Vertical Antitrust Policy as a Problem of Inference

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I. Introduction

The Supreme Court's 1977 *Sylvania*

efficiencies.[6] Complementing the law's focus on economics is the creation of the position of

Chief Competition Economist, to promote the use of economic analysis in EC competition

policy.[7]

 To assess the competitive effects of a vertical restraint, one must compare the world with

the restraint – which is observed – to the world without the restraint, whic

practice; for example, primary market power, foreclosure levels, the nature of contracts, the shape of cost and demand functions, etc. Given the evidence x, assume that the decision-maker can either stop the practice or allow it to continue. Using Bayes' rule, we can write the policy maker's belief about the relative odds that a given practice is anticompetitive as a function of his prior beliefs about the practice, and the relative likelihood that the evidence observed would be produced by anticompetitive conduct:

(1)

particular practice and market characteristics. Such differences have at least the potential to

explain differences in policy toward vertical practices in different jurisdictions.

II. Theories of Harm from Vertical Practices[10]

    A. Softening Horizontal Competition

        1. *Raising Rivals' Costs*

The possibility that firms could profit from raising rivals' (and potentially their own) costs constitutes much of the basis for challenging the "Chicago School" view that vertical restraints seldom harm competition.[11] For example, Salop and Scheffman (1983, 1987) point out that vertical integration or restraints sometimes provide ways for firms to raise their rivals' costs and thereby profitably reduce market output.

Salop and Sheffman (1987) consider a dominant firm that controls a parameter ( ) that affects the costs of the dominant firm and a competitive fringe, possibly in different ways. In one special case, they interpret   as an input price controlled by the dominant firm by varying its input purchases. In this case, the dominant firm can raise input costs (both its own and its rivals') by "over-purchasing inputs," through either excessive purchases of inputs on the open market or excessive purchases of productive capacity through vertical integration.[12]

Salop and Scheffman show that over-purchasing inputs may be profitable, and may reduce partial equilibrium welfare, depending on cost and demand parameters and the cost-raising technology. However, there is no general incentive to raise rivals' costs, and even when it is privately profitable to do so, the attendant welfare consequences may be positive.[13] If the

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[10] In limited space our discussion does not come close to a thorough survey.

[11] In this paper we focus on the case of fixed proportions technology, which formed the basis for most of the "Chicago view" that vertical integration and restraints are benign or efficient.

[12] A substitute for vertical integration in this context may be the cartelization of the upstream market. For example, Granitz and Klein (1996) argue that Standard Oil raised rival refiners' costs by cartelizing the oil transportation market (the railroads) and conspiring with them to charge rival refiners higher prices for transportation services.

[13] A cost raising strategy is profitable if it raises the dominant firm's residual demand curve by more than its average cost curve. This generally depends on the cost and demand parameters and the cost-raising technology.

The results in the strategic agency literature are fragile, as they depend in subtle ways on the details of the oligopoly game. For example, under Cournot competition, vertical separation typically leads to the opposite result -- more intense competition than vertical integration. The difference between the Cournot and Bertrand cases arises from the different nature of strategic interactions (strategic substitutes versus complements) in the models. The adverse effects of separation also require that contracts are observable to rivals. If contracts are unobservable, firms can do no better than they do by writing efficient two-part tariffs (wholesale prices equal to marginal cost), so the strategic effects of vertical separation disappear.[17] It is worth noting that even if firms can make their contracts observable, they have short term incentives to renegotiate secretly. If secret renegotiations are feasible, the "softer competition" equilibrium unravels.

The strategic agency models that study vertical separation (with observable contracts) focus on situations in which each vertically separated firm deals with only one firm in the other (upstream or downstream) market. That is, there is no input market competition. This assumption is important. For example, if each of the differentiated products in Bonanno and Vickers is competitively supplied, then the strategic effects of vertical separation disappear. The reason is that downstream competition makes it unprofitable for rivals to raise price in response to an increase in the cost of any particular firm. So the commitment by any one firm to a higher wholesale price has no value.

