



Columbia University

*Department of Economics
Discussion Paper Series*

Competitive Effects of Vertical Integration

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Discussion Paper No.: 0506-11

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November 2005

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Abstract

The paper surveys the economics literature on the competitive effects of vertical integration, assesses the relevance of the economics literature for several recent regulatory and antitrust cases, and defends a structured rule of reason approach to evaluating the competitive effects.

JEL classification: K4, L5

COMPETITIVE EFFECTS OF VERTICAL INTEGRATION

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I. INTRODUCTION

Vertical integration is an enduring topic for economics. The structure-conduct-performance perspective of the 1950s and 1960s viewed vertical integration suspiciously, worrying about exclusionary practices that foreclose competitors and leverage monopoly from one market to another. The Chicago School of the 1960s and 1970s rebutted these concerns by pointing out the weak microeconomic foundations of leverage theory, and explaining why vertical integration increases economic efficiency. Transaction Cost Economics of the 1970s and 1980s staked a middle ground, identifying new efficiency rationales for vertical integration, while cautioning that firms with market power may have strategic goals poorly aligned with consumer welfare (Williamson, 1975; 1985). Most recently, a new literature on vertical foreclosure (a.k.a. Post-Chicago Economics) applied game-theoretic tools to develop new theories of strategic vertical integration and identify circumstances in which vertical integration alters industry conduct to the detriment of competitors and consumers. The rich intellectual history of industrial organization economics thus reveals assorted approaches to the topic.

Vertical integration raises contentious issues for antitrust policy and industry regulation. Antitrust policy in the United States recognizes that a vertical merger can

* I thank participants at the LEAR conference on “Advances in the Economics of Competition Law” at Rome in June 2005, and participants at a seminar at Columbia University for their comments. I also thank Steven Salop for extensive comments on earlier drafts, and Sergei Koulayev for excellent research assistance. I am fully responsible for the final product.

create incentives for anticompetitive foreclosure or facilitate collusion, while remaining mindful that vertical integration can achieve efficiencies (ABA, 2003).¹ Vertical integration raises a similar conflict for the economic regulation of industries. While foreclosure concerns offer a rationale to restrict the conduct of vertically integrated firms, faith in market efficiency and doubt about the regulatory benevolence support a trend toward deregulation (Stigler, 1971). While Chicago School critiques of foreclosure theory and cautions about the difficulties of collusion (Stigler, 1964) urge a permissive approach to vertical mergers and the regulation of vertically integrated industries, Post-Chicago theories of harmful vertical integration nevertheless featured prominently in some recent merger reviews and regulatory proceedings.

My purpose in this essay is to review the economics literature on the competitive effects of vertical integration, and assess its relevance for competition policy and industry regulation. Section II organizes my literature review around five major theories, after discussing some preliminary issues. The theories depend on assumptions both about the market power of firms to raise prices above costs and to exclude competitors, and about the power of contracts to control and align the incentives of parties. Two theories, dubbed “single monopoly profit” and “eliminating markups”, derive from the Chicago School. Two other theories, “restoring monopoly power” and “raising rivals’ costs”, are from Post-Chicago Economics. The remaining theory, “facilitating collusion” has long roots in competition policy, but only recently began to receive a firmer grounding in the modern economic theory of collusion. Section III examines the relevance of these and related theories in the context of three recent cases. The first case is the acquisition of

¹ The U.S. Department of Justice’s 1984 Merger Guidelines also recognize “evading regulation” as an additional anticompetitive motive for vertical integration (DOJ, 1984). This issue is beyond the scope of our essay.

DirectTV, a distributor of video programming, by News Corp., a diversified media company (FCC, 2004). The Federal Communication Commission (FCC) reviewed this vertical merger under its authority to approve the transfer of certain licenses. The FCC's conditional approval of the acquisition placed certain restraints on the conduct of the new vertically integrated firm. The second case is the airline computer reservation system (CRS) proceeding of the Department of Transportation (DOT, 2004). CRSs provide information, booking, and ticketing services for scheduled airline flights. Airlines once owned these systems, but divested their ownership interests by the end of the proceeding. In the wake of vertical disintegration, the DOT allowed all regulations of the CRS industry to lapse. The third case is the acquisition of Masonite, a manufacturer of an intermediate good in the production of molded doors, by Premdor, a partially vertically integrated manufacturer of molded doors (U.S. v. Premdor, 2001). The Department of Justice (DOJ) agreed to the merger with a consent order requiring Masonite to divest one of its plants to a new entrant in the intermediate good market. Section IV outlines a simple framework for the economic analysis of the competitive effects of vertical integration, based on a more elaborate framework in Riordan and Salop (1995). The simple framework is explained with reference to the three cases introduced in the previous section. Section V concludes with some general comments about the state of economic knowledge regarding the competitive effects of vertical integration.

II. ECONOMIC ANALYSIS OF VERTICAL INTEGRATION

Preliminary Issues

Vertical integration is the organization of successive production processes within a single firm, a firm being an entity that produces goods and services (Riordan, 1990).² A firm can be interpreted as a unified ownership of assets used in production (Grossman and Hart, 1986), and as a nexus of contracts linking its owners to factors of production, managers, and creditors (Jensen and Meckling, 1976). The owners of a firm directly or indirectly control the use of assets, and keep the profits from production after compensating other claimants. Thus, vertical integration brings upstream and downstream assets and production under unified ownership and control.

There are varieties of vertical integration. Consider for illustration a supply chain in which raw materials and other inputs are used to produce an intermediate good, which in turn is a component input into the production of a final good, which in turn is distributed to consumers through a retail channel. Forward vertical integration occurs when a firm expands the scope of its activities to both produce and distribute the final good. For example, shoe manufacturer Brown Shoe Company integrated forward when it acquired shoe retailer Kinney (*U.S. v. Brown Shoe Co.*, 370 U.S. 294, 1962). A firm integrates backward when it produces an intermediate good that is a component in the assembly of a final product. For example, Ford sought to acquire Autolite to produce the sparkplugs for its automobiles (*U.S. v. Ford Motor Co.*, 405 U.S. 562, 1972). A firm also integrates backward by producing materials or capital goods used in the production of a final output. For example, Alcoa acquired bauxite mines to supply its alumina

² There are of course different legal forms of a firm, ranging from sole proprietorships, to partnerships, to corporations.

refineries (*U.S. v. Alcoa*, 377 U.S. 271, 1945). Moreover, vertical integration in either or both directions can be partial or full, depending on whether the firm produces all its requirements for an input, or distributes its final product exclusively through its own distribution channels. Vertical integration can also be partial if a firm acquires an ownership share of an upstream supplier or downstream customer, possibly with limited control rights (O'Brien and Salop, 2000).

Vertical integration can occur by internal growth or by merger. A firm integrates backward internally by building its own facilities for manufacturing an intermediate good, or forward internally by creating its own distribution facilities. Vertical integration by investment in new productive assets usually expands markets, and therefore presumably does not raise competitive concerns. This is not to say that a vertically integrated market structure necessarily outperforms a non-integrated one, because, for industries subject to regulation, restrictions on the conduct of vertically integrated firms might improve market performance. A firm also vertically integrates by acquiring productive assets from a firm already participating in a relevant upstream or downstream market, or by acquiring stock in a firm owning those assets. A vertical merger by asset acquisition or stock acquisition potentially raises competitive concerns, in which case conduct restrictions or a divestiture of assets might make acceptable an otherwise anticompetitive vertical merger.

Economic analysis demonstrates that the competitive effects of vertical integration depend on the structure of upstream and downstream markets. Among the most important elements of market structure is the market power of firms in the relevant industries. Market power is the profitable ability to raise price above cost or to exclude

competitors, and is traced usually to conditions of industry concentration, product differentiation, or cost advantages. Durable market power that yields supra-competitive profits is protected by “barriers to entry”, a label that applies generally to market conditions that prevent the erosion of supra-competitive profits by new entry (Bain, 1956; DOJ, 1997).³ Vertical integration that fails to increase market power by eliminating competitors or raising entry barriers is unlikely to have adverse consequences for consumers.

An equally important element of market structure for analyzing vertical integration is the power of contracts to align incentives and control the conduct of firms. Generally, “contract power” refers to the ability of firms to commit credibly not to behave opportunistically (Williamson, 1975; 1985; 1989), either *via* explicit legally enforceable contracts, or *via* implicit contracts supported by self-enforcing behavioral norms (Baker, Gibbons and Murphy, 2002). If contracts have sufficient power to control conduct, then there is little scope for improvement by vertical integration. For example, in some circumstances, nonlinear pricing and appropriate vertical restraints might achieve similar profit-maximizing outcomes as vertical integration (Mathewson and Winter, 1984). However, by closing gaps in incomplete contracts, common ownership might enable production decisions to adapt better to market conditions (Williamson, 1975), or might improve investment incentives (Grossman and Hart, 1986; Hart and Moore, 1990). To the that extent that contracts are incomplete, vertical integration might alter incentives for opportunistic behavior in ways that increase market power.

³ There is a continuing debate on the most appropriate economic definition of “entry barriers”; see *American Economic Review, Papers and Proceeding*, 2004).

Important issues surrounding the power of contracts concern the ability and incentive of upstream firms for price discrimination.⁴ Price discrimination is infeasible if a supplier cannot control effectively the use of purchased quantities by limiting resale and preventing arbitrage (Tirole, 1988). In the absence of price discrimination, upstream suppliers charge a uniform price for each unit sold to downstream customers. The ability to price discriminate can be a mixed blessing. On the one hand, the full exploitation of market power can require a more complicated pricing strategy than setting a uniform price, e.g. two part tariffs or other forms of quantity discounting (Mathewson and Winter, 1984). On the other hand, credible “most favored customer” clauses that limit price discrimination can control opportunistic behavior by an upstream supplier that otherwise might undermine its ability to extract monopoly profits from the downstream industry (Hart and Tirole, 1990; O’Brien and Shaffer, 1992; McAfee and Schwartz, 1994; Rey and Tirole; 2003). Such issues regarding the ability and incentive for price discrimination appear in various guises in the economic theories of the competitive effects of vertical integration reviewed below.

My review adopts a couple of simplifying assumptions for expositional convenience and clarity. First, there are well-defined relevant upstream and downstream product and geographic markets. Relevant markets include all products that are reasonably good demand substitutes. Market definition is the customary first step for market power analysis (DOJ, 1997). Second, the objective of a firm is profit

⁴ Price discrimination traditionally is categorized into three types. First-degree price discrimination refers to bargaining over terms on a customer-by-customer basis. Second-degree price discrimination involves different customers paying different prices because they make different choices from the same menu of possibilities. Quantity discounts are an important example of second-degree price discrimination, as customers electing different quantities end up paying different average prices. Finally, third-degree price discrimination means setting prices for different groups of customers, for example, setting different prices in geographically distinct markets.

maximization. In particular, a vertically integrated firm aims to maximize the joint profit of its upstream and downstream operations. A corollary assumption is that vertical integration eliminates information asymmetries between the upstream and downstream divisions, thus enabling better coordination (Riordan, 1990).⁵

Single Monopoly Profit

The Chicago School contends that an upstream monopolist protected by durable barriers to entry can claim a monopoly profit but once. If an upstream monopolist can use contracts to extract fully a monopoly profit from a downstream market, then there is no role for vertical integration to play in leveraging monopoly power to obtain any additional profit. The single monopoly theory presumes that vertical integration has some purpose other than leveraging monopoly power.

The single monopoly profit theory is clearest in the simple case of an upstream monopoly supplying an intermediate good to a downstream perfectly competitive industry. If downstream firms are equally efficient, then it is sufficient to consider uniform pricing in this case. A critical assumption is that requirements of the intermediate good are in fixed proportion to the final good. In this case, the upstream monopolist maximizes profits by setting a wholesale price for the intermediate good that results in a price to consumers that is the same as would charge a fully integrated monopolist. Since the perfectly competitive downstream industry earns only normal returns, the full monopoly profit is returned to the upstream firm in wholesale revenues. If the upstream monopolist were to integrate forward and acquire a downstream firm,

⁵ This assumption sidesteps thorny problems about decentralized incentives inside the firm, in particular, the difficulty of aligning the incentives of owners and managers. See Mookherjee (2003) and Baldenius (2005).

then the integrated firm would continue to earn exactly the same level of economic profits, assuming the remaining firms in the downstream industry continue to behave competitively.⁶

This simple version of the single monopoly profit theory is formalized as follows. Suppose that a vertically integrated monopolist producing a homogeneous final good can sell quantity Q at price $P(Q)$ by incurring manufacturing and distribution costs $C(Q)$. Therefore, the profit of the monopolist is $\Pi(Q) = P(Q)Q - C(Q)$. Assuming this profit-function has a unique maximum, the quantity that maximizes monopoly profit is Q^* satisfying the first-order condition for a maximum $P(Q^*) + Q^*P'(Q^*) = C'(Q^*)$, where a prime indicates the slope of a function. This condition is the familiar rule of equating marginal revenue and marginal cost. In contrast, consider an upstream monopolist who manufactures the good and distributes it through a perfectly competitive retail industry by setting a uniform wholesale price W . If the constant average cost of retail distribution is c_d , and there are no cost economies of vertical integration, then upstream manufacturing cost is necessarily $C_u(Q) = C(Q) - c_dQ$. A perfectly competitive downstream industry earns zero profits, requiring $P(Q) = W + c_d$. Therefore, the competitive equilibrium quantity equals the monopoly quantity if $W = C'(Q^*) - Q^*P'(Q^*) - c_d$.

