

## CHAPTER 13

### NON-HORIZONTAL MERGER ANALYSIS

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Various types of merger transactions fall under the umbrella of non-horizontal mergers. They include vertical mergers (mergers between firms at adjacent vertical levels), complementary product mergers, and conglomerate product mergers.

The acquisition of a competitor by a vertically integrated firm raises both horizontal and non-horizontal merger issues. This chapter uses the term *vertical* as short-hand for all these variants. It uses the terms *upstream* and *downstream* to describe the two markets, although in the case of complementary product and conglomerate mergers, each of the two merging products may be considered as the upstream or downstream product.

Non-horizontal acquisitions can violate Section 7 of the Clayton Act and Section 1 or Section 2 of the Sherman Act. Vertical mergers can lead to anticompetitive effects centered in either of the product markets. The mechanism of harm can involve unilateral, coordinated, and/or exclusionary effects. The primary concern is exclusionary effects that involve input foreclosure, customer foreclosure, or both.

Concerns can also arise from the misuse of competitively sensitive information, which can involve either exclusionary effects from fear of misuse that leads to self-foreclosure or collusive effects associated with information exchange. Non-horizontal mergers can also be used to evade price regulation or the provisions of long-term contracts with customers. At the same time, they can lead to procompetitive efficiencies.

Previous chapters have presented the basic economic analysis of these exclusionary and collusive effects. The economic analysis of foreclosure was explained in detail in the exclusionary conduct section. This economic analysis is briefly summarized here.<sup>1</sup>

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<sup>1</sup> For a sampling of the technical economics literature on anticompetitive concerns, see Jonathan B. Baker, *Exclusion as a Core Competition Concern*, 78 ANTITRUST L.J. 527 (2013); Jeffrey Church, *Vertical Mergers*, in 2 ISSUES IN COMPETITION LAW AND POLICY 1455 (2008) [hereinafter Church, *Vertical Mergers*]; Janusz A. Ordover, Garth Saloner, and Steven C. Salop, *Equilibrium Vertical Foreclosure*, 80 AM. ECON. REV. 127 (1990); Oliver Hart and Jean Tirole (1990), *Vertical Integration and Market Foreclosure*, BROOKINGS PAP. ECON. ACT. MICROECONOMICS 205 (1990); Patrick Rey and Jean Tirole, *A Primer on Foreclosure*, in 3 HANDBOOK OF INDUSTRIAL ORGANIZATION

## I. Decision Theory Analysis of Vertical Merger Liability Standard

Commentators associated with the Chicago School, such as Robert Bork and others, have argued that fundamentally different presumptions should be applied to vertical and horizontal mergers.<sup>2</sup> Bork argued that foreclosure was illusory, and that what some assumed was foreclosure was nothing more than a neutral rearrangement of relationships between suppliers and customers. He also embraced an economic model that implied that competitive harm was implausible because there is only a single monopoly profit, which would be unaffected by a merger (except under rare circumstances).<sup>3</sup> He also argued that in contrast to horizontal mergers, non-horizontal mergers raised no inherent competitive concerns, because the merging products are not substitutes. At the same time, vertical mergers eliminated the double marginalization of input costs, incentivizing price decreases.

### A. Flawed Presumption That Vertical Mergers Are Procompetitive

This analysis would suggest that vertical mergers deserve a procompetitive presumption. A modern economic approach shows that the market and technological assumptions underlying this analysis are either highly limited or incorrect.

#### 1. The illusory foreclosure argument

The illusory foreclosure argument is based on a simple model of supply and demand. Suppose that each of three upstream firms ( $U1$ ,  $U2$ , and  $U3$ ) provides inputs to all three downstream firms ( $D1$ ,  $D2$ , and  $D3$ ). After the vertical merger of  $U1$  and  $D1$ , suppose that the merged firm decides to engage in full self-dealing—that is,  $U1$  stops supplying inputs to  $D2$  and  $D3$ , and  $D1$  stops buying inputs from  $U2$  and  $U3$ . In this scenario, the two other upstream firms,  $U2$  and  $U3$ , can replace their lost sales to  $D1$  with increased sales to  $D2$  and  $D3$ . The merger simply rearranges the demand/supply arrangements.

This model might make sense in unconcentrated markets (say, markets with 10 firms at each level), where the merging firms have small market shares, as in the merger between Brown Shoe's manufacturing facilities and Kinney shoe stores.<sup>4</sup> It is not a good fit for markets in which the elimination of  $U1$ 's sales to  $D2$  and  $D3$  give  $U2$  and  $U3$  the ability and incentive to raise their input prices to these downstream rival firms. In that situation, the higher costs of  $D2$  and  $D3$  will allow  $D1$  to gain sales and raise its price.

Suppose that in the pre-merger world, the three upstream firms were able to informally and imperfectly tacitly coordinate, allowing them to charge more than marginal cost but less than the profit-maximizing cartel price. Of the upstream merging firm forecloses by raising its prices or refusing to sell to the rival downstream firms, the two remaining upstream competitors can raise

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2145 (Mark Armstrong and Robert H. Porter eds., 2007); Michael H. Riordan, *Competitive Effects of Vertical Integration*, in HANDBOOK OF ANTITRUST ECONOMICS 145 (Paolo Buccirossi ed., 2008); Michael H. Riordan and Steven C. Salop, *Evaluating Vertical Mergers: A Post-Chicago Approach*, 63 ANTITRUST L.J. 513 (1995); Michael Salinger, *Vertical Mergers and Market Foreclosure*, 103 Q.J. ECON. 345 (1988); David T. Scheffman and Richard S. Higgins, *Vertical Mergers: Theory and Policy*, 12 GEO. MASON. L.R. 967 (2004).

<sup>2</sup> ROBERT H. BORK, THE ANTITRUST PARADOX: A POLICY AT WAR WITH ITSELF 225-45 (1978).

<sup>3</sup> *Id.* at 229,232.

<sup>4</sup> *Brown Shoe Co. v. United States*, 370 U.S. 294 (1962).

their prices, either because they can better tacitly coordinate or because the products are differentiated and the price increase by *U1* naturally leads *U2* and *U3* to raise their prices in response. In this way, their responses will “accommodate” the foreclosure. As a result, there will be real foreclosure and price effects, not the mere rearrangement of supply relationships imagined by Bork.<sup>5</sup> Other potential coordination (i.e., collusive) effects among the non-merging input suppliers are also possible in this type of oligopoly structure, suggesting that a vertical merger would not represent just a neutral rearrangement of supply relationships.

### 2. *The single monopoly profit theory*

Chicago School scholars in the 1960s and 1970s famously criticized anticompetitive foreclosure allegations involving a monopolist’s tying, vertical mergers, and vertical agreements on the grounds that there is only a single monopoly profit.<sup>6</sup> According to this theory, an upstream (or tying product) monopolist can fully collect the monopoly profit from pricing the monopoly product and would not have an incentive to engage in this exclusionary conduct to maintain or enhance its monopoly power. Its only foreclosure incentive would be to achieve procompetitive cost reductions or product improvements.

In the context of a vertical merger, the theory is valid only under the following very limited economic conditions:

- The upstream monopoly is perfectly protected by prohibitive entry barriers.
- Downstream products are homogeneous, not differentiated.
- The monopolist’s input is used in fixed proportions in producing the downstream products.
- The input monopolist has imperfect information about the downstream firms’ costs.

When the products are differentiated, the single monopoly profit theory fails, because the downstream firms mark up their costs and the monopolist is not able to extract the profits with simple per unit prices.<sup>7</sup> In this case, a vertical merger can lead to both foreclosure of the unintegrated rival and the elimination of the double marginalization (EDM) of benefits, creating both harms and benefits.

### 3. *Lack of inherent anticompetitive concerns*

Some scholars have argued that in contrast to horizontal mergers, which raise intrinsic competitive concerns, non-horizontal mergers are likely to be pro-competitive.<sup>8</sup> According to this reasoning, a

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<sup>5</sup> For a more detailed exposition of this point with figures, see Thomas G. Krattenmaker and Steven C. Salop, *Anticompetitive Exclusion: Raising Rivals’ Costs to Achieve Power over Price*, 96 YALE L.J. 209 (1986). For a fully specified technical model, see Janusz Ordover et al., *Equilibrium Vertical Foreclosure*, 80 AM. ECON. REV. 127 (1990).

<sup>6</sup> For the classic statement, see Ward S. Bowman, Jr., *Tying Arrangements, and the Leverage Problem*, 67 YALE L.J. 19 (1957). See also BORK at 229; Aaron Director and Edward H. Levi, *Law and the Future: Trade Regulation*, 51 NW. U. L. REV. 281 (1956). The theory recognizes an exception if the monopolist is regulated, in which case the merger can be used to evade regulation.

<sup>7</sup> In the unusual case in which the monopolist’s pricing involves a two-part tariff consisting of a per unit price equal to marginal cost and a perfectly discriminating lump-sum fee, it can extract all the downstream profits.

<sup>8</sup> See Daniel P. O’Brien, *The Antitrust Treatment of Vertical Restraints: Beyond the Possibility Theorems*, in THE PROS AND CONS OF VERTICAL RESTRAINTS (2008).

pure vertical merger between two monopolists in vertically adjacent markets has no anticompetitive effects and yields EDM efficiency benefits. Supporters of this view also argue that the empirical evidence supports a procompetitive presumption.<sup>9</sup>

These contrasting presumptions do not hold up to rigorous analysis, for two main reasons. First, each of two standalone monopolists might be a potential entrant into the market of the other or a potential sponsor for an independent entrant, because creating competition in the adjacent market would increase the ability to extract profits. If there is potential for entry, each firm may set its price below the monopoly level. In the limit, absent any entry barriers, the potential for entry by equally efficient entrants could lead each monopolist to set a limit price equal to marginal cost. After the vertical merger, the merged firm could set the monopoly price for the vertically integrated product and be unwilling to sponsor competitive entry.

Second, there is an incentive to support competition in the adjacent market even if the firm is not a standalone monopolist in its market. Before the vertical merger and absent any expectations of a merger, the future upstream merging firm has an inherent incentive to support competition by rivals of the future downstream merging firm by charging them competitive input prices. In this sense, the future upstream merging firm is like a quasi-partner of those rivals in competing with the potential future upstream merging firm. After the vertical merger, this quasi-partner merges with the downstream merging firm. A vertical merger is thus analogous to a horizontal merger between the downstream merging firm and the quasi-partner, raising inherent horizontal concerns.<sup>10</sup> Even without the horizontal merger analogy, this reasoning indicates that the pre-merger incentive to support the rivals of the future upstream merging firm are replaced with the post-merger incentive to engage in foreclosure conduct directed at those rivals.

#### 4. Non-horizontal merger efficiencies

Like horizontal mergers, non-horizontal mergers may lead to efficiency benefits. These benefits can include coordination of design and production, risk reduction, EDM, harmonization of incentives, and elimination of free-riding, all of which are discussed in previous chapters.<sup>11</sup>

Horizontal mergers can also yield efficiency benefits. In neither type of merger are these potential benefits inevitably cognizable under the conditions set out above or necessarily dominate the anticompetitive effects, however. Substantial valid and merger-specific efficiencies sufficient to offset the potential harms from foreclosure and improved pricing coordination are not inevitable. They cannot justify the sort of procompetitive presumption favored by Bork and others.

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<sup>9</sup> See James C. Cooper et al., *Vertical Antitrust Policy as a Problem of Inference*, 23 INT'L J. INDUS. ORG. 639 (2005); and Francine Lafontaine and Margaret Slade, *Exclusive Contracts and Vertical Restraints: Empirical Evidence and Public Policy*, in HANDBOOK OF ANTITRUST ECONOMICS 391 (Paolo Buccirossi ed., 2008).

<sup>10</sup> Serge Moresi and Steven C. Salop, *When Vertical is Horizontal: How Vertical Mergers Lead to Increases in "Effective Concentration,"* 59 REV. IND. ORG. 177 (2021).

<sup>11</sup> See Steven C. Salop, *Invigorating Vertical Merger Enforcement*, 127 YALE L.J. 1962 (2018); Armen A. Alchian and Harold Demsetz, *Production, Information Costs, and Economic Organization*, 62 AM. ECON. REV. 777 (1972); Paul L. Joskow, *Vertical Integration*, HANDBOOK OF THE NEW INSTITUTIONAL ECONOMICS 319 (Claude Menard and Mary M. Shirley eds., 2005); Dennis W. Carlton, *Vertical Integration in Competitive Markets Under Uncertainty*, 27 J. INDUS. ECON. 189 (1979).

