CASE X:
Monopsony and Predatory Bidding in the Lumber Industry:
The Weyerhaeuser Cases (2007)

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1. Introduction

The U.S. Supreme Court, in *Weyerhaeuser Company* v. *Ross-Simmons Hardwood Lumber Company, Inc.*,[1] was confronted with the question of whether its previously announced standards for evaluating predatory pricing[2] would also apply to so-called predatory bidding. In predatory *pricing*, a seller of goods temporarily lowers its prices below the point of profitability in order to take business away from its competitors who are unable to sustain such losses. By eliminating these competitors, the seller is subsequently able to achieve monopoly profits.

In predatory *bidding*, a firm temporarily pays more than it needs to for one or more important inputs in order to deprive its competitors of supply. When rival buyers are forced to exit the market because they are no longer economically viable, the predatory bidder maintains (or increases) its monopsony power. The monopsonist is then able to restrict the quantity (and thus lower the unit price) of its subsequent input purchases, allowing it to generate cost savings

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[1] 549 U.S. 312 (2007).

[2] The standards for predatory pricing in the sale of products had been laid out by the Court fourteen years earlier in *Brooke Group Ltd.* v. *Brown & Williamson Tobacco Corp*., 509 U.S. 209 (1993).

that exceed both the profits that were sacrificed on the restricted output, and the losses that were previously incurred in bidding up prices.[3]

In comparing the two practices, the *Weyerhaeuser* Court noted that both "involve the deliberate use of unilateral pricing measures for anticompetitive purposes," and both require self-inflicted short-term losses in order to attain supra-competitive profits in the future.[4] Since firms are often reluctant to incur these losses, either practice is relatively unlikely to occur.[5] Further, both aggressively bidding for inputs and cutting prices for outputs involve the very essence of competition, and the Court noted "myriad legitimate reasons—ranging from benign to affirmatively procompetitive—why a buyer might bid up input prices."[6]

As the Court emphasized, a monopsony is to the buy side of the market what a monopoly is to the sell side and is sometimes colloquially called a "buyer's monopoly."[7] Based on the presumed symmetry between claims of predatory pricing and predatory bidding, the Court held that the same standards should apply in evaluating predatory selling of outputs and predatory buying[8] of inputs. Prior predatory pricing authority had established a two-prong test that required proof that: a) output prices were being set at below the alleged predator's costs; and b) there was

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[3] In theory, this may ultimately lead to the monopsonist's acquiring monopoly power in the output market as well. In that case, the monopsonist could also, under certain market conditions, recoup its losses by raising output prices to monopolistic levels.

[4] 549 U.S. 312, 322.

[5] In *Brooke Group*, the Court had noted that "'predatory pricing schemes are rarely tried, and even more rarely successful.'" 509 U.S. 209, 226, quoting *Matsushita Elec. Industrial Co.* v. *Zenith Radio Corp.*, 475 U.S. 574, 589 (1986).

[6] 549 U.S. 312, 323–24.

[7] 549 U.S. 312, 320.

[8] We intend *predatory buying or predatory overbuying* to be synonymous with the term used by the Supreme Court, *predatory bidding.*

a reasonable chance (or "dangerous probability"[9]) that the predator would subsequently recoup the losses that it suffered from these below-cost prices through its exercise of market power.[10] Adapting these standards to predatory bidding, the *Weyerhaeuser* Court decision requires proof that: a) input prices were being set at a level where output costs exceeded captured revenues;[11] and b) there was a dangerous probability the predator's subsequent exercise of monopsony power would allow it to recoup its losses. [12] Because the plaintiffs in *Weyerhaeuser* had not met—or even attempted to meet—these standards, the judgment in their favor was reversed and the case remanded. [13]

While few economists would disagree that there are strong similarities between predatory bidding and predatory pricing, not everyone agrees that the issues are identical, or even sufficiently similar to warrant the application of the same legal standard. In this chapter, we describe Weyerhaeuser's place in the hardwood lumber market and the specific claims of predatory bidding that it faced. We then place these claims in the context of the economic literature on predatory conduct and evaluate the economic and statistical analysis presented by each side in the Weyerhaeuser disputes. Finally, we advance an alternative lens on predatory buying that is more consistent with the market and institutional structure of the lumber industry.

[9] The more easily satisfied "reasonable chance" standard applies to claims under the Robinson-Patman Act, and the more stringent "dangerous probability" standard applies to claims under section 2 of the Sherman Act.

[10] *Brooke Group*, 509 U.S. 209, 225. Meeting this test requires a determination that the predatory pricing would have had its intended effect on rivals, and that this would have enabled a subsequent increase in prices sufficient to make the scheme profitable, taking into account both the initial losses and the time value of money.

[11] 549 U.S. 312, 325.

[12] Id. 325–26.

[13] Id. 326.

2. Weyerhaeuser's Place in the Hardwood Value Chain

Harvested tree species are generally described as either "hardwood" or "softwood," depending on their physical properties.[14] In both production and consumption, there is some degree of substitutability and complementarity (e.g., harvesting mixed stands) among hardwoods and softwoods. The hardwood product value chain extends from standing timber resources (i.e., tracts of forested land) to end-products such as doors, paper, and furniture that are directly purchased by consumers. Timber harvesters grow trees on their own land, lease land on which they grow trees, or contract for the right to harvest trees from specific tracts owned by others, such as the U.S. Forest Service.

The end use of these trees depends upon their quality: trees with pervasive rot, staining, or other defects are not suitable for use in finished lumber and will generally be converted to pulp through a chipping process. Felled trees of sufficient quality are cut into lengths described as "sawlogs" before they are transported to a sawmill. Mill operators acquire sawlogs in one of three ways: (1) purchases in open-bidding markets; (2) purchases pursuant to existing short-term or long-term contracts with timberland owners; or (3) harvesting from timberlands owned or leased by the mill owners themselves.

At the mill, sawlogs are milled into planks that are referred to as rough-hewn lumber. In this process, additional chips are created as a by-product that can be used for pulp. Rough-hewn lumber from lower-quality sawlogs typically is used to build wooden pallets (33 percent of U.S. lumber consumption), which are then re-sold for use in shipping and warehousing. The better-

[14] More than 20 species of trees constitute the economically significant hardwood timber resource, and those species can be scientifically characterized by 15 measured physical characteristics that are factors considered by manufacturers of wood products. http://www.westernhardwood.com/hardwood_specifications.shtml.

quality lumber may then be sold in its rough condition (for example, to a lumber yard for use in construction framing), or it may be kiln-dried and milled to greater smoothness and uniformity to add to its value. Finished kiln-dried lumber is sold to lumberyards, to millworkers (who further mill it into high-value products such as moldings or trim, accounting for 11 percent of U.S. hardwood lumber uses), or to manufacturers who create such products as furniture (15 percent of U.S. hardwood lumber uses), flooring (13 percent), and cabinets (12 percent). The chips, which are the by-product of lumber milling, are typically converted to pulp (the basis for most paper products) or are used for manufactured wood products such as particle board and multi-density fiberboard (MDF). The *Weyerhaeuser* cases involved allegations of predatory bidding in the Pacific Northwest (PNW) for primarily one hardwood species: alder sawlogs. The allegations of the cases spanned a number of years in the 1990s and early 2000s.

In North America, the most prevalent and commonly harvested species of alder is red alder (*Alnus rubra*). [15] In 2002, less than 4 percent of U.S. hardwood lumber production came from red alder. Although different species of hardwood are put to different uses, alder is one of the most versatile, and it appears in virtually all types of hardwood products, including doors, furniture, cabinets, paneling, shutters, turnings, and moldings.

Plaintiffs in a series of related cases contended that Weyerhaeuser had exercised monopsony power in a relevant market consisting of alder sawlog purchases in the Pacific Northwest region of the United States. In several of these cases, it was simultaneously alleged that Weyerhaeuser had exercised monopoly power in pricing its output of alder lumber. Alder

[15] U.S. Census Bureau (2003, Table 4).

is the most abundant and commercially important hardwood in the PNW[16] with red alder[17] comprising approximately 60 percent of the total PNW hardwood volume.[18] Moreover, approximately 28 percent of the hardwood lumber produced in the PNW is exported.[19]

Weyerhaeuser is an international forest products company that has been in operation for more than 100 years. It currently manages approximately 20.3 million acres of timberland in North America, 325,580 acres in Uruguay, and 43,980 acres in China. In 2002, Weyerhaeuser was vertically integrated and operated a wide array of milling and manufacturing operations that produced products ranging from rough-hewn lumber and pallets to roofing, flooring, scaffolding, pulp, printing, and specialty papers. At the time of *Ross-Simmons* and subsequent disputes, Weyerhaeuser owned six hardwood sawmills in the PNW and procured approximately 65 percent of the alder sawlogs available there for sale. Weyerhaeuser obtained its PNW supply of alder sawlogs from the timberlands that it owned and/or actively managed, from contracts with other timberland owners, and through purchases made on the open market.

3. Legal Proceedings

Ross-Simmons, plaintiff in the *Weyerhaeuser* case, had for 40 years operated a hardwood-lumber sawmill in Longview, Washington, until May 2001, when it ceased operations. Ross-Simmons

[16] Niemiec, Ahrens, Willits, and Hibbs (1995, p. 14).