The single monopoly profit theory is robust to a variety of downstream market structures, once the upstream monopolist is unshackled from uniform pricing or can enforce appropriate vertical restraints (Mathewson and Winter, 1984). Consider, for example, a symmetric downstream industry selling either homogeneous or differentiated

⁶ Essentially the same argument applies to backward integration if the downstream industry is a monopoly and the upstream industry is perfectly competitive. In this case, the downstream monopolist also is a monopsonist on the input market. Moreover, the argument generalizes if monopolist or monopsonist were to integrate partially by acquiring a fraction of the assets of the downstream or upstream industry.

products, and competing by choosing either quantities *a la* Cournot or prices *a la* Bertrand.⁷ The upstream monopolist can set a wholesale two-part tariff $W(Q) = F + WQ$, such that the (marginal) wholesale price W elicits monopoly pricing downstream, and the fixed fee F extracts profits. For example, suppose that the downstream industry is a symmetric Cournot oligopoly with N firms and constant average cost c_d . Then equilibrium conduct results in a total industry output satisfying $P(Q) + (Q/N)P'(Q) = c_d + W$.⁸ Therefore, the monopoly output is elicited by setting a wholesale price $W^* = P(Q^*) - c_d + (Q^*/N)P'(Q^*)$, and monopoly profit is extracted by setting a franchise fee $F^* = - (Q^*/N)^2 P'(Q^*)$.⁹ Thus, with two-part tariffs, the upstream monopolist collects its single monopoly profit contractually, and gains no further monopoly profit by vertical integration. Clearly, the two-part tariff solution requires that the upstream supplier is able to prevent resale. Otherwise, savvy downstream firms would decline to pay the franchise fee and purchase the good on the secondary market on terms reflecting the wholesale price.

The single monopoly profit theory assumes that bargaining power is concentrated in the hands of the upstream monopolist. The upstream firm presents its downstream customers with a harsh take-it-or-leave-it offer: either purchase the intermediate good under the terms of the two-part tariff, or withdraw from the downstream market. This extreme bargaining posture is most plausible in unregulated markets when the downstream industry is unconcentrated and price discrimination is impossible. If the

⁷ Generally, the Cournot quantity-setting model of oligopoly is appropriate for modeling the capacity decisions of firms in a homogeneous product industry, while the Bertrand price-setting model is more appropriate for a produce-to-order differentiated product industry.

⁸ See Amir and Lambson (2000) for sufficient conditions for unique symmetric Cournot equilibrium.

⁹ If the downstream firms are asymmetric, then the terms of the two-part tariffs can be customized for each customer in order to achieve the goal of fully monopolizing the downstream industry.

downstream industry is concentrated and contracts negotiated individually, then the assumption of one-sided bargaining power seems less plausible. Is it credible for the upstream monopolist to refuse to deal if an important customer rejects the firm's initial offer? It obviously is difficult for the firm to commit not to even consider a profitable counteroffer, and the give-and-take of bilateral bargaining can limit the ability of an upstream firm to fully extract rents from the downstream industry (Rogerson, 2003; Salop and Woodbury, 2003).

Vertical integration can alter bargaining power (de Fontenay and Gans, 2002). According to the theory of bilateral bargaining, a greater cost of delay in reaching agreement weakens a party's bargaining power, resulting in an agreement that is less favorable to the more impatient party (Rubinstein, 1982). Suppose an upstream monopolist (U) is bargaining separately with two downstream firms ($D1$ and $D2$) who compete with each other. Suppose that U makes a separate initial offer to each downstream firm. If both accept, then the downstream firms each earn some level of profit. If instead $D1$ were to accept and $D2$ reject U 's offer, then $D1$ would experience a gain in profit by virtue of a temporary competitive advantage over $D2$. If contracts are bilateral, so that terms are not contingent on acceptance by the other downstream firm, then this windfall accrues purely to $D1$ and does not influence continued bargaining between U and $D2$. Now suppose that U and $D1$ are integrated. If $D2$ were to reject U 's initial offer, then the downstream windfall accrues directly the integrated firm. Thus, the costs of delay in reaching agreement with $D2$ are less when U is vertically integrated,

which strengthens U 's bargaining power in dealing with $D2$. The increased bargaining power is an effect of and possible motive for vertical integration.¹⁰

Grimm, Winston, and Evans (1992) test the single monopoly profit theory by examining railroad markets with “interlining”. The typical situation they consider is one in which a railroad is a monopolist on a route between two locations, A and C, but faces interline competition from one or more other railroads on shorter segments of this route, e.g. between B and C, where location B is “on the way” to C from A. Thus, in order to ship between A and C, the interliner must have access to the A-B segment. According to the single monopoly profit theory, the amount of interlining is irrelevant for the ability of the monopolist to extract rents from shippers on the A-C route, yet the data show that shippers between A and C fare significantly better with more interline competition on the B-C segment. How can this be? The result could be due to maximum rate regulation of non-competitive routes, despite the general deregulatory stance of the Interstate Commerce Commission (ICC) at the time.¹¹ Obviously, the integrated railroad cannot extract a monopoly profit from the A-B segment if regulators prevent it from raising the price of this input to the monopoly level. Alternatively, the take-it-or-leave-it bargaining assumption of the single monopoly profit theory may be too strong, particularly if the interliners bring some brand differentiation advantages to the table.

¹⁰ There are bargaining reasons for vertical integration even if $D1$ and $D2$ do not compete with each other and operate in independent markets. Suppose that U s bargains to allocate a scarce supply of the upstream good. Thus, the opportunity cost of supplying an incremental amount of the upstream good to $D2$ is that it could be supplied alternatively to $D1$. Suppose further that the demands of consumers depend positively on relationship-specific investments that $D1$ and $D2$ must undertake prior to negotiating with U . A vertically integrated firm $U-D1$ has a profitable incentive to “overinvest” in order to increase its bargaining strength in dealing with $D2$ (Bolton and Whinston, 1993; Kranton and Minehart, 2004).

¹¹ See Snyder (1995) for a critique of the conclusion that this evidence indicates vertical foreclosure.

Restoring Monopoly Power

A new literature on vertical foreclosure counters the single monopoly profit theory by arguing that an inability to make enforceable multilateral commitments prevents an upstream monopolist from using contracts to extract monopoly profits from a downstream industry, and that vertical integration helps overcome the commitment problem and “restore” monopoly power (Rey and Tirole, 2003). The commitment problem is illustrated by reconsidering the two-part tariff solution proposed above for the case of symmetric downstream Cournot oligopoly. According to this version of the single monopoly profit theory, the upstream monopolist sets a wholesale price W^* above its marginal cost in order to induce the downstream monopoly outcome, and then fully extracts the monopoly profit from the downstream industry with a fixed fee F^* . Suppose, however, that the upstream firm has successfully negotiated this contract with $(N-1)$ of the downstream competitors who thereby are committed to pay the fixed fee. The upstream firm has an incentive to deviate and secretly offer the remaining downstream firm a contract with a lower wholesale price. By doing so, the upstream firm essentially offers Firm N a variable cost advantage over its rivals, for which Firm N is willing to pay a higher fixed fee. Once the $(N-1)$ rivals learn about this “sweetheart deal”, they regret their contracts because more intense competition from the advantaged Firm N makes it impossible for the others to earn enough operating profits to recover F^* .¹² Anticipating the predicament the $(N-1)$ firms refuse to accept the monopolizing contracts in the first

¹² If the $(N-1)$ rivals face a two part tariff (W^*, F^*) and each produce Q^*/N and DI produces q , then the joint profit of U and DI is $(N-1)F^* + W^*(Q-q) + [P(Q) - c_d]q - C_u(Q)$ where $Q = q + (N-1)Q^*/N$. This joint profit function is maximized where $P(Q) + P'(Q)q = C'(Q)$. Under the usual regularity conditions for the existence and uniqueness of Cournot equilibrium, the solution has $q > Q^*/N$, resulting in a downstream price below the monopoly level. Consequently, the rival firms earn negative profits net of F^* . The deviant contract that induces this q from DI sets $W = P(Q) + P'(Q)q - c_d$. Thus $W < W^*$. The fixed fee that extracts supra-competitive profits from DI is $F = -P'(Q)q^2 > F^*$.

place. Such skepticism by the downstream industry leads to a lower wholesale price and more competitive downstream price that limits the ability of the upstream supplier to extract the monopoly profit with a two-part tariff (Hart and Tirole, 1990; McAfee and Schwartz, 1994; O'Brien and Shaffer, 1992; Rey and Tirole, 2003).¹³

A key assumption of the restoring-monopoly-profit theory is that the upstream monopolist cannot make multilateral commitments. In the Hart and Tirole (1990) model, an upstream firm makes simultaneous take-it-or-leave-it contract offers to supply a fixed proportions intermediate good to N downstream firms who sell a homogeneous product to final consumers. In this model, it is important that contracts are both bilateral and private. If contract offers were public, then there could be no surprise sweetheart deals, because downstream firms would observe the contract offers to rivals and make a rational acceptance decision. More generally, the privacy of contracts is less crucial if the take-it-or-leave-it bargaining assumption is relaxed. Even if contract offers are public, downstream firms that lock themselves into a long-term contract risk the misfortune of being “surprised” by a rival who rejects the initial offer and subsequently negotiates a sweetheart deal (McAfee and Schwartz, 1994).

¹³ More formally, in the perfect Bayesian equilibrium of this game, the upstream firm (U) offers each of the N downstream firms (D_1, \dots, D_N) a contract that is immune to deviation. The equilibrium concept requires a specification of beliefs when D_1 is offered an out-of-equilibrium contract. Rey and Tirole (2003) argue that “passive beliefs” are most reasonable when firms set quantities in advance of sales and contracts are secret, that is, when offered a deviation contract, D_1 continues to believe that downstream rivals have been offered their equilibrium contracts and continue to choose their equilibrium quantities. Thus, in the symmetric Cournot case, a two part tariff that is immune to deviation incentives satisfies $W = P(Q) + P'(Q)q - c_d < W^*$, where $Q = Nq$ satisfies $P(Q) + P'(Q)q = C'(Q)$; see previous footnote. If $C_u(Q) = c_u Q$, then this solution corresponds to Cournot competition between n symmetric vertically integrated firms with constant average costs $c = c_d + c_u$. Rey and Tirole (2003) acknowledge that passive-beliefs equilibria are less compelling when downstream firms set prices for differentiated products. In the price-setting case, however, even under an alternative belief system (“wary beliefs”), incentives for opportunistic behavior by U result in a more competitive outcome compared to a vertically and horizontally integrated monopoly (Rey and Verge, 2003).

Partial vertical integration by merging with one of the downstream firms restores the upstream firm's ability to extract monopoly profit, because sweetheart deals with downstream competitors are costly to the downstream division of the integrated enterprise. The cannibalized profits of the downstream division become an opportunity cost of selling more through an independent retail channel. These opportunity costs provide the needed discipline to discourage sweetheart deals that erode downstream prices and prevent the full extraction of monopoly profits (Hart and Tirole, 1990; Rey and Tirole, 2003).

Sufficiently powerful contracts solve the commitment problem without vertical integration. For example, if the final good is homogeneous, then exclusive dealing can mimic the exclusionary effects of vertical integration and similarly restore monopoly power (Hart and Tirole, 1990; Rey and Tirole, 2003). Market-wide retail price maintenance with a return option has similar efficacy (Rey and Tirole, 2003). Obviously, such contractual solutions must be enforceable to be effective. Perhaps surprisingly, most favored customer (MFC) clauses are less successful at restoring monopoly power. The reason is that a sweetheart deal may not be attractive to a competitor whose rival has already accepted the deal (McAfee and Schwartz, 1994). For instance, suppose that a downstream duopolist gains a competitive advantage by accepting a two-part tariff with a lower (marginal) wholesale price and a higher fixed fee that extracts additional profits. The rival duopolist would decline the same deal, because more vigorous competition at the lower wholesale price would make it impossible to recover the higher fixed fee. In this case, an MFC clause fails to deter opportunism.¹⁴

¹⁴ DeGraba (1996) clarifies that a most-favored customer clause deters opportunism if a downstream firm can "pick and choose" among individual terms of two-part tariffs. Consequently, if the monopolist offers a

The theory of restoring monopoly power *via* vertical integration extends to an upstream market structure in which the market power of a low cost supplier is constrained by a higher cost potential supplier (Hart and Tirole, 1990; Rey and Tirole, 2003). In this case, the available single monopoly profit is no higher than the efficiency rents of the low cost supplier. Similarly to the case of upstream monopoly, a commitment problem prevents the low-cost upstream firm from fully capturing these efficiency rents, and vertical integration overcomes the commitment problem and restores monopoly power to the detriment of final consumers. Matters are different if the upstream industry is a homogeneous price-setting oligopoly whose members are equally efficient. In this case, there are no efficiency rents and therefore no monopoly to restore by vertical merger. Thus, the theory of restoring monopoly power only provides an explanation for forward integration by the cost leader of an upstream oligopoly.¹⁵

The extent to which vertical integration solves the commitment problem and restores monopoly power depends on downstream market structure. If the downstream market is homogeneous, and there are non-decreasing returns to scale at the firm level, then a vertically integrated firm can collect monopoly profits by refusing to deal with independent downstream competitors.¹⁶ Matters are more complicated if downstream final products are differentiated or exhibit decreasing returns to scale, in which case

lower marginal wholesale price to any competitor, then all competitors are able to access this reduced marginal price without suffering a higher fixed fee.