### 5. Empirical evidence

Some earlier studies suggested that the retrospective analysis of vertical mergers (and vertical disintegration) demonstrates the benefit of according vertical mergers a procompetitive presumption even in concentrated markets.<sup>12</sup> Those studies analyzed only small, selected number of markets for which data were available, however, and many of the mergers were found to be either anticompetitive or unclassifiable. In addition, some of the markets were so unconcentrated that anticompetitive risks and enforcement action were unlikely to occur.<sup>13</sup>

### **B. Decision Theory Analysis of Procompetitive Presumption**

Decision theory analysis does not support a procompetitive presumption for vertical mergers in concentrated markets. Indeed, in some limited circumstances there is a basis for applying an anticompetitive presumption, as described below.

#### 1. Timing of vertical merger enforcement actions

Some commentators have suggested that enforcement policy toward vertical (or conglomerate or complementary product) mergers should be delayed unless and until the merged firm engages in anticompetitive conduct,<sup>14</sup> on the grounds that the firm may never attempt exclusionary conduct. This delay, they argue, would be less costly than and could avoid false positive errors of enjoining non-problematical mergers or requiring unnecessary and inefficient remedies.

Decision theory analysis does not support such a policy, which suffers from several flaws that would lead to false negatives and under-deterrence:

- Consumers would suffer harms during the interim period, before liability was established and a remedy put in place, and the merged firm could delay resolution of the matter for a long time.
- The change in market structure caused by the merger could be irreversible, even if the merger were unwound after the fact. If, for example, the exclusionary conduct of the merged firm caused excluded rivals to exit, the only remaining remedy might be inefficient price regulation.
- The anticompetitive conduct may not be reliably detected even after the fact, just as illegal coordination may not be detected after a horizontal merger.
- Having to bring the case under Section 1 or Section 2 instead of Section 7 would mean it would be tried under more defendant-friendly standards.

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<sup>1212</sup> James C. Cooper et al. *Vertical Antitrust Policy as a Problem of Inference*, 23 INT'L J. INDUS. ORG. 639 (2005); Francine Lafontaine and Margaret Slade, *Vertical Integration and Firm Boundaries: The Evidence*, 45 J. ECON. LIT. 629 (2007)

<sup>13</sup> See Marissa Beck and Fiona Scott Morton, *Evaluating the Evidence on Vertical Mergers*, 59 REV. IND. ORG. 273 (2021). Revisiting their earlier work and examining additional studies, LaFontaine and Slade conclude that a procompetitive legal presumption for vertical mergers is not appropriate. Francine Lafontaine and Margaret Slade, *Presumptions in Vertical Mergers: the Role of Evidence*, 59 REV. IND. ORG. 255 (2021).

<sup>14</sup> Presidential Transition Report: The State of Antitrust Law 2012, A.B.A. SEC. ANTITRUST L. 7 (Feb. 2013) at 8-9.

Failure to address these kinds of issues in the context of pre-merger review could lead to significant consumer harm and under-deterrence. Indeed, the fundamental rationale for the Hart-Scott-Rodino Act was to prevent the delays and limitations inherent in after-the-fact enforcement.

## *2. Remedies for anticompetitive vertical mergers*

Some commentators have argued that vertical merger remedies should be limited to behavioral (conduct) remedies, as is generally the case.<sup>15</sup> This remedial approach reflects confidence that these restrictions can prevent competitive harm while allowing the firms to achieve efficiency benefits that will increase competition.

This confidence is sorely misplaced. A conduct remedy represents an acknowledgment that the merger likely creates incentives to behave in ways that will harm competition. It also represents a belief that the agency has identified and enumerated all the behaviors that might manifest those incentives in the future. But regulated firms are surely better informed about how various actions might allow them to exercise their market power, as regulatory economics makes clear.<sup>16</sup> Moreover, the options for anticompetitive behavior will likely evolve as market conditions change.

Despite this dynamic context and fundamental information asymmetry, consent decrees today are typically short-lived, with little room for modification. This short duration may be based on the view that markets will self-correct over the life of the decree or that certain provisions will outlive their usefulness.<sup>17</sup>

In fact, market self-correction may not occur, and the consent decree provisions may fail to achieve their goal of preserving competition. For this reason, rational and effective consent decrees should permit the agencies and courts to monitor the market and modify the decree if conditions change that make the provisions of the decree ineffective in preserving competition.

These problems with behavioral remedies have been acknowledged in the case of horizontal mergers. In contrast, they have tended to be ignored or downplayed in vertical transactions.<sup>18</sup> Remedies such as firewalls, exclusion prohibitions, and antidiscrimination provisions include loopholes and may be difficult or impossible for the agencies or a court to enforce.

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<sup>15</sup> James A. Keyte and Kenneth B. Schwartz, *Getting Vertical Deals Through the Agencies: "Let's Make a Deal,"* 29 ANTITRUST 10, 12-15 (2015). See Steven C. Salop and Daniel P. Culley, *Vertical Merger Enforcement Actions: 1994-2016*, GEO. U. L. CTR. (June 30, 2017).

<sup>16</sup> See Jean-Jacques Laffont and Jean Tirole, *A THEORY OF INCENTIVES IN PROCUREMENT AND REGULATION* (1993).

<sup>17</sup> Modified Final Judgment, *United States v. Comcast Corp.*, No. 1:11-cv-00106 (R/JL) (D.D.C. August 21, 2013), <https://www.justice.gov/atr/case-document/file/492176/dl?inline=>.

<sup>18</sup> The Justice Department's remedy policy guide states that "remedial provisions that are too vague to be enforced, or that can easily be misconstrued or evaded, fall short of their intended purpose and may leave the competitive harm unchecked." U.S. DEPARTMENT OF JUSTICE, ANTITRUST DIVISION POLICY GUIDE TO MERGER REMEDIES 13 (June 2011), <http://www.justice.gov/sites/default/files/atr/legacy/2011/06/17/272350>.

Antidiscrimination provisions such as most-favored-nations (MFNs) provisions can create their own competitive problems.<sup>19</sup>

For these reasons, structural relief—such as divestitures of the critical products that raise foreclosure concerns, divestitures sufficient to eliminate post-merger market power concerns, and fully paid-up licenses for critical intellectual property—should generally be required. In some situations, it will be necessary to enjoin a merger. It is also important to incorporate a process for post-merger competitive reviews that provide the agencies with an opportunity to significantly alter consent decrees if necessary to ensure competitive performance.<sup>20</sup> Although such provisions will place financial risk on the merging parties, doing so is preferable to putting all the competitive risk on consumers. Requiring the merging firms to bear this risk will also help deter overreaching claims.

The courts play an important role in remedial design. In litigated cases where the merging firms commit to a remedy as part of their merger defense, courts can take a skeptical view of behavioral remedies. They can also reject merger settlements with weak remedies and demand a role for judicial oversight and a broader scope for modification of consent decrees.

## II. Exclusionary effects: Foreclosure

Non-horizontal mergers can lead to anticompetitive harms from either exclusionary or collusive effects.<sup>21</sup> Exclusionary effects can involve input foreclosure or customer foreclosure analysis (see Part II, particularly Chapter 10).

Input foreclosure can arise from withholding or raising the costs of critical inputs to downstream rivals. Customer foreclosure can involve refusing to purchase inputs from upstream rivals and customer exclusives. Self-foreclosure involves downstream or upstream rivals withdrawing from beneficial relationships with the integrated firm out of fear that their sensitive competitive information will be misappropriated to divert customers to the integrated firm or fear of being dependent on a firm that has become a competitor.

Foreclosure can also lead to collusive (coordination) effects. A vertical or complementary products merger can also lead to collusion by facilitating the exchange of sensitive competitive information among firms. Non-horizontal mergers can also be used to evade regulation or long-term contractual obligations in ways that create anticompetitive effects.

The language and much of the analysis that follows focuses on vertical mergers. However, it generally applies to complementary product and conglomerate mergers.

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<sup>19</sup> For further analysis of the competitive effects of MFNs, see, e.g., Steven C. Salop and Fiona Scott Morton, *Developing an Administrable MFN Enforcement Policy*, 27 ANTITRUST 15 (2013); Jonathan Baker and Fiona M. Morton, *Antitrust Enforcement Against Platform MFNs*, 127 YALE L.J. 2176 (2018).

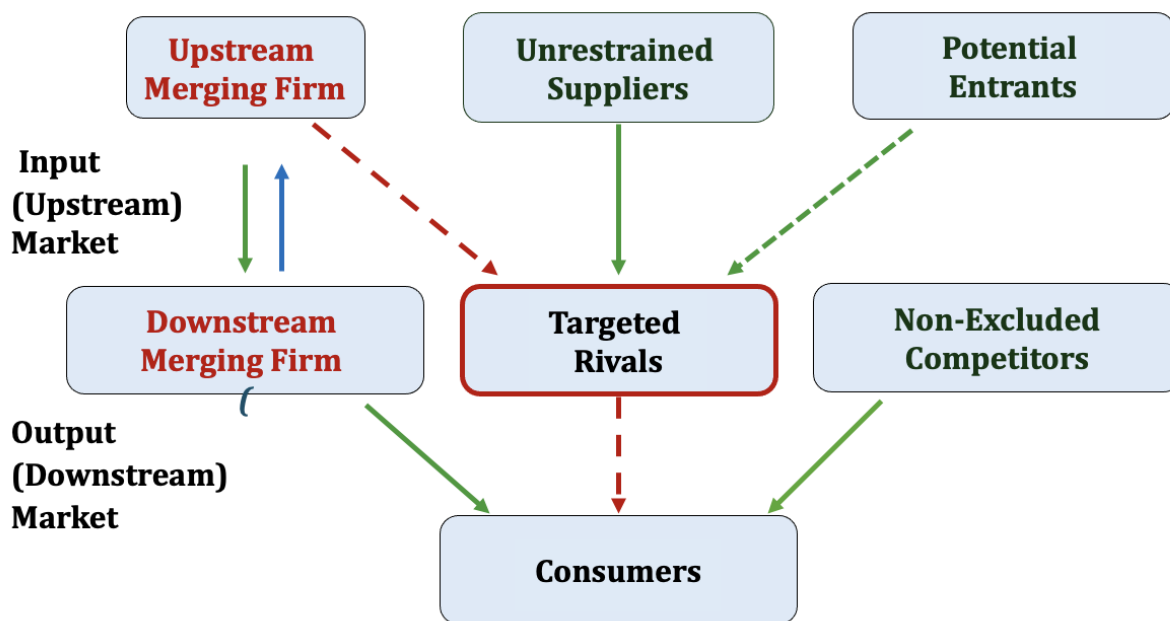
<sup>20</sup> See Steven C. Salop, *Modifying Merger Consent Decrees: An Economist Plot to Improve Merger Enforcement Policy*, 31 ANTITRUST 15 (2016).

<sup>21</sup> For a general law journal analysis, see Steven C. Salop, *Invigorating Vertical Merger Enforcement*, 127 YALE L.J. 1962 (2018).

### A. Input Foreclosure

Input foreclosure occurs when the upstream merging firm raises prices or refuses to sell its critical input to one or more actual or potential rivals of the downstream merging firm, including distribution services, potentially giving the downstream merging firm the power to raise or maintain price. Figure 13.1 illustrates framework.

**Figure 13.1 Input foreclosure**



The exercise of market power from input foreclosure may involve purely unilateral conduct. For example, if foreclosure directly raises rivals' costs, other upstream firms may increase their own prices in an accommodative response, exacerbating the cost increase. (However, if rivals have sufficient cost-effective alternatives, their costs will not rise). The price increase by the merging firm might also facilitate coordination by the other upstream competitors.<sup>22</sup>

If the targeted rivals' costs are materially increased, the downstream merging firm may gain the ability and incentive to increase its price and market share. Price increase concerns would be exacerbated if the foreclosure led to coordination downstream.

Several factors would prevent downstream firms from gaining such power. First, there may be a sufficient number of non-targeted rivals whose cost are not increased. These firms could include other vertically integrated rivals who do not purchase the input; downstream rivals that do not use the targeted input; competitors that cannot be targeted because they have counterstrategies; or other downstream products that are demand substitutes.

<sup>22</sup> Consider, for example, an upstream firm that had been a maverick competitor in the pre-merger market, thereby preventing coordination. The merger would eliminate its incentive to remain a maverick.

