumer welfare prescription. (Bork 1995, p. 66.)

There is an alternative view that it is only total welfare that should count. Indeed, some interpret Bork's use of "consumer welfare" to mean

³⁰*United States Steel Corp. v. Fortner Enters., Inc.*, 429 U.S. 610, 617 (1977).

³¹See *Reiter v. Sonotone Corp.*, 442 U.S. 330, 343 (1979) and *NCAA v. Board of Regents of Univ. of Okla.*, 468 U.S. 85 (1984).

total welfare (see Rule 2005). Given the common belief that price discrimination improves overall efficiency, this would suggest that price discrimination should not be an antitrust problem.

However, the result that price discrimination improves efficiency is true only for the artificial case of perfect price discrimination. This ideal case leads many to believe that more price discrimination improves efficiency. No such result follows.

Imperfect Price Discrimination Is Not Efficient

Trident asserted that "[m]ost tying arrangements are economically beneficial." Yet, few of the claimed benefits apply to the case of a requirements tie like that imposed by Trident. The predominant benefit claimed is that "patent tying may create efficiencies in calculating license fees" (at 29). An unstated, but implied, efficiency is the act of price discrimination.

In elementary economic textbooks, it is practically taken as a given that price discrimination is efficient, but this is an unfortunate oversimplification; see Carroll and Coates (1999). There are two problems with that conclusion.

The first problem is one of interpretation. The efficiency argument treats the impact on consumers and producers equally. The gain to the monopolist from price discrimination comes from increased sales and from an increased ability to capture surplus from consumers. Thus, while the monopolist gains, consumers generally lose.³² With perfect price discrimination, consumers end up with no surplus at all. Even if the monopolist gains more than the consumers lose, that net gain in efficiency should not justify allowing the tied contract. Producer profits and consumer surplus should not be (and are not) treated equivalently in antitrust.³³ The expected harm to consumers should result in striking down the tied contract even if there is a net gain in economic efficiency.

The second problem is fundamental: There is no reason to believe that price discrimination is efficient. The classic efficiency result is based on perfect price discrimination (also known as "first-degree price discrimination"). Perfect price discrimination requires the firm to have perfect knowledge about each customer's valuation. In practice, perfect price discrimination does not exist. Instead, price discrimination is based on

³²Under special circumstances, price discrimination may result in a net gain to consumers. The price discrimination must lead to a large increase in output, and the increased output must result in significant economies of scale; see Hausman and MacKie-Mason (1988). This result also requires that the high-value consumers obtain very little surplus under the one-price-to-all contract.

³³For example, §2 of the Sherman Act prohibits monopolization without regard to its efficiency. Thus, a firm charged with monopolization could not use the potential efficiency of price discrimination as a defense. Consumers are given more weight than producers when calculating damages in antitrust cases. Damages are not based on the loss of overall efficiency but rather on metrics such as overcharges or loss in consumer welfare.

purchase behavior such as the use of a complementary product (called "second-degree price discrimination") or on observable group characteristics such as senior citizen discounts (called "third-degree price discrimination"). In the simple case of linear demand and constant costs, both second- and third-degree price discrimination can result in lower efficiency.³⁴ *There is no general result that suggests that imperfect price discrimination improves efficiency, even treating consumer surplus and producer profits equally.*

Of particular relevance to the *Independent Ink* case is the potential efficiency of price discrimination via metering tariffs. With a single consumer in the market and complete knowledge of the customer's preferences, a metering tariff can extract all the consumer surplus and achieve perfect efficiency. Bork (1995, p. 398) uses the intuition of perfect price discrimination to assert that "the more the monopolist is allowed to discriminate, the better are the results in terms of resource allocation."

This conclusion is false: With imperfect price discrimination, more is not always better. Specifically, the introduction of metering can reduce market efficiency when customers are heterogeneous. As the monopolist uses metering to capture more surplus from large customers, this may lead to small and medium customers' being excluded entirely from the market. As a result, total output and efficiency both may fall; see Kwoka (1984). There is no evidence, empirical or theoretical, suggesting that imperfect price discrimination in general and metering, in particular, improves efficiency.³⁵

Furthermore, firms will find resistance to their attempts to impose imperfect price discrimination. This resistance leads to an often-overlooked inefficiency: Firms spend significant resources to impose price discrimination, while consumers spend resources to avoid being subject to price discrimination.

A third reason why price discrimination is costly is that no firm has a perfect monopoly. Consumers can find ways to create substitutes. They will do their best to avoid being subject to price discrimination, and these avoidance efforts end up being costly. Unlike the consumer welfare loss from a single-price monopolist, where low-value customers end up being excluded from the market, price discrimination causes high-value customers to distort their behavior, which can make the costs especially large.