¹⁵ Chen and Riordan (2004) demonstrate that, if exclusive dealing is enforceable, then a vertically integrated supplier may be able to exclude equally efficient upstream competitors and effectively cartelize the downstream industry with two-part tariffs. In this scenario, the integrated supplier effectively organizes a downstream cartel by compensating downstream competitors for committing not to deal with alternative suppliers.

¹⁶ In the symmetric Cournot case, if U integrates forward, then U simply refuses to deal with independent downstream competitors, foreclosing them from the market. This foreclosure does not sacrifice any monopoly profits under the assumption of constant average costs (Hart and Tirole, 1990).

partial vertical integration leads to less competitive outcomes but does not enable the full extraction of monopoly profits from the downstream industry.¹⁷

There is little empirical evidence bearing directly on the restoring-monopoly-power theory.¹⁸ A recent case study of the cement and ready-mix concrete industries shows that downstream concrete prices tend to fall and quantities rise as local markets become more vertically integrated, contrary to the predictions of the restoring-monopoly-power theory and other foreclosure theories,¹⁹ but consistent with an alternative efficiency explanation (Hortacsu and Syverson, 2005). These findings support a presumption that the most cement/concrete merger in the sample were pro-competitive, while not necessarily ruling out that some mergers were anti-competitive. Thus, a task for advocates of the restoring monopoly theory is to propose observable conditions under which harmful foreclosure effects are likely to dominate pro-competitive efficiencies.²⁰

Experimental research similarly finds mixed support for the restoring-monopoly-power theory. Martin, Norman and Snyder (2001) devised an experimental game patterned closely on the Hart and Tirole (1990) model of vertical foreclosure. The experimental results support the basic contention of the theory that private bilateral contracting makes it difficult for an upstream monopolist to restrict quantity, and that a partially integrated firm is more able to overcome this commitment problem and earn higher profits. At the same time, the results cast doubt on the ability of upstream firms to

¹⁷ See, for example, Chen and Riordan (2004), who study a price-setting spatially differentiated downstream oligopoly.

¹⁸ Event studies yield ambiguous evidence on the competitive effects of vertical integration (Rosengren and Meehan, 1994; Snyder, 1995; Mullin and Mullin, 1997).

¹⁹ These effects also contradict the raising-rivals-cost and facilitating-collusion theories discussed below.

²⁰ This undoubtedly is a difficult task, but because the predictions of the theory depend on out-of-equilibrium beliefs, about which observable evidence must be difficult to come by. What are lacking from the general theory are robust predictions across a set of plausible beliefs (Segal and Whinston, 2003). See earlier footnote.

extract profits fully from the downstream industry with take-it-or-leave-it offers.

Consistent with the broader experimental literature on “ultimatum games”, downstream players often reject “unfair” offers that leave too little on the table.²¹

Eliminating Markups

The case for a permissive approach to vertical mergers is stronger if firms have market power in both upstream and downstream markets, and if effective price discrimination in the intermediate goods market is difficult. The argument is clearest in the artificial case of successive monopoly and no price discrimination.²² The upstream monopolist sets a uniform wholesale price W for the intermediate good. Taking W as given, the downstream monopolist chooses a quantity Q to maximize $[P(Q) - W]Q - C_d(Q)$. Assuming the downstream cost function $C_d(Q)$ is smooth, and has a well defined slope $C_d'(Q)$ at every point, the quantity choice determines a final price $P = P(Q)$ that adds a monopoly markup to the downstream marginal cost $[W + C_d'(Q)]$. This yields the same outcome as an integrated monopoly if and only if the wholesale price is equal to upstream marginal cost, i.e. $W = C_u'(Q^*)$. The problem is that the upstream monopolist has an incentive to raise W above its marginal cost. The upstream markup raises the marginal cost of the downstream firm, leading to a final price P above what an integrated

²¹ Martin, Norman, and Snyder (2001) also casts doubt on the validity of passive beliefs that Rey and Tirole argue is appropriate when downstream firms choose quantities in advance of sales.

²² The artificiality is plain. If there is only a single customer for the intermediate good, then there can be no resale market for the input, and therefore no reason for the contracting parties to restrict their attention to uniform pricing. The argument makes more sense if the downstream industry is an oligopoly, and the upstream monopolist cannot control resale. Even then, the monopolist might be able to depart from simple uniform pricing by restricting the quantities it sells to individual firms. For example, in the symmetric case, the upstream monopolist could simply offer a quantity $q^* = Q^*/N$ to each downstream firm for a take-it-or-leave-it price that extracted the monopoly profits. The downstream firms each would take the deal, have no incentive for resale, and the upstream firm would earn the full monopoly profit. Such simple quantity forcing is less attractive if the monopolist is incompletely informed about downstream profits, and, therefore, unable to calculate Q^* . Quantity forcing also fails if the upstream monopolist is unable to make multilateral commitments (Hart and Tirole, 1990; Rey and Tirole, 2003).

monopolist would charge. The vertical integration of successive monopolies eliminates this “double marginalization” and results in a lower price of the final good. By this argument, vertical integration both raises profits and benefits consumers (Spengler, 1950).

The double marginalization argument for vertical integration breaks down if sufficiently powerful contracts enable efficient price discrimination. Two-part pricing is sufficient to carry the argument. Let Q^* denote the fully integrated monopoly quantity, and let $W^* = C_u'(Q^*)$ the upstream marginal cost corresponding to this quantity. If the upstream monopolist sets a two-part tariff schedule $W(Q) = F + W^*Q$, then the downstream firm maximizes its profit by choosing Q^* . The upstream firm sets F appropriately to fully extract the monopoly profit.²³ Thus, consistent with the single monopoly profit theory, two-part pricing enables the upstream monopolist to achieve the same profit as a vertically integrated monopoly, and results in the same downstream equilibrium price to consumers.²⁴

The double marginalization hypothesis is relevant, however, if inefficient bargaining results in a wholesale price above upstream marginal cost. Bargaining is likely to be inefficient if there is an information asymmetry between the upstream and downstream firms. In this case, it is hard for the upstream firm to know the value of Q^* , and therefore is unsure of the correct value of W^* . In this case, bargaining with incomplete information generally results in marginal wholesale prices above marginal cost (Maskin and Riley, 1984), creating a double marginalization problem when the

²³ Alternatively, the upstream and downstream monopolists bargain over A to divide the surplus. Efficient bargaining maximizes the joint surplus by setting the slope of the wholesale price schedule equal to $C_u(Q)$.

²⁴ A drawback of the two-part tariff solution is that it provides poor incentives for quality, both at the upstream and downstream level (Mathewson and Winter, 1984).

downstream firm sets the final price.²⁵ By eliminating the information asymmetry between the upstream and downstream division, vertical integration eliminates a double markup and lowers the final price to the monopoly level.²⁶

The single monopoly profit theory assumes that the monopolized intermediate good is in a fixed proportion to the final good. The theory also fails if the downstream technology uses the monopolized upstream input in variable proportions with other inputs and it is not possible to control input usage contractually. In this case, any attempt of the upstream monopolist to raise W prompts the downstream industry to substitute toward other inputs. Thus, upstream monopoly pricing creates an input distortion compared to the cost-minimizing input combination of a vertically integrated firm. The unified control of production in a vertically integrated firm achieves a cost economy by correcting the input distortion.²⁷ The variable proportions case further illustrates the importance of the power of contracts. In this case, an inability of an upstream monopolist to dictate the input usage of downstream customers undermines the logic of the single monopoly profit theory.

Empirical evidence on eliminating markups with vertical integration is mixed. Chipty (2001) and Waterman and Weiss (1996) study the backward integration into programming by cable systems operators (CSOs), and find various pieces of evidence

²⁵ The metering argument for tying (Telser, 1979) is an early version of this theory.

²⁶ See Riordan (1990) for a discussion of how vertical integration alters information structure.

²⁷ While the cost reduction from vertical integration puts downward pressure on prices, an accompanying horizontal consolidation of the downstream industry has the opposite effect. Consequently, in the variable proportions case, the net competitive effect of forward integration by an upstream monopolist is difficult to determine without detailed information about industry structure (Perry, 1989). Abiru (1988) analyzes a successive Cournot oligopoly in which the downstream industry has a constant elasticity of substitution in production and with a constant elasticity of final demand, and presents conditions under which, holding downstream horizontal industry structure constant, vertical integration results in lower final prices. These conditions require that the “raising rivals’ cost” effect of partial vertical integration is not too great (Salinger, 1988), as discussed in the next section.

consistent with double marginalization. First, vertically integrated CSOs are more likely to carry their own premium programming (e.g. subscription movie channels), rather than share rents with a rival programmer. Second, and more importantly, integrated CSOs sell more basic cable and premium subscriptions. Double marginalization is particularly plausible in cable programming because it is the usual industry practice to price exhibition rights for programming on a per subscription basis. Villas-Boas (2004), on the other hand, finds no evidence of double marginalization in the pricing of yoghurt, consistent either with the hypothesis that contracts between manufacturers and retailers solve the double marginalization problem, or with the hypothesis that yoghurt manufacturers lack market power.

Raising Rivals' Costs (RRC)

A vertically integrated firm might engineer an increase in rivals' costs by driving up the price of a scarce input (Salop and Scheffman, 1987; Riordan, 1998). Scarcity is indicated by an upward sloping curve for a competitively supplied input, meaning that a positive shift in demand for the input elicits an expansion of supply only at a higher price. By artificially increasing its own demand for the scarce input, the vertically integrated firm elevates the market price of the input, thus raising the costs of its unintegrated rivals. Vertical integration matters for this incentive, because self-supplied input requirements are insulated from the price increase.²⁸ Consequently, the higher input price impacts the costs of the integrated firm and its downstream competitors asymmetrically. This cost-raising strategy benefits the downstream operation of the integrated firm by causing rivals

²⁸ Put another way, by driving up the market price of input, the vertically integrated firm increases the value of its own upstream assets. The greater returns of downstream foreclosure outweigh the higher opportunity cost of these assets.

to exit the market or otherwise reduce their supply of the final good. While final consumers are harmed by higher downstream prices, the exclusion of less efficient rivals contributes to overall economic efficiency to the extent that market share shifts toward the more efficient vertically-integrated firm. Riordan (1998) demonstrates that net effect on economic efficiency is negative when an integrated dominant firm's output market share is high relative to its input market share.²⁹

Vertical integration might similarly benefit the downstream division of an integrated firm by reducing competition in the upstream market (Ordoover, Saloner, and Salop, 1990). Consider an upstream oligopoly selling a homogeneous input to a downstream oligopoly at a uniform wholesale price. Withdrawal of the integrated firm from the input market, except for self-supply, might increase the market power of the remaining upstream oligopolists, causing these firms to raise prices to the downstream market.³⁰ The resulting higher procurement costs disadvantage rival downstream firms in competition with the downstream division of the integrated firm. If the independent downstream firms pass through these cost increases to final consumers even partially, then market share is likely to shift in favor of the integrated firm. Consumers will suffer higher prices, unless there is a countervailing effect on prices from eliminating double marginalization (Reiffen and Vita, 1995), and less choice if independent downstream firms exit the market.

²⁹ This conclusion depends on the specifics of the dominant firm model: large dominant firm competing downstream against a competitive fringe; perfectly competitive upstream market; no price discrimination in upstream or downstream markets (Riordan, 1998).

³⁰ The vertically integrated firm might raise rivals' costs by raising its input price rather than withdraw entirely from the input market. Indeed, a refusal to deal by the vertically integrated supplier could be ill advised if it causes rival downstream firms to integrate backwards (Ordoover, Salop, and Saloner, 1990; 1992).

An issue for this RRC theory is the credibility of the upstream division's refusal to deal with downstream competitors (Reiffen, 1992; Hart and Tirole, 1990). The problem is that it may be irresistible for the vertically integrated firm to undercut the input prices of upstream rivals. After all, if there are profits to be earned by selling to downstream competitors, then the vertically-integrated firm would like to capture those profits as long as the expense to its downstream profits is sufficiently small. If the upstream products are differentiated, so that upstream firms have a limited ability to steal business from a rival with a small price cut, then credibility is less of an issue and a vertical integrated firm has a greater incentive actually to execute a refusal-to-deal strategy.³¹ In contrast, if the upstream product market is homogeneous, then the vigor of competition in the upstream market might be unaffected by vertical integration, leaving both competitors and consumers unharmed.³²

There are a number of ways that a vertically- integrated firm might commit to refuse to deal with downstream competitors. First, the vertically integrated firm might establish a reputation for exclusive self-supply. Suppose that a credible withdrawal by the upstream division from the input market benefited the downstream division by causing higher input prices to downstream rivals, as described above. Suppose further that any deviation from the refusal-to-deal policy, presumably in the quest of short-term

³¹ Ma (1997) studies a model with differentiated upstream goods in which a vertical integrated firm has a short run incentive to completely foreclose its downstream rival. An interesting feature of this model, motivated by telecommunications and health care markets, is that the downstream firms sells to consumers "options" to purchase products in the future.