Vertically separated firms may deal with a single supplier or buyer due to exclusive contracts. Using the implications of the strategic agency literature, it is a short step from this observation to see that exclusive territory contracts may have the effect of softening competition. In particular, exclusive contracts can effectively transform a situation with a competitive

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downstream market, where upstream competitors cannot use two-part tariffs to soften competition, into a game of strategic agency in which two-part tariff contracts can be used for this purpose. This is the source of the anticompetitive effect of exclusive territories in the two-part tariff variant of the model in Rey and Stiglitz (1995). As with vertical separation, this effect is fragile. In particular, the result disappears if wholesale prices are unobservable to rivals; and the restraints' competitive effects depend on the form of competition (e.g., Cournot or Bertrand).

A number of papers have appeared that employ the two-stage framework that originated in models of strategic agency to examine the effects of vertical integration and restraints in a variety of environments. We will not attempt to survey this literature further, but simply note some consistent themes that emerge. First, under linear input pricing, vertical practices typically affect the double-marginalization externality, sometimes making it worse[18] and sometimes mitigating it.[19] Firms must be aware of this effect when evaluating the profitability of strategies designed to soften competition. Second, the results often depend on the ability of rivals to observe wholesale prices; this observability allows firms to make credible commitments through their contracts. Third, the predictions of these models often depend on the nature of the oligopoly model employed.[20]

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[18] For example, Rey and Stiglitz (1995) examine the effects of exclusive territories by Bertrand oligopolists that charge linear prices (they also consider nonlinear contracts, as noted in the text). In their model, exclusive territories may benefit firms by inducing softer competition, but they may also exacerbate the double-marginalization externality. Thus, it may or may not be profitable to use exclusive territories to soften competition under linear input pricing.

[19] For example, several authors have shown that resale price maintenance can eliminate double mark-up distortions.

[20] There a another class of models that identify the possibility of "foreclosure" deriving from "multilateral opportunism." See Rey and Tirole (2003) for a survey of the relevant literature. By "multilateral opportunism" we mean joint decisions by an upstream and downstream firm that adversely affect the profits of rival downstream firms. (We note that mitigation of bilateral opportunism often is an important procompetitive motive for vertical mergers (see, e.g., Klein, Crawford, and Alchian (1978); Klein (1978); Joskow (1985)). We do not believe that the models described by Rey and Tirole provide a basis for antitrust enforcement. Antitrust policy towards monopolies and dominant firms should be directed against conduct that the monopolist uses to preserve or extend its monopoly. An upstream firm's use of vertical integration or restraints to mitigate opportunism has nothing to do with protecting itself from horizontal competition (as conventionally defined), or with extending or entrenching this market power.

C. Dynamic Effects

The theories discussed above are static, in the sense that they do not consider the effects of vertical practices on entry, exit, or long-run investment incentives. A third general class of theories of harm from vertical practices addresses these dynamic effects. This literature has focused mainly on the competitive effects of tying/bundling[21] and exclusive dealing.[22]

Whinston (1990) was the first to examine rigorously the potential entry deterring effects of tying. His model shows that a commitment to tying can cause a firm to price more aggressively against oligopoly rivals in the tied good market. If there are economies of scale in production in this market, this commitment can deter entry into production of the tied good because the potential entrant realizes that competition will be too vigorous for it to earn enough to cover its average costs. Carlton and Waldman (2002) show how a monopolist can use tying to preserve its monopoly in future periods or extend it into newly emergent markets. Nalebuff (2004) shows that a company with market power in two products that can bundle them together can make it harder for a rival selling only one of the products to compete.

The welfare effects of tying and bundling in these models are theoretically ambiguous, for a variety of reasons. In Whinston's model, for example, the commitment to compete more

Instead, vertical integration helps the firm avoid opportunism so that it can exercise (potentially legitimately acquired) existing market power. Under the theory, the upstream firm will have incentives to use vertical practices even if there is no scope for altering competition at the upstream level. In this sense, the use of vertical restraints for this purpose is analogous to price discrimination by an incumbent monopolist – it allows the monopolist to capture a larger share of the social value created by its product, often increasing social welfare in the process.