[17] "Red alder's 'relatives' are found in many parts of the world with some 30 species of alder growing worldwide. Common alder (*Alnus glutinosa*) is native to Europe and North Africa and also grows in Russia, western Asia and Japan" Kaiser (1998, p. 30). Although many of the related alder species are not harvested commercially, the global distribution of suitable hardwood timberlands indicates the potential for entry into timber production.

[18] Niemiec et al. (1995, p. 88).

[19] Eastin, Shook, and Sammarco (1999, p. iii). According to these authors, alder exports increased by 76% between 1994 and 1997, with Germany, Italy, Taiwan, and Japan being the chief importers (pp. 8-11).

alleged that Weyerhaeuser had used its dominant position to drive up the prices for alder sawlogs in the PNW to levels that reduced or entirely eliminated Ross-Simmons' profit margins with the intention of driving it and other competitors out of business. As proof that this practice had occurred, Ross-Simmons pointed to Weyerhaeuser's large share of the alder purchasing market, rising alder sawlog prices during the alleged predation period, and declining profits of Weyerhaeuser's hardwood lumber division during that same period.[20]

Prior to trial, Weyerhaeuser moved for summary judgment on Ross-Simmons' predatory-bidding theory, asserting that it should be governed by the test for predatory pricing that was established by the Supreme Court in *Brooke Group*. The district court denied the motion, rejected the argument that *Brooke Group* was the governing test, and held that proof that Weyerhaeuser operated at a loss was not required. At trial, Ross-Simmons introduced no evidence to prove that Weyerhaeuser's costs of producing alder lumber, including the allegedly inflated cost of the logs, exceeded its revenues from sales of that lumber. Indeed, it was undisputed that Weyerhaeuser and its alder sawmills in the Pacific Northwest had operated at a profit throughout the alleged predation period. Similarly, Ross-Simmons introduced no evidence to show that Weyerhaeuser would be able to recoup any losses that it incurred as a result of its alleged overpayment for sawlogs by implementing monopsonistic buying once it had vanquished its competitors and stopped engaging in predation.[21]

Following a nine-day trial, the district court submitted the case to the jury, instructing that Weyerhaeuser's log-buying practices should be found to be anticompetitive if the jury concluded

[20] Logs represent up to 75 percent of a sawmill's total costs. From 1998 to 2001, the price of alder sawlogs increased while prices for finished hardwood lumber fell. These divergent trends in input and output prices cut into the mills' profit margins, and Ross-Simmons suffered heavy losses during this time, leading to its demise.

[21] Indeed, the factual record showed that even during the alleged predation period, when Weyerhaeuser's alleged overpaying for sawlogs supposedly was making it nearly impossible for others to compete, new hardwood sawmills opened in the Pacific Northwest and still other hardwood sawmills expanded their operations.

that Weyerhaeuser had "purchased more logs than it needed, or paid a higher price for logs than necessary, in order to prevent [plaintiffs] from obtaining the logs they needed at a fair price." On April 18, 2003, the jury returned a verdict in which it found that there was a relevant market for alder sawlogs but no corresponding relevant market for finished alder lumber. The jury also found that Ross-Simmons had proven its claims against Weyerhaeuser for monopsonization and attempted monopsonization and awarded damages of $26,256,406, which were trebled to approximately $79 million.

Weyerhaeuser appealed, and the Ninth Circuit Court of Appeals affirmed the jury's verdict, reasoning that *Brooke Group* "established a high liability standard for sell-side predatory pricing cases because of its concern with the facts that consumers benefit from lower prices and that cutting prices often fosters competition."[22] By contrast, the Ninth Circuit reasoned that if a predatory bidder maintained or raised its output prices, consumers would achieve no benefit over the short run and would suffer a long-term loss. On the other hand, if output prices were simultaneously lowered, this would place further pressure on competitors during the period of predatory bidding, magnifying the risk that rivals would be forced to exit the market. [23] Accepting the plaintiffs' evidence that supply was highly inelastic in the upstream market for sawlogs, the Ninth Circuit also rejected the argument that higher input prices "might encourage new companies to enter the supply side of the market and expand output, thereby increasing innovation and efficiency so that consumers benefit in the long run…."[24]

[22] 411 F.3d 1030, 1037 (2005). The appeals court continued, "an important factor distinguishes predatory bidding cases from predatory pricing cases: benefit to consumers and stimulation of competition do not necessarily result from predatory bidding the way they do from predatory pricing."

[23] Id. 1037–38.

[24] Id. 1038.

Accordingly, the Ninth Circuit held that *Brooke Group* did not govern and ruled that the district court "did not need to instruct the jury that overbidding for sawlogs could be anticompetitive conduct only if Weyerhaeuser operated at a loss and a dangerous probability of Weyerhaeuser's recoupment of its losses existed."[25] The court added that the instruction given—which told the jury to determine whether Weyerhaeuser purchased more logs than it needed, paid a higher price than was necessary, and prevented plaintiff from obtaining logs at a fair price—"provided sufficient guidance regarding how to determine whether conduct was anticompetitive."

In the wake of the favorable verdict for Ross-Simmons, two similar lawsuits were filed by five current and/or former competitors of Weyerhaeuser. [26] Within two months, an additional lawsuit was filed by another competitor of Weyerhaeuser.[27] These were followed by a class action on behalf of purchasers of alder lumber that alleged that Weyerhaeuser had exercised monopoly power to elevate prices for its output.[28] Shortly thereafter, a final suit was filed by five more of Weyerhaeuser's current and former sawmill competitors.[29]

4. Alleged Anticompetitive Conduct across Cases

The centerpiece of all of these cases was the allegation that Weyerhaeuser had used its dominant position in the PNW to drive up prices for alder sawlogs to levels that severely reduced or eliminated profit margins.

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[25] Id. 1039.

[26] *Westwood Lumber Company, Inc., et al*. v. *Weyerhaeuser Company*, No. CV03-551-PA *("Westwood")* and *Coast Mountain Hardwoods, Inc.* v. *Weyerhaeuser Company*, No. CV03-552-PA *("Coast Mountain").*

[27] *Washington Alder, LLC*, v. *Weyerhaeuser Company*, No. CV03-753-PA *("Washington Alder").*

[28] *Morelock Enterprises, Inc.*, v. *Weyerhaeuser Company*, No. CV04-583-PA *("Morelock").*

[29] *Smith Street Mill, Inc., et al.* v. *Weyerhaeuser Company*, No. CV04-1049-PA ("*Smith Street*").

Mill Capacity. Plaintiffs contended that Weyerhaeuser had acquired monopsony power in the alder sawlog market in part through an aggressive history of acquisitions. Between 1995 and 2000, Weyerhaeuser acquired three of its hardwood mill competitors in the region, two of them under conditions that plaintiffs contended were coerced. Weyerhaeuser continually increased the capacity of these and its other alder sawmills, which plaintiffs argued increased its consumption of alder sawlogs and its share of the alder sawlog market. Competitors were allegedly deterred from adding capacity of their own, based on a threat to cut off lumber supply to a long-time customer, Westwood Industries, when it proposed to build its own hardwood lumber mill.

Weyerhaeuser offered evidence that, although its production of alder lumber had increased significantly, its consumption of alder sawlogs had not. Instead, this increased output was the result of large investments in mill infrastructure, including major technological innovation. From 1990 to 2000, Weyerhaeuser made more than $75 million in capital investments in its hardwood mills in the Pacific Northwest, and during this period, production increased at every Northwestern hardwood mill that Weyerhaeuser owned.

In response to the claim that Westwood was discouraged from opening its own sawmill operations, Weyerhaeuser established that Westwood had in fact carried through with its plan, opening a mill four times larger than originally contemplated. The intimidating remark relied upon by plaintiffs was explained as an unpleasant luncheon conversation for which an apology was made the next day. Furthermore, Weyerhaeuser never ceased to supply Westwood as a lumber customer, so it argued there was no adverse effect on Westwood or on competition in the hardwood market. Weyerhaeuser showed that in addition to Westwood, numerous new mills entered the market during

the alleged period of predation, and that a number of its competitors had significantly expanded their own mill capacity during that same time period.

Timberland Ownership. In addition to sawmill capacity, Weyerhaeuser acquired new timberland resources over this period by buying up two forest-products companies that owned major hardwood stands (one through a hostile takeover) as well as the alder-specific forest licenses that had belonged to one of the sawmill competitors that it had acquired. Plaintiffs contended that these acquisitions were carried out in order to keep alder sawlog supply from Weyerhaeuser's competitors. In support of this position, they offered testimony from former Weyerhaeuser employees who said that managers in the 1980s and early 1990s had discussed keeping sawlog prices high and later recouping the losses once competitors exited the market.

The defense responded that to the extent that Weyerhaeuser had gained additional hardwood timberland in the PNW through its corporate acquisitions, these acquisitions had reduced its need to go to market to bid for the available supply of alder sawlogs. Weyerhaeuser simply pointed out that such acquisitions increased its self-supply, freeing an offsetting procurement of biddable log supply for its competitors.