³² This felicitous outcome does not occur if upstream competition has the structure of a descending price auction, in which competing suppliers, observing each other's offers, sequentially bid down prices. In this case, the vertically integrated firm looks ahead and realizes that its bid for the business of independent downstream firms will be met by further price-cutting by the upstream rivals. Such foresight convinces the vertically integrated firm to offer higher prices or to stay out of the bidding altogether (Ordoover, Salop, and Saloner, 1992). This defense of the theory does not work, however, if intermediate goods contracts are bilateral and private, in which case upstream rivals do not observe, and therefore are unable directly to respond to, competing offers (Hart and Tirole, 1990).

profits, creates expectations by upstream competitors that the vertically integrated firm would deviate similarly in the future. In anticipation of this behavior, upstream competitors cut prices, and the raising rivals' cost strategy unravels. If the long-term benefits of a credible refusal to deal exceed the short-term profit opportunities, then a reputation for refusing to deal with competitors is a credible one. Second, the upstream division of the vertically integrated firm might design its product to be incompatible with products or manufacturing processes of downstream competitors (Church and Gandal, 2000; Choi and Yi, 2000). This mechanism requires that design changes are sufficiently costly, and that the technological incompatibility is effectively irreversible in the short-run.³³ Third, downstream competitors might be concerned that a vertically integrated supplier would have an incentive to reduce the quality of the input, or reduce the quality of complementary services. In this case, the distorted incentives of a vertically integrated firm automatically disadvantage its upstream division, thereby increasing the market power of upstream rivals.

Downstream competitors might consider countermeasures to limit the damage from a rival's vertical merger with an upstream supplier, including integrating backwards also, or cultivating an alternative source of supply. In some cases, the threat of defensive backward integration by rivals limits the raising rivals cost effect of vertical integration (Ordoover, Salop, and Saloner, 1990). An interesting, and at first blush surprising, countermeasure for independent downstream firms is to "make a deal with the devil" and contract with the vertically integrated supplier at a supra-competitive price (Chen, 2002). A rival downstream firm, by promising to pay the integrated supplier a profit on upstream

³³ The significance of technological compatibility is also emphasized in the economics literature on tying (Whinston, 1990).

sales, weakens the integrated firm's incentive to compete aggressively in the downstream market. This collusive effect of vertical contracting arises because the integrated firm treats the foregone upstream profit as an opportunity cost of winning a downstream sale (Chen and Riordan, 2004). Thus, the independent downstream firm, by contracting with the upstream firm, effectively raises the opportunity cost of its integrated rival, thereby driving up downstream prices and profits, to the detriment of final consumers. In this case, the countermeasure reinforces the anticompetitive effect of vertical integration.

If two-part tariffs are available,³⁴ then the raising rivals' cost effect of vertical integration might reduce participation in the downstream market with no offsetting double marginalization effect. Suppose an equally efficient rival upstream firm offers a two-part tariff that sets the wholesale price equal to its marginal cost, while exercising market power by setting a positive fixed fee. Then vertical integration has no effect on the variable costs of the downstream industry, and does not result in higher downstream prices unless independent downstream firms exit the market in response to the changed vertical structure. If the vertically integrated firm refuses to deal with independent downstream firms, then the resulting increased market power of upstream rivals could translate into higher fixed fees charged to downstream customers, and the resulting higher fixed costs of market participation could cause some downstream firms to exit the industry. A more concentrated downstream market profits the integrated firm, while presenting consumers with less choice and higher prices.

³⁴ Two-part tariffs should not necessarily be interpreted as an exact description of contracting practices. An equivalent pricing strategy is a step tariff such that infra-marginal units sell at a higher price than marginal units do. The premia paid on the infra-marginal units is equivalent to the fixed fee. Other forms of volume discounting can be interpreted similarly.

Similarly, a raising rivals' costs strategy can preserve the market power of a vertically integrated firm by deterring entry into upstream and downstream markets. Suppose that a potential entrant has the *present* ability to enter the downstream market with a superior product by sinking a fixed cost, and a *future* ability to enter the upstream market by investing in R&D. If the firm enters the downstream market only, then bargaining with the upstream incumbent results in some distribution of rents between to the two firms.³⁵ The new entrant might be able to capture additional rents from its superior downstream product by integrating backwards when its R&D investment comes to fruition. Thus, the most profitable entry strategy might be to enter the downstream market presently and to enter the upstream market in the future. The vertically integrated incumbent might deter this two-level entry strategy by depriving the entrant of present revenue or raising the entrant's present cost by refusing to deal. By effectively "tying" the sale of its intermediate good to the sale of its final good, perhaps technologically, the vertically integrated firm forecloses competition in the downstream market, deters entry into the upstream market, and preserves its market power (Carlton and Waldman, 2002).

Alternatively, a technological tie that forecloses downstream rivals protects a vertically integrated upstream monopolist from downstream innovation competition (Gilbert and Riordan, 2005). By reducing compatibility with a monopolized intermediate good, the vertically integrated firm discourages innovation by possibly more efficient downstream competitors, and thereby protects the return from its own innovations. Such technological tying by a vertically integrated firm harms consumers and reduces

³⁵ This division of rents from bilateral bargaining deflects the single monopoly profit theory.

economic efficiency if it forecloses more innovative downstream competitors.³⁶ In some cases, however, technological foreclosure can increase economic efficiency by improving innovation incentives of the vertically integrated firm.

In an early contribution to the new vertical foreclosure literature, Salinger (1988) made the important observation that RRC effects can coexist with eliminating-double-marginalization effects. Salinger (1988) considers a model of successive Cournot oligopoly, in which an intermediate good is transformed into a final good in fixed proportions. In the model, upstream oligopolists (simultaneously and independently) choose quantities, determining a uniform price of the intermediate good. Downstream firms, taking the intermediate goods price as given, then choose their quantities, determining a price of the final good.³⁷ The exercise of market power at each stage of production determines a markup of price above marginal cost. A vertical merger eliminates an upstream supplier because the vertically integrated firm refuses to deal with independent downstream firms, thus increasing the market power of remaining upstream oligopolists, while creating a more aggressive downstream competitor who is able to produce at marginal cost. The net competitive effect is ambiguous in general. Klass and Salinger (1995) contends that calculation of the net competitive effect usually is impractical, because it requires too much detailed information about market structure.

³⁶ The single monopoly profit theory fails in the Gilbert-Riordan model because the upstream monopolist is unable to price discriminate between alternative uses of the intermediate good, and therefore is unable fully to extract monopoly profits from the downstream competitor.

³⁷ On the surface, this appears to be an odd behavioral assumption. Even though the intermediate good is in a fixed proportion of the final good, a downstream firm acts as price-taker when purchasing the intermediate good, but a quantity-setter when producing the final good. This conduct might be rationalized, however, by assuming that firms first at each stage simultaneously choose quantities *a la* Cournot and then simultaneously choose prices *a la* Bertrand (Kreps and Scheinkman, 1983), although it is unclear to what extent this interpretation depends on assumptions about rationing in the intermediate goods market (Davidson and Deneckere, 1986).

The Ordover, Saloner, and Salop (1990) RRC model assumes that upstream competitors lack market power in the absence of vertical integration, thus eliminating any possible efficiency gain from eliminating double marginalization. In this basic model, vertical integration creates market power in upstream market, the exercise of which results in higher wholesale prices to independent downstream firms. It is straightforward to modify the theory to assume upstream market power in the non-integrated environment, e.g. by assuming product differentiation. Such modifications introduce an eliminating-double-marginalization effect that stands side by side with the raising-rivals'-costs effect of vertical integration (Reiffen and Vita, 1995).³⁸ If both effects are present, with the raising rivals' cost effect driving prices lower and the double marginalization effect driving prices higher, then the net welfare effect is ambiguous.

Empirical evidence provides some limited support for RRC theory. Chipty (2001) and Waterman and Weiss (1996), discussed above in the context of double marginalization, show that backward integration of CSOs into programming does result in some market foreclosure. Vertically integrated CSOs tend to carry fewer premium movie services, in addition to being more likely to carry their own, and are less likely to carry a rival basic movie service. Similarly, integrated CSOs are less likely to carry a rival shopping network in addition to their own. This evidence is consistent with the hypothesis that vertically integrated CSOs refuse to deal with rival programmers, or hold out for more favorable terms. Gilbert and Hastings (2002) studies gasoline distribution, and present evidence that a vertically integrated refiner charges higher wholesale prices in cities where it competes more with independent gas stations. This is direct evidence in

³⁸ If upstream market power is due to quantity competition, then a vertical merger that increases upstream market power is not necessarily profitable (Salant, Switzer, and Reynolds, 1983)

favor of the hypothesis that a vertically integrated firm seeks to raise the cost of downstream rivals by raising wholesale prices. More complete supporting evidence would demonstrate that rival refiners are capacity constrained and/or raise their wholesale prices as well. Hortacsu and Syverson (2005), discussed earlier, present preliminary evidence that vertical integration of cement and concrete manufacturers leads to lower final prices, contrary to RRC theories.

Facilitating Collusion

Antitrust and regulatory authorities have remained concerned that vertical integration might facilitate collusion at upstream or downstream levels. Generally, successful express or tacit collusion requires reaching an agreement, monitoring compliance, and punishing defections. Vertical integration might facilitate collusion by aiding any of these activities.

The 1984 Non-horizontal Merger Guidelines of the U.S. Department of Justice informally articulates several theories of harmful vertical integration. A primary concern expressed in the Guidelines is that forward integration might increase market power by raising barriers to entry (DOJ, 1984, Section 4.21):

In certain circumstances, the vertical integration resulting from vertical mergers could create competitively objectionable barriers to entry. Stated generally, three conditions are necessary (but not sufficient) for this problem to exist. First, the degree of vertical integration between the two markets must be so extensive that entrants to one market (the “primary market”) also would have to enter the other market (the “secondary market”) simultaneously. Second, the requirement of entry at the secondary level must make entry at the primary level significantly more difficult and less likely to occur. Finally, the structure and other characteristics of the primary market must be otherwise so conducive to noncompetitive performance that the increased difficulty of entry is likely to affect its performance.

A second concern of the Guidelines is that forward integration might facilitate collusion because it is easier for an upstream firm to monitor retail prices (DOJ, 1984, Section 4.221):

A high level of vertical integration by upstream firms into the associated retail market may facilitate collusion in the upstream market by making it easier to monitor price. Retail prices are generally more visible than prices in upstream markets, and vertical mergers may increase the level of vertical integration to the point at which the monitoring effect becomes significant. Adverse competitive consequences are unlikely unless the upstream market is generally conducive collusion and a large percentage of the products produced there are sold through vertically integrated retail outlets.

A third concern of the Guidelines is that a vertical merger might eliminate a “disruptive buyer” who has a strong incentive to encourage a defection from a collusive agreement (DOJ, 1984, Section 4.222):

The elimination by vertical merger of a particularly disruptive buyer in a downstream market may facilitate collusion in the upstream market. If upstream firms view sales to a particular buyer as sufficiently important, they may deviate from the terms of a collusive agreement in an effort to secure that business, therefore disrupting the operation of the agreement. The merger of such a buyer with an upstream firm may eliminate that rivalry, making it easier for the upstream firms to collude effectively.

These theories, particularly the last two, have not received much formal attention in the economics literature.³⁹

Nocke and White (2005) formalizes collusion by an upstream industry as a subgame perfect equilibrium of a repeated game, at each stage of which downstream product market competition follows the negotiation of supply contracts with upstream firms. The theory demonstrates how vertical integration possibly facilitates collusion by an “outlets effect”, a “reaction effect”, and a “lack of commitment effect”. The outlet

³⁹ In addition to these three theories, the Guidelines also worry that vertical integration might enable public utilities to evade rate regulation (DOJ, 1984, Section 4.23).

effect means, that by foreclosing part of the downstream market, a vertically integrated firm reduces the incentive of upstream rivals to defect from an agreement. The reaction effect means that a vertically integrated firm is better able to punish defections of upstream competitors by quickly increasing competition in the downstream market. In contrast, a non-integrated market structure must wait to renegotiate supply contracts before punishing a defection effectively. Finally, the lack-of-commitment effect means that a vertically integrated firm finds a departure from upstream collusion less profitable because of rivalry in the downstream market. Independent downstream firms are less willing to deal with a vertically integrated firm because of a rational expectation that the vertically integrated firm will expand in the downstream market if the collusion breaks down. Weighing against these adverse effects of vertical integration is a “punishment effect” of vertical integration. The punishment effect refers to the possibility that acquisition of a downstream firm might increase the integrated firm’s incentive to defect from an upstream collusion by securing profits in the downstream market should the collusion collapse. An important result of the paper is to show that the outlet effect of a single vertical integration outweighs the punishment effect for a homogeneous-good upstream industry. The paper also loosely relates the reaction effect to the Non-Horizontal Merger Guidelines’ theory that vertical integration facilitates collusion by making it easier to monitor downstream prices, and the outlets effect to the Guidelines’s disruptive buyer theory. Nevertheless, these legal theories from the Guidelines still have a long way to go before finding a solid foundation in modern economic analysis.

Riordan and Salop (1995) sketches an informal theory of how information exchange through a vertically integrated firm facilitates upstream collusion. Suppose that

the vertically integrated firm does not satisfy all of its input requirements internally, and solicits bids from rival upstream firms to supply its remaining requirements. The vertically integrated firm potentially can use this information to monitor its upstream rivals' compliance with a collusive agreement. Moreover, the downstream division, in the course of its ongoing communications with upstream rivals, might be able to engineer an agreement to keep input prices high. For example, upstream firms might be able to signal a proposed agreement *via* their bids to the downstream division. In this way, the downstream division acts as a conduit for communication for the upstream industry. Several conditions are necessary for such an exchange to have an anticompetitive effect. First, the upstream industry must be otherwise conducive to horizontal collusion. Second, the bid information received by the downstream division must be "projectable", meaning that it is informative about prices upstream rivals charge to other downstream firms. This is most likely to be the case if price discrimination is infeasible. Third, the information must be unique, i.e. must not be available from an alternative source. These requirements greatly narrow the circumstances in which a facilitating-collusion theory based on information exchange potentially is applicable. In any case, the Riordan-Salop theory awaits formalization.