### ***B. Rebuttable Structural Presumption for Input Foreclosure Concerns***

The *Philadelphia National Bank* structural presumption does not apply to vertical mergers, because they do not increase market concentration. A defensible rebuttal presumption of anticompetitive harms from input foreclosure could be applied if the merged firm meets the following conditions:

- It supplies a “competitively significant” input.
- It has a sufficiently high “foreclosure share” of the purchases of its brand by “foreclosable rival” firms.
- A hypothetical merger of the downstream merging firm and all the foreclosable rivals that purchase the input from it would exceed the Merger Guidelines’ Herfindahl-Hirschman Index (HHI) threshold.<sup>23</sup>

Guideline 5 of the 2023 Merger Guidelines adopts an anticompetitive presumption similar to the first two conditions. The Guidelines do not require the third condition, but they do treat the downstream market share of the merged firm and market structure as a relevant factor in the foreclosure analysis.

An input supplied by the merging firm is “competitively significant” to rivals if elimination of access or worsened terms for it would place those rivals at a material competitive disadvantage that would allow the merged firm to raise downstream prices. To illustrate, a vertical merger of rival law firms that would lead to a 50 percent increase in their cost of paper clips would not be competitively significant.

The “foreclosure share” is the fraction of purchases of a merged firm’s input brand by “foreclosable rivals.” Foreclosable rivals consist of rival participants in the downstream output market that purchase some or all of this input from the upstream merging firm. To satisfy the presumption, the foreclosure share must be sufficiently large to infer that limited access would place the rivals at a material disadvantage. The 2023 Merger Guidelines intend the critical foreclosure share threshold to indicate actual or approaching monopoly power. A share of 50 percent might be a useful proxy. In the extreme situation, the upstream merging firm is the sole provider of an input used by all downstream competitors in the pre-merger market. In this case, the foreclosure share would be 100 percent, and all downstream rivals would be “foreclosable.” If instead the merging input supplier accounted for 50 percent of all rivals’ total downstream purchases and 0 percent for the others, the foreclosure share would be 50 percent. (The foreclosure share would also be 50 percent if all rivals purchased half their needs from the upstream firm or half bought 75 percent and the other half buy 25 percent.)

The hypothetical merger test is based on the idea that increases in the input price by the upstream merging firm place pressure on the rivals to increase their prices. This upward pricing pressure is similar to what occurs when a merged firm acquires its rivals and controls their prices. This test

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<sup>23</sup> Steven C. Salop, *Revising Guideline 6 with Evidence to Establish A Structural Inference for Input Foreclosure*, PROMARKET (September 29, 2023). <https://www.promarket.org/2023/09/29/revising-guideline-6-with-evidence-to-establish-a-structural-inference-for-input-foreclosure/>.

somewhat overstates the effect, however, because the upstream merging firm does not totally control the prices of the rivals.

An alternative that captures this idea of partial control has been derived from a rigorous economic model. It is satisfied if a hypothetical acquisition by the downstream merging firm of a 50 percent passive partial ownership interest in all of the dependent rivals would lead to modified HHIs (mHHIs) that would violate the Merger Guidelines HHI thresholds.<sup>24</sup>

### ***C. Input Self-Foreclosure from Feared Misuse of Information***

A vertical merger can lead to the transfer of sensitive competitive information about rivals' plans and prices that can lead to exclusionary effects. Such information could be used to target the customers of the rival firm. The ability of the merged firm to respond more rapidly or even pre-emptively to rivals' new products as a result of earlier warning could also reduce their incentives to innovate.

Suppose a firm designs an innovative new product finds it necessary to reveal its plans to the firm that will fabricate the product. If the fabricator merges with a competing designer and transfers information on the new design to that firm's design division, the merged firm will be able to respond more quickly to the first firm's innovation, if not preempt it. The fear that this information could be transferred could deter the innovation altogether. Alternatively, it could lead the innovator to substitute to a more expensive or lower-quality standalone fabricator to avoid the misuse of its design information (self-foreclosure). That rival fabricator might also gain the power to raise its own prices if it understands that it need not fear competition from the integrated fabricator as a result of the self-foreclosure. Either way, competition and consumer welfare will be harmed.

#### ***1. Staples/Essendant***

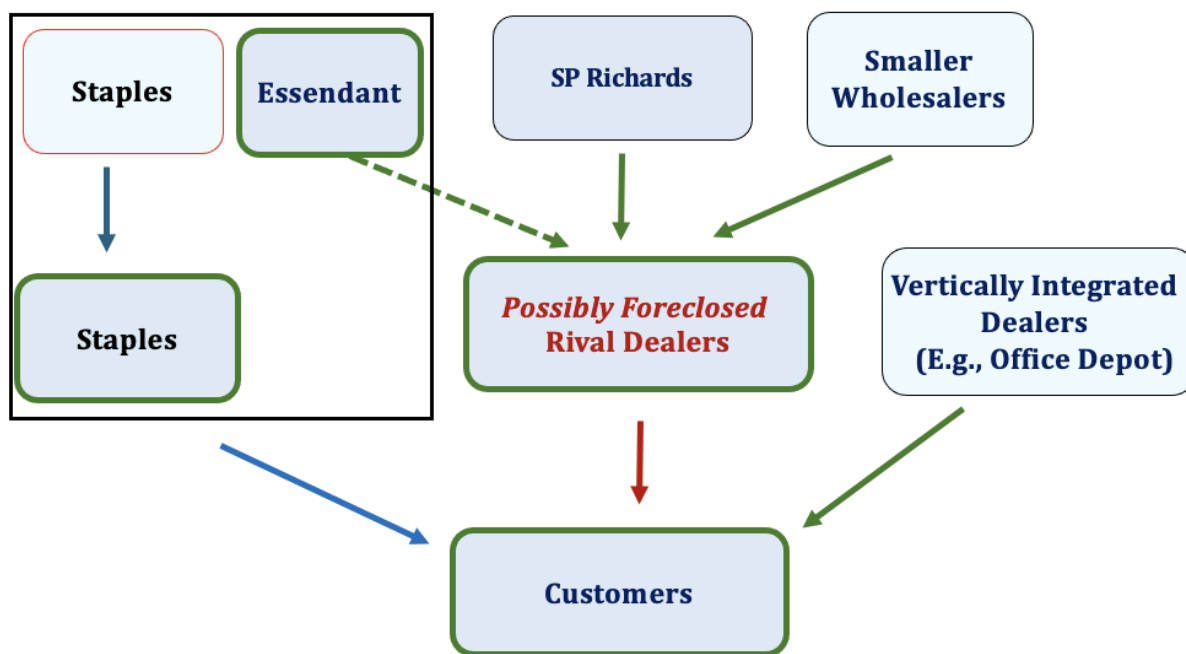
The 2019 *Staples/Essendant*<sup>25</sup> merger cleared the Federal Trade Commission (FTC) by a 3–2 vote. It illustrates the economic concept of self-foreclosure and how it can lead to upstream and downstream price increases.

Staples is a large office supply retailer that also acts as a wholesaler for itself but not for other retail competitors, as illustrated in Figure 13.2. Essendant was a wholesale supplier of office supplies to competitors of Staples. Although Essendant is upstream and Staples downstream, this merger might be characterized as diagonal instead of vertical, in the sense that Staples supplied itself. This fact also suggests that the usual potential vertical efficiency benefits might be weak or not apply at all.

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<sup>24</sup> See Serge Moresi and Steven C. Salop, *When Vertical is Horizontal: How Vertical Mergers Lead to Increases in "Effective Concentration,"* 59 REV. IND. ORG. 177 (2021).

<sup>25</sup> Statement of Chairman Joseph J. Simons, Commissioner Noah Joshua Phillips, and Commissioner Christine S. Wilson, *In the Matter of Sycamore Partners II, L.P., Staples, Inc. and Essendant Inc.*, FTC File No. 181-0180 (January 28, 2019).

**Figure 13.2 Staples/Essendant self-foreclosure and accommodation**

The basic foreclosure concern was that Essendant might raise its wholesale prices to Staples' retail rivals, which could divert sales to Staples, thereby allowing Staples to increase its market share and price. A related concern was that the merger would give Essendant access to sensitive competitive information on Staples' retailer rivals. If it transferred this information to Staples, Staples might use it to cannibalize its rivals' customers.

The rebuttal argument was that Staples' retail rivals would be protected by competition at the wholesale level. If Essendant raised prices, reduced its service, or misused the information, the retailers would substitute to Essendant's competitors, most notably its largest wholesale competitor, S.P. Richards (SPR). As a result, Essendant would lose wholesale sales and Staples would gain no retail sales.

Misuse of the information would be difficult for retailers to monitor. If retail customers feared this misuse of their information, they might protect themselves by shifting to SPR or other wholesalers, even if they charged higher prices. Even if Essendant did not raise price or misuse the information, this retailer self-foreclosure could raise rival's costs and increase Staples' market share and incentive to raise retail prices. Even if SPR did not charge higher wholesale prices before the merger, customers' fear of information misuse and self-foreclosure would provide SPR with the ability and incentive to raise its own wholesale prices. This price increase would then incentivize Essendant to increase its prices. Self-foreclosure could also lead to wholesale pricing coordination between Staples and SPR.

## 2. UnitedHealth Group/Change

The merger between United Health Group (UHG) and Change sought to combine UHG's large health insurance business and Change's business as the largest clearinghouse for processing healthcare

provider reimbursement claims for UHG and its competitors. The parties claimed that the proposed acquisition would reduce the cost and increase the efficiency of the claims payment process.

The government raised a vertical foreclosure concern regarding UHG gaining access to sensitive information on rival insurers that was provided to Change,<sup>26</sup> which UHG could use to target rivals' customers. Knowing this, UHC's rivals would innovate less, out of fear that UHC would free-ride off their innovations. To address this competitive concern, UHG instituted a firewall policy to prevent this type of information transfer.

The court rejected the government's claims and expressed its confidence that the firewall would be sufficient:

The evidence adduced at trial established that, for it to be likely that the proposed acquisition would substantially lessen competition, United would have to uproot its entire business strategy and corporate culture; intentionally violate or repeal longstanding firewall policies; flout existing contractual commitments; and sacrifice significant financial and reputational interests. The Government has failed to show that United's post-merger incentives will lead it to take such extreme actions. Nor has the Government put forward real-world evidence that United's rivals are likely to innovate less out of fear that United will poach their data. No payer witness made that claim; in fact, all the payer witnesses testified to just the opposite.<sup>27</sup>

The court concluded that "based on all the evidence presented at trial. . . United's incentives to protect external customers' data outweigh its incentives to 'misuse' that data."<sup>28</sup>

One interesting aspect of UHG's incentive analysis involved employee preferences. As the decision recounts, "When asked by the Court what would happen if employees were instructed to share data with UHC, Peter Dumont—UHG's Chief Privacy Officer—firmly and credibly responded: 'I honestly think you would see a lot of people quitting.'" The court found these reassurances convincing. By contrast, the court in the *Bertelsman*<sup>29</sup> horizontal merger transaction (discussed in Chapter 12) was very skeptical of promises that the company would keep its commitment to require its editors to compete with one another.

#### ***D. Customer Foreclosure***

Customer foreclosure occurs when a downstream merging firm reduces or ceases purchases from actual or potential rivals of the upstream merging firm. It can lead one or more upstream suppliers to face higher marginal costs, exit, or reduce investment, thereby permitting the upstream merging firm to exercise market power. The upstream merging firm may gain market power over input users in other markets, as indicated by the heavy arrows pointing to the other input users on the right in Figure 13.3. It may also gain market power over its downstream rivals, as indicated by the

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<sup>26</sup> A second foreclosure concern (not addressed here) involved foreclosure of Change's services to UHG's competitors.