Contractual Buying Arrangements. Weyerhaeuser's control over market supply was allegedly further enhanced by various contractual arrangements, including exclusive alder sawlog purchasing agreements (which plaintiffs characterized as long-term), rights of first refusal with large industrial timberland owners, and exclusive log-trading arrangements, all of which, plaintiffs contended, were implemented in order to deprive competitors of sufficient sawlog supply. In particular, plaintiffs argued that Weyerhaeuser's supply contracts with

Georgia-Pacific (G-P) and Crown Pacific were both long-term and exclusive, thus precluding others from gaining access to their alder stands. Under the trading arrangements, Weyerhaeuser delivered certain grades and species of softwood logs to other large industrial timberland owners in exchange for their commitment to supply their alder sawlogs to Weyerhaeuser. Based on provisions of one of its acquisition contracts, plaintiffs also contended that Weyerhaeuser required purchasers of its timberlands to sell back to it any alder sawlogs harvested from those timberlands.

Weyerhaeuser responded that the G-P contracts, which plaintiffs characterized as both exclusive and long-term, applied to only a limited portion of the sawlogs from specific tracts, were limited to a single year, required Weyerhaeuser to negotiate the price, and allowed G-P to retain the logs for pulping or to sell to third parties if it did not accept Weyerhaeuser's proposed price. Although these contracts provided that "both companies will always have the first refusal on the base volumes," witnesses testified that this only gave Weyerhaeuser the right to offer a first price, which G-P was free to reject. The three contracts with Crown were similarly short-term (6 months, 13 months, and 9 months) and of limited scope, and Crown had required Weyerhaeuser to pay 25 percent of the purchase price up front.[30]

Plaintiffs' evidence regarding log-trading arrangements also centered on G-P contracts, which contemplated that pulp logs would be delivered to G-P's pulp mill in Bellingham in exchange for sawlogs that Weyerhaeuser could use in its sawmills. A document describing hardwood logs "available with trade" was explained by the author to represent merely a hypothetical log purchase

[30] In order to prevail on these claims related to preventing competitors from obtaining logs, plaintiffs should have had to prove that Weyerhaeuser substantially foreclosed competitors from the relevant market. See, e.g., *Jefferson Parish Hosp., Dist. No. 2 v. Hyde*, 466 U.S. 2, 45 (1984) (O'Connor, J., concurring) (non-price-related conduct is anticompetitive only when "a significant fraction of buyers or sellers are frozen out of a market" by the defendant's conduct); *Omega Envtl., Inc. v. Gilbarco, Inc.*, 127 F.3d 1157, 1162 (9th Cir. 1997). No plaintiff in the Weyerhaeuser cases attempted to prove substantial foreclosure.

that Weyerhaeuser might be able to accomplish by trading softwood logs, rather than an actual transaction.

In arguing that Weyerhaeuser tied sales of its timberlands to agreements to sell back future alder harvests, plaintiffs relied on a contract by which Weyerhaeuser sold previously acquired assets of Diamond Lumber. The provision had only a three-year life and, prior to its execution, the alder stands had belonged in perpetuity to Weyerhaeuser. Thus, the agreement reduced, rather than increased, Weyerhaeuser's control over alder sawlog supply. Weyerhaeuser also introduced evidence that it had waived the restrictions prior to their scheduled termination.

Stockpiling and Mill Subsidies. The plaintiff also provided testimony that Weyerhaeuser sometimes bought more sawlogs than it needed with the purpose of keeping them from competitors, and that output lumber prices had dropped while input sawlog prices rose, thus cutting into Weyerhaeuser's profits. The accusation of stockpiling (which can result in staining and degradation of logs that are not promptly milled) was premised primarily on two inventory bulges, one made in 1989 and the other in 1993, at Weyerhaeuser's Longview mill, which was located within a mile or so of the Ross-Simmons mill. A former Weyerhaeuser employee testified that he had been told that the purchases were made in order to deprive Ross-Simmons of sawlog supply.

Plaintiffs also took the position that the Longview mill had been subsidized by Weyerhaeuser, transferring large volumes of alder sawlogs harvested from its own timberlands at below market value, contrary to its historical practices. The implication of this testimony was that the Longview mill would have been unprofitable but for the below-market sawlog supply. The competitor mill plaintiffs also alleged that Weyerhaeuser stockpiled large quantities of finished alder

lumber to depress the prices of that lumber at the same time that it was driving up alder sawlog prices to unprecedented levels in order to create a price squeeze that would harm its competitors.

Plaintiffs' argument that logs that Weyerhaeuser transferred to its Longview mill were underpriced and had been subsidized by Weyerhaeuser was based on a comparison of prices paid for third-party purchases and the prices booked for these internal transfers. Weyerhaeuser responded that the price difference resulted from the fact that many of the truckloads that it sent to Longview consisted only of pulp logs, which have a far lower value but were needed for Weyerhaeuser's nearby pulping operation. Moreover, the two periods of inventory buildup relied upon by plaintiffs were explained by the fact that pulp logs had been purchased to meet expected demand that failed to materialize.

Overbidding. Finally, plaintiffs contended that Weyerhaeuser had informed alder sawlog suppliers in Oregon and Washington that it would beat prices paid by its competitors without regard to any ceiling and/or that it insisted on the opportunity to have a "last look" and make the "last bid." This position was premised on testimony from plaintiffs' own log buyers repeating what they said they had been told by various log sellers.

All of the Weyerhaeuser witnesses denied that they committed to beat other's prices, or that they employed a last-look, last-bid practice. Every log supplier who testified in any of the three cases that went to trial similarly denied that Weyerhaeuser had engaged in such practices.

5. Economics Literature

Given the allegations made in the various plaintiffs' cases and Weyerhaeuser's responses, what guidance on predatory pricing has the economics literature offered? Specifically, among the

alternative economic frameworks (both strategic and nonstrategic), which one(s) have the courts accepted? Notably, even the economics literature that is non-game-theoretic recognizes that predatory conduct is inherently strategic.

Much of the early non-game-theoretic economic literature[31] and many court rulings[32] have focused on the tradeoff that a rational predatory firm must compute between its short-run losses and the benefits it hopes to achieve after its prey is harmed. As Ordover and Saloner emphasize (1989, p. 580), courts have "fully accepted the view that rational anticompetitive behavior is likely only if the firm can expect to recoup the upfront costs of its anticompetitive campaign." McGee (1958; 1980) has gone so far as to argue that firms reach a dominant position because of their superior skill and efficiency, advantages that are easily lost if not sustained in the face of self-correcting markets.

Game-theoretical formulations focus on the inherently strategic nature of predatory conduct and isolate a set of rational-equilibrium strategies. A crucial feature of these formulations is the role played by imperfect and asymmetric information, scale economies, and barriers to entry. Predatory-pricing rational-equilibrium outcomes have been derived under the following circumstances:

- when capital markets are imperfect and the predator has greater financial resources than its rivals (Fudenberg and Tirole 1985);
- when the established firm and new entrant(s) do not possess the same information about demand or cost (Fudenberg and Triole 1986; Saloner 1987);
- when technology is structured by endogenous costs that result from a learning-by-doing process (Cabral and Riordan 1994, 1997);

[31] See Telser (1966); Joskow and Klevorick (1979); Easterbrook (1981); Elzinga and Mills (1989; 1994); McGee (1980); Milgrom and Roberts (1982); Scherer (1976), and Williamson (1977).

[32] See *Matsushita Elec. Industrial Co.* v. *Zenith Radio Corp.*, 475 U.S. 574, 589 (1986); *Cargill, Inc.* v. *Monfort of Colo., Inc.*, 479 U.S. 104 (1986); and *Brooke Group*, 509 U.S. 209, 225 (1993).

- when firms invest in their reputations in the face of multiple potential entrants (Rosenthal 1981; Milgrom and Roberts 1982);
- when uncertainty exists about which strategies rivals will execute (Roth 1992; Bernheim 1984);
- when a predatory firm cuts selling prices in one market in order to harm prey by implicitly threatening to reduce prices in the future in the same or additional markets ("reputation-effect predation") (Bolton, Brodley, and Riordan 2000);
- when below-cost pricing by one supplier allows a buyer to extract rents from a second supplier (Marx and Shaffer 1999); and
- during a shakeout phase of intense competition, when low prices (perhaps below marginal cost) emerge that complement large investments in cost reduction and reputation formation (Bagwell et al. 1997).

Thus far, in their predatory-analysis rulings, the courts—including the Supreme Court, in its Weyerhaeuser rulings—have not adopted any of the game-theoretic formulations (Klevorick 1993). Areeda and Hovenkamp (1992, p. 629) argue that courts end up using price-cost comparisons as the presumptive guide to predation because other factors are seldom demonstrable. As Klevorick has noted, "Areeda and Turner's reliance on a static model of dominant-firm behavior to derive their test reflected their doubt that a sound legal rule could be fashioned to cope with the inherently 'speculative and indeterminate' assessment of long-run considerations."[33]

[33] The Areeda-Turner test was proposed by Areeda and Turner (1975) and uses average variable cost (AVC), as a proxy for marginal cost, as the criterion for judging whether prices are predatory: A price that is at or above
(Footnote continued on next page)

Although courts have continued to apply the Areeda and Turner test[34] as the presumptive guide to analysis of predation cases, they often also refer to recoupment of the losses that a predatory firm incurs. The long-run equilibrium can be investigated to determine whether predation could be successful. In fact, as Areeda and Hovenkamp (1992, p. 631) note, this determination can take precedence over any cost-based test.