Airline pricing illustrates this phenomenon. Airlines use advance purchase and Saturday night stayover restrictions to offer discounts to leisure

³⁴Third-degree price discrimination causes a misallocation of goods to consumers, thereby reducing efficiency. Where demand functions are linear and the good is produced at a constant marginal cost, profits increase but by less than the loss to consumers; see Schmalensee (1981).

³⁵A necessary, but not sufficient, condition is that price discrimination lead to an expansion in output; see Varian (1985).

customers while still getting business travelers to pay full fare. In response to this policy, some business travelers extend their stays to include a Saturday night. This distortion in behavior can lead to large social losses, well above the incremental gains from the extra demand that arises at the discounted fares; see Morrison and Winston (1995) and Nalebuff (2003). The effort to price discriminate is also costly to firms that make large investments in "customer relationship management" (CRM) software in order to fine-tune their pricing to customers.

In sum, price discrimination via metering will typically lead to reductions in consumer welfare. There is no presumption that total welfare will increase. Even when there is an apparent gain, the efficiency calculations leave out the substantial costs that firms pay to enforce such metering and the substantial costs that consumers pay to avoid being metered. For these reasons, the courts should maintain the *per se* rule against tying, even when used for the purpose of metering.

Metering, If Done, Should Be Done Directly

Assume that it was established that the requirements tie in Trident was designed for the purpose of price discrimination via metering. Why should this metering be a problem when done indirectly via a requirements tie but not a problem if done directly? We accept that a legally gained monopolist is allowed to charge a monopoly price, even to the detriment of consumers. But the law need not facilitate the exercise of monopoly power. The argument against indirect metering is that it may be easier to implement because it is more opaque to consumers.

Firms anticipate consumer resistance to direct metering, such as a price per page. Metering via a requirements-tied sale is less obvious to consumers. With direct metering, the customer must be told what the cost is per page or per use. With indirect metering, customers may be in the dark. Market power is enhanced by the shrouded nature of the pricing.

Studies show that most customers have little idea of how much it costs to print a page using a laser printer or with inkjet cartridges; see Gabaix and Laibson (2006). Customers do not know the capacity of the ink or toner cartridge measured in typical pages. Even if they can forecast the future cost of the cartridge, they do not know the proper denominator. In the case of Trident, ink consumption rates were not provided, making it difficult to estimate the true lifetime cost of using its printhead.

Indirect metering via tied sales is thus a more subtle form of price discrimination. It achieves a result similar to direct metering without a blatant or naked exercise of market power. Thus, it may facilitate metering and thereby enhance a firm's existing market power.

To the extent that risk sharing is valuable, it can still be done via direct metering. Indeed, to the extent that ink or the complementary product only

imperfectly measures usage, the firm can improve its profits through the use of direct metering.

Firms that have been able to price discriminate only because customers were fooled by shrouded prices would no longer be able to enhance their market power at the expense of consumers. Such firms are using the complementary product as a way artificially to enhance their market power. Thus, the prohibition against tied sales for a firm with market power can be justified as a way to limit the firm's exercise of its market power through price discrimination.

CONCLUSION

The predominant explanation for the requirements-tied sales contracts used by Trident is price discrimination via metering. Customers were not offered an opportunity to buy the printer at a higher price without the ink contract. The contract went beyond the initial sale of ink to cover a lifetime supply. The replacement ink was sold at a very high price compared with that of the alternatives. This ability to price discriminate via metering should be viewed as evidence of market power. Although the Court's ruling in this case means that Trident's patent no longer leads to a presumption of market power, this may be established through traditional economic analysis.

On the assumption that market power is established, the next debate in antitrust is whether tying contracts used for the purpose of price discrimination should be viewed as a per se violation, subject to a rule of reason, or presumed to be legal. Should metering be treated differently when done directly versus indirectly?

I have argued that the per se rule should be maintained even when the tie is used for metering. The rationale is explained by Justice Stevens in *Jefferson Parish*:

[Tying] can increase the social costs of market power by facilitating price discrimination, thereby increasing monopoly profits over what they would be absent the tie. And from the standpoint of the consumer—whose interests the statute was especially intended to serve—the freedom to select the best bargain in the second market is impaired by his need to purchase the tying product, and perhaps by an inability to evaluate the true cost of either product when they are available only as a package.³⁶

Whether one agrees with this perspective or not, the case of *Trident v. Independent Ink* has set the stage for a much-needed reexamination of the broader rule against tying.

³⁶*Jefferson Parish Hosp. Dist. No. 2 v. Hyde*, 466 U.S. 2 (1984) at 15.

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