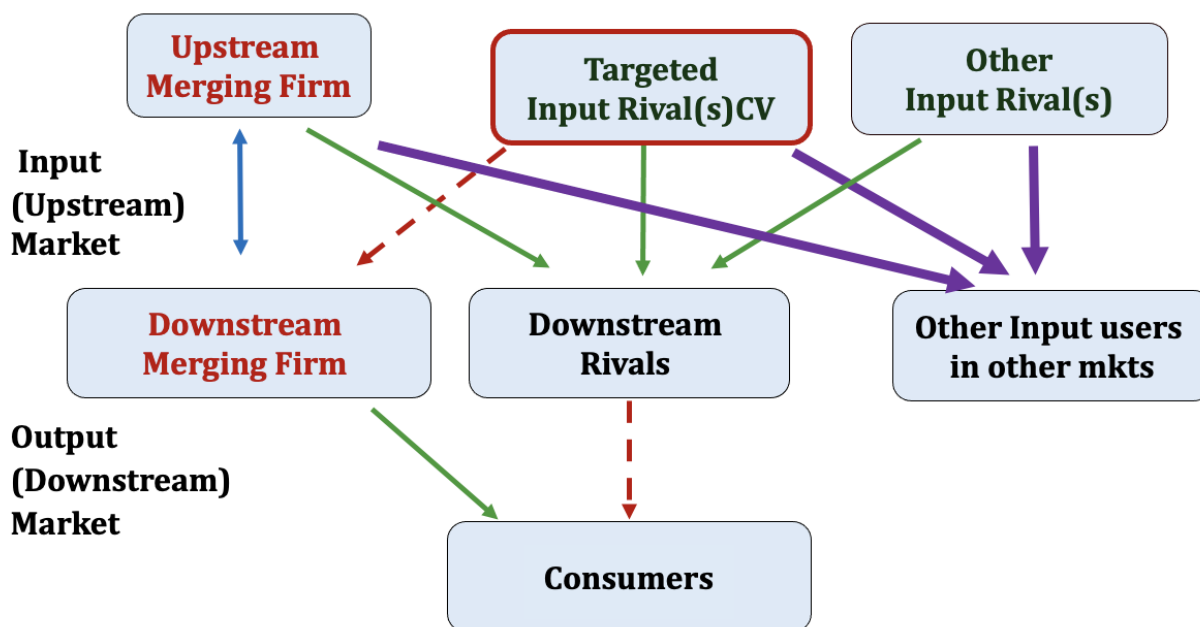
<sup>27</sup> *U.S. et al. v. UnitedHealth Group Incorporated et al*, No. 1:2022cv00481 - Document 138, p.33 (D.D.C. 2022).

<sup>28</sup> *Id.* at 39.

<sup>29</sup> *United States v. Bertelsmann SE & Co.*, No. CV 21-2886-FYP, 2022 WL16949715 (D.D.C. Nov. 15, 2022).

arrows pointing to them in Figure 13.3. Customer foreclosure can thus also lead to an input foreclosure effect, because the downstream rivals of the merging firm suffer higher input costs. The foreclosed upstream rival(s) may be actual or potential competitors. Where potential competitors are foreclosed, the exclusionary conduct can be seen as raising barriers to entry and reducing innovation.

**Figure 13.3 Customer foreclosure**



The impact on the targeted downstream rivals may be immediate; there may also be longer-run effects, because raising a rival's costs (in the case of input and customer foreclosure) or reducing the number of customers it can target (in the case of customer foreclosure) may reduce its incentives to invest. Although it may not exit, the reduction in its investment may marginalize it over time, reducing its ability to constrain the dominant firm.

### ***E. Complementary Product Mergers***

The analysis of a merger between firms that produce complementary products is analogous to a vertical merger. It can apply to mergers of products in an ecosystem, such as a hardware and software product.

In a complementary product merger, each complement is analogous to an input for the firms in the market for the other complement. The analysis can conceptualize the equivalent of input foreclosure in either direction. The foreclosure presents itself in a somewhat different but analytically very similar way. Instead of refusing to sell to rivals after the merger, total foreclosure presents itself as selling the complements solely in a bundle. Instead of raising the input price,

partial foreclosure presents itself as charging a higher price for products on a standalone basis relative to the price of the bundle.<sup>30</sup>

Consider two competing versions of each complement, brands A1 and A2 for product A and brands B1 and B2 for product B. Suppose both brands of each product are equally compatible and interoperable with both brands of the other product. In this scenario, consumers have four available bundles: A1B1, A1B2, A2B1, and A2B2.

Consider next a merger between A1 and B1. Purchasers of the A1B1 bundle have the potential for EDM. A2B2 bundle purchasers are unaffected, at least in the short run. Purchasers of the A1B2 and A2B1 bundles face potential foreclosure of their bundles if the merged firm makes either or both of its A1 and B1 products incompatible with A2 or B1. If A1 is made incompatible with B2 and B1 is made incompatible with A2, the A1B2 and A2B1 products would no longer be available, as illustrated in Figure 13.4, where the strike-outs indicate incompatibility.

**Figure 13.4 Complementary product incompatibility**

|                  | <i><b>B1</b></i>              | <i><b>B2</b></i>              |
|------------------|-------------------------------|-------------------------------|
| <i><b>A1</b></i> | <i><b>A1B1</b></i>            | <del><i><b>A1B2</b></i></del> |
| <i><b>A2</b></i> | <del><i><b>A2B1</b></i></del> | <i><b>A2B2</b></i>            |

<sup>30</sup> The main modeling difference between a vertical and complementary product merger is the timing of the price setting. In the standard vertical merger analysis, the price of the product sold by the upstream firm is set first, with the knowledge that the price of the product sold by the downstream firm will be set in response to the upstream firm's price. This vertical version best describes situations in which (i) the first product is an input embedded in the second product, (ii) the final customer deals only with the downstream firm that sells the second product, and (iii) the price of the input (the first product) cannot be changed after the downstream firm sets its price. By contrast, in the standard complementary product merger analysis, the price of each of the two products is set with the (correct) expectation of the other's price, and neither price can be changed after the other firm sets its price. This complements version best describes situations in which the final customer purchases the two products separately.

The pre-merger purchasers of A1B2 now lose that option. If they are more “loyal” to B2 (in the sense of being less price sensitive to price increases for B2 than price increases for A1), they are more likely to shift to A2B2, which would reduce the profits of the merged firm. If they are more “loyal” to A1 than to B2, they are likely to shift to A1B1, which would increase the profits of the merged firm.<sup>31</sup> Similarly, the A2B1 purchasers now lose that option and need to shift to the A2B2 bundle or the merged firm’s A1B1 bundle, which leads to a similar profit and loss calculation. Whether the foreclosure is profitable will depend on the magnitudes of the diversions to each of these alternatives and the margins earned on A1 and B1. The analysis can consider the profitability of the incompatibility of either or both merging products.<sup>32</sup>

### ***F. Conglomerate Mergers***

Conglomerate mergers are mergers between firms that are not competitors and do not involve an input buyer or seller. Such mergers can raise anticompetitive concerns. For example, the FTC’s complaint (settled before trials) in the *Amgen/Horizon*<sup>33</sup> merger involved an allegation that the merged firm would charge a higher price of Amgen’s product to third-party payers that favored a competitor of Horizon after its patent expired. The FTC pointed to Amgen’s alleged prior practice of conditioning rebates on blockbuster products on insurers and on Pharmaceutical Benefit Managers (PBMs) giving other Amgen drugs priority placement. Besides claiming that anticompetitive bundling would not be in their self-interest, the companies argued that the two drugs were subject to different reimbursement rules (one a “medical benefit,” the other a “pharmacy benefit”).<sup>34</sup> The parties also offered a consent decree that would prohibit such bundle discounts, which the FTC accepted after some delay.<sup>35</sup>

## **III. Collusive Effects**

The exclusionary effects of foreclosure can involve coordinated conduct and effect. Non-horizontal mergers can facilitate collusive effects.

### ***A. Collusive (Coordination) Effects from Foreclosure***

Foreclosure can lead to collusive (coordination) effects, as shown in the example above in which foreclosure lead to coordination by the non-merger upstream firms to accommodate the

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<sup>31</sup> Shifting to A2B1 seems less likely for these A1B2 purchasers, because they preferred A1 to A2 and B2 to B1.

<sup>32</sup> This vertical arithmetic profitability calculation is discussed later in this chapter in the context of the *Illumina/Grail* vertical merger. The foreclosure is profitable if the product of the diversion ratio (*DR*) times the dollar margin (*\$M*) is larger for the share of diversion flowing to A1B1 than the share of diversion flowing to A2B2. This product of *DR* and *\$M* the concept of “value of diverted sales” discussed in the context of horizontal mergers.

<sup>33</sup> Complaint: *FTC v. Amgen Inc. and Horizon Therapeutics PLC*, No. 23-CV-3053 (May 16, 2023). [https://www.ftc.gov/system/files/ftc\\_gov/pdf/2310037amgenhorizoncomplainttropi.pdf](https://www.ftc.gov/system/files/ftc_gov/pdf/2310037amgenhorizoncomplainttropi.pdf)

<sup>34</sup> [https://www.ftc.gov/system/files/ftc\\_gov/pdf/608151.2023.07.07\\_-\\_answer\\_and\\_defenses\\_of\\_respondents\\_amgen\\_inc\\_and\\_horizon\\_therapeutics\\_plc.pdf](https://www.ftc.gov/system/files/ftc_gov/pdf/608151.2023.07.07_-_answer_and_defenses_of_respondents_amgen_inc_and_horizon_therapeutics_plc.pdf)

<sup>35</sup> FTC Approves Final Order Settling Horizon Therapeutics Acquisition Challenge (December 14, 2023), <https://www.ftc.gov/legal-library/browse/cases-proceedings/231-0037-amgen-inc-horizon-therapeutics-plc-matter>.

foreclosure by the merged firm. Foreclosure can also lead to or exacerbate coordination in other ways.

After a vertical merger, the upstream merging firm would have the incentive to foreclose and raise the costs of a maverick downstream firm that was preventing its downstream merger partner and the other rivals from coordinating. The upstream merging firm lacked this incentive in the pre-merger world. Upstream firms would benefit from more intense competition and lack of coordination in the downstream market. The vertical merger changes the incentive they face.

A non-horizontal merger that involves acquisition of a disruptive maverick competitor can improve coordination. A vertical merger in which a leading downstream firm acquires the upstream maverick firm can lead to coordination by upstream firms that will lead rival downstream firms to pay higher input prices.

This analysis of the acquisition of a maverick can also occur on the buyer side. If a leading upstream firm acquires a downstream firm that acted as a disruptive buyer, that merger could allow the upstream firms to coordinate better in pricing to non-merging downstream firms.

Vertical integration would increase the ability and incentive of two firms to engage in input foreclosure against their unintegrated rivals. If there are multiple vertical mergers, perhaps in response to one another, the outcome may lead to broad foreclosure of unintegrated rivals and coordinated downstream price increases by the integrated firms. Barriers to entry might also rise from rivals facing higher costs, an issue that arose in the Jeld-Wen/CMI merger, discussed below

### ***B. Collusive Information Transfers***

A vertical merger can also lead to collusion by facilitating the exchange of sensitive competitive information among firms. One of the merging firms can act as a “messenger” that transfers pricing information between its merger partner and the competitors in the vertically adjacent market with which it also deals. This information exchange can be used to facilitate parallel accommodating conduct, interdependent pricing, or even express collusion. In the case of express collusion, the messenger firm can also act as an intermediary for side payments. If, for example, the messenger is the upstream firm, the side payments can be hidden as price discounts or price surcharges on input sales made to competitors.

## **IV. Procompetitive Efficiency Benefits Analysis**

Vertical integration and vertical mergers may lead to procompetitive efficiency benefits, including lower costs, higher quality, greater investment, improved innovation, and EDM. These efficiencies generally flow from the fact that the merger internalizes effects that one firm’s conduct has on the profits of the other.

Two standalone firms producing complementary goods do not take into account the impact of their decisions or actions on other firms; each takes actions that maximize its own profits. A vertical merger between the two firms aligns their incentives. The merged firm will take account of the effects of one division’s action on the profits of the other division and will make decisions that maximize the combined profits of the two previously independent firms. It is in this sense that the merger internalizes the externalities.

Absent the merger, could those benefits be attained by contracts? Or does the existence of private information and strategic bargaining impede the attainment of the efficiencies absent the merger?<sup>36</sup> For readers steeped in the Coase Theorem, strategic bargaining is a Coasian transaction cost that can prevent a mutually beneficial deal.<sup>37</sup>

### **A. Cost and Quality Efficiency Benefits**

A vertical merger can lead to lower costs or higher quality in various ways. After merging, firms may be able to better schedule production, which can lower costs. A retail merger partner may be able to provide the producer partner [with information about new products desired by consumers or the best balance between price and features, leading to either higher quality or lower costs. When the upstream firm was a standalone firm, it would have had to share the benefits of those better products with its retail competitors, reducing its incentive to develop and report the information.

### **B. Increased Investment and Innovation**

A merger can increase investment and innovation in several ways. Thanks to the sharing of information, the integrated firm may discover additional possible avenues for innovation. By eliminating private information and strategic bargaining, a merger increases the likelihood that investments that benefit both parties will be made.