Elzinga and Mills (1989, 1994) have offered a test for predation that requires that courts analyze both the predatory period and the recoupment period. Their test focuses on the recoupment period. They introduce as their benchmark for predation the long-run competitive price in the industry. As a result, the Elzinga-Mills test allows for prices to exceed average variable cost but still, in certain circumstances, to be predatory. Elzinga and Mills (1989, p. 871) maintain that "if a predatory strategy is an economically implausible investment, as judged by the parameters of the recoupment plan, it implies that the alleged predator is exonerated."

This recoupment test can only be executed if all of the following are determined: (1) the duration of the predatory period; (2) the duration of the recoupment period; (3) the long run "but-for" (or competitive) price; (4) the predator's weighted average cost of capital; (5) the discount rate that makes the returns during the predatory and recoupment periods comparable; (6) a structural model that includes the demand and the supply of the firm's rivals; and (7) prices that are charged both during the predatory and future recoupment periods. This recoupment test (like the Areeda-Turner test) would be implemented in a partial-equilibrium framework.

AVC would generally be judged as not predatory; a price that is below AVC would raise suspicions that would call for further exploration.

[34] In addition to the Areeda and Turner test, a large number of other partial-equilibrium tests (some of which attempt to capture the strategic aspects of predatory conduct) have been offered in the economic literature. For a survey of these earlier tests, see Ordover and Saloner (1989).

With respect to the potential distinction between predatory selling and predatory bidding, Baumol et al. (2006) argue in their filing of an Amici Curiae ("friend of the court") brief to Weyerhaeuser's appeal of the Ninth Circuit's ruling in the Ross-Simmons matter that a predatory-buying strategy is "the mirror-image of predatory pricing on the seller's side" (p. 6). This analysis recognizes that abusive monopsonistic (or dominant-firm oligopsonistic) conduct cannot take place unless market power exists. In this sense, given that monopsony is symmetric with monopoly (Noll 2005, p. 591),[35] it follows that analytical similarities exist between predatory selling and predatory buying.[36]

The ALJ Symposium. Before the Supreme Court ruled in *Weyerhaeuser*, the *Antitrust Law Journal* published three papers on predatory buying: two by consultants to the plaintiff, Ross-Simmons (Kirkwood 2005; Zerbe 2005), and one by a consultant to Weyerhaeuser (Salop 2005). All three papers focus on the economic analysis of predatory buying and the appropriate legal standard. Once again, the focus is on a two-stage analysis: the period of predation and the subsequent potential recoupment period. Any analytical differences between predatory buying and predatory selling turn on how the markets for the downstream product (lumber) and for the

[35] The Seventh Circuit, speaking through Judge Posner, has expressly stated that monopsony pricing "is analytically the same as monopoly or cartel pricing and so treated by the law." *Khan* v. *State Oil Co.*,93 F.3d 1358, 1361 (7th Cir. 1996), rev'd on other grounds, 522 U.S. 3 (1997). Other courts have reached the same conclusion. *Todd* v. *Exxon Corp.*, 275 F.3d 191, 202 (2nd Cir. 2001); *United States* v. *Syufy Enters.*, 903 F2d 659, 663 n.4 (9th Cir. 1990) ("[m]onopsony and monopsony power are the equivalent on the buying side of monopoly and monopoly power on the selling side"); *Houser* v. *Fox Theaters Mgmt. Corp.*, 854 F.2d 1225, 1228 & 1231 (3rd Cir. 1988) (applying principles of *Matsushita* and *Monsanto* to monopsony claims); *Betaseed, Inc.* v. *U & I Inc.*, 681 F.2d 1203, 1221 (9th Cir. 1982) (applying a sell-side tying standard to a buy-side tie).

[36] Dissenters include Carstensen (2004) and Jacobson and Dorman (1991, 1992). Jacobson and Dorman argue for more lenient antitrust treatment when horizontal competitors form joint-purchasing organizations. In contrast, Carstensen suggests that mergers among buyers in some markets are more likely to be anticompetitive than is generally the case for mergers among sellers.

input (sawlogs) are defined, the demand elasticity for the final product, the supply elasticity for the input, and the importance of related markets.

Both Kirkwood and Salop accept the premise that predatory buying[37] is the mirror-image of predatory selling. Both involve an initial period, in which the predatory firm sacrifices short-term profits by reducing the selling price of its product or by increasing the buying price of an input. However, the reduced output selling price can hold only if the predatory firm is able to stimulate an increase in the amount of input quantity available. Such an increase in supply would lead to an increase in the quantity flowing through to the final-product market. In this case, predatory buying would produce the same result as predatory selling to consumers by decreasing prices. This outcome requires that during the initial predation period, the input supply is not perfectly inelastic, nor is the demand in the output market perfectly elastic.

With respect to predatory selling, only the demand-elasticity assumption is required. If a second, or recoupment, stage is successful, a monopsonistic reduction in input-buying prices would likely reduce the quantity that is available in that market. The reduced input utilization would likely decrease product output, and so raise prices to final-product consumers. As in the case of predatory selling, however, the correspondence between input prices and final product prices is not direct. As all three authors recognize, in general, a monopsonistic reduction in input buying may have little, if any, impact on final product prices. In the final analysis, any adverse impact of predatory bidding on consumers' welfare in the initial stage is less direct than the consequences of predatory selling.

[37] Salop uses the term *predatory overbuying* to refer to what the Supreme Court (along with Kirkwood and Zerbe) calls "predatory bidding." As noted earlier (fn. 8), we use "predatory bidding" interchangeably with "predatory buying."

The debate between Kirkwood and Salop turns on whether the analytical similarities between predatory bidding and predatory selling require identical legal treatment (i.e., the legal standards of *Brooke Group).* Both Kirkwood and Salop specify that the Sherman Act requires the promotion of consumers' welfare rather than the protection of competitors who may be adversely impacted by a dominant firm's predatory bidding. Zerbe rejects the consumer-welfare test and instead argues for a test of economic efficiency.[38] He advances an analytic lens that calls for a general-equilibrium analysis, arguing that predatory buying may ultimately harm consumers by reducing economic efficiency. Since the *Brooke Group* test relies on a partial-equilibrium analysis (which both Kirkwood and Salop impose in their assessments), Zerbe argues that this test should not apply either to predatory bidding or to predatory selling.

Given the presumption that the ultimate goal of antitrust enforcement is to protect consumers' welfare, the differences between Kirkwood and Salop turn on the appropriate legal standard turn on whether predatory bidding is or is not sufficiently different from predatory selling to justify a different standard. Since a principal motivation for the *Brooke Group* standard is the likely "chilling effect" that predatory-buying cases (or for that matter, predatory-selling cases) are likely to have on price competition, an analysis of market structure and the possibility of future recoupment is the fundamental basis for separating anticompetitive predatory conduct from pro-competitive pricing, whether in output (overselling) or input markets (overbuying). Salop argues that successful second-stage recoupment in predatory-selling cases poses a greater risk to beneficial competition because it always harms consumers, while predatory buying, when it is being successfully recouped in the second stage, does not necessarily harm consumers. In

[38] For a similar perspective, see Carlton (2007).

contrast, Kirkwood argues that since final-product demand is generally not perfectly elastic, monopsony power that results from successful predatory buying would harm consumers. He also contends that liability should be based on a general consumer-welfare standard rule-of-reason analysis of whether a defendant's bidding was likely to harm consumers. Regarding potential chilling effects, Kirkwood argues that predatory-bidding cases do not represent a direct assault on price cutting, as does predatory selling. In predatory-selling disputes, the *Brooke Group* standard is driven by a strong concern for false positives and low-risk false negatives. The stringent *Brooke Group* "bright line" rule, Kirkwood argues, is less likely to chill price cutting in the case of predatory bidding than in the case of predatory selling. In contrast, Salop rejects Kirkwood's proposed consumer-welfare test and insists that predatory bidding must also meet the *Brooke Group*'s price/cost test or loss requirement.

The typical partial-equilibrium, two-stage analysis, that involves a predation period followed by a recoupment, fails to recognize related markets, particularly substitutability and/or complementarity of both inputs and outputs. Accordingly, as Zerbe suggests, a general-equilibrium lens is needed in order to investigate the potential impact of related markets. The basic elements of such an analysis are presented in the appendix.

6. Empirical Evidence:

In all of the *Weyerhaeuser* cases, the fundamental economic questions turned on definitions of the upstream sawlog market and the downstream lumber market. Without first assessing the range of products and geographic scope of the lumber and sawlog markets, it was impossible to determine Weyerhaeuser's position in each market. Moreover, it would not be possible for Weyerhaeuser to engage in sustainable predatory bidding (or predatory selling) if it lacked sufficient market power.

The structure of the downstream and upstream markets was also important determinants of whether rational recoupment was possible.