Chen and Riordan (2004) argues that vertical integration might facilitate an effective cartelization of a downstream industry *via* exclusive contracts. Generally, an upstream supplier might organize a cartel by contracting with a downstream industry to restrict output and prices to final consumers. A multilateral agreement toward this end most likely would run afoul of Section 1 of the Sherman Act which bars contracts and conspiracies "in restraint of trade." The question remains whether an upstream supplier

could achieve much the same outcome by entering into purely bilateral contracts with individual members of the downstream industry. Exclusive contracts could prevent downstream participants from defecting by contracting with alternative upstream suppliers. However, the endeavor still has to overcome a “commitment problem” similar to the one in the restoring monopoly power theory. That is, having engineered a cartel with exclusive bilateral contracts, the upstream “cartel ringmaster”⁴⁰ might have an incentive to “cheat” by offering individual “sweetheart deals” that destabilize the cartel, and the ability to do so because there is no multilateral agreement to prevent it. Just as in the restoring monopoly profit theory, vertical integration helps overcome the commitment problem by changing the incentives of the upstream supplier, whose downstream division suffers the consequences of any sweetheart deal extended to a downstream competitor. If the integrated firm cannot commit credibly to restrict its own sales to consumers, then the effective cartelization is only partial and fails to replicate the monopoly outcome. Nevertheless, the theory does explain higher prices in the downstream market as a consequence of vertical integration *cum* exclusive dealing, together with the exclusion of equally or even more efficient competitors in the upstream market.

⁴⁰ Krattenmaker and Salop (1986) originally introduced the “cartel ringmaster” theory to describe a situation in which a downstream firm organized a supplier cartel to exclude downstream competitors.

III. SELECTED CASES

News Corp. – DirectTV Acquisition

News Corp. (NC) acquired from General Motors a controlling interest of Hughes Electronics in 2003.⁴¹ The FCC approved the acquisition subject to certain conditions.⁴² The FCC conditions among other things required NC to make its programming available to multi-channel video program distributors (MVPDs) on a non-exclusive and non-discriminatory basis, and required the commercial arbitration of disputes regarding certain kinds of programming. The Justice Department determined not to challenge the merger, stating that the FCC conditions addressed its main concerns about the transaction.

The FCC correctly identified the NC acquisition as a vertical merger of video programming and distribution assets. Hughes Electronics owned DirectTV, one of the two major direct broadcast satellite (DBS) companies in the United States, the other being EchoStar. The DBS providers compete in the MVPD market with cable system operators (CSOs) across the United States, although cable service is not available in some rural areas. Typically, there is a single CSO in local markets. NC, through its subsidiary Fox, owns an assortment of video programming assets, including regional sports networks (RSNs) and local broadcast television stations.

⁴¹ News Corp. acquired 34% of Direct TV shares, and a corresponding entitlement to several seats on the board of directors.

⁴² FCC authority for approval of the merger stemmed from its obligation to determine that the transfer of certain licenses and authorizations from General Motors to News Corp. were in the public interest.

The FCC identified the relevant upstream product market as video programming services, distinguishing separate markets for RSNs among others.⁴³ The Fox RSNs have exclusive rights to exhibit major sports events, including games played by popular regional sports teams. The FCC identified the relevant downstream product market to be MVPD services. The FCC rejected the idea that television broadcast stations are sufficiently close substitutes to be included in the same downstream market, and therefore found that the merger raised no horizontal concerns. The FCC also determined the relevant geographic market for regional sports programming to be the distribution footprint of the RSN, and the geographic market for MVPD services to be the franchise area of the rival CSO.⁴⁴

The FCC recognized that MVPD markets are highly concentrated. Most relevant MVPD markets have three major participants, the two DBS companies and the local CSO. The CSOs typically have the lion's share of these markets. At the time of the acquisition, DirectTV had 13% and EchoStar an even smaller share of MVPD markets nationally. There are evidently substantial barriers to entry into MVPD markets. The FCC concluded that NC had significant power in the market for RSN programming. The argument relied on the idea that, for many consumers, there is not a close substitute for the ability to watch their favorite teams on a regular basis. Thus, the market power of an RSN derives from the underlying market power of the sports teams for which it holds exclusive exhibition rights.

⁴³ The FCC also identified a separate market for local broadcast television programming, and a separate market for non-sports and national sports programming. Our discussion ignores these markets for the sake of brevity.

⁴⁴ Thus, the FCC implicitly ignored rural markets lacking a CSO.

The FCC described contracting practices in the relevant intermediate product market only briefly. License fees for video programming depend on the number of subscribers and may involve quantity discounts. Other conditions might include control of advertising slots and concessions to carry additional programming.

The FCC considered a raising rivals' cost theory based on the idea that the merged entity might have an incentive to foreclose permanently rival MVPDs access to Fox RSNs. The FCC staff analysis employed straightforward vertical arithmetic. Suppose that NC refuses permanently to supply RSN programming to a CSO with whom it competes in a local MVPD market. NC loses the affiliate fees paid by CSO for the right to carry the RSN, as well as advertising revenues attached to subscribers of the CSO. Some subscribers who care about the rival RSN will defect to DirectTV. Therefore, NC will earn increased affiliate fees from DirectTV, and, by virtue of its partial ownership of DirectTV, a share of the profits from these new subscribers including associated advertising revenues. The FCC concluded that the losses outweighed the gains from permanent foreclosure under plausible assumptions about consumer behavior (FCC, 2004, Appendix D).

The FCC nevertheless concluded that the vertical merger would enable NC to increase the price of RSN programming to MVPDs. This conclusion was based on a novel theory that the merger would increase NC's bargaining power by increasing its incentive and ability to withdraw programming temporarily in the course of negotiations over terms and conditions of carriage. The FCC summarized its theory as follows (FCC, 2004, ¶4):

(O)ur analysis of the principal allegations of competitive harm in the record demonstrates that this vertical integration has the potential to

increase the incentive and ability of News Corp. to engage in temporary foreclosure bargaining strategies during carriage negotiations with competing MVPDs for two types of “must have” video programming products – broadcast television station signals and regional cable programming sports networks – in order to secure higher prices for its programming. Although News Corp., like other broadcast networks, engages or attempts to engage in this sort of behavior today, ownership of a competing MVPD platform with a national footprint means that News Corp. would stand to gain from any subscriber losses the affected MVPD suffers during the period of foreclosure when those subscribers move over to its competing MVPD platform to access the desired programming. The ability to gain revenues via its ownership interest in DirectTV thereby helps offset any temporary losses that News Corp. would suffer from withdrawal of its programming from the competing MVPD in terms of lost advertising and/or affiliate fee revenues. This offsetting revenue gain makes use of the strategy more tolerable to News Corp post-transaction than it was pre-transaction and thereby increases the likelihood and frequency of its use. This lowering of the cost of foreclosure to News Corp. from present levels fundamentally and substantially alters the bargaining dynamic between the program supplier and the competing programming distributor to the benefit of the former at the expense of the latter and its subscribers. To the extent that News Corp. succeeds in using temporary foreclosure strategies to extract supra-competitive prices for its programming, these transaction-specific higher programming costs are likely to be passed through as higher MVPD prices, which in turn would harm consumers.

Thus, the FCC concluded that vertical integration increased NC’s bargaining leverage in negotiation of carriage agreements with CSOs to the detriment of consumers.

In order to further justify its temporary foreclosure theory, the FCC resorted to what seems an odd theory of consumer inertia (FCC, 2004, ¶79):

In markets exhibiting consumer inertia, among other things, temporary foreclosure may be profitable even where permanent foreclosure is not, because, during the period of foreclosure, downstream customers may switch to the integrated firm’s downstream product and, due to inertia, then not immediately switch back to the competitor’s product once the foreclosure has ended. Consumers choosing an MVPD are subject to inertia and partial lock-in, because, among other things, there are switching costs associated with changing providers and some MVPDs, including DirectTV generally require one-year contracts. Thus,

temporary foreclosure may generate profits that continue for a longer period than the period of upstream losses caused by the reduction in demand for the input.

The theory seems odd because it appears to assume that inertia only works in one direction, suggesting consumer irrationality. Inertia that discourages consumers from switching back to a preferred MVPD might be expected also to give the same consumers pause before switching MVPD providers to avoid an only temporary loss in their favorite programming. If switching costs are large, then a rational consumer would not switch if they expected only a short-lived withdrawal of programming from their otherwise preferred MVPD. Moreover, it is not clear why rival MVPDs do not solve the problem of consumers leaving for temporary reasons by requiring a one-year contract.

The FCC nevertheless concluded that NC had a heightened post-merger incentive for temporary foreclosure based on an analysis that assumed foreclosure lasted only one month, while defecting consumers returned to their previous MVPD only slowly. The short-lived withdrawal of the RSN from a rival CSO obviously limited the lost profits of the upstream division, while consumer inertia stretched out the downstream gains from foreclosure over a sustained period. The FCC based its projections of consumer behavior in response to temporary foreclosure on an empirical analysis of a previous isolated incident in which a regional sports network temporarily withheld programming from a CSO.

The FCC argued that NC's enhanced bargaining power from the vertical merger would harm consumers in two ways. First, higher priced RSN programming resulting from NC's enhanced bargaining power would at least partly be passed on to consumers in

the form of higher subscription prices. Second, consumers would be deprived temporarily of valuable sports entertainment if NC actually executed a temporary foreclosure strategy. Standard bargaining theory suggests that the first effect is the more important one. A greater threat of temporary foreclosure should enable NC to obtain more favorable terms without ever having to carry out the threat.

It is interesting to consider the relevance of the single monopoly profit theory for this case. Suppose that, prior to the merger, NC made a profit-maximizing take-it-or-leave-it offer of terms and conditions to a CSO for the right to carry its RSN programming. Then, according to the single monopoly profit theory, vertical integration with DirectTV does not enable NC to extract any additional profit from the CSO, because NC is already fully extracting a maximized profit. A defect of the single monopoly profit theory is its assumption that, prior to the merger, NC commits to withhold programming permanently if its take-it-or-leave-it offer is rejected by the CSO. A problem with assumption is that, if the CSO rejects the offer, then NC has an incentive to make a concession in order to retain the MVPD's business. In other words, the take-it-or-leave-it offer is not credible, in which case the give-and-take of bilateral bargaining might frustrate NC from fully extracting monopoly profits. Indeed, the FCC concluded that a permanent withdrawal of programming was not a credible threat. The FCC concluded that the vertical integration would strengthen NC bargaining power in bilateral negotiations, by reducing the opportunity cost of a temporary withholding of programming. Thus, while there is only a single monopoly profit on the table, vertical

integration allows an upstream firm to claim more of it because of increased bargaining power.⁴⁵

The restoring monopoly profit theory was given little weight in the case, partly because the FCC's program access rules limited NC's opportunities for exclusion and price discrimination, and the vertical merger did not lessen these limitations. Moreover, NC offered to commit not to discriminate or enter into exclusive arrangements even beyond the scope of the program access rules. The FCC incorporated these commitments into its conditions for approval of the merger. It is ironic that, according to the restoring monopoly theory, such commitments enforced by a government agency, might increase the ability of an upstream firm to extract monopoly profits from the downstream industry (Whinston, 2003). Thus, it is conceivable that the non-discrimination conditions of the merger had an anticompetitive effect, apart from any effect of vertical integration. Such a concern apparently was not explored in the case.

Other possible theories of competitive effects or vertical integration were not given much attention. The FCC recognized possible efficiencies from the elimination of double marginalization, but doubted that these efficiencies were sufficient to overcome the raising rivals' cost effect of the merger on consumer prices. The FCC did not consider explicitly the effect of NC's changed incentives on the market power of other providers of sports programming.

⁴⁵ Rogerson (2003b, Appendix) argued this point with a simple reduced form model of Nash bargaining. Nash's theory of bargaining assumes that parties to a transaction proportionally divide the surplus value of a transaction, which is the value over and above the value of the "outside" opportunities of the parties should bargaining break down. Vertical integration arguably increased NC's outside opportunity, because NC partially internalized the benefit to DirectTV of temporary or permanent foreclosure of DirectTV's cable competitors. See also Salop and Woodbury (2003, Appendix) for a similar argument in the context of the CRS proceeding discussed next.

CRS Proceeding

In 2004 the U.S. Department of Transportation (DOT) determined to deregulate airline computer reservation systems (CRSs). The final rulemaking phased out a host of non-discrimination requirements and contracting prohibitions installed by the Civil Aeronautics Board (CAB) from 1984, and by the DOT from 1982 when it took over regulatory authority. Prominent among the regulations was a rule against “display bias” – a CRS could not present information in a format that gave preferential treatment to a particular airline. The DOT concluded that market conditions had changed to make continued regulation of the CRS industry unnecessary. The changed market conditions included divestures of CRS ownership by the airlines and especially the growing importance of the Internet for booking flights.

The market for CRS services is a “two-sided market”. The CRS industry provides airline flight information, booking, and ticketing services to travel agents. To produce these services, CRS firms grant access to airlines to provide flight information and receive booking through the system. The airlines typically pay the CRS firm a fee for each booking, with the size of the fee depending on the “level of service”, i.e. the quality of information and booking capabilities the airline is able to provide on the system. Most travel agents obtain CRS access for free, and many receive signing bonuses and rebates for bookings. In addition, CRS providers give volume-related incentives to induce a subscriber to increase its bookings through that system. The two sets of transactions – with airlines on the one hand, and travel agents on the other – obviously are complementary.