[21] A literature we have not discussed explores the use of tying/bundling to price discriminate (e.g., Bowman, 1957; Stigler, 1963; Adams and Yellen, 1976) or to extract surplus through additional margins (e.g., Burstein, 1960; Mathewson and Winter , 1997; Martin, 1999). The welfare effects of tying/bundling in this literature are theoretically ambiguous.

[22] There is an informal perception in the policy arena that vertical integration can deter entry if it forces potential entrants to enter at more than one level (e.g., both upstream and downstream). See, for example, the Non-Horizontal Merger Guidelines issued by the U.S. Department of Justice, at http://www.usdoj.gov/atr/public/guidelines/2614.htm, §4.21. While this point seems plausible enough, to our knowledge it has not been formally modeled in the economics literature.

aggressively caused by tying can also lower price. In addition, the welfare effects of entry into

the tied good market are typically ambiguous because of the usual tradeoff between greater

product variety and the fixed costs of entry. Whinston summarizes the welfare and policy

implications of his analysis as follows:

> While the analysis vindicates the leverage hypothesis on a positive level, the normative implications are less clear. Even in the simple models considered here, which ignore a number of other possible motivations for the practice, the impact of this exclusion on welfare is uncertain. This fact, combined with the difficulty of sorting out the leveraged-based instances of tying with other cases, makes the specification of a practical legal standard extremely difficult. (Whinston, 1990, p. 855-856)

Carlton and Waldman also express caution in using their analysis to condemn tying. In

the working paper version of their paper, they discuss the antitrust implications of their analysis:

> It would be a grievous mistake to condemn such strategic behavior and attempt to use the antitrust laws to condemn it without an analysis of the welfare consequences of such behavior and without an analysis of the likelihood of being able to correctly identify such behavior without simultaneously condemning we

inferences from these analyses always must bear in mind that harm to competitors (e.g., harm to the non-bundling firms in Nalebuff) is not the same as harm to competition. Instead, harm to competitors is often – indeed, usually – consistent with enhanced competition. We normally would not condemn firms for making cost-reducing investments that induce more aggressive price competition, even if this competition harms competitors. Why, then, challenge tying or bundling arrangements having similar effects?

Evaluating the welfare consequences of tying is difficult in part because tying has several potential benefits (price discrimination, quality enhancement, lower transaction costs, etc.) Carlton and Waldman make a distinction between "physical tying," where products are tied by physical attributes like compatibility, and "contractual tying," where products are tied by contract. Noting the difficulty of using cost-benefit analysis to identify harmful tie-ins, they conclude that, "other than in exceptional cases, plausible efficiency justifications for a physical tie should defeat an antitrust attack on tying."[24] They suggest that the standard for contractual tying might be lower with the balancing of costs versus benefits done as it is now done in exclusive dealing cases in the U.S.

Similar to the dynamic effects of tying and bundling, the dynamic effects of exclusive dealing arise from denying rivals sufficient scale to be profitable. We agree that this is the biggest source of anticompetitive risk from these practices. However, conducting a welfare analysis of exclusive dealing is also extremely difficult.

Rasmusen et al. (1991), Bernheim and Whinston (1998), and Winston and Segal (2000), among others, show that exclusive dealing (ED) potentially can deter entry by preventing entrants from achieving minimum viable scale. Like most of the literature on vertical restraints,

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[24] Carlton and Waldman (1998), p. 39.

the exclusive dealing models are highly stylized. For example, these articles assume that downstream markets are served by local monopolists, and that the scale economies in the upstream market take a particular form. Even in these simple settings, the welfare effects of exclusive dealing are theoretically ambiguous.[25] For more realistic settings, e.g., with downstream oligopoly, and general assumptions about the degree of scale economies, the theory has not been fully worked out.

instance, the losses are minuscule ($0.60 per cable subscriber per year).[27] Second, a far greater

number of studies found that the use of vertical restraints in the particular context studied

improved welfare unambiguously (i.e., resulted in lower prices and larger quantities).

