WORKING PAPERS

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WORKING PAPER NO. 179

October 1990

BUREAU OF ECONOMICS
FEDERAL TRADE COMMISSION
WASHINGTON, DC 20580

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The Limits of Raising Rivals' Costs

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October 1990

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ABSTRACT

The 1980's saw the evolution of a vertical antitrust theory often referred to as "Raising Rivals' Costs." Our analysis examines this theory and its robustness with respect to a number of assumptions. In addition, the applicability of the theory to two well known cases is evaluated. In these cases, the facts are shown to be inconsistent with the requirements of the theory. It appears that while "Raising Rivals' Costs" is a theoretically valid method of achieving an anticompetitive effect on price, its practical uses are extremely limited.

I. Introduction

The 1970's saw the rise to prominence of the "Chicago School" of antitrust analysis (see Bork, 1978, and Easterbrook, 1986). Two important arguments of this school are that predatory strategies are unlikely to be profitable to the predator, and that exclusionary practices are much more likely to be efficient than anticompetitive.

In the 1980's, the concept of raising rivals' costs (RRC) arose to challenge the Chicago School. RRC advocates, starting with Salop and Scheffman (1983) present RRC as an innovative method of modelling how upstream exclusion can profitably raise rivals' costs in a predatory fashion. In a subsequent article, Salop and Scheffman (1987 at 32) assert that "cost-raising strategies can be an important anticompetitive instrument even if the predator is a price-taker in the output market." Thus, RRC advocates claim to have discovered a new market failure which allows firms to exploit vertical relationships and create competitive problems without consideration of traditional market power. They argue that RRC represents a significant challenge to the Chicago School and call for new and more extensive interpretations of the antitrust laws.

The basic RRC idea can be traced back to Director and Levi (1956 at 290) who refer to a "special case" condition where a firm with monopoly power "... can decide to impose additional costs upon itself for the sake of [an exclusionary] restriction. Such a restriction might be valuable if the effect of it would be to impose greater costs on possible competitors." Williamson (1968) provides an example demonstrating how capital-intensive firms could profit by increasing industry-wide wages and thereby obtaining an advantage over their labor-intensive rivals. In formalizing the RRC result, Salop and Scheffman (1987 at 22) model the behavior of a predatory dominant firm that can raise the costs of its fringe competitors. Exactly how a predator implements an RRC strategy and the cost of such a strategy, however, has not previously been fully explored. Krattenmaker and Salop (1986a) present a simple graphical model of upstream predation, while Ordover, Saloner and Salop (1990, hereafter cited as OSS) suggest a vertical merger can lead to an anticompetitive effect if the merger allows the remaining upstream firm to behave anticompetitively.

The RRC methodology has not gone unchallenged. Brennan (1988) asserts that for a firm to profitably raise rivals' costs it must exploit market power in the relevant input market. The predator gains to the extent it shares in the upstream monopoly profits. Brennan (at 103) concludes that "the vertical aspects (of RRC) add little to the competitive analysis that is not already understood." Boudreaux and DiLorenzo (1990) expand on Krattenmaker and Salop's (1986a) discussion of the potential for counterstrategies to defeat the predator's attempt to obtain an advantage on its rivals. They suggest that suppliers and victims will interact to bid the price of an input up to the exclusionary price, and therefore no firm can gain a strategic advantage over its rivals.

Neither the advocates nor the critics of RRC have described the technical limitations of the concept. Moreover, with the exception of the recent OSS paper, a general model of how RRC strategies affect input prices does not exist. This paper fills that void and finds some limited theoretical support for the RRC concept. Section II examines the downstream market and shows that a RRC strategy is not viable if all firms have constant costs. If all firms do not have constant costs, a predator is likely to need a significant cost advantage for RRC to be a profitable strategy. Section III models exclusion in the upstream market to determine how the predator can affect the costs of its victims and how much exclusionary rights will cost the predator. It is shown that it may be expensive for a predator to purchase such rights. Sections II and III together show that exclusion-based RRC can lead to anticompetitive effects, but only in a narrow range of situations.

Section IV addresses the collusive permutations of RRC, which appear to apply only under restrictive conditions. RRC collusive schemes, however, already seem to be actionable under the horizontal aspects of the antitrust laws. Section V addresses the OSS vertical integration model. This model avoids the horizontal pitfalls, but applies only to a very narrow range of fact and strategic situations. Finally, Section VI examines the relevant facts in two famous RRC cases, *Klor's* and *Pennington.* In both cases the facts fail to fit the RRC theory. The evidence in *Klor's*, suggests only a response to free-riding on product specific services, while in *Pennington* the facts are consistent with unilateral action on the part of a legal monopolist, a labor union.