Trade flows and spatial integration of lumber pricing support the hypothesis that the geographic scope of the downstream lumber market is global. For the year 2002, virtually all regions of the world participated in hardwood supply across all major countries, with aggregate production decomposed as follows: Asia (30%), U.S. (26%), South America (18%), Europe (16%), Africa (6%), Central America and the Caribbean (2%), and Canada (1%). In order to compete in this global landscape, numerous studies have shown that even the largest firms must respond to global forces beyond their control, and that only through technological change is it possible to capture scale economies in order to be cost-competitive. With respect to product scope, the plaintiffs' experts used an analytical lens that differed dramatically from the lens of the defendant's expert. The plaintiff's experts relied on survey-data sources: the *Hardwood Market Report (HMR)* and the *Weekly Hardwood Review (WHR)*. Rather than being based on actual transactions, these surveys collect price data that companies report weekly. The surveys seek to reflect the mode (the most frequently occurring price) each week. The plaintiff's experts used these data to evaluate simple price-difference correlations across grades and different species of hardwood. Given the low price-difference correlations, plaintiff's experts concluded that the product scope in the downstream lumber market was limited to alder.

However, as the defendant's expert noted, Werden and Froeb (1993, p. 330) have shown that such price correlations are neither necessary nor sufficient to delineate a relevant market. Another evidentiary issue was that when compared, *HMR* and *WHR* (both of which measure prices for specific locations, grades, and species) revealed simple correlations of first differences ranging as low as 10 percent and no higher than 31 percent, which is an unexpectedly low result for two survey

instruments that measure the same phenomenon. In the Ross-Simmons matter, the jury concluded that such price correlations did not support the claim that the scope of the lumber market was limited to the alder species.

Given the limitation of simple price correlations, the defendant's economics expert performed a cointegration analysis (involving the application of a vector error-correction model) to the transaction data produced during discovery for all plaintiffs and the defendant. This methodology is designed to capture the linear combinations of co-movements among multiple time series.[39] The results of this analysis suggested that the product scope for the relevant downstream lumber market included not only kiln-dried alder lumber, but at a minimum, several other hardwood species: Pacific Coast maple, ash, black walnut, cherry, hard maple, yellow poplar, red oak, soft maple, and white oak produced in the United States, the linga species produced in Latin America, and European beech.

In addition to the cointegration analysis, a standard framework for evaluating the product scope involves the application of a SSNIP test. Fortunately, during a benchmark period that occurred well before Weyerhaeuser allegedly engaged in any predatory conduct, large variation in the foreign-currency prices of alder for these periods of time was accompanied by significant changes in alder-export volumes prior to the alleged period of wrongful conduct. Based on these data, the defendant's expert estimated spatial-demand curves in order to evaluate whether a competitive supplier of alder lumber who increased the price of alder lumber could do so profitably. The defendant's expert

[39] The estimated cointegration equation may be interpreted as the long-run equilibrium relationship between the variables (Greene 2000, p. 790). In contrast to simple correlation analysis, cointegration can investigate the relationship among many variables, again without any assignment of causality. Instantaneous correlation when many variables move together requires searching for a linear combination that is stationary. Formally, a vector y_t is said to be cointegrated if there exists a vector β_i such that $\beta'_i y_t$ is trend-stationary. If there exist r such linearly independent vectors β_i, $i = 1, \ldots, r$, then y_t *is* said to be cointegrated with cointegrating rank r. The matrix $\beta = (\beta_1, \ldots, \beta_r)$ is called the cointegrating matrix.

concluded that given the substitutability and the complementarity of other hardwood lumber products, a small but significant long-term increase in alder lumber prices would prove to be unprofitable.[40]

The geographic and product scope of the upstream log market were much more contentious. Initially, the plaintiffs argued that the assembly costs for each mill, including transportation, determined a local geographic zone of alder-log supply that was specific to each mill. Accordingly, plaintiffs decomposed the entire procurement area in the states of Oregon and Washington into a number of individual geographic alder-log-supply zones. The defendant's expert rejected this hypothesis based on evidence that the procurement areas from one mill to another overlapped and that log prices were spatially integrated.

As in the case of the downstream lumber market, the plaintiff's experts again put forward survey data for alder-log prices. One source was "Loglines Log Price Reporting Service" ("Loglines"); the other source, which covered Washington State, was the *Washington Log Market Report (WLMR).* The defendant assessed simple first-differences price correlations for these two survey-data sources and contended that the survey data did not represent the actual transaction data that were produced through discovery. Moreover, controlling for the quality of logs (grades, diameters, and lengths), the simple-correlation coefficient between these two survey-data sources was only 0.41, well below what one would expect for two survey instruments that were supposed to measure the same market phenomena. Nevertheless, the court accepted the plaintiff's experts' argument that the product scope of the log market was limited to alder.

[40] As the plaintiff's expert in Ross-Simmons, Richard Zerbe (2005, p. 720), recognizes, "the monopsonists [referring to Weyerhaeuser] had little market power in the output market."

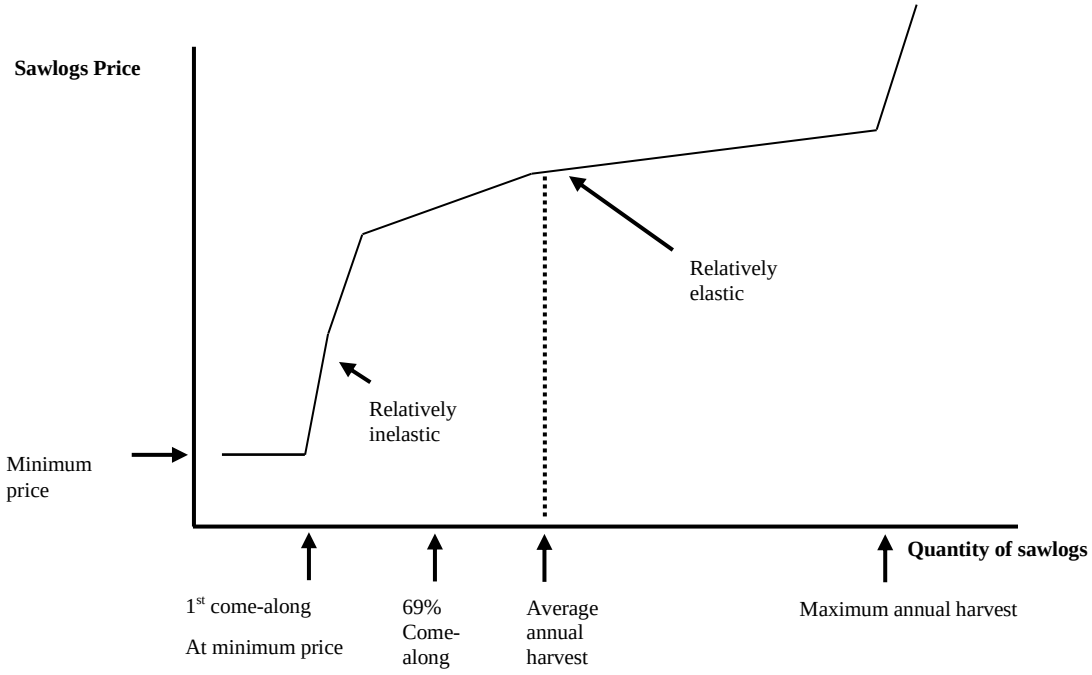
The plaintiffs also concluded that the supply function for alder logs was perfectly inelastic. They based this assertion on their claim that alder sawlogs constitute a "come-along" harvest species, or a species that is harvested only secondarily to the harvest of softwoods. In other words, because alder hardwood grows on the same tracts of land as softwood species, whenever a landowner decided to harvest a particular tract, he or she faced complementarities in the procurement of alder sawlogs with softwood timber. The plaintiffs also relied on internal planning documents from Weyerhaeuser that specified that a large percentage of the annual alder harvest was price-inelastic because it was "come-along."

But Weyerhaeuser claimed that only a portion of the supply of alder logs qualified as "come-along." Some timber tracts, Weyerhaeuser contended, contained exclusively or primarily alder trees, and the density of that growth also varied across tracts. In addition, the defendant's expert argued, in deciding whether to harvest, each landowner faced a trade-off between delaying the harvest versus harvesting in the current period. That is, flexibility existed on the supply side with regard to both current-versus-future-harvest and to harvesting alder-rich versus alder-poor tracts. The defendant's analysis of these details produced a supply function for the timberlands covering the PNW that was inelastic over some harvested sawlogs but relatively elastic for a larger quantity of harvested logs. The defendant also asserted that observed prices generally took place over the more-elastic range of this supply relationship.

This supply structure is represented in Figure X-1, which shows that approximately 69 percent of the alder harvest is "come-along" and so perfectly inelastic, bound by a minimum price that must cover harvesting and logging cost before even any supply is forthcoming. Additional supply (beyond "come-along" quantities) requires weighing trade-offs between alder-rich versus alder-poor tracts and future versus current logging. Here, a much greater elasticity is observed.

Significantly, the average annual harvest and observed prices for alder sawlogs take place over the very-elastic range of the supply curve.