More specifically, the studies in Table 1 appear to provide strong support for the

proposition that vertical integration/vertical restraints often help solve double markup problems,

and/or reduce costs in other ways. These studies include:

of RPM generally was consistent with demand-increasing activities by retailers. Also consistent

with this rationale for vertical restraints are Sass & Saurman's (1996) findings that the ban on

exclusive territories in beer sales reduced beer consumption by 6%. Mullin & Mullin (1997)

found vertical integration induced investment in relationship-specific assets in steel production;

Hersch (1994) also concluded that his stock market event study provided evidence consistent

with the efficiency rationale for RPM. Heide, Dutta, & Bergen's (1998) study of exclusive

dealing contracts found that a key determinant of the use of exclusive dealing contracts was

whether manufacturer compensated dealers for services potentially "free ridable" by rival

manufacturers. Notably, Heide *et al*. found also that the perception by managers that entry was

Hastings (2004) found that retail petrol prices increased when "unbranded" stations were acquired by branded refiner. However, she concludes that the change in price at newly-acquired stations is attributable to the effects of "branding" formerly "unbranded" retailers, *not* to greater vertical control by refiners; indeed, she notes explicitly that her empirical evidence does not support "divorcement" restrictions (i.e., proscriptions on the vertical control of gasoline retailers by refiners).

Overall, we would characterize the empirical literature on vertical restraints/vertical integration as follows:

- Most studies find evidence that vertical restraints/vertical integration are pro-competitive;

- This efficiency often is plausibly attributable to the elimination of double-markups or other cost savings;

- A number of studies also find evidence consistent with "dealer services" efficiencies;

- Instances where vertical controls were unambiguously anticompetitive are difficult to find.

IV. Discussion

In this section we apply our review of the literature on vertical restraints to our Bayesian decision framework. We first summarize what we believe our review of the relevant literature says about the likely competitive effects of various vertical contracting practices:

Most models that predict (potential) harm from vertical restraints require pre-existing market power at multiple stages of production. This condition usually implies the existence of efficiencies from vertical control, and the magnitude of the efficiency often rises monotonically with the level of pre-existing market power. The models that fail to find such efficiencies do so by invoking assumptions that are empirically unrealistic and hard to verify.

Even when the *only*

elimination of double markups – theory shows that most vertical restraints have competitive effects that are ambiguous theoretically, and whose sign and magnitude are extremely sensitive to the presence of conditions and circumstances that are

(4)
$$\frac{P(x|C)}{P(x|A)} \quad \frac{L_{II}}{L_{I}} \quad \frac{P(A)}{P(C)} \ .^{31}$$

It is easy to see from (4) that the optimal enforcement rule depends on the likelihoods, loss functions, and the prior beliefs. A decision to challenge a given restraint is more likely if: (1) the cost of type-II errors is high relative to the cost of type-I errors; (2) there are strong priors that a practice is anticompetitive; and (3) theory suggests a strong likelihood that the evidence was generated by an anticompetitive rather than a procompetitive or benign practice. In this framework, likelihoods and priors may vary according to the type of restraint at issue and the pro and anticompetitive theories posit

against the overturning of legal precedents except in extraordinary circumstances) rationally may

lead U.S. authorities to be biased against type-I errors.[35]

V. Conclusion

The outcome-based approach to antitrust ushered in by *Sylvania* in the United States (and

gaining momentum in the EU) requires enforcement officials to demonstrate likely adverse

effects on welfare. We view this primarily as a problem of inference: given the evidence, what

is the probability that a given practice is anticompetitive?   One approach to the inference

problem is to set up "screens" based on structural conditions like market share, where harm is

presumed if the conditions are met. Unfortunately, the search for a screen that works well in all

but a few well specified instances has proved elusive.[36]

A second approach is one based on an economic model of the restraint; i.e., posit a

theory under which the restraint in question can harm competition, against alternatives in which

the restraint is benign or procompetitive, and then determine which theory best explains the

available evidence. In this paper, we have argued that it is difficult to distinguish welfare-

enhancing from welfare-reducing vertical practices based on evidence because the theory of

vertical control tells us only that anticompetitive effects are possible. Until theory can be used to

determine how likely it is that a restraint will lead to an anticompetitive outcome, it does not give