RRC represents a credible theory of economic harm. The circumstances, however, in which it can occur are usually so limited that almost always represents a minimal threat to competition. Further, because active enforcement of RRC theories would represent a threat to efficient exclusive practices (as discussed in Brennan, 1988 at 107), it is likely that economic efficiency would be higher if this paradigm were not generally used in antitrust analysis.

II. The Predatory Exclusion Model

The formal model of raising rivals' costs is presented in Salop and Scheffman (1987). In this model, the predator is posited to be able to increase input prices in some unspecified manner. The model then analyses the behavior of the predator in competition with a fringe of other firms. Given its position, the predator is able to maximize its profits by choosing the market price of both the output and the input. This section generalizes the Salop and Scheffman model to illustrate the degree of applicability of RRC.

The notation used in this section is as follows:

Q, Q_1, Q_2	industry, predator, and fringe final output, $Q = Q_1 + Q_2$
P, w	Final output price and the increase in input price due to exclusion.

The demand curve for the final product is

(2-1) $$Q = D(P)$$

The fringe supplies output according to the schedule

(2-2) $$Q_2 = S(P, w)$$

Salop and Scheffman model the predatory firm's costs using one functional form. Their formulation can be expanded upon for clarity. The predator must incur not only direct production costs, but also the costs of exclusion (as further discussed below in Section III). These costs are additively separable. The predator's cost function is therefore redefined here as

(2-3) $$\text{Costs} = C(Q_1, w) + E(w)$$

where $C(Q_1, w)$ represents direct costs from producing output Q_1 given an increase in the input price of w and $E(w)$ represents the costs of generating exclusion such that the increase in the price of the input is w.

The predator maximizes profits over P and w

(2-4) $$\text{Profits} = P(D(P)\text{-}S(P,w)) - C(D(P)\text{-}S(P,w), w) - E(w)$$

Taking derivatives of (2-4) with respect to w and P and rearranging slightly yields

(2-5) $$-S_w(P\text{-}C_{Q1}) = C_w + E_w$$

(2-6) $$(P - C_{Q1})/P = -Q_1/p(D_p - S_p) = 1/e_r$$

where e_r is the elasticity of the residual demand facing the predating firm.

Combining (2-5) and (2-6) generates for an interior solution

(2-7) $$S_w/(D_p - S_p) = (C_w + E_w)/Q_1$$

The right hand side of (2-7) is equal to the increase in price that the predator obtains. Since the fringe is supplying the good at price equal to marginal cost, this is also equal to the increase in the fringe's marginal costs. The left hand side equals the change in average costs of the predator, average costs which now include both the costs of production and the costs of exclusion. Thus, the primary necessary condition for an RRC strategy to be profitable is for it to raise the predator's average costs less than it raises its rivals' marginal costs.

These conditions can be used to determine the structural conditions necessary for the model to be viable. For instance, if all firms have the same production technology and constant returns to scale, the predator's production costs would increase as much as the fringe's, and there would be no profits for the predator, even before taking the costs of exclusion into account. Since the predator must incur the costs of exclusion, RRC could not occur with constant returns to scale technology. Under these conditions, even a firm with a large market share could not exploit a RRC strategy.[1]

It is also necessary for the RRC strategy to affect the cost structure of all the fringe firms across the relevant antitrust market for the RRC strategy to raise price. If two groups of fringe firms with elastic supply curves are competing, an RRC strategy would be unprofitable if the cost increase affects only one group. In this

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[1] It has been suggested (Scheffman, 1988, and Langenfeld and Morris, 1990) that RRC strategies can generate supranormal profits if an industry trade association has sufficient economic power to enforce anticompetitive regulations on its members. Given that the trade association divides the costs of exclusion among rivals, there is no need to endogenously model the costs of exclusion. When limited to analysis of markets with powerful trade associations, the RRC concept appears to support an active enforcement policy.

case, D_p in (2-7), the slope of the residual demand curve facing the one group of affected fringe firms, is quite large and the predating firm will not be able to raise significantly the price it receives for its good.

The Salop and Scheffman model does not require market power to profitably raise rivals' cost. Instead, for an RRC strategy to be profitable the predator must usually have a different technology than its prey. For instance, the standard scenario has the predating firm with constant costs and a fringe with higher marginal costs. If the fringe uses the excluded input more intensely than the predator, the predator may be able to raise the marginal costs of its rivals by more than it raises its own costs, which now include the costs of exclusion.

Figure 1[2] illustrates this RRC scenario in which a firm that lacks market power in the output market engages in anticompetitive exclusion to raise price. Firm 1 produces Q_{11} at cost C_{11} and is capacity constrained beyond Q_{11}. A large number of fringe firms produce at costs C_{21}. In this market, fringe firms will produce up to Q_1 and the efficient firm does not have market power.