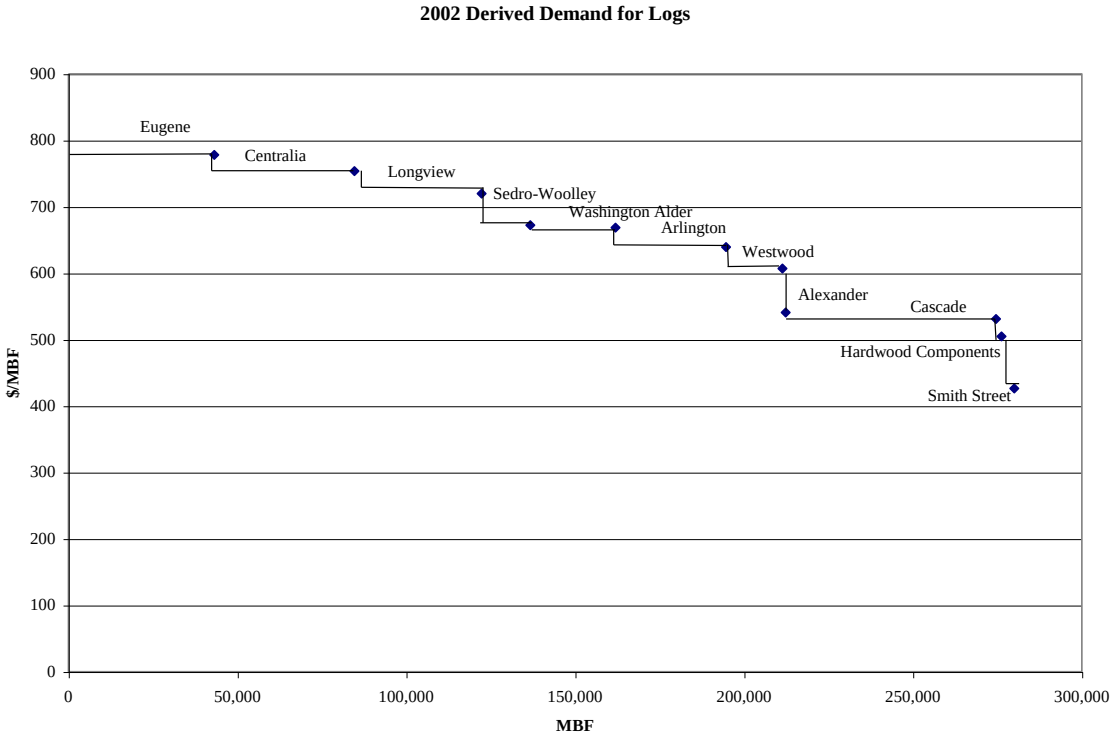
Figure X-1. The Alder Sawlog Supply Curve



Along with the alder log supply, the defendant's expert also measured the maximum willingness-to-pay for alder logs for all mills that operated in the relevant two states for which data were produced in discovery (Oregon and Washington) for 2002.[41] The computation of this maximum willingness-to-pay (or derived demand) was based on the break-even point for each sawmill, given its variable costs and the revenues that it generated from the lumber produced from alder logs, the technical efficiency of its operations, and its operating cost structure. Since each mill relied on different technologies and operating methods, each mill's maximum willingness-to-pay also varied. The resulting derived demand of the mills engaged in the various disputes is presented in Figure X-2.

[41] The year 2002 is critically important. The district court's ruling in favor of Ross-Simmons was final for purposes of collateral estoppel. The judge ruled that Weyerhaeuser would be precluded at trial from contesting the plaintiffs' monopsonization claim for the period 1996–2001. This ruling meant that for the years in question, the following had already been determined: "(1) the existence of a relevant product market for alder sawlogs, which is confined geographically to the Pacific Northwest; (2) that Weyerhaeuser possessed monopoly power in the market; and (3) that Weyerhaeuser willfully acquired and maintained such monopoly through anticompetitive conduct." With respect to the attempted monopolization claim (and for the same period), the district court judge also ruled that Weyerhaeuser would be precluded from contesting that "(1) Weyerhaeuser had a specific intent to obtain monopoly power in the alder sawlog market; (2) Weyerhaeuser attempted to obtain monopoly power in that market through anticompetitive conduct; and (3) there was a dangerous probability that Weyerhaeuser would succeed in obtaining such monopoly power." Finally, the judge ruled that Weyerhaeuser would be precluded from contesting that its own "monopolization of the alder sawlog market through illegal anti-competitive means was a material cause of antitrust injury to Ross-Simmons . . . and a material cause of Ross-Simmons going out of business in May 2001." As a result, when *Washington Alder* v. *Weyerhaeuser* went to trial, the only year that was not subject to issue preclusion was 2002. (Although the judge continually referred to "monopoly" and "monopolization," it seems very likely that he meant "monopsony" and "monopsonization," since he was referring to market power that was being exercised by a buyer.)

Figure X-2. 2002 Derived Demand for Logs[42]



MBF = thousand board feet

From the derived demand for alder sawlogs and the supply relationship for timber owners, Weyerhaeuser introduced evidence that it was never the marginal buyer of logs and that the revenues that it generated from alder lumber always exceeded its variable cost as well as the sum of its variable and fixed costs. Based on Weyerhaeuser's data, the company's purchasing practices passed the Areeda-Turner test (as the Supreme Court later recognized in *Weyerhaeuser).* In only a few instances, Weyerhaeuser asserted, did the smaller, inefficient mills face log prices that exceeded their maximum willingness-to-pay.

[42] Of these mills, Weyerhaeuser owned Eugene, Centralia, Longview, Sedro-Woolley, and Arlington.

Weyerhaeuser introduced evidence that a SSNIP test to determine whether it would have benefited from reducing the price it paid for sawlogs during any prospective, second-stage recoupment period. Recognizing that the elasticity of supply varies across sub-regions due to the age of the trees, their physical location, and their density, a hypothetical 5 percent reduction in prices paid for sawlogs would have taken place over the supply-elastic range represented in Figure X-1. The locational heterogeneous supply curves aggregate up to the total supply, whose elasticity value for the total amount moving through the market was approximately 5. As a result, on a buying-price reduction of 5 percent,[43] the supply of logs available to Weyerhaeuser could have fallen by as much as 25 percent. Therefore, the defendant claimed, the price reduction would have been unprofitable during any potential second-stage recoupment period, assuming Weyerhaeuser would have been successful in a first-stage predatory elimination of competitors.

Other facts also suggest that the product scope in the upstream log-procurement market should be expanded beyond just alder. Two other hardwood species, maple and poplar, were available for purchase by lumber mills in Washington and Oregon. Serious questions arose about whether sufficient quantities of these alternative hardwood species were available to meet the derived demand of the competing mills. At a minimum, however, the pricing for these alternative species can be treated as a related market, and it can be argued that the related markets with access to a common resource input: timberland.

[43] In this hypothetical scenario, Weyerhaeuser would earn at most an extra 5% of its revenues on the reduced sales it makes, since it pays 5% less for those logs. On the 75% of its original sales that it retains, it would earn at most an extra 5%, for a gain of at most 0.75 x 0.05 = 0.0375, or 3.75%, of its revenues. However, Weyerhaeuser would not earn a profit on the lost sales. Given Weyerhaeuser's operating profit margin of 28% of its revenues during the period 1990–2002, the loss of 25% of its input (and hence output) would reduce its profit by 0.28 x 0.25 = 0.07, or 7%. The net effect of the reduced prices offered by Weyerhaeuser is a reduction in its profit of at least 0.07 – 0.0375 = 0.0325, or 3.25%. Accordingly, this attempt to reduce sawlog buying prices would not be profitable.

Recall that one of the plaintiffs' claims was that Weyerhaeuser assumed the role of the dominant firm, with monopsony power, and abused that role in the market for sawlogs. One test of this claim is to determine whether Weyerhaeuser was the price leader for purchases of alder sawlogs. If Weyerhaeuser was the driving force behind alder log prices, then the prices it paid for logs should lead the prices paid by other competing mills. Here again, a complete transaction database on all sawlog purchases by Weyerhaeuser and two of its largest competitors, Washington Alder and Cascade, was available through discovery. The test for the hypothesis that Weyerhaeuser was the price leader was based on a Granger (1969, 1988) causality analysis under the condition (specified by plaintiffs) that the only species available in the upstream market was alder.[44] This empirical causality analysis revealed that Weyerhaeuser did not lead the setting of these prices. Rather, the two principal hardwood mills that competed with Weyerhaeuser (and each other), Washington Alder and Cascade, alternately occupied the price-leadership position. Interviews with log sellers and independent-contractor loggers provided supporting evidence for this conclusion, as did analysis that was conducted in the normal course of business by two large timber owners (Plum Creek and Menasha).

7. Conclusion

Among the host of Weyerhaeuser matters that came before the district court, a number of contradictory rulings were issued. In the three actual trials that were conducted, one found that there was no relevant market for finished alder lumber but that Weyerhaeuser had monopsony power in the upstream market for alder sawlogs, which it abused through its predatory conduct,

[44] Granger causality focuses on linear prediction. A variable is said to be Granger-causal for another variable, y_t, if it helps predict y_t at some stage in the future. For the sawlog price-leadership analysis, Washington Alder's and Cascade's transaction prices Granger-caused subsequent Weyerhaeuser prices, but not vice versa.

and that recoupment was a distinct possibility (*Ross-Simmons*). The second found that there was not only no relevant market for finished alder lumber but also that Weyerhaeuser did not engage in abusive monopsonistic practices in the upstream sawlog market (during the only year that was not subject to issue preclusion, 2002) (*Washington Alder).*The third found that there was a separate relevant market for finished alder lumber and that Weyerhaeuser had exercised and abused its monopoly power in the downstream lumber market (*Morelock).*[45] Such contradictory rulings call out for an objective economic test to avoid evidence spun to fit a theme of anticompetitive intent. The Supreme Court provided such a test for predatory bidding in its ruling in *Ross-Simmons* v. *Weyerhaeuser*.