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[35] The reluctance to overrule precedent, and the collective action problem associated with private incentives to challenge bad precedent, is likely to insulate the deterrent effect of a type-I error, while the market may be self-correcting with respect to type-II errors. As Easterbrook (1984, pp. 2-3) observes:

> If the court errs by condemning a beneficial practice, the benefits may be lost for good. Any other firm that uses the condemned practices faces sanctions in the name of *stare decisi*s, no matter the benefits. If the court errs by permitting a deleterious practice, though, the welfare loss decreases over time. Monopoly is self-destructive. Monopoly vices eventually attract entry.

 See also McChesney (2003, 1401, 1412) ("The cost of Type II errors . . . will be low, as long as barriers to entering markets plagued by suspected anticompetition are also low. As prices rise because of anticompetitive contracts or practices, new entrants emerge to alleviate or even eradicate the problem.").

[36] For a discussion of screens *see* Vickers (2004).

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Article	Product	Method & Data	Finding	Conclusion
Ippolito & Overstreet (1996)	Glassware	Analyzed (1) changes in market shares of Corning and its rivals; (2) abnormal stock returns for Corning and rivals when Cornings' use of RPM ruled illegal	Corning lost market share in the years following forced abandonment of RPM. Corning suffered negative abnormal returns (12-16%) when FTC complaint announced, principal rival (Anchor Hokcing) enjoyed positive (3-7%) abnormal return.	Evidence rejects anticompetitive theories that the RPM contracts facilitated dealer or manufacturer cartels, and instead supports a "principal-agent" explanation in which RPM helped increase demand for Corning's products.
Ippolito (1991)	various	Examined a large sample of private and government RPM cases brought between 1976 and 1982. From reading of published decisions, attempted to assess the "strength" of plaintiff's case according to several criteria designed to assess the case's relative strength.		

Article	Product	Method & Data	Finding	Conclusion
Hersch (1994)	spirits, apparel, electronics, appliances, toiletries, tires, watches, department stores, grocery chains, retail drug chains, variety chains	Stock market event study of the impact of the Supreme Court's 1951 *Schwegmann* decision, which substantially weakened the enforceability of RPM contracts. .	Analyzed the impact of the decision on the share prices of both manufacturers and dealers. Generally found that the decision generated minimal abnormal returns for most of the firms in his sample.	Results provide (weak) support for the dealer cartel theory (principally in one industry, consumer electronics) and the efficiency rationales for RPM. No support was found for the manufacturer cartel theory
Slade (1998)	beer	Investigated the UK Merger and Monopolies Commission's decision to require large vertically integrated brewer/retailers to divest themselves of pubs and also to offer the beer of at least one rival brewer. Estimated reduced form retail price equations for "tied" and "free" pubs using panel specification.	Found that the implementation of the beer orders resulted in higher retail prices at vertically controlled retailers ("tied houses"), while prices at unintegrated retailers ("free houses") remained unchanged.	Divestiture policy did not accomplish its goal of reducing retail beer prices. The variety of beers available at retail may have increased.

Article	Product	Method & Data	Finding	Conclusion
Barron, Taylor, & Umbeck (2004)	gasoline	Assesses the likely consequences of "open-supply" legislation, which proscribes contracts between gasoline refiners and retailers requiring the latter to purchase their gasoline exclusively from a particular refiner. Estimated reduced form retail price equation using panel data including a dummy variable indicating whether the station was direct-supplied by a refiner	Stations that switched from jobber-supply to direct refiner supply reduce their prices by 0.6¢-1.0¢ per gallon.	Open supply legislation would not result in lower retail prices.
Barron & Umbeck (1984 & 1985)	gasoline	Compared pre- and post-divorcement (vertical separation) pricing behavior of gasoline stations in Maryland.	At stations that had been company-owned before the enactment of the legislation, fullservice rices rose 6.7¢ (relative to competitors); self-service prices rose 1.4¢. They also found that prices at competing stations also rose post-divorcement.	Requiring vertical separation between refiners and retailers results in higher retail prices.
Vita (2000)	gasoline	Estimated reduced form retail gasoline price equation using state level cross-section data.	Found that retail prices about 2.6¢ higher in states with divorcement policies, compared to states without such restrictions.	Requiring vertical separation between refiners and retailers results in higher retail prices.
Shepard (1993)	gasoline	Estimated reduced form retail price equation. Specification includes dummy variable if the station is company owned.	Company-owned (i.e., vertically integrated) stations charged lower prices per gallon (between 1.4¢ and 10¢ per gallon) than their nonintegrated counterparts.	Contractual form important in determining behavior of retailers.