Consider, for example, a \$150 investment that would increase the profits of the upstream and downstream firms by \$100 each. If the firms were integrated, they surely would make this investment; absent the merger and cost sharing by the firms, the investment by one firm would exceed the increase in profits, and neither firm would make it.

Joint investments are common, so this type of efficiency might not be merger specific. However, if before the merger the profits of each firm are not common knowledge, the two standalone firms may not reach an agreement, as each would have the incentive to understate its benefits in an attempt to justify paying a smaller share of the cost. If, for example, each firm claimed that its profits would rise by only \$40, the investment would not appear to be jointly profitable. Even if it is clear that the investment were jointly profitable, stubborn bargaining by each firm might prevent an agreement. If each firm refused to pay no more than \$74 of the \$150, for example, no deal would occur.<sup>38</sup>

Or, suppose that investments by each firm must be made to earn a return and the investments must be made sequentially. For example, suppose that an investment by each firm of \$50 will yield a return of \$75 each if both invest and nothing if only one invests. In this scenario, each firm may wish to go second in order to “hold-up” the other firm to make a larger contribution to its

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<sup>36</sup> See Ronald H. Coase, *The Nature of the Firm*, 4 *ECONOMICA* 386 (1937); Oliver E. Williamson, *The Vertical Integration of Production: Market Failure Considerations*, 61 *AM. ECON. REV.* P&P 112 (1971).

<sup>37</sup> Robert Cooter, *The Cost of Coase*, 1 *J. LEGAL STUD.* 1 (1982).

<sup>38</sup> See Oliver E. Williamson, *Transaction-Cost Economics: The Governance of Contractual Relations*, 22 *J. LAW ECON.* 233 (1979); Oliver D. Hart and John Moore, *Property Rights and the Nature of the Firm*, 98 *J. POL. ECON.* 1119 (1990).

investment cost, once that first firm's investment has already been made.<sup>39</sup> Contracts might be unable to eliminate the risk of hold-up because contracts are incomplete and contractual enforcement is costly and imperfect.<sup>40</sup>

By creating a single entity, a merger can internalize this misrepresentation and strategic bargaining concern. A vertical merger shares the profits and thereby eliminates the hold-up risk. However, it is not clear that this internalization necessarily implies that the benefits are fully merger-specificity. After all, the same issues would arise in negotiating the acquisition price and merger terms. If those terms can be successfully negotiated, then so, too, might the terms of particular investments also might be negotiated.

### ***C. Elimination of Double Marginalization/Cournot Complements***

The EDM efficiency benefit in a vertical merger—and the equivalent “Cournot complements”<sup>41</sup> effect in complementary product mergers—can occur when the upstream partner with some market power begins to charge the downstream partner an input “transfer price” equal to its marginal cost rather than a higher price that would earn it a margin over cost. In this way, the downstream firm's overall marginal cost is reduced to the efficient level, and it purchases the efficient amount of the input. If it passes through some or all of the marginal cost reduction as a lower downstream price, downstream consumers would benefit from the vertical integration. The effect could also benefit consumers who do not purchase from the vertically integrated firm, because the lower prices by the integrated firm may lead rival firms to reduce their prices, to mitigate sales losses.<sup>42</sup>

This efficiency benefit is not inevitable, however, as discussed in Chapter 10. The basic EDM/Cournot complements effect benefits consumers only if it leads the merged firm to raise its output and reduce its downstream price. If it does not, the merged firm simply transfers accounting profits from its upstream division to its downstream division. This caveat is sometimes ignored by commentators who treat EDM efficiency benefits as automatic and rely on the difference between the pre-merger input price and marginal cost. For example, Illumina's EDM rebuttal failed because its economic expert provided merely an “illustrative” model based on Illumina's gross margin, as discussed below.

Downstream price decreases can be mitigated or eliminated in several ways.

#### ***1. Competitor matching price responses***

The incentive to pass through the transfer price reduction may be mitigated if the firm anticipates that its downstream price cut will induce price cuts by competitors in response. If the rivals match the price reduction, the benefit to the merged firm will be much reduced. If the downstream firms

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<sup>40</sup> See Benjamin Hermalin, Avery Katz, and Richard Craswell, *The Law and Economics of Contracts*, in (A. Mitchell Polinsky and Steven Shavell), *HANDBOOK OF LAW AND ECONOMICS* (2007).

<sup>41</sup> Cournot first identified this issue in his classic book in 1838. Gaspard-Auguste de Cournot, *RECHERCHES SUR LES PRINCIPES MATHÉMATIQUES DE LA THÉORIE DES RICHESSES* CH. IX (1838).

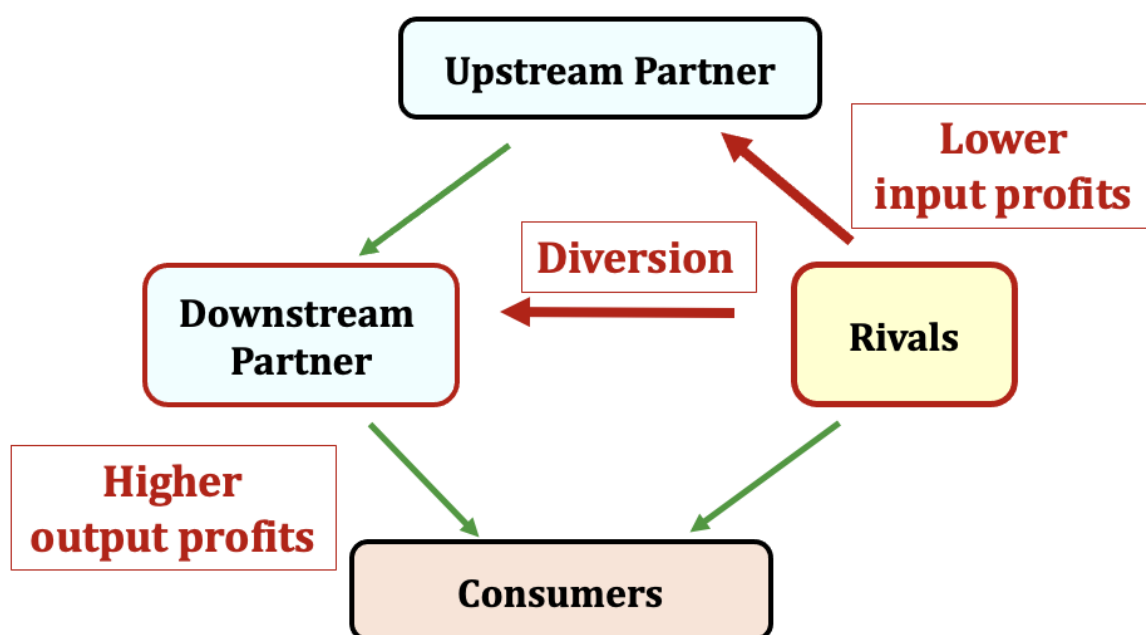
<sup>42</sup> See Nathan Miller et al., *Pass-Through in a Concentrated Industry: Empirical Evidence and Regulatory Implications*, 48 *RAND J. ECON.* 69 (2017).

were tacitly coordinating before the merger, the merged firm would not want to set off a disruptive, mutually harmful price war.

## 2. Opportunity costs of reducing price

The price pass-through will be mitigated— and possibly even eliminated—if the upstream partner's input continues to be sold to competitors. This effect occurs if the downstream price reduction diverts sales from rivals who purchase the input from the upstream division at an input price above cost and thereby contribute profits to the upstream partner, as discussed in Chapter 10.<sup>43</sup> The loss of these profits accruing to the upstream firm create an opportunity cost to the merged firm when it faces the decision of whether and by how much to reduce the downstream price in response to the reduced input transfer price,<sup>44</sup> as illustrated in Figure 13.5

**Figure 13.5 Opportunity costs of pass-through of elimination of double marginalization**



A numerical example illustrates this opportunity cost. Suppose that before a vertical merger, the downstream firm has a marginal production cost of \$1 and a \$9 cost for one unit of the input purchased from the upstream firm, for a total marginal cost of \$10. Suppose that its profit-maximizing price is \$15 and that it sells 10 units, for total profits of \$50  $[(\$15 - \$10) \times 10]$ . Suppose that the upstream firm has marginal costs of \$1 per unit, so that it earns a margin of \$8  $(\$9 - \$1)$  on these 10 units, for a profit of \$80. In addition, suppose that the upstream firm sells eight units to rivals of the downstream firm and earns an additional \$64  $(\$8 \times 8)$ .

<sup>43</sup> For further details, see Steven C. Salop, *Invigorating Vertical Merger Enforcement*, 127 YALE L.J. 1962 (2018).

<sup>44</sup> Carl Shapiro, *Vertical Mergers and Input Foreclosure: Lessons from the AT&T/Time Warner Case*, 59 REV. IND. ORG. 303, 325-26 (2021); Yongmin Chen, *On Vertical Mergers and Their Competitive Effects*, 32 RAND J. ECON 667 (2001); Serge Moresi and Steven C. Salop, *vGUPPI: Scoring Unilateral Pricing Incentives in Vertical Mergers*, 79 ANTITRUST L.J. 185 (2013).

Assume next that the two firms merge and the upstream partner reduces its input transfer price to the downstream partner down to its marginal cost of \$1. The merger will not by itself change their total profits; it will only reallocate them between the two divisions of the integrated firm: The EDM will increase the downstream partner's margin from \$5 ( $\$15 - \$10$ ) to \$13 ( $\$5 + \$8$ ), and the upstream partner's margin on these sales will fall to zero.

Given this set of conditions, assume next that the downstream partner responds to the EDM by reducing the downstream price by \$4 (half of the input transfer price reduction). At this lower price, suppose that its sales increase by four units, of which three are diverted away from rivals who purchased the input from the upstream partner. In this scenario, the downstream partner's profits rise by \$52 ( $\$13 \times 4$ ). However, the loss of those three units to rivals means that the upstream partner's profits fall by \$24 ( $\$8 \times 3$ ). After subtracting this \$24, the net profit increase for the integrated firm is \$28, a reduction of almost half from the original \$52. The \$24 in lost upstream profit is the opportunity cost of lowering the price. This opportunity cost would lead the firm to reduce the downstream price by less.

The opportunity cost is higher when demand is more inelastic, because the level of sales diverted from rivals may be lower than the level of purchases from the upstream firm. If the upstream firm earns a higher margin on sales to rivals than on sales to the downstream firm, the opportunity cost will also be higher. In extreme cases, the opportunity cost could eliminate the incentive to reduce the downstream price at all.

Suppose that all four units gained by the downstream partner were diverted from rivals who purchased inputs from the upstream partner. If the upstream partner charges those rivals \$14 per unit, earning a margin of \$13, the opportunity cost would be \$52 ( $\$13 \times 4$ ), which is equal to the downstream partner's increased profits. In this case, the incentive to pass on the EDM with a downstream price reduction would be neutralized. Downstream consumers would gain no efficiency benefits from the EDM.

### *3. Merger specificity*

Some EDM might be accomplished without a merger. Absent a merger, the two firms could, for example, negotiate an input pricing agreement that involves a two-part tariff, that is, setting the unit input price equal to marginal cost and also charging a lump-sum annual fee. When the input price of the marginal unit is equal to marginal cost, the downstream firm would have the incentive to set a lower price than if the input price were above marginal cost.

A similar effect could be accomplished by the upstream firm offering a volume discount schedule such that the price of the last (marginal) units purchased is closer (or equal) to the upstream firm's marginal cost. In the extreme, a take-or-pay contract reduces the buyer's marginal cost to zero, which would drive purchases even beyond the marginal cost level. If the EDM can be partially but not fully captured absent the merger, only the incremental effects that cannot be captured would be considered merger specific.

### ***D. Example of Efficiency Claims: The Union Pacific/Norfolk Southern Merger***

As an illustration of some specific efficiency claims, consider the proposed railroad merger of Union Pacific (UP) and Norfolk Southern (NS) currently being analyzed by the Surface Transportation

Board.<sup>45</sup> The merger is mainly vertical. UP operates primarily west of the Mississippi River and NS largely east of the Mississippi. The carriers “interchange” shipments at Chicago, Kansas City, St. Louis, Memphis, and New Orleans. Absent the merger, shippers must contract with a western carrier and an eastern carrier. Some locations of UP and NS are sole-served (monopoly points); others are competitive points with the Burlington Northern Santa Fe (BNSF) in the west or CSX in the east.

Trains typically comprise blocks of cars bound for different destinations. Individual railcars are switched into yards, where they are sorted and classified into blocks, which may be removed and attached to different trains multiple times over the course of a journey. These “handlings” introduce delay and variability.