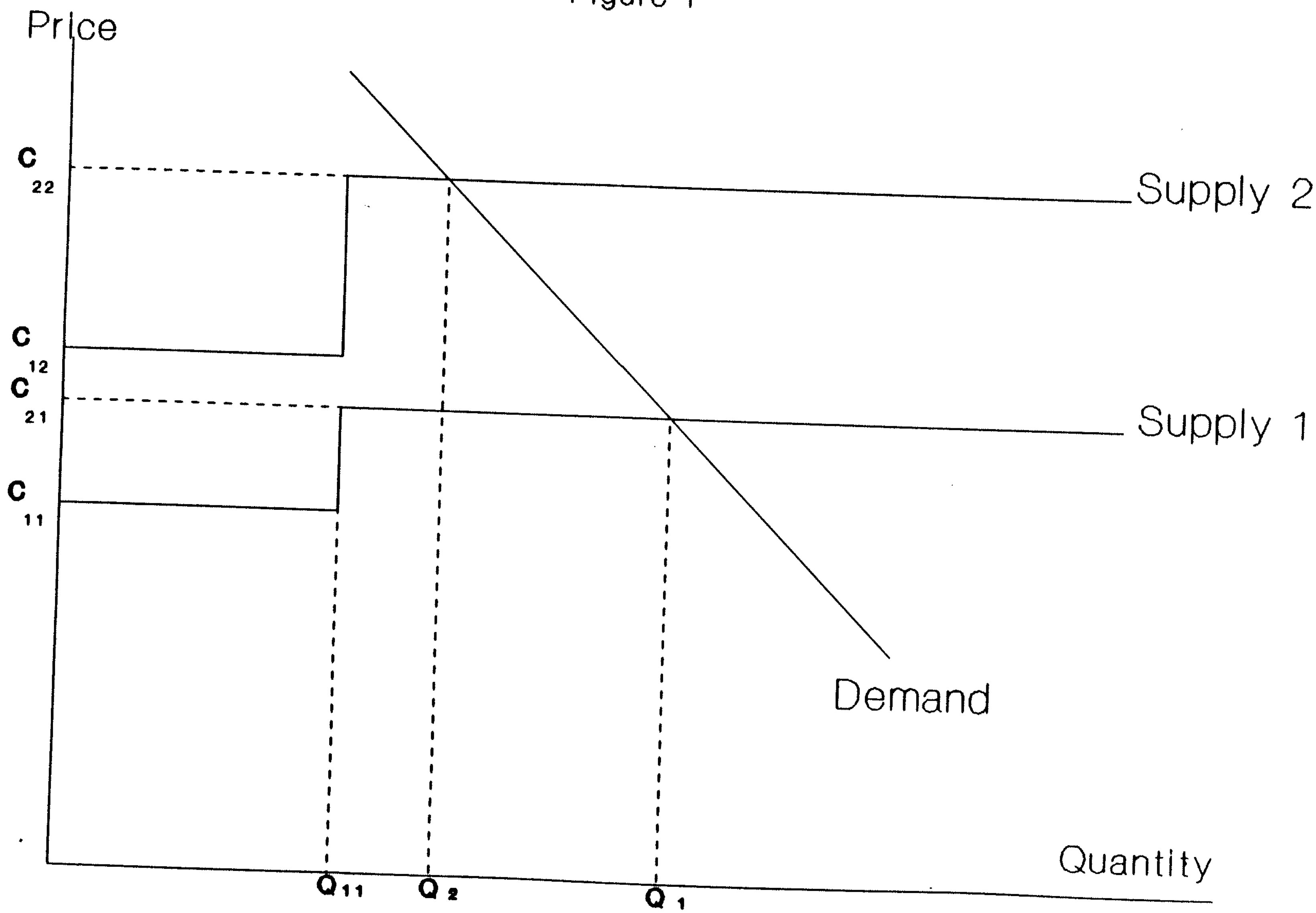
If the efficient firm predates it may be able to raise the fringe's costs to C_{22} and raise its own costs a smaller amount C_{12}. If the marginal revenue conditions are appropriate, the fringe may stay in the market. If these additional profits to the firm exceed the cost of purchasing exclusionary rights in the upstream market, a RRC equilibrium will exist without market power.

Although the Salop and Scheffman model involves one predator, the analysis can be extended to a "oligopoly" scheme of exclusion under certain conditions. Assume that there are a small number (n) of firms with the "special" production technology. Each firm could incur exclusionary expenses to raise input costs, although each predator would obtain only a fraction (1/n) of the profits available to a firm unilaterally adopting a predatory strategy. Given significant and increasing costs of

[2] This is a modification of Figure 1 in Scheffman (1988).