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Article	Product	Method & Data	Finding	Conclusion
Hastings (2004)	gasoline	Investigated the retail price effects of the purchase of "unbranded" gasoline stations (i.e., stations doing business under the name of "Thrifty") by a branded refiner (ARCO). Estimated reduced-form price equation with dummies indicating (1) if station competes with independent; and (2) if the station became company-owned	Found that the rivals of the acquired stations raised their prices post-acquisition by about 5¢/gallon, but that the tendency to raise prices did not depend on the vertical structure of the rival ARCO station (i.e., whether it was vertically integrated, lessee-dealer, or open dealer). .	The change in price at newly-acquired stations attributed to the effects of "branding" formerly "unbranded" retailers. The evidence does not support divorcement restrictions.
Slade (1998)	Gasoline	Investigated determinants of contractual form between branded gasoline refiners and retailers. Estimated probit equation with dependent variable equal to 1 if retailer sets prices; independent		

Article	Product	Method & Data	Finding	Conclusion
Heide, Dutta, & Bergen (1998)	industrial machinery & electronic/ elelectric machinery	Conducted a detailed survey of managers responsible for distribution decisions. Estimated a logit model of the probability that distributors were restricted from carrying the products of rivals.		

Article	Product	Method & Data	Finding	Conclusion
Rosengren & Meehan (1994)	various	Stock market event study of the impact of (1) the announcement of a vertical merger, and (2) the announcement of an antitrust complaint against that merger, on the value of unintegrated rivals, using a database of all vertical transactions challenged by federal enforcement agencies between 1963 and 1982.	No significant abnormal returns to rivals when merger-related events announced.	Study provides no evidence for market foreclosure theory.
Reiffen (1998)	railroads	Stock market event study of Union Pacific (UP) Railroad's attempt to obtain a significant minority share of the voting equity in Chicago Northwestern (CNW) Railroad. Rivals of posited a theory of foreclosure that connects UUne.1(d.)TJ19..5( )-21 lf13wn2e 6 3ae(h)5.5(eo(1963con)4.4-02it)5.8(a)-1.1(rket)5.6(d.)T8481ip2(v2.4(a)-0)-7.5(the CN8481i)W t2(v2.4(5(y)7.5(om3.16 3e		

Article	Product	Method & Data	Finding	Conclusion
Lopatka & Godek (1992)	aluminum	Assesses the claims that Alcoa maintained its monopoly in aluminum ingot production by raising the costs of potential entrants through "overbuying" supplies of two inputs critical to aluminum production: electricity and bauxite	Demonstrate that foreclosure theory is empirically implausible. Alcoa never controlled more than a minuscule fraction (at most, approximately 5 percent) of the market for electric power. Second, Alcoa's acquisition of bauxite ore accounted for only a fraction of available supplies, and moreover was consistent with its own input demand levels (i.e., there was no credible evidence of the Alcoa "overbought" bauxite ore).	"Raising rivals' costs" theory of harm from Aloca's input procurement policies empirically implausible.
Graddy (1997)	fast food	Cross-sectional reduced form price regression with dummy variable indicating whether store is company-owned or franchise.	The price of a meal at a company-owned store is approximately 2.8% lower than the same meal at a franchised store.	Evidence supports theory that prices will be higher when franchises have local market power.