The empirical analysis reviewed here shows why plaintiffs were unable to establish that *Weyerhaeuser* satisfied the *Brooke Group* test. The evidence supporting the hypothesis that Weyerhaeuser incurred losses because it overpaid for sawlogs did not exist. The court also rejected the claim that a "dangerous probability" existed that the defendant would eventually recoup any initially excessive buying costs. The defendant succeeded in showing that sufficiently low barriers to entry for potential competitors existed and that actual competitors had successfully entered the market during the alleged period of monopsonistic abuse. In addition, the defendant persuaded the court that sawlog suppliers were responsive to price change (rejecting the earlier assertion of the Ninth Circuit related to inelastic supply) and that it lacked monopoly power in the downstream lumber market.

In the first-stage loss test of *Brooke Group*, there is indeed a difference between predatory bidding and predatory selling: the former has indirect while the latter has direct

[45] Morelock alleged that Weyerhaeuser had gained its monopoly in the lumber market by means of anticompetitive acts in the alder sawlog market. It appears to have done so in order to use all of the same evidence of anticompetitive intent that Ross-Simmons and the other plaintiffs had relied on in the other cases.

impacts on consumer welfare. In addition, the potential "chilling effects" on pro-competitive pricing of any legal standard can be expected to differ between two types of conduct. Moreover, even if a defendant had wielded downstream monopoly power as well as upstream monopsony power, a general-equilibrium framework would not necessarily result in "first-stage" losses. In a general-equilibrium context, with flexible entry and exit, profitable predatory bidding can occur only when the vertical market structure admits both monopolistic and monopsonistic behavior. Only in that case can the increase in rivals' cost permit the predatory firm to exercise and enhance its market power as a monopolist without necessarily eliminating its rivals from the output market. Hypothetically, under these conditions, it is even possible for the predatory firm to enhance its monopoly power in the output market, recouping its investment by raising the input prices for its competitors as well as itself.

We maintain that investigating market power and its potential abuse in vertical structures such as the lumber industry requires a general- rather than partial-equilibrium lens. As we argued, the *Brooke Group* standard and the seminal work of Areeda and Turner (1975) rely on a partial-equilibrium framework. This framework is not robust in the face of substantial substitutability and/or complementarity in input supplies and output demands and of alternative technologies employed by competing firms. In contrast, the general-equilibrium analysis reveals that if a firm in a concentrated industry cannot adjust the output price through its input-buying behavior, then it cannot sustainably increase its profits by overbuying the input. Instead, the traditional monopsony result obtains only where a firm restricts input market quantity. At a minimum, in the presence of related industries, much can be learned from a general-equilibrium analysis conducted to assess the long-run comparative statics before turning to a two-stage dynamic analysis to assess whether competitive readjustment is artificially prevented. Two-stage

predatory behavior, whether bidding or selling, should require identification of artificial barriers to other firms' re-entry or new-firm entry during the recoupment period.

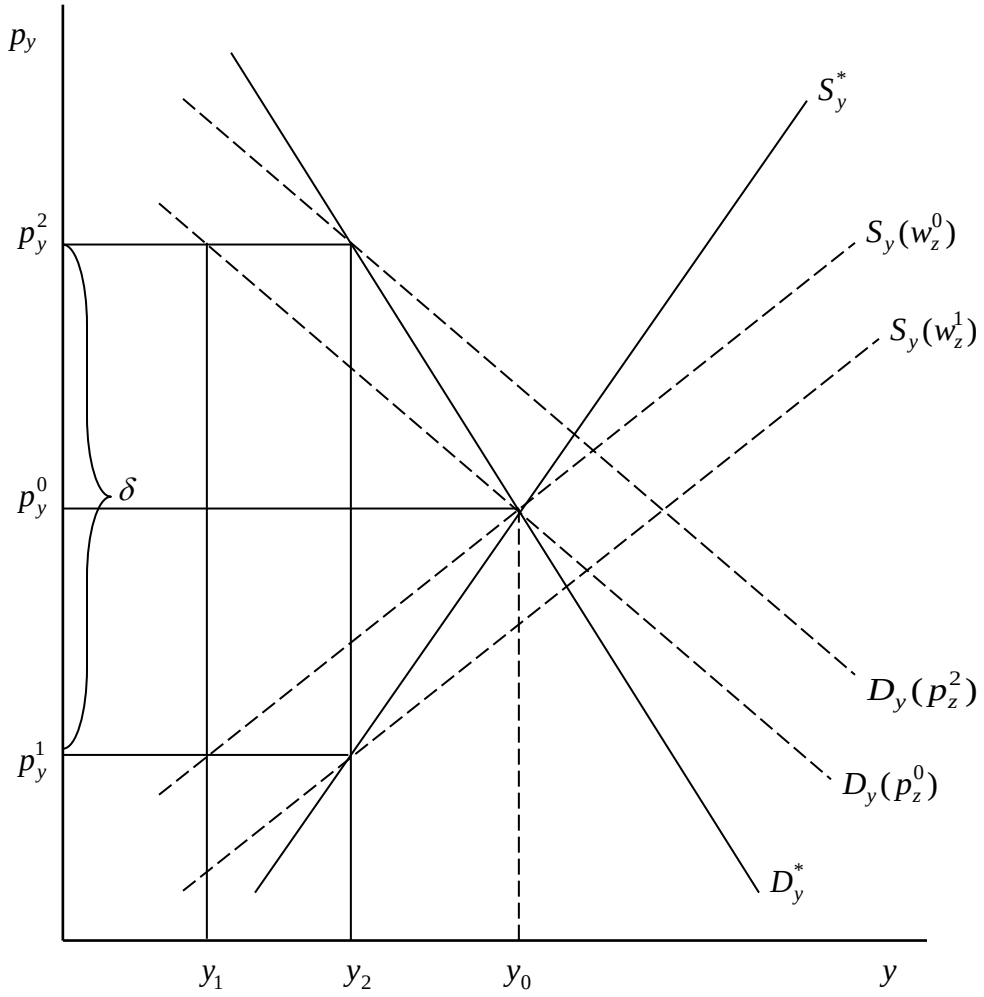
Following the financial crises of 2008 and the burst of the housing bubble, the competitive landscape of the Pacific Northwest hardwood industry has changed dramatically. Two entrants during the alleged damage period, Westwood and Diamond West, have shut down; the Weyerhaeuser subsidiary Northwest Hardwoods has acquired Washington Alder; a new poplar hardwood lumber mill has entered the market; two of the Pacific northwest Weyerhaeuser lumber mills, Arlington and Sedro Wolley, and the Canadian Weyerhaeuser lumber mill, Delta, have been closed; and finally, in June of 2011, Weyerhaeuser sold its Northwest Hardwoods subsidiary to a private equity group for $108 million. Many of these developments were driven by the housing market collapse. Alder sawlog prices have fallen by as much as 50 percent in 2009, and the overall alder timber harvest has fallen to between 60 and 70 percent of the 2004–05 harvest levels. A major source of stability and growth following the trough in 2009 has been China export demand.

Appendix

In order to explain the different results that are obtained via a general-equilibrium versus a partial-equilibrium approach, it is critical to distinguish between ordinary supply and demand relationships within the context of individual markets. A supply relationship is a schedule of quantities of a good that producers will supply at various prices. An *ordinary supply* of a designated good holds constant either the prices or quantities of all other goods except for the designated good. In contrast, a *general-equilibrium supply* allows the prices and quantities in all other markets to adjust to changes in the designated market. Similarly, a demand relationship is a schedule of quantities of a good that consumers will demand at various prices. An *ordinary demand* for a designated good holds constant the prices or quantities of all other goods except the designated good. In contrast, a *general-equilibrium demand* allows prices and quantities in all other markets to adjust. *Partial equilibrium* is characterized by the price and quantity that equate an ordinary supply and an ordinary demand in a single designated market. *General equilibrium* is characterized by the prices and quantities that equate supply and demand in all markets.

To illustrate the conceptual distinctions, consider Figure X-3. In the absence of distortion or anticompetitive conduct, partial equilibrium in the market for good *y* occurs where the ordinary supply $S_y(w_z^0)$ intersects the ordinary demand $D_y(p_z^0)$. Partial equilibrium can be characterized for any given set of prices in other markets. One possible choice is to condition both ordinary supply and ordinary demand on the general-equilibrium prices that exist in all other markets when the market for good *y* is not distorted. These prices are represented by w_z^0 and p_z^0. Where w_z^0 represents the general-equilibrium prices of all factor inputs used by producers of *y*, $S_y(w_z^0)$ represents the ordinary supply of *y*, given those prices. Similarly, where p_z^0 represents the general-equilibrium prices of all other consumer goods, $D_y(p_z^0)$ represents the ordinary demand for *y*, given those prices. Accordingly, ordinary supply and ordinary demand for good *y* equate in both partial and general equilibrium at quantity y_0 and price p_y^0.