The two-sided nature of the CRS market makes product market definition tricky. The U.S. CRS industry is comprised of four firms: Amadeus, Galileo, Sabre, and WorldSpan. From the perspective of travel agents, the different CRSs are close substitutes in the long run. The market for travel agent services apparently is highly competitive, and travel agents who fail to serve consumers well by providing clear and accurate information on alternatives lose consumers to competitors offering better service. Consequently, travel agents have an incentive to favor a CRS that eschews display bias to serve consumers better. Moreover, larger travel agents subscribe to multiple CRSs, and can switch between systems easily. In the short run, however, many smaller travel agents use a single CRS, apparently because of the time and training it takes to learn how to use a particular system. Consequently, airlines need access to a particular system to reach the consumers served by the travel agents who use only that system. Thus, from the perspective of airlines, the different CRSs are not perfect substitutes for reaching customers. Accordingly, the DOT viewed the CRS firms each to be a monopoly access provider to airlines, and determined that each of the four systems comprised a relevant market. With this market definition in hand, the DOT concluded that CRS firms possess significant market power *vis-à-vis* the airlines, while observing the continuing erosion of this market power by Internet distribution.

U.S. airlines were integrated forward into the CRS market when the DOT (and previously the CAB) adopted its rules governing the market. For example, United owned Galileo, and American, Delta, and Northwest jointly owned Worldspan. This vertical integration raised concerns that the CRS firms would discriminate in favor of their owners, and that airlines would discriminate in favor of CRS firms in which they had an

ownership interest. The first concern led to rules prohibiting display bias, effectively requiring the CRS industry to provide non-discriminatory access to airlines. The second concern led to a misguided rule requiring airlines with a significant ownership interest in a CRS to purchase access to other systems at “reasonable” fees. This purchase mandate seemed destined to create or increase the market power of a CRS, given inevitable ambiguity about the meaning of reasonable.

During the course of the DOT proceeding, all U.S. airlines divested their ownership interest in CRSs.⁴⁶ This change in market structure, together with the growing importance of Internet distribution, helped motivate the DOT’s deregulation of the industry.⁴⁷ The DOT assumed that independent CRSs had an incentive to sell display bias to the highest bidders, and recognized that the practice could mislead consumers and distort competition. Nevertheless, the DOT determined to eliminate its rule against display bias after six months (effective July 2004). Its explanation was that “ongoing developments” – a.k.a. the Internet - would continue to erode CRS market power over time, and provide travel agents and consumers with alternative sources of information.

The DOT expressed its concerns about display bias with the following raising rivals’ cost theory. First, busy travel agents are more likely to book flights displayed first, even if those flights are less convenient or more costly to consumers. Second, by shifting demand to favored airlines, display bias might cause disadvantaged rivals to offer fewer flights, or even to exit a market. Third, a consequent reduction in the capacity or the number of competitors might result in higher fares and fewer flights to the detriment of consumers. The last step of this argument is a slippery one, because, by the same logic

⁴⁶ Amadeus was owned partially by three European airlines.

⁴⁷ Salop and Woodbury (2003) argued on Sabre’s behalf that a vertically integrated CRS had an RRC incentive to raise the price of CRS access to rival airlines, and presented a bargaining model to that effect.

of the first two steps, display preference could cause the favored airline to add more flights and enter new markets. Indeed, it seems a fair presumption that a display preference purchased by an airline lacking significant market power increases competition. But a pro-competitive defense does not apply to a dominant firm using display bias to deter entry or eliminate competition and maintain or extend its market power.

It is interesting that the DOT did not argue that vertical integration necessarily increased the incentive for display bias, even though it alluded to the changed vertical structure of the CRS industry as a motivation for its deregulation. The DOT noted that “(o)bviously a system that is not owned or controlled by a U.S. airline will not have the same incentives to prejudice the competitive position or rival airlines.” Nevertheless, the DOT went on to conclude that an independent CRS likely would have the ability and incentive to sell preferential display treatment. Moreover, it is at least conceivable that a dominant firm has an incentive to purchase preferential treatment with an exclusionary intent. Thus, the DOT’s analysis begs the question of whether vertical divestiture reduced the ability or incentive for anticompetitive display bias.

The single monopoly profit theory seems to apply to the CRS market. The DOT found that each CRS firm had monopoly power *vis-à-vis* the airlines. If selling preferential display treatment to an airline maximizes profits, then a CRS will do so, and there is no further monopoly profit gained by vertical integration with an airline. An airline can bid for preferential treatment from the independent CRS firm, and should not expect that acquiring an ownership share is a less expensive means of purchase. Therefore, the demand for preferential display bias is not obviously a motive for vertical

integration, perhaps explaining why airlines divested their ownership in CRSs by the end of the proceeding.

The restoring monopoly power theory also plausibly applies to the CRS industry, although the DOT did not explicitly consider this. Suppose that a CRS firm would maximize profit by committing not to engage in preferential display bias, but that such a commitment is unenforceable because of contractual incompleteness. If airlines were to agree to high booking fees on the promise of neutral display bias, then the CRS firm might have an incentive to break its promise and offer preferential treatment to one of them. Anticipating this incentive, the airlines would refuse to pay such high fees in the first place. If this commitment problem were a serious one, then the CRS industry presumably would have lobbied the DOT to keep its display bias rules in place. Apparently, this was not the case. And if commitment were not a problem, then a most favored customer clause would seem to be an effective contractual device for dealing with the problem.

Premdor–Masonite Merger

In 2001, the DOJ challenged Premdor's acquisition of Masonite from International Paper Company. The DOJ identified the relevant downstream market to be molded doors, and the relevant upstream market to be molded doorskins. Molded doors are manufactured by pressing molded doorskins onto a flat door. Premdor manufactured molded doors, and Masonite manufactured molded doorskins among other things. Prior to the merger, Premdor had only limited capacity to produce molded doorskins, and purchased most of its doorskins requirements from Masonite. There was one other major

competitor in each of the two markets, a vertically integrated molded door manufacturer referred to as the “non party firm”, who produced molded doorskins mostly but not exclusively for its own requirements, as well as fringe door-makers. The DOJ settled its complaint with a consent agreement requiring Masonite to divest one its doorskin plants to a new entrant into the upstream market.

The DOJ was concerned primarily that the vertical merger would facilitate collusive pricing in the upstream market for molded doorskins. The DOJ thought that the ability of Premdor to integrate backward by internal growth disciplined coordinated pricing by Masonite and the non-party firm in the molded doorskin markets, and that the merger would eliminate this discipline. Thus, the DOJ identified facilitating collusion in the upstream market to be an anticompetitive horizontal effect of the merger.

The DOJ was concerned also that the merger facilitated collusion in the downstream market for molded doors (U.S. v. Premdor, 2001, p. 6):

In addition, Masonite acts as a significant competitive constraint in the interior molded door market. Premdor and the non-party firm have an incentive to coordinate pricing to reduce output. Coordination would reduce the output of interior molded doors, and lead to higher door prices. However, such an output reduction would also reduce the output of interior molded doorskins sold in the United States, harming Masonite. Thus, Masonite would have an incentive to disrupt such coordination through increased sales to the other non-vertically integrated door manufacturers. After the proposed transaction, a vertically integrated Premdor/Masonite combination will not have the same incentive to defeat coordination in the interior molded door market by increasing sales to the non-integrated door manufacturers since the combined company would be competing against those door manufacturers, and would benefit from an increase in the prices of interior molded doors.

The DOJ’s sketchy theory that vertical integration facilitates tacit collusion downstream to my knowledge does not have any counterpart in the game-theoretic economics literature on collusion. The DOJ’s theory of coordinated conduct, however,

does seem related to a raising rivals' cost theory of unilateral upstream conduct. By the merger Masonite gains an incentive to raise the price of doorskins to unintegrated downstream rivals, because of the benefit to Premdor of softer downstream competition. This incentive to raise the costs of downstream rivals' after the merger undermines a prior incentive of Masonite to counteract downstream collusion by cutting prices to fringe doormakers. Thus, the merger facilitates downstream collusion according to a raising rivals' costs theory.

The DOJ also implicitly identified a possible double marginalization effect, but in such a way as to argue that the cost economies from the vertical merger would facilitate collusion in the downstream market. The DOJ argued that the "non-party firm acts as significant competitive constraint in both the upstream and downstream markets" because of cost advantages. The DOJ argued that this cost advantage would largely evaporate after the merger, possible because of eliminating of markups or coordination economies. The DOJ argued that cost economies from the vertical merger would facilitate collusion by narrowing the non-party firm's cost advantage and thereby blunt its incentive to deviate from coordinated pricing to gain additional market share.

Finally, the DOJ suggested that the vertical merger would facilitate collusion by changing the information structure of the market. Collusion in the upstream market was impeded by the fact that Masonite could not monitor easily the vertically integrated non-party firm's supply of molded doorskins to itself. Masonite gained better information on the downstream market for molded doors once it integrated with Premdor. Thus, it would be easier for the two vertically integrated firms to coordinate downstream prices of

molded doors. This is an interesting idea that, to my knowledge, has not been analyzed formally in the economics literature.

IV. FRAMEWORK

A general presumption that vertical integration is pro-competitive is warranted by a substantial economics literature identifying efficiency benefits of vertical integration, including empirical studies demonstrating positive effects of vertical integration in various industries. However, there is also a growing body of academic literature identifying possible anticompetitive effects of vertical integration in particular circumstances, including empirical evidence that particular vertical integrations may have had harmful or mixed competitive effects. Moreover, even a convincing demonstration that vertical integration in a particular industry is pro-competitive “on average” does not eliminate the possibility of harmful effects in a significant fraction of cases. Thus, a task for legal and economic analysis to identify those particular (and perhaps relatively few) circumstances in which vertical mergers reduce, or regulatory restraints on vertically integrated firms increase, consumer welfare.

This section sets forth a three-step framework for evaluating the competitive effects of vertical integration based on the more elaborate framework proposed in Riordan and Salop (1995).⁴⁸ The first step evaluates if vertical integration is likely to raise the costs or otherwise damage the viability of competitors, or make collusion easier. The second step evaluates likely adverse consequences for consumers, e.g. higher prices,

⁴⁸ Riordan and Salop (1995) separately consider input and customer foreclosure, and address competitive effects in ancillary markets. Riordan and Salop (1995) also discuss evasion-of-regulation theories beyond the scope of the present essay.

lower quality, or less product variety. The final step puts possible efficiencies of vertical integration into the balance to evaluate net competitive effects. The three-step framework is useful either for weighing the merits of a vertical merger, such as the NC/DirectTV and Premdor/Masonite mergers, or for pondering the usefulness of restrictions on the conduct of a regulated industry, such as the CRS industry.

A usual preliminary step is to evaluate market power at the upstream and downstream levels by analyzing the structure of these markets. If upstream and downstream markets both are unconcentrated, then vertical integration is unlikely to enable or extend the exercise of market power unless it is by superior efficiency. Similarly, low entry barriers into the upstream and downstream industries might preclude anything but a fleeting increase in market power from vertical integration. If entry is easy, then any attempt by a vertically integrated firm to raise prices, likely would be met by timely new entry or expansion of competitors sufficient to restore consumer welfare.

A preliminary analysis of market power, however, often is premature. A problem with a market concentration screen is that it focuses controversy on market definition, and distracts from the fundamental question of whether vertical integration is likely to raise prices or otherwise injure consumers. In the CRS proceeding, the DOT determined that each CRS was a monopoly, but did not analyze satisfactorily how vertical integration changed incentives for display bias, and therefore did not explain clearly whether and how the vertical divestiture of CRSs by airlines helped justify its decision to deregulate the CRS industry. Similarly, a potential problem with a preliminary entry barrier screen is that it is difficult to determine the likelihood, timeliness, and sufficiency of entry without first evaluating the competitive effects of vertical integration (Salop, 2000).

Moreover, reliable quantitative measures of entry barriers are difficult to come by, and a convincing evaluation of entry barriers often ultimately requires a coherent analysis of competitive effects.

Step 1: Impact on Rivals' Costs and Viability and on Facility to Collusion

The first step evaluates the likely effects of vertical integration on the unilateral and coordinated conduct of participants in relevant markets. Vertical integration might increase the costs or otherwise damage the viability of competitors, or might better enable tacit or express collusion. Such effects might occur either in upstream or downstream relevant markets. A vertical merger potentially injures downstream competitors by raising their costs or by making their product less attractive to consumers. Such injuries might be accomplished by denying, degrading, or raising the price of access to an important input for which there are no close substitutes ("input foreclosure"). Vertical integration also potentially harms upstream competitors. A refusal to deal by the downstream division of a vertically integrated firm might shrink the customer base of upstream rivals ("customer foreclosure"). A reduced customer base can threaten the viability of downstream rivals by compromising economies of scale and discouraging investments in product and process improvements necessary to remain competitive.

A convincing input foreclosure theory of harmful vertical integration has two crucial elements. First, equally cost-effective substitute inputs are unavailable. Second, a vertically integrated firm has an incentive to withdraw from the input market or raise the price of the input. If a vertically integrated firm remains ready and willing to compete

aggressively to supply downstream rivals, then vertical integration does not increase the market power of rival input suppliers.