Interchanges make services less reliable, because the hand-off between two independent railroads creates operational risks, including the risk of misplacing railcars, according to UP. It claims that the merger would reduce the cost of shipments that are currently interchanged and help move them more rapidly and reliably. It also argues the merger would increase its investment.

UP’s expert economists testified that the incentives of the combined railroad to implement these benefits exceed those of the standalone carriers because of the internalization of external benefits. One of them argued as follows:

UP has little incentive to incur costs itself in order to reduce NS’s costs of delivering interline services. As a result, as an independent entity pre-transaction, UP has weak economic incentives to divert activities from its own direct services in order to sort and reclassify cars to better serve NS’s interests. However, a combined railroad would have the full incentive to optimize UP’s and NS’s combined network.<sup>46</sup>

Absent the merger, she argued, a contract to achieve these benefits would have to be extremely complex and would require efforts by both railroads that could lead to disputes that would be difficult to resolve. She also argued that the fact that these improvements have not already been undertaken is evidence that the claimed benefits are merger specific.

She also argued that the “hold-up problem” helps explain why UP and NS acting independently may fail to invest in new infrastructure that would expand capacity. Investments made by UP would be profitable only if it increased shipments with UP rather than a competitor. NS’s bargaining leverage over UP would increase after UP had sunk the investment cost. Fear of this hold-up could lead UP to forgo the investment. UP’s economist also argued that the merger would achieve EDM benefits on both shipments between UP and NS monopoly points and shipments diverted to the merged firm as a result of its improved service and incentives to offer lower prices.

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<sup>45</sup> *Union Pac. Corp.—Control—Norfolk S. Corp.*, Docket No. FD 36873, Decision No. 7, slip op. (S.T.B. served Dec. 19, 2025). I consulted with UP on this merger.

<sup>46</sup> *Verified Statement of Elizabeth M. Bailey*, Union Pacific/Norfolk Southern Merger Application, Surface Transportation Board (Finance Docket No. 36873) at ¶44.

## V. Recent case law examples

### A. *Illumina/Grail Vertical Merger*

The *Illumina/Grail*<sup>47</sup> merger involved an innovative new approach to cancer testing technology. Illumina manufactures and sells next-generation sequencing (NGS) platforms for DNA sequencing. In 2015, it created a subsidiary, Grail, with the goal of creating a multi-cancer early detection (MCED) test that used Illumina's NGS platform to identify the possible presence of multiple forms of cancer in a single blood sample. In 2017, Illumina spun off Grail into a separate company with new investors to reduce its risk and diluted its ownership stake in the company to 12 percent. In 2020, Illumina agreed to repurchase a 100 percent stake in the spun-off company in anticipation of Grail obtaining approval from the Food and Drug Administration for its cancer screening test, which it received in April 2021. The reacquisition required Illumina to file a merger application.

The FTC complaint alleged that Illumina would have the ability and incentives to foreclose rival producers of MCED tests, thereby entrenching Grail's monopoly. The FTC administrative law judge rejected the complaint in September 2022.<sup>48</sup> FTC staff subsequently appealed to the Commission, which issued its opinion in March 2023.

The Commission found that the merger was likely to substantially lessen competition in the market for the research, development, and commercialization of MCED tests.<sup>49</sup> Its decision applied both the ability-and-incentives and a version of the structural inference approach. Illumina appealed to the Fifth Circuit Court of Appeals, which affirmed that the FTC had substantial evidence to find that the unremedied merger violated Section 7 but rejected the Commission's remedial analysis.<sup>50</sup>

#### 1. *Anticompetitive ability and incentives analysis*

Figure 13.6 illustrates the structure of the merger.

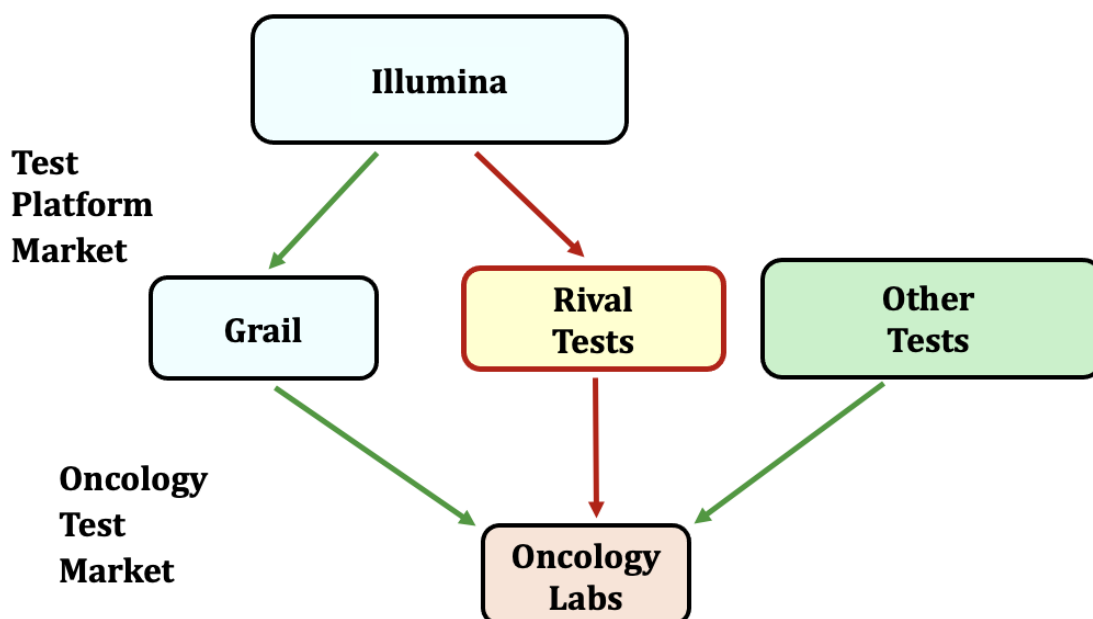
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<sup>47</sup> *Illumina, Inc. v. FTC*, No. 23-60167, slip op. (5th Cir. Dec. 15, 2023).

<sup>48</sup> Initial Decision. (2022, September 9). *In the Matter of Illumina, Inc., and GRAIL, Inc.* FTC Docket No. 9401. Retrieved from: [https://www.ftc.gov/system/files/ftc\\_gov/pdf/D09401InitialDecisionPublic.pdf](https://www.ftc.gov/system/files/ftc_gov/pdf/D09401InitialDecisionPublic.pdf).

<sup>49</sup> Commission Opinion. (2023, March 31). *In the Matter of Illumina, Inc., and GRAIL, Inc.* FTC Docket No. 9401. Retrieved from: [https://www.ftc.gov/system/files/ftc\\_gov/pdf/d09401commissionfinalopinion.pdf](https://www.ftc.gov/system/files/ftc_gov/pdf/d09401commissionfinalopinion.pdf).

<sup>50</sup> *Illumina, Inc., v. FTC*, No. 23-60167, slip op. (5th Cir. Dec. 15, 2023).

**Figure 13.6 Illumina/Grail foreclosure incentives**

The court also accepted the FTC’s analysis of foreclosure incentives. It did not accept Illumina’s arguments that it lacked incentives to foreclose because the forgone profit of lost input sales would exceed Grail’s increased downstream profits in the future. As the court noted, “Given Illumina’s monopoly power and shifting business priorities, it was reasonable for the Commission to conclude that Illumina would likely foreclose against Grail’s competitors—even at the expense of some short-term profits—to pursue its long-term goal of establishing itself (via Grail) as the market leader in clinical testing.”<sup>51</sup>

Illumina also argued that foreclosure would have been profitable even absent the transaction, because, considering Illumina’s previous 12 percent financial interest in Grail, the acquisition would not have any incremental foreclosure effects. Not surprisingly, the FTC made the point that the incentive to foreclose would increase when Illumina’s interest rose to 100 percent. The court accepted the FTC’s analysis, because Illumina’s foreclosure incentives would grow in the future. For the same reason, the court also dismissed Illumina’s argument that as Grail is a monopolist, there were no rivals’ sales to foreclose.

## *2. Elimination of double marginalization and other claimed efficiencies*

The court accepted the Commission’s approach of treating EDM as an efficiency rebuttal factor for which the merging parties have the burden of production. The Commission found that the EDM benefit was not merger specific, because Grail had discussed alternatives to merger with its investment banker. The court rejected this conclusion, based on evidence that Grail was unable to get Illumina to engage on the issue.

<sup>51</sup> *Illumina v. FTC*, No. 23-60167, pg. 19 (5th Cir. 2023).

However, the court affirmed the Commission's conclusion that Illumina failed to provide sufficient evidence that EDM would (rather than could) be passed through to customers as lower downstream prices. This finding is important, because EDM provides competitive efficiency benefits only if it is passed through. Significant pass-through would be less likely to occur in this case, because the substantial effect of the foreclosure on rivals' costs and quality would reduce the competitive need to do so.

Illumina's economic expert did not attempt to quantify the likely EDM pass-through, possibly because doing so would have required a full equilibrium model. He merely provided an "illustrative" model based on Illumina's gross margin. This analysis was viewed as insufficient, because the incentive to pass through EDM can be reduced or even eliminated by the offsetting opportunity cost.

Illumina proposed a contractual remedy, which the FTC viewed as insufficient. The court rejected the Commission's legal standard, holding that it was not necessary for Illumina to produce evidence that there would be insufficient likelihood of any lessening of competition, allowing it instead to produce evidence that there would be insufficient likelihood of substantially lessening of competition, taking account of the strength of the FTC's prima facie case. The court remanded the remedy for reconsideration. Illumina announced that it would not appeal but would instead divest its position in Grail.

### ***B. AT&T/Time Warner: Vertical Merger in a Negotiation Market***

In a market in which prices are negotiated rather than set unilaterally by the merging firm, a different quantitative methodology—termed the Nash Bargaining Equilibrium (NBE), which originated in the work of Nobel laureate economist John Nash<sup>52</sup>—can be applied. The simplest NBE model assumes that the bargaining parties know their reservation prices—the minimum price a seller would be willing to accept and the maximum price a buyer would be willing to pay. Each party's reservation price depends on its next best alternative, referred to as the BATNA (Best Alternative to a Negotiated Agreement), the disagreement point, or the threat point.

A party's reservation price for a product or service is not the same as its underlying value to that party, as illustrated in this simple hypothetical bargaining situation. Suppose that repairing certain problems in a house before listing it for sale would increase the sale price by \$20,000. Suppose that the homeowner has a binding bid for the work from one firm for \$10,000 and contacts a second firm, in an attempt to obtain a lower price. The homeowner's reservation price would be \$10,000 (not the \$20,000 increase in the ultimate house sale price).

After looking over the job, the second contractor figures he could repair the house for as little as \$6,000, but he would like to negotiate a higher price. This contractor's reservation price is \$6,000. According to Nash bargaining theory, the contractor and the homeowner would be expected to make a deal at a price somewhere between \$6,000 and \$10,000.

Where the ultimate negotiated price lies in this range depends on the bargaining skill and impatience (cost of delay) of the two parties. If, for example, the homeowner is impatient, because

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<sup>52</sup> The model has also been used in horizontal merger analysis, particularly for evaluating hospital mergers. See *St. Alphonsus Med. Ctr.-Nampa Inc. v. St. Luke's Health Sys., Ltd.*, 778 F.3d 775 (9th Cir. 2015).

she is about to list the house for sale and has already purchased a new house, the price might end up close to \$10,000. If the homeowner is in no rush and the contractor is desperate to win the contract, the price might end up close to \$6,000. If the homeowner and contractor have similar bargaining skills and costs of delay, the price might end up halfway between the reservation prices. A price of \$8,000 splits the gains from the agreement equally.

When the buyer's reservation price exceeds the seller's reservation price, the parties will generally be expected to reach an agreement and to do so quickly, in order to minimize delay costs. (Labor unions and companies typically reach new contracts without lockouts or strikes, most legal disputes are settled without litigation, and most lawsuits are settled. But delays may occur. Both parties may rationally take a tough initial bargaining stance and misjudge the other party's reservation price, thereby delaying or missing out entirely on reaching a mutually beneficial deal. Suppose, for example, that the contractor believes that the homeowner has not shopped around and that her reservation price is \$15,000. In this case, the contractor might hold out for more than \$10,000. If he did, he would lose the bid, as the homeowner would go with the first contractor. Alternatively, it might take time before parties come to mutually agreeable terms or one of them might behave in a way that violates the other's sense of fairness, which could lead the negotiations to end without a deal.