Figure X-3. General- Versus Partial-Equilibrium Supply and Demand



Now suppose a distortion, represented by δ, is introduced into the *y* market. After adjustment, the price received by producers of *y* (excluding the distortion) is p_y^1, and the price paid by consumers (including the distortion) is p_y^2, where $p_y^2 - p_y^1 = \delta$. At a lower output price, producers of *y* will demand less of their factor inputs, which will cause prices in their factor-input markets to decline from w_z^0 to, say, w_z^1, on the presumption that supplies of their factor inputs are not perfectly elastic. In turn, however, with lower factor-input prices, the ordinary supply of *y*, as conditioned on input prices, will shift outward from $S_y(w_z^0)$ to $S_y(w_z^1)$, because producers of *y* will choose to supply a greater quantity of *y* at any given price of *y*.

At the same time, the higher price p_y^2 will cause buyers to increase demand for species or products that substitute for *y* and reduce demand for products complementary to *y*. This adjustment will cause prices of substitutes to rise and prices of complements to fall, on the assumption that their supplies are not perfectly elastic. In turn, however, both an increase in the price of substitutes and a reduction in the price of complements will cause the ordinary demand for *y*, as conditioned on the price of substitutes and complements, to shift outward from $D_y(p_z^0)$ to $D_y(p_z^2)$, because buyers will choose to purchase more of *y* at any given price of *y*.

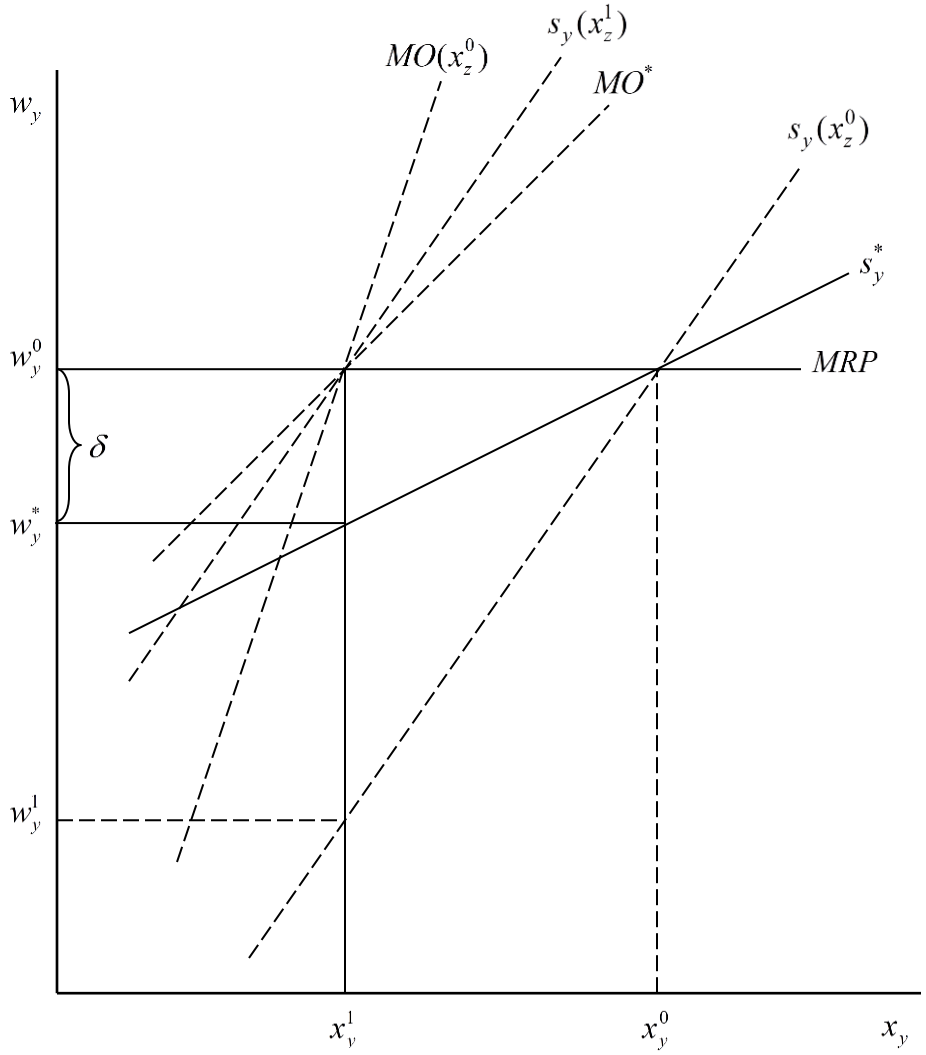
As these shifts occur (after prices have adjusted to equate respective quantities supplied and demanded in all markets), the new general equilibrium will not be at the quantity y_1, where the vertical difference between the original ordinary demand and ordinary supply is equal to δ. Rather, the new general-equilibrium quantity in the *y* market will be at quantity y_2, where the vertical difference between the new ordinary demand and ordinary supply is equal to δ. Varying the size of the distortion δ traces out the general-equilibrium supply S_y^* and general-equilibrium

demand D_y^*, which take account of equilibrium adjustments in all other markets in the economy in response to various distortions in the *y* market. While these general-equilibrium concepts of supply and demand for an individual market depend upon the type of distortion that is introduced (see Just, Hueth, and Schmitz 2004, pp. 355–361), the graphical illustration reveals that the impact on market quantity can be very different when realistic adjustment in related markets is considered.

For the case of monopsony power, Figure X-4 illustrates the difference between ordinary and general-equilibrium supply when related markets exist. For simplicity's sake, this graphical representation assumes that the producer of good *y* has a constant-marginal-revenue product, given by *MRP*, for the input x_y. (This would be the case under constant returns to scale if all inputs were variable and other inputs were available in elastic supply.[46]) The ordinary supply of x_y, given general-equilibrium quantities x_z^0 in other primary and intermediate goods markets, is $s_y(x_z^0)$. With competitive behavior, the producer maximizes profit by equating the input price (specified by the ordinary supply) to marginal-revenue product. The resulting input quantity purchased by the producer is x_y^0 when other quantities are at general-equilibrium levels represented by x_z^0. Thus, the general-equilibrium market quantity and price of x_y are x_y^0 and w_y^0, respectively.

[46] Marginal revenue product and marginal value product coincide in the case of constant marginal revenue product. More generally, if output demand for the producer is not perfectly elastic, then marginal revenue product rather than marginal value product must be used to account for declining output price as more of the input is used.

Figure X-4. Equilibrium Effects of Monopsony with a Related Market



Alternatively, assume that the producer exercises monopsony power as a buyer of x_y by reducing the quantity purchased in order to reduce its acquisition price. Traditional partial-equilibrium analysis of monopsony determines the relevant marginal-outlay schedule from the ordinary supply, $s_y(x_z^0)$. The marginal-outlay schedule specifies the marginal cost of buying an additional unit of the input, given that according to the supply relationship, an increase in quantity drives up the price paid on the entire quantity. The marginal outlay in Figure X-4 is represented by $MO(x_z^0)$, which, in the case of a linear supply, follows a line halfway between the ordinary supply $s_y(x_z^0)$ and the vertical axis. Regardless of linearity, the marginal outlay depends on the same quantities of other goods, represented by x_z^0, as does the ordinary supply. The conventional partial-equilibrium monopsony solution that maximizes the producer's profit equates marginal-revenue product, *MRP*, to the marginal outlay, $MO(x_z^0)$, by restricting purchases to x_y^1. The monopsonist is thus able to reduce the input price of x_y along the ordinary supply $s_y(x_z^0)$ from w_y^0 to w_y^1.

With general-equilibrium adjustment, however, reducing the input suppliers' output of x_y to x_y^1 will generally cause adjustments in other markets. For example, input suppliers with joint technologies will have a lower marginal cost of producing alternative substitute intermediate goods, but the marginal cost of producing complementary (e.g., by-product) intermediate goods will increase. Accordingly, in general equilibrium, where other markets are free to adjust, quantities of the input suppliers' substitute products will increase, but the quantities of the suppliers' complementary products will decline. Where the quantities of these other intermediate goods after equilibrium adjustment are represented by x_z^1, both of these

adjustments will cause a reduction in the ordinary supply of x_y as represented by the shift to $s_y(x_z^1)$ in Figure X-4.

The analysis above pertains only to monopsonistic input-market distortions. What about the case of predatory abuses in both the input and the output markets? Here, Salop's separation between predatory bidding ("predatory overbuying") and raising rivals' costs through overbuying is instructive. In the latter case, the predator's intention is to raise the output-market competitors' input cost so as to allow the predator itself to acquire or enhance its market power as a monopolist. Such an action, when combined with predatory bidding, simply means that when a dominant firm has market power in both its input and output markets, it can abuse its power by optimally combining both strategies. As Just and Rausser (2007a; 2007b) have shown, even when no anticompetitive barriers to reversibility exist (i.e., when rival firms are forced to exit the market but also have incentives to re-enter during a recoupment period[47]), profitable predatory bidding is sustainable in the long run, but predatory selling is not. This result turns on characteristics of technologies of competing industries (species of hardwood) and structure of input supplies and output demands, including the degree of substitutability or complementarity. Under a wide range of conditions, profitable predatory bidding (including predatory overbuying, or raising rivals' costs) can occur on a continuing basis without the need for evidence of actual losses during an initial stage of predation.

[47] See Just and Rausser (2007a; 2007b) for analyses of market structures that admit monopoly power as well as market structures that admit both monopoly and monopsony power. For the latter structure, Just and Rausser show that although predatory overbuying can be profitably sustained, overselling cannot.

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