A convincing theory of customer foreclosure similarly has two major elements. First, vertical integration must reduce the customer base of rival upstream firms at given prices. For this to happen, the downstream division of the integrated firm must have the incentive to refuse to deal with or to reduce its purchases from outside suppliers. Moreover, rival upstream firms must lack the incentive or be unable easily to expand sales to other downstream customers. If the upstream division of the integrated firm is capacity constrained, or if the integrated firm withdraws from supplying the downstream market, perhaps pursuant to an input foreclosure strategy, then rival upstream suppliers arguably would suffer little or no net decrease in demand from the resulting realignment of customer-supplier relationships. Second, the reduced customer base must place rival upstream firms at a competitive disadvantage to the integrated firm. There are various ways for this to happen. A reduced customer base might sacrifice economies of scale or scope, thus raising the marginal costs of rival upstream firms. If the resulting cost disadvantage were sufficiently great, then rivals might leave the market. Otherwise, higher marginal costs might cause rivals to stem profit losses by raising prices resulting in a further loss of customers. A reduced customer base might also cause upstream rivals to reduce investments in process innovation or product improvement. Innovation is itself a source of scale economies, because any reduction in the unit cost or a price premium for higher quality is captured on the entire customer base. Thus, a reduced customer base reduces the returns to innovation.

Input foreclosure was a central concern of the FCC in NC/DirectTV. The FCC identified RSNs as “must have” programming for many MVPD consumers because there is no good substitute for watching their favorite teams on television. Resale of the programming is illegal, and piracy is not very attractive because of the time sensitive nature of sports entertainment. The key issue was whether, after acquiring DirectTV, Fox had a heightened incentive to withhold access to RSN programming or raise the price of RSN programming to MVPD competitors. The FCC concluded that after the merger Fox would not have an incentive permanently to deny competitors access to RSN programming, but did have a greater incentive temporarily to withhold programming in the course of bargaining over terms of program carriage. The enhanced threat of temporary foreclosure would increase Fox’s bargaining power, and enable Fox to raise the price of RSN programming to MVPD competitors.

Input foreclosure was also at issue in the CRS proceeding. Display bias in favor of a vertically integrated airline potentially disadvantages rival airlines. While access to each CRS was crucial for an airline to reach all customers, the Internet was fast becoming an alternative important source of access. Extrapolating the rising importance of Internet distribution, the DOT determined that display bias by a CRS was less likely seriously to disadvantage rival airlines in the future. In other words, the DOT believed that Internet bookings were quickly becoming an equally cost-effective substitute for bookings with traditional travel agents.

In the Premdor case, the DOJ argued that, after the merger, Masonite had an incentive to raise the price of molded doorskins to independent molded door manufacturers. The DOJ did not address explicitly the possibility that the non-party firm

might expand to serve independent downstream competitors, but, if the case had gone to trial, the DOJ might well have argued that the vertically integrated non-party firm would exercise increased market power by likewise raising prices to independent downstream rivals. The DOJ did express the doubt that entry in the molded doorskin market would be “timely, likely or sufficient to prevent the exercise of market power that the two dominant, vertically-integrated firms would be able to collectively exercise following the merger.”

Vertical integration also might increase the ability and incentive for tacit or express collusion by changing the information structure of markets. If a vertically integrated firm contracts out for some of its input requirements, then the downstream division may obtain price quotes and possibly other competitively sensitive information from upstream competitors. The downstream division can transmit this information to the upstream division, and similarly can transmit information in the opposite direction in the course of commercial communications with outside suppliers. Thus, the downstream division of a vertically integrated firm potentially is a conduit for information exchange that potentially increases the likelihood of coordinated conduct.

In order for information exchange stemming from vertical integration to raise competitive concerns, several conditions are necessary. First, the input market must otherwise be conducive to collusive conduct. For example, if the input market is unconcentrated, then information exchange is unlikely to increase the likelihood of coordinated conduct. Second, the exchanged information must be “projectable” to other competitive bidding situations. For example, if the vertically integrated firm is uniquely situated, then the input prices quoted to the downstream division may not be indicative of

the prices quoted to other customers. Finally, the exchange information must be “unique”, in the sense that the same or closely similar information cannot be communicated readily *via* other legal channels. Absent these conditions, it is unlikely that the changed information structure resulting from vertical integration facilitates collusion.

In the Premdor case, the DOJ argued that the upstream market was conducive to coordinated conduct because of high concentration and a homogeneous product, and argued further that the merger eliminated Premdor’s incentive to integrate backwards in response to higher doorskin prices. The DOJ also argued that reduced cost asymmetries between Premdor-Masonite and vertically integrated non-party firm made it easier for the two firms to monitor and punish defections from an express or tacit agreement. For example, prior to the merger, Masonite did not operate in the downstream market and consequently lacked information on the conduct of its vertically integrated rival. Thus, the DOJ suggested, at least obliquely, that the merger improved communication between upstream firms by giving Masonite a presence in the downstream market.

Step 2: Anticompetitive Impact on the Output Market

It is widely agreed that competition policy should concern itself with injury to consumers rather than mere injury to competitors. Competitive markets generally improve economic welfare by weeding out less efficient competitors. Consequently, policies that protect inefficient competitors may undermine competitive processes to the ultimate detriment of consumers. Consumer injury results from input or customer

foreclosure only if output prices rise, product quality decreases, or consumer have fewer choices.

Final consumers are injured by vertical integration if upstream suppliers raise prices, due to either increased market power or higher costs, and downstream firms pass on these price increases. Input foreclosure provides a basis for increased market power, while customer foreclosure provides a basis for higher upstream costs. Consumers are also harmed if left with fewer choices because downstream firms exit, or lesser quality choices because downstream or upstream firms reduce investments in product improvement. In the NC/DirectTV case, the FCC concluded that Fox would exercise increased bargaining power resulting from vertical integration by raising the price per subscriber of RSN programming,⁴⁹ and concluded with little discussion that rival MVPD firms would pass on these higher costs of RSN programming to consumers in the form of higher prices.

In the Premdor case, the DOJ argued the merger facilitated upstream market collusion *via* a raising rivals' cost effect on independent rivals in the downstream market for molded doors. A possible problem with this theory is that, after the merger, Premdor might have a greater incentive to expand in the downstream market, which could disrupt upstream collusion with the vertically integrated non-party firm. The DOJ, however, simultaneously advanced a theory of downstream market collusion. It is conceivable that successful downstream market collusion would control Premdor's incentive for expansion. The interplay between these theories of collusion at two different market

⁴⁹ My understanding is that cable programming contracts typically establish a wholesale price per subscriber. The reason for this standard contracting practice may be to create an incentive to produce high quality programming. RSN programming contracts are "blind", i.e. the sports games have not been played yet. Bargaining over fixed fees, while controlling final prices, is a better way to divide profits, but could also provide unfortunate incentives to degrade quality by cutting production costs.

levels is complex, and the DOJ did not fully articulate or defend an integrated theory in its brief competitive impact statement.

Step 3: Efficiencies and Net Competitive Impact

Eliminating markups potentially is an important theory of pro-competitive vertical integration. Perceiving a lower marginal cost of production, including by eliminating input distortions, a vertically integrated firm has an incentive to reduce price and expand output. Other possible efficiencies of vertical integration are better coordination of design and production decisions, improved incentives for relationship-specific investments, and better provision of point of sale services.

A conceivable efficiency argument in the NC/DirectTV case is that vertical integration eliminated bargaining failures between NC and DirectTV that might cause a temporary withdrawal of Fox RSN programming from DirectTV. This might be understood as a kind of variable proportions distortion, particularly if DirectTV would substitute other programming to fill the channel space during any lapse. FCC did not consider such an argument, perhaps because it regarded temporary foreclosure strategies unlikely prior to the acquisition.

A possible efficiency defense for display bias in the CRS proceeding is that a preferential display potentially is a form of product promotion that helps an airline expand capacity and enter new markets, or even simply to “advertise” its existing flights. On this theory, a ban on display bias might be a barrier to entry and expansion. For this efficiency theory to be persuasive against a convincing theory of competitive harm, it would be important to argue that entrants and competitors did not have access to an

equally efficient alternative advertising channel to promote their service. Moreover, a valid concern is that the efficiency theory does not apply to incumbents who are well established and already well known to travel agents and consumers. The DOT did not consider these issues explicitly.

In the Premdor case, the DOJ argued that cost economies from the merger facilitated collusion between two vertically integrated firms by reducing the incentive of the previous cost leader to defect from an agreement. This is at best a roughly plausible theory based on the modern theory of collusive oligopoly. A cost-leader indeed may have the greater incentive to defect from a collusive agreement, but this depends on market shares. One possibility is that a cost leader receives a larger market share under the collusive agreement in order to control its incentive to defect (Noldeke and White, 2004). Thus, a narrowing cost advantage due to merger-related efficiencies could cause only a realignment of collusive market shares in favor of Premdor-Masonite without any substantial disruption of coordinated pricing. At the same time, the cost economies of the merger might push down prices to final consumers if firms behave non-collusively, and possibly even under collusive pricing. After all, a collusive vertically integrated duopoly ideally mimics a horizontally integrated monopoly. Typically, a profit-maximizing firm does lower prices in response to a cost reduction of some of its products. The DOJ recognized cost efficiencies from the vertical merger, while arguing that the required divestiture of one of Masonite's molded doorskin plants would limit collusion.

Summary

My proposed three-step framework treats the evaluation of the net competitive impact of vertical integration in merger cases or regulatory proceedings ultimately as a “battle of theories” with the following rules of engagement. The complaining party must prove injury to competitors and to consumers in Steps 1 and 2 of my proposed framework. The merging parties or an integrated firm must have an opportunity to defend with evidence in support of a pro-competitive theory in Step 3. Finally, a court or regulatory authority must weigh the merits of the alternative theories, recognizing the possibilities that one or the other or both might be correct, and make a reasoned assessment of whether on balance vertical integration is likely to harm final consumers. This assessment should encompass whether the facts of the case validate the critical assumptions of the alternative theories, and whether the competitive effects predicted by a valid theory are likely to be significant quantitatively. The controlling questions are whether vertical integration is likely to cause significantly higher prices, less product variety, or lower product quality.

V. CONCLUSIONS

Competitive effects of vertical integration remains an active topic of industrial organization research, and a challenge for antitrust and regulatory policies. The Chicago School’s single monopoly profit theory is still a touchstone for academic research and policy analysis. The assumptions of the theory are a point of departure for any alternative theory, and for any analysis of real market structures. Although the single-monopoly-profit theory’s extreme assumption of concentrated bargaining power has not received

much attention in the academic literature, a more realistic theory of give-and-take bargaining lay behind the FCC's decision in the NC/DirectTV case. The restoring monopoly power theory is a clear and well-articulated alternative to the single monopoly profit theory, but has not been influential in recent cases. In contrast, variants of raising rivals' costs theory played a prominent role in recent cases concerning the conduct of vertically integrated firms, including the NC/DirectTV merger, the CRS deregulation proceeding, and the Premdor-Masonite merger. Eliminating markups lurks as an available efficiency defense in these cases, but has not been given much weight in recent cases. Finally, collusion continues to be a concern in vertical merger cases, including Premdor-Masonite, although economic theory has been slow to formalize models of how vertical integration facilitate collusion. The further development of economic theory in this area could contribute to more rigorous applications of facilitating collusion theories of vertical integration.

Hovenkamp (2001) among others argues that Post-Chicago theories of anticompetitive vertical integration "may not be quite ready for prime time" because of administrative impracticality. The objection usually is raised with general concerns that such theories might be employed too aggressively in antitrust or regulatory proceedings. The essence of the objection is that raising rivals' costs and eliminating markups theories both apply to concentrated upstream and downstream industries with market power, and that it is difficult to find factual evidence that distinguishes one from the other. I disagree that this is necessarily the case, and propose that courts often do have the ability to balance the significance of alternative theories for economic welfare when both have some validity.

Market power is only one important structural element for discerning the competitive effects of vertical integration. Another is the power of contracts. An eliminating markups defense for vertical integration requires that firms are unable to achieve this efficiency with arm's length contracts. This is most clearly the case when price discrimination is difficult. Contracts in many intermediate markets, however, feature restraints and nonlinear pricing. Thus, there should be some burden on defendants to show that factual conditions regarding contracts support an eliminating markups defense. At the same time, a different set of contractual failures might support a raising rivals' costs theory or restoring monopoly power theory, requiring a similar burden on plaintiffs. Such a framework suggests a "battle of theories" with courts and regulatory authorities adjudicating the relative merits of the alternatives.

More generally, it is a mistake to suppose that only one theory of competitive effects can be valid in any given case. Both a raising rivals' costs theory and an eliminating markups theory might be plausible. In such circumstances, parties to the debate should provide evidence on factual conditions supporting the theories and on the actual importance of the theories for economic welfare. The court or regulatory authority should weigh the evidence to determine which theory is the more important one for understanding the competitive effects of vertical integration on a case-by-case basis. Hovencamp (2001) observes that such balancing requires the courts and regulatory authorities to exercise significant sophistication. This is true, but it seems too cynical merely to assume that these institutions are not up to the task. The balancing of the magnitude of competitive effects calls for a structured "rule of reason" approach to weigh the evidence and evaluate the likely consequences of vertical integration for economic

welfare. Meanwhile, further progress on the academic front should assist the courts and regulatory authorities in developing a rigorous approach to evaluating the competitive effects of vertical integration.