A change in either of the party's BATNA would change its reservation price and, in consequence, alter the negotiated outcome in the NBE model. Suppose that before striking a deal with the homeowner, the contractor is offered \$8,000 to do a different job and cannot do both. This improved BATNA would increase his reservation price to \$8,000 and increase his bargaining leverage. If the parties have similar bargaining skills and costs of delay, they would be expected to negotiate a \$9,000 price (halfway between the contractor's new reservation price of \$8,000 and homeowner's reservation price of \$10,000) that is \$1,000 higher than if the contractor had not been offered the \$8,000 job.

#### *1. Application of Nash bargaining equilibrium to the AT&T/Time Warner merger*

The NBE methodology can be explained in the context of the *AT&T/Time Warner*<sup>53</sup> merger, in which the competitive concern involved input foreclosure in a market in which the price of the input was negotiated rather than set unilaterally by the input sellers. AT&T owned the DirecTV satellite video distributor. The merger would allegedly have increased Time Warner's bargaining leverage in negotiations with DirecTV's closest competitor, Dish, and others, leading to higher negotiated prices for Time Warner programs. As a result, DirecTV would gain the power to raise its subscription prices.

Vertical mergers can lead to EDM, which can create offsetting downward pricing pressure. The plaintiff's economic expert testified that EDM would place some downward pricing pressure on DirecTV's prices but that the net effect would still be higher prices and substantial consumer harm. He estimated these effects with an economic simulation model that used Time Warner and DirecTV

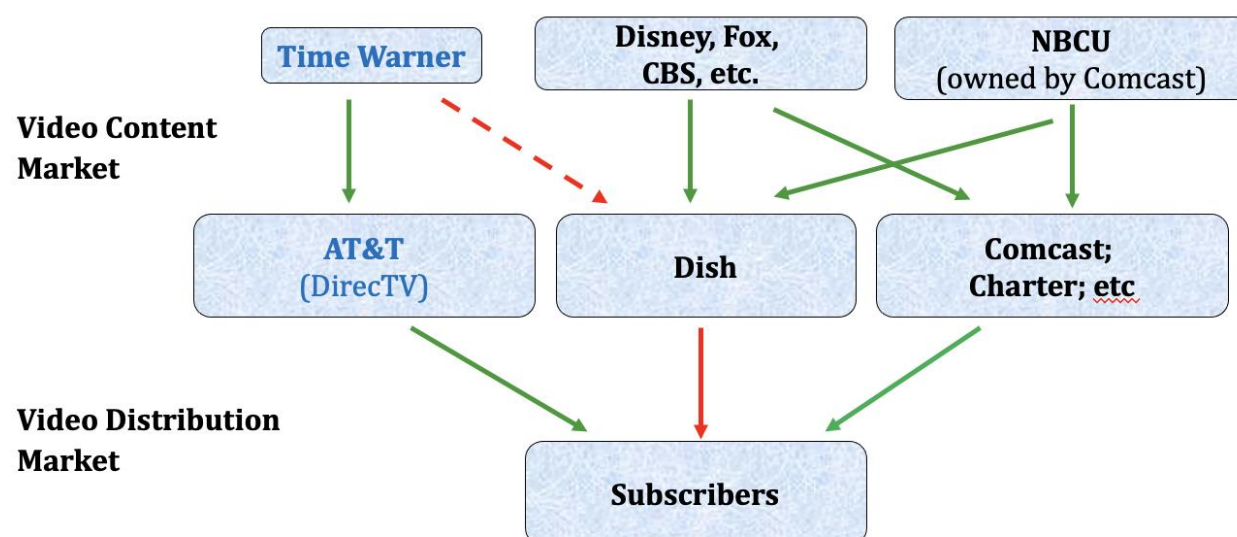
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<sup>53</sup> *United States v. AT&T, Inc.*, No. 18-5214 (D.C. Cir. 2019). For simulation analysis of the effect of bargaining power on the impact of vertical mergers, see Gloria Sheu and Charles Taragin, *Simulating Mergers in a Vertical Supply Chain with Bargaining*, 52 RAND J. ECON. 596 (2021).

data. The district court rejected this model and the Justice Department's claims in an economically flawed decision that the D.C. Circuit criticized but upheld.

The government analyzed the consequences of input foreclosure under the assumption that Time Warner's programming prices were negotiated with pay-TV distributors rather than simply set unilaterally by Time Warner. It relied on this kind of bargaining logic to conclude that the merged firm would raise the price of Time Warner's programming to video distributors that compete with AT&T's video distribution business centered around DirecTV, particularly Dish, its closest competitor. Figure 13.7 illustrates the basic market structure (assuming, for simplicity of discussion, that Dish is the only targeted competitor).

**Figure 13.7 AT&T/Time Warner negotiation model**



If no distribution agreement is reached between Time Warner and Dish before the merger and Time Warner programming is blacked out on Dish, Time Warner will lose programming revenue and Dish will lose revenue, because some subscribers will shift to DirecTV and other distributors if Dish lacks Time Warner programming. These revenue losses will determine the parties' respective pre-merger reservation prices.<sup>54</sup>

The merger changes their reservation prices. The revenue of DirecTV would rise, because Dish would lose some subscribers to it. These extra revenues for DirecTV would make a blackout less costly for the merged firm.<sup>55</sup> For this reason, they would raise Time Warner's negotiation

<sup>54</sup> The marginal cost of sharing content with additional more subscriber is assumed to be zero. In addition to reducing subscriber and licensing revenue, the blackout would reduce advertising sold by Time Warner and Dish.

<sup>55</sup> Time Warner's next best alternative involves not making a deal with Dish. After the merger, that alternative is still costly to Time Warner but less costly than it was before the merger, because the merged firm benefits when Dish customers switch to DirecTV. The merger thus raises Time Warner's reservation price and leads to a higher negotiated price for programming (much as the homeowner would pay for the repairs increased when the contractor's reservation price rose). It is not unusual for a merger to change a firm's profitability calculus, as it does here for Time Warner.

reservation price once it became a division of AT&T. The merger would enhance its bargaining leverage when negotiating with Dish, allowing post-merger Time Warner to obtain a higher price for its programming than the standalone Time Warner could. Those higher prices would lead Dish to raise its prices to customers who purchase video subscriptions. DirecTV could take advantage of lessened competition by picking up new customers, raising its own video distribution prices, or some combination of the two.

EDM would increase DirecTV's revenue losses from a blackout, placing downward pricing pressure on the negotiated price. However, the net effect on the equilibrium negotiated price would still be positive (i.e., lead to net anticompetitive effects), according to the simulation model.

## 2. Judicial analysis

This vertical merger bargaining model analysis [is] well accepted in the economic literature. Economists from the Federal Communications Commission (FCC) used it in similar analysis of the Comcast/NBC merger.<sup>56</sup> However, the district court in the AT&T/Time Warner case ridiculed it, calling it a "Rube Goldberg machine."<sup>57</sup> In addition to objecting to the seeming complexity of the model, the court was troubled by the fact that long-term content blackouts are very rare. This objection was actually irrelevant, as application of the NBE model does not depend on the likelihood that the parties permanently fail to reach an agreement. The model explains how the bargaining outcome is reached even in settings in which the parties' next-best alternatives are much worse than reaching an agreement (i.e., when the joint gains from reaching an agreement are large).

The D.C. Circuit did not describe the district court as rejecting application of the bargaining model when the parties will almost surely reach an agreement (which is how the government characterized the lower court decision on appeal). Rather, it found that the district court had made findings on the facts, based on the testimony of industry executives and an econometric study of the consequences of prior vertical integration in the industry. The district court also concluded that the merger changed the stakes for Time Warner only slightly. Put differently, the merger would make too little difference to Time Warner's reservation price to materially affect the price at which the merged firm would license cable programming to video distributors, notwithstanding the results of simulation model used by the expert witness.

The district court also placed weight on Time Warner's promise to enter into no-blackout arbitration agreements if and when negotiations broke down. The agreements would mean that Dish would have the option to continue carrying Time Warner programming pending arbitration

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<sup>56</sup> See *In re Applications of Comcast Corp., General Electric Co., and NBC Universal, Inc. for Consent to Assign Licenses and Transfer Control of Licensees*, Memorandum Opinion and Order, MB Docket No. 10-56, FCC 11-4, 26 FCC Rcd 4238 (January 20, 2011); Jonathan Baker, *Comcast/NBCU: The FCC Provides a Roadmap for Vertical Merger Analysis*, 25 ANTITRUST (2011).

<sup>57</sup> *U.S. v. AT&T, Inc.*, 310 F. Supp. 3d 161, 184 (D.D.C. 2018). Rube Goldberg machines were said to be overly complicated for performing a simple task. In this case, AT&T's incentives to foreclose Dish were obvious and simple to explain. The more complex model was built in order to show that the harmful impact of the foreclosure exceeded likely benefits from EDM and deal with possible criticisms by AT&T's economist.

under the terms and conditions of its existing contract until the arbitrator made a decision.<sup>58</sup> The appeals court accepted the district court's position that the government should have analyzed the consequences of the arbitration agreements for the price at which Time Warner would be expected to license its programming.

***C. Jeld-Wen/CMI: Merger with a "Frankenstein Monster" Effect***

*Jeld-Wen/CMI*<sup>59</sup> was a successful private antitrust case attacking an acquisition of a small mainly upstream producer by a vertically integrated competitor. The merger was both vertical and horizontal. The case involved competition in molded interior doors and doorskins (the material that is glued to a plain solid wood door to create the molded door effect). CMI was a doorskin plant resulting from a Justice Department divestiture remedy when two vertically integrated molded door companies, Masonite and Premdor, merged in 2001.<sup>60</sup> Several small unintegrated door producers, including Steves & Sons (Steves), purchased doorskins from the integrated company. CMI was divested to ensure that this fringe of standalone door companies would have an independent doorskin supplier as an alternative to Masonite and Jeld-Wen, the two major vertically integrated door companies.

CMI was not doing well, as a result of reduced housing construction during the Great Recession that followed the financial meltdown in 2008.?, Jeld-Wen proposed acquiring it. In anticipation of Justice Department concerns, Jeld-Wen struck long-term supply contracts with Steves and other producers. As a result, Steves and others did not complain to the Justice Department, and the CMI acquisition was approved. Masonite and Jeld-Wen competed to sell doorskins to the independents, as well as competing with each other and the independents in the market for molded doors.

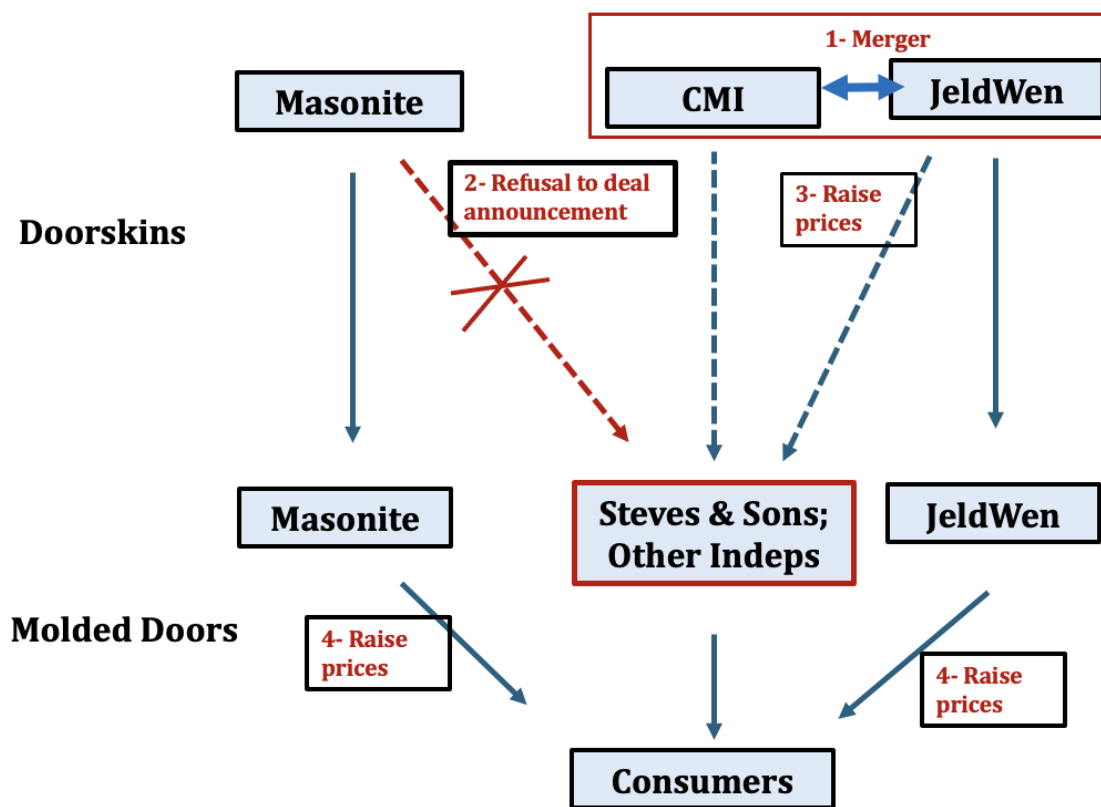
This situation changed in 2014, when Masonite announced that it would no longer sell doorskins to independents. Jeld-Wen forwarded this announcement to Steves with a note that read "Let's talk." Jeld-Wen then demanded prices that were higher than those in its long-term contracts. The move led Jeld-Wen and Masonite to raise their door prices. Figure 13.8 illustrates the market structure and the exclusionary conduct.