REFERENCES

- Abiru, Masahiro (1988). "Vertical Integration, Variable Proportions and Successive Oligopolies." *Journal of Industrial Economics*, 36, 315-325.
- American Bar Association Antitrust Law Section (ABA; 2003). *Antitrust Law Developments*, 5th edition, ABA Publishing.
- Amir, Rabah and Val E. Lambson (2000), "On the Effects of Entry in Cournot Markets," *Review of Economic Studies*, 67, 235-254.
- Bain, Joe S. (1965), *Barriers to New Competition*, Harvard University Press.
- Baker, George, Robert Gibbons, and Kevin Murphy (2002), "Relational Contracts and the Theory of the Firm," *Quarterly Journal of Economics*, 117, 39-84.
- Baldenius, Tim (2005). "Ownership, Incentives, and the Hold-up Problem." *RAND Journal of Economics*, forthcoming.
- Bolton, Patrick and Michael Whinston (1993). "Incomplete Contracts, Vertical Integration, and Supply Assurance." *Review of Economic Studies*, 60, 121-48.
- Carlton, Dennis W. and Michael Waldman (2002). "The Strategic Use of Tying to Preserve and Create Market Power in Evolving Industries." *RAND Journal of Economics*, 33, 194-220.
- Chen, Yongmin (2002). "On Vertical Mergers and Their Competitive Effects." *RAND Journal of Economics*, 33, 667-685.
- Chen, Yongmin, and Michael H. Riordan (2004). "Vertical Integration, Exclusive Dealing, and Ex Post Cartelization." Columbia University Department of Economics working paper.

Chipty, Tasneem (2001). "Vertical Integration, Market Foreclosure, and Consumer Welfare in the Cable Television Industry." *American Economic Review*, 91, 428-453.

Choi, Jay Pil, and Sang-Seung Yi (2000). "Vertical Foreclosure with the Choice of Input Specifications." *Rand Journal of Economics*, 31, 717-743.

Church, Jeffrey, and Neil Gandal (2000). "Systems Competition, Vertical Merger, and Foreclosure." *Journal of Economics and Strategy Management*, 9, 25-52.

Coase, Ronald (1972). "Durable Goods Monopolists." *Journal of Law and Economics*, 15, 143-150.

Davidson, Carl and Raymond Deneckere (1986). "Long-run Competition in Capacity, Short-run Competition in Price, and the Cournot Outcome." *RAND Journal of Economics*, 17, 404-415.

de Fontenay, Catherine and Joshua S. Gans (2002). "Vertical Integration in the Presence of Upstream Competition." Working paper, forthcoming in *RAND Journal of Economics*.

DeGraba, Patrick (1996). "Most-Favored-Customer Clauses and Multilateral Contracting: When Nondiscrimination Implies Uniformity." *Journal of Economics and Management Strategy*, 5, 565-579.

Department of Transportation (DOT, 2004). Computer Reservation System Regulations: Final Rule. <http://www.dot.gov/affairs/ComputerReservationsSystem.htm> .

Federal Communications Commission (FCC, 2004). "Memorandum and Order in the Matter of General Motors Corporation and Hughes Electronics Corporation, Transferors, and The News Corporation, Transferee, for Authority to Transfer

Control.” MB Docket No. 03-124, adopted December 19, 2003, and released January 14, 2004.

Gilbert, Richard and Justine Hastings (2002). “Market Power, Vertical Integration, and the Wholesale Price of Gasoline.” Yale University working paper, forthcoming in *Journal of Industrial Economics*.

Gilbert, Richard and Michael Riordan (2005). “Product Improvement and Technological Tying in a Winner-Take-All Market.” Columbia University working paper.

Grimm, Curtis M., Clifford Winston, and Carol A. Evans (1992). “Foreclosure of Railroad Markets: A Test of Chicago Leverage Theory.” *Journal of Law and Economics*, 35, 295-310.

Grossman, Sanford, and Oliver Hart (1986). “The Costs and Benefits of Ownership: A Theory of Vertical Integration.” *Journal of Political Economy*, 94, 691-719.

Hart, Oliver, and John Moore (1990), “Property Rights and the Nature of the Firm.” *Journal of Political Economy*.

Hart, Oliver, and Jean Tirole (1990). “Vertical Integration and Market Foreclosure.” *Brookings Papers on Economic Activity: Microeconomics*, special issue, 205-276.

Hortacsu, Ali and Chad Syverson (2005). “Cementing Relationships: Vertical Integration, Foreclosure, Productivity, and Prices,” University of Chicago working paper.

Hovenkamp, Herbert (2001). “Post-Chicago Antitrust: A Review and Critique.” *Columbia Business Law Review*, 257-337.

Jensen, Michael C. and William H. Meckling (1976), “Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure.” *Journal of Financial Economics*, 3, 305-360.

- Klass, Michael W. and Michael A. Salinger (1995). "Do New Theories of Vertical Foreclosure Provide Sound Guidance for Consent Agreements in Vertical Merger Cases?" *Antitrust Bulletin*, 667-698.
- Kranton, Rachel E. and Deborah F. Minehart (2004), "Vertical Integration and Specific Investments: A Tale of the Second Best." University of Maryland working paper.
- Krattenmaker, Thomas G. and Steven C. Salop (1986). "Anticompetitive Exclusion: Raising Rivals' Costs to Achieve Power over Price." *Yale Law Journal*, 96, 209-293.
- Kreps, David and Jose Scheinkman (1983). "Quantity Precommitment and Bertrand Competition Yield Cournot Outcomes," *Bell Journal of Economics*, 14, 326-337.
- McAfee, R. Preston and Marius Schwartz (1994). "Opportunism in Multilateral Vertical Contracting: Nondiscrimination, Exclusivity, and Uniformity." *American Economic Review*, 84, 210-230.
- Ma, Ching-To Albert (1997). "Option Contracts and Vertical Foreclosure." *Journal of Economics and Management Strategy*, 6, 725-753.
- Martin, Stephen, Hans-Theo Norman, and Christopher Snyder (2002). "Vertical Foreclosure in Experimental Markets." *RAND Journal of Economics*, 19, 219-234.
- Maskin, Eric and John Riley (1984). "Monopoly with Incomplete Information." *RAND Journal of Economics*, 15, 171-96.
- Matthewson, G. F. and R. A. Winter (1984). "An Economic Theory of Vertical Restraints." *RAND Journal of Economics*, 15, 27-38.
- Mookherjee, Dilip (2003). "Delegation and Contractual Hierarchies: An Overview," Boston University working paper.

- Mullin, Joseph C. and Wallace P. Mullin (1997), "United States Steel's Acquisition of the Great Northern Ore Properties: Vertical Foreclosure or Efficient Contractual Governance?" *Journal of Law, Economics, and Organization*, 13, 74-100.
- Nocke, Volker and Lucy White (2005). "Do Vertical Mergers Facilitate Upstream Collusion?" Penn Institute for Economic Research Working Paper 05-013.
- O'Brien, Daniel P. and Steven C. Salop (2000), "Competitive Effects of Partial Ownership: Financial Interest and Corporate Control." *Antitrust Law Journal*, 67, 559-614.
- O'Brien, Daniel and Greg Shaffer (1992). "Vertical Control with Bilateral Contracts." *RAND Journal of Economics*, 23, 299-308.
- Ordover, Janusz A., Steven C. Salop, and Garth Saloner (1990). "Equilibrium Vertical Foreclosure." *American Economic Review*, 80, 127-142.
- _____ (1992). "Equilibrium Vertical Foreclosure: Reply." *American Economic Review*, 82, 698-703.
- Perry, Martin (1989). "Vertical Integration: Determinants and Effects." *Handbook of Industrial Organization I*, edited by R. Schmalensee & R. Willig, Elsevier.
- Reiffen, David (1992). "Equilibrium Vertical Foreclosure: Comment." *American Economic Review*, 82, 694-697.
- Reiffen, David and Michael Vita (1995). "Is There New Thinking on Vertical Mergers? A Comment." *Antitrust Law Journal*, 63, 917-942.
- Rey, Patrick and Jean Tirole (2003). "A Primer on Foreclosure." Forthcoming in the *Handbook of Industrial Organization III*, edited by Mark Armstrong and Robert Porter, Elsevier.

- Rey, Patrick and Thibaud Verge (2003), "Bilateral Control with Vertical Contracts."
University of Toulouse working paper.
- Riordan, Michael H. (1990). "What is Vertical Integration?" *The Firm as a Nexus of Treaties*, edited by Aoki, Gustafsson and Williamson, Sage Publications, 1990.
- Riordan, Michael H. (1998). "Anticompetitive Vertical Integration by a Dominant Firm."
American Economic Review, 88, 1232-1248.
- Riordan, Michael H. and Steven C. Salop (1995), "Evaluating Vertical Mergers: A Post-Chicago Approach." *Antitrust Law Journal*, 63, 513-568.
- Rogerson, William (2003a), "An Economic Analysis of the Competitive Effects of the Takeover of DirectTV by News Corp." FCC filing, June 13, MB Docket No. 03-124.
- Rogerson, William (2003b), "A Further Economic Analysis of the News Corp. Takeover of DirectTV," FCC filing, August 4, MB Docket No. 03-124.
- Rosengren, Eric S. and James W. Meehan Jr. (1994). "Empirical Evidence on Vertical Foreclosure." *Economic Inquiry*, 32, 303-317.
- Rubinfeld, Daniel L. and Hal J. Singer (2001). "Open Access to Broadband Networks: A Case Study of the AOL-Time Warner Merger." *Berkeley Technology Law Journal*, 631-675.
- Rubinstein, Ariel (1992), "Perfect Equilibrium in a Bargaining Model." *Econometrica*, 50, 97-100.
- Salant, Stephen, Sheldon Switzer, and Robert J. Reynolds (1983). "Losses Due to Merger: The Effects of an Exogenous Change in Industry Structure on Cournot-Nash Equilibrium." *Quarterly Journal of Economics*, 98, 185-199.

- Salinger, Michael (1988). "Vertical Mergers and Market Foreclosure." *Quarterly Journal of Economics*, 103, 345-356.
- Salop, Steven C. (2000). "First Principles Approach to Antitrust, *Kodak*, and Antitrust at the Millennium." *Antitrust Law Journal*, 68, 187-202.
- Salop, Steven C. and Michael H. Riordan (1995). "Evaluating Vertical Mergers: A Post-Chicago Approach." *Antitrust Law Journal*, 63, 513-568.
- Salop, Steven C. and David T. Scheffman (1987). "Cost-raising Strategies." *Journal of Industrial Economics*, 36, 19-34.
- Salop, Steven C. and John R. Woodbury (2003). "Economic Analysis of the DOT's NPRM Proposals." DOT filing, March 17, Docket Nos. OST-97-2881, OST-97-3014, OST 98-4775.
- Segal, Ilya and Michael D. Whinston (2003), "Robust Predictions for Bilateral Contracting with Externalities." *Econometrica*, 71, 757-791.
- Snyder, Christopher M. (1995). "Empirical Studies of Vertical Foreclosure." *Industry Economics Conference Papers and Proceedings (University of Melbourne and Bureau of Industry Economics)*, 95/23, 98-127.
- Spengler, Joseph J. (1950). "Vertical Integration and Antitrust Policy." *Journal of Political Economy*, 58, 347-352.
- Stigler, George (1964). "A Theory of Oligopoly," *Journal of Political Economy*, 72, 44-61.
- _____ (1971). "The Theory of Economic Regulation." *Bell Journal of Economics*, 71, 3-21.

- Telser, Lester (1979). "A Theory of Monopoly of Complementary Goods." *Journal of Business*, 52, 211-230.
- Tirole, Jean (1988). *The Theory of Industrial Organization*, M.I.T. Press.
- U.S. Department of Justice (DOJ; 1984). *Non-Horizontal Merger Guidelines*,
<http://www.usdoj.gov/atr/public/guidelines/2614.pdf> .
- U.S. Department of Justice and Federal Trade Commission (DOJ; 1997). *Horizontal Merger Guidelines*,
http://www.usdoj.gov/atr/public/guidelines/horiz_book/hmg1.html .
- U.S. v. Premdor (2001). "Competitive Impact Statement, Civil No.: 1:01CV01696."
<http://www.usdoj.gov/atr/cases/f9000/9017.htm>.
- Villas-Boas, Sofia (2004). "Vertical Contracts between Manufacturers and Retailers: Inference with Limited Data." U.C. Berkeley working paper.
- Waterman, David, and Andrew A. Weiss (1996), "The Effects of Vertical Integration between Cable Television Systems and Pay Cable Networks." *Journal of Econometrics*, 72, 357-395.
- Whinston, Michael (1990). "Tying, Foreclosure, and Exclusion." *American Economic Review*, 80, 837-859.
- _____ (2001). "Exclusivity and Tying in U.S. v. Microsoft: What We Know, and Don't Know." *Journal of Economic Perspectives*, 15, 63-80.
- Williamson, Oliver E. (1975). *Markets and Hierarchies: Analysis and Antitrust Implications*, Free Press, New York.
- Williamson, Oliver E. (1985). *The Economic Institutions of Capitalism*, Free Press, New York.

Williamson, Oliver E. (1989). Transaction Cost Economics. Handbook of Industrial Organization, Vol. I, edited by R. Schmalensee and R. Willig, Elsevier.

U.S. v. Premdor (2001). Competitive Impact Statement. Civil No.: 1:01CV01696, Filed August 13. <http://www.usdoj.gov/atr/cases/f9000/9017.htm>.

U.S. Department of Justice (DOJ, 1984). Non-Horizontal Merger Guidelines. <http://www.usdoj.gov/atr/public/guidelines/2614.htm>.