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<sup>58</sup> The government did not present expert testimony on its view of the shortcomings of AT&T's promise. For analysis of those shortcomings, see Gene Kimmelman and Steven C. Salop, *AT&T's Flawed Arbitration Proposal*, MEDIUM (Apr. 10, 2018), <https://publicknowledge.medium.com/atts-flawed-arbitration-proposal-d020e66b2985>.

<sup>59</sup> *Steves and Sons, Inc. v. JELD-WEN, Inc.*, 988 F.3d 690 (4th Cir. 2021).

<sup>60</sup> Final Judgment, *United States v. Premdor Inc.*, No. 01-01966 (D.D.C. April 5, 2002), available at <https://www.justice.gov/atr/case-document/file/507676/dl>. I consulted with the merging parties on this transaction.

**Figure 13.8 Jeld-Wen/CMI doorskins foreclosure**

Steves complained to the Justice Department. When the Department failed to act, Steves filed a private antitrust case, which it won at trial, in 2018.<sup>61</sup> The court ordered Jeld-Wen to revert to the terms of the contract and to divest CMI. Both the trial judgment and the divestiture were upheld on appeal.<sup>62</sup> After some delays, the litigation over the divestiture was completed, in 2026.<sup>63</sup>

This case also illustrates the “accommodation effect,” which Krattenmaker and Salop originally termed the “Frankenstein monster” effect.<sup>64</sup> That terminology is highly appropriate here. Masonite’s unilateral announcement that it would not supply Steves or the other independents endowed Jeld-Wen with monopoly power, which it used to raise the costs of the independents. This economic analysis was well explained at trial by Steves’ economic expert.<sup>65</sup>

<sup>61</sup> *Steves and Sons, Inc. v. JELD-WEN, Inc.*, 345 F.Supp.3d 614 (E.D.Va. 2018).

<sup>62</sup> *Steves and Sons, Inc. v. JELD-WEN, Inc.*, 988 F.3d 690 (4th Cir. 2021).

<sup>63</sup> *Joint Position, Steves & Sons, Inc. v. JELD-WEN, Inc., No. 3:16-cv-545, ECF No. 1891 (E.D. Va. Apr. 10, 2026)*.

<sup>64</sup> Thomas G. Krattenmaker and Steven C. Salop, *Anticompetitive Exclusion: Raising Rivals’ Costs to Achieve Power over Price*, 96 YALE L.J. 209 (1986).

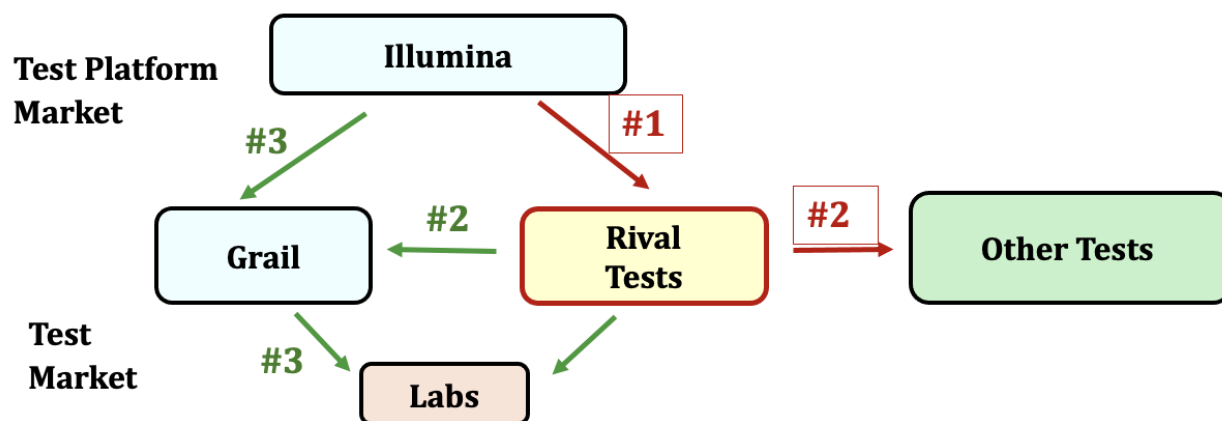
<sup>65</sup> *Steves and Sons, Inc. v. JELD-WEN, Inc.*, 345 F.Supp.3d 614, 635-637 (E.D.Va. 2018).

## VI. Quantifying Foreclosure Incentives with the Vertical Arithmetic Methodology

Economists have developed several quantitative methodologies for gauging input foreclosure incentives. The simplest metric is the vertical arithmetic methodology, which estimates the profitability of the upstream merger partner totally foreclosing sales of the input to the rivals of the downstream merging firm. This methodology compares the reduction in the variable profits of the upstream firm from the reduction in input sales with the increases in the variable profits of the downstream firm from gaining the sales diverted from the foreclosed downstream rivals. It assumes that EDM occurs, in that the downstream firm obtains the input at marginal cost after the merger. But it also assumes that the downstream price does not change, from either the upward pricing pressure resulting from the foreclosure or the downward pricing pressure from the EDM. It also assumes that upstream prices do not change (i.e., there is no accommodation effect).

The methodology can be explained in the context of the Illumina/Grail merger. Suppose that before the merger, rivals sell  $R$  units and Illumina earns a dollar variable profit margin of  $Mu$  on each of these sales. Suppose that Grail earns a variable profit margin of  $Md$  on its test sales. The profitability of the total foreclosure strategy can be sketched out as the series of steps shown in Figure 13.9.

**Figure 13.9 The vertical arithmetic methodology**



Suppose Illumina withholds all input sales from rival test producers and loses the variable profits that it would have earned (Step 1). Those profits are equal to its dollar margin ( $Mu$ ) times the lost sales from the rivals ( $R$ ), a profit reduction of  $Vu = Mu \times R$ . Assume that without the input from Illumina, these test firms cannot produce the tests.

Suppose that a fraction  $d$  of their sales are diverted to Illumina and the rest are diverted to other tests that do not need the Illumina inputs, so that Grail's sales increase by  $d \times R$ , as shown as Step 2. Grail earns higher variable profits on these new sales, as shown as Step 3. It earns its downstream variable margin  $Md$  plus the upstream margin  $Mu$ , because Illumina transfers the input to Grail at marginal cost, leading to an increase in Grail's dollar variable profit of  $Vd = (Mu + Md) \times d \times R$ . The merged firm's profits rise if the downstream profit increase is larger than the upstream profit decrease ( $Vd > Vu$ ), which leads to the condition  $d > Mu / (Mu + Md)$ —that is,  $d$  exceeds the fraction of total variable profits accounted for by upstream division. Profitability is therefore more likely when the downstream dollar margin is higher than the upstream dollar variable margin. Suppose,

for example, the firm earns \$100/per unit downstream and \$25 per unit upstream, for a total of \$120. Total foreclosure would be profitable if the diversion ratio exceeds 20 percent (25/125).

The vertical arithmetic methodology is overly permissive, because the assumption of total foreclosure is extreme. It is equivalent to a prohibitive (e.g., infinite) input price increase that eliminates all sales—a price increase that is unlikely to be profit maximizing. A partial foreclosure strategy involving a smaller price increase that leads rivals to continue to purchase some input from the upstream firm will typically be more profitable.

### ***A. Vertical Arithmetic with Complementary Products***

In a merger of complements, the vertical arithmetic methodology tends to show the profitability of foreclosure in one or the other direction. Using the same terminology of U and D for the two complementary products, suppose two firms, U1 and U2, compete in selling product U, and two other firms, D1 and D2, compete in selling product D. Suppose the products are perfect complements (i.e., a consumer purchases one unit of U and one unit of D to create its system product). Suppose that some consumers purchase each of the four possible bundles (U1D1, U1D2, U2D1, and U2D2). Suppose that the pre-merger per unit dollar margins are  $Mu = \$25$  and  $Md = \$100$ .

Suppose next that U1 and D1 merge and stop selling D1 on an unbundled basis but continue to sell U1 on an unbundled basis. This partial bundling eliminates D1's sales and profits on the U2D1 product sales, and would be profitable only if the fraction of previous U2D1 sales diverted to U1D1 satisfied  $d > Md/(Mu + Md) = 75$  percent. In light of the difference in margins, this high level of diversion is unlikely.

Consider next the possibility of ceasing standalone sales of U1. In this case, the merged firm would lose the per unit profits on sales of U1D2 but would obtain the fraction of sales diverted to U1D1, which would be profitable if  $d > Mu/(Mu + Md) = 25$  percent. This rate of diversion is much more plausible.

Stated differently, lack of plausibility of diversion in one direction implies greater plausibility in the other. In the extreme case of  $Mu = \$1$  and  $Md = \$99$ , the level of diversion required to make withholding D1 is 99 percent (99/100), and the level of diversion required to make withholding U1 is 1 percent (1/100).

### ***B. Partial Foreclosure***

Concerns about partial foreclosure (i.e., raising the input price rather than totally withholding the input) can be gauged using the vertical Gross Upward Pricing Pressure Index (vGUPPI) methodology. Doing so is more complicated to calculate than the “vertical arithmetic” because this methodology takes account of the downstream price effects from both foreclosure and EDM.<sup>66</sup> Even this methodology is simplified, however, in that it does not account for possible accommodation effects by other upstream competitors and non-foreclosed downstream rivals. Accounting for product substitution also adds complexity. To take all these effects into account in a quantified way,

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<sup>66</sup> Serge Moresi and Steven C. Salop, *vGUPPI: Scoring Unilateral Pricing Incentives in Vertical Mergers*, 79 ANTITRUST L.J. 185 (2013).

economists have formulated equilibrium merger simulation models that they attempt to calibrate to observed market data.

### VII. Evasion of Price Regulation or Long-Term Contracts

A vertical merger can be a way to avoid a regulatory constraint applicable to one of the merging firms. Suppose, for example, that the downstream firm's price is regulated but it is permitted to pass on cost increases, including the price of inputs purchased from the upstream merging firm. In this situation, the downstream regulation can be evaded by having the upstream firm raise its price. This effect is neither exclusionary nor collusive. It is best characterized as opportunistic, analogous to the installed base opportunism theory in *Kodak*.<sup>67</sup>

A vertical merger may analogously facilitate evasion of pricing constraints in long-term private contracts with input price escalators that use market indexes. In this situation, a vertical merger might permit and provide an incentive for the upstream merging firm to take actions to increase the price index in order to increase the costs of the competitors of the downstream affiliate, thereby increasing its profits at both levels. Suppose, for example, that the long-term contracts for jet fuel sold by refineries to airlines contain a provision that ties the fuel contract price to the published spot price of jet fuel. After the merger of Airline A and Refinery X, Refinery X might make spot market purchases or reduce spot market sales in order to increase the published spot price, thereby increasing the contract price paid by competing Airlines B and C for their jet fuel. Its post-merger incentive to do so would be driven by the fact that these price increases would benefit Airline A.<sup>68</sup>

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<sup>67</sup> *Eastman Kodak Co. v. Image Technical Services, Inc.* 504 U.S. 451 (1992). The installed led base opportunism refers to the fact that Kodak had market power over the locked-in installed base of previous copier owners that required replacement parts and service.

<sup>68</sup> The indexing of contract prices to spot prices motivated the collusive conduct in *Socony Vacuum. U.S. v. Socony-Vacuum Oil Co.*, 310 U.S. 150 (1940).