RAISING RIVAL'S COSTS WITHOUT MARKET POWER

Figure 1



exclusion (see Section III), it is likely that none of the firms acting unilaterally could profitably incur substantial exclusionary expenses. It may be possible, however, for the firms to engage in a Cournot-style game with firms tacitly colluding to supply exclusion equalling approximately 1/n times the "monopoly" or one firm level.

While multi-firm exclusion is theoretically possible, in practice it may be difficult to implement. If each predator can purchase exclusionary rights from a number of equal cost suppliers, it may be easy to allocate the costs of exclusion among the oligopolists. On the other hand, if these conditions do not hold, for example if input suppliers have asymmetrical cost functions, then it may be quite difficult for the oligopolists to arrange to share the costs of exclusion, and even the Cournot-style result may break down as each predator fails to provide the appropriate level of exclusion.

Both the one firm and oligopolistic models of exclusion require entry barriers to prevent new firms from duplicating the technology of the efficient firms and driving the fringe out of business. A healthy fringe is generally required for a RRC model to be viable, because the increase in the cost of the fringe is what drives the anticompetitive price increase. Note that Stiglerian barriers[3] are required to protect the fringe, because supranormal profits are an equilibrium characteristic of the RRC model. These barriers are much less common than the simple entry impediments (often based on time) relevant to merger analysis.

There is one other important caveat to place on the usefulness of RRC theories in antitrust enforcement. As Salop and Scheffman (1984 at 18, Proposition 5, 1987 at 26, Proposition 5) note, if the predator's output (not its market share) rises, the effects on welfare are ambiguous, as low cost output from the predator may be replacing high cost fringe output. Thus, if an alleged anticompetitive exclusion results in an increase in the predator's output, there is no easy method of determining the effects

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[3] Stiglerian barriers in this context are costs borne by inefficient firms that have not been borne by existing efficient firms. (See Stigler, 1968 at 67).

of that strategy on welfare. Given this, it would appear that a necessary condition for enforcement action, assuming that allocative efficiency is the goal of antitrust, is a reduction in the predator's output. This would exclude from judicial scrutiny to the "overbuying" scenarios discussed in Krattenmaker and Salop (1986 at 237), where the predator buys and uses "too much" of the input (which results in an increase in its own output) in order to raise the price of that input to its competitors.

In conclusion, anticompetitive exclusion is theoretically possible, but only under restrictive conditions. First, RRC models depend on cost asymmetries protected by Stiglerian barriers to entry, with the predating firm having a significant cost advantage over its rivals. Second, RRC is more likely when only one firm holds the cost advantage. Collusive exclusion would appear to be quite difficult. Finally, if exclusion is expensive (an issue Salop and Scheffman do not directly deal with), the applicability of RRC strategies and thus the competitive problems they can cause will be limited.

III. Markets For Anticompetitive Exclusion

The term "raising rivals' costs" may be considered somewhat of a misnomer. The crucial strategic element generating profits for the predator in equation (2-5) is the term S_w, the amount of output reduction generated by a rise in the exclusionary input price of w. Thus, the profits gained in an exclusionary strategy come from reducing the output of the fringe firms.

The basic idea associated with the exclusion methodology is for the predator to obtain exclusionary rights to a portion of the input industry's output and prevent it from being supplied to downstream firms. Thus, some suppliers are at least partially "excluded" from the input market and the price of the input rises above its previous level. Both the predator and prey bid for the output produced by the remaining suppliers and any high-cost new entrants.

The economics of exclusion can be readily converted into standard supply and demand analysis. What the predator is trying to do is reduce the input supplied below the market-clearing level.[4] In terms of Figure 2, input suppliers of I have supply curve S_1. Producers of output have a derived (from the price of final output) demand curve for the input I represented by D_1. Absent exclusion, the equilibrium output is I_1 at point A.

Krattenmaker and Salop (1986a) model exclusion as shifting the supply curve up and to the left until the market generates the exclusionary price. They (1987 at 87) appear to argue that input firms will be willing to sell exclusion for the value of their forgone profits absent exclusion.[5] Thus, under this theory, to reduce input supplies from I_1 to I_2, the predator pays suppliers the amount ABC not to produce in this range. This output reduction raises the price of the input from P_1 to P_2, as P_2 is the price that clears the market given demand curve D_1.

This result, however, is not an equilibrium. Consider the fringe supplier at point B on the supply curve. It can produce input at cost C_2 and sell it at P_2 in the open market, making a profit of P_2-C_2. Yet under the Salop and Krattenmaker analysis, it only accepts a profit of P_1-C_2 by not producing.

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[4] Note that measuring exclusion as a constant function in the upstream market will overestimate the amount of exclusion generated if fixed proportions technology does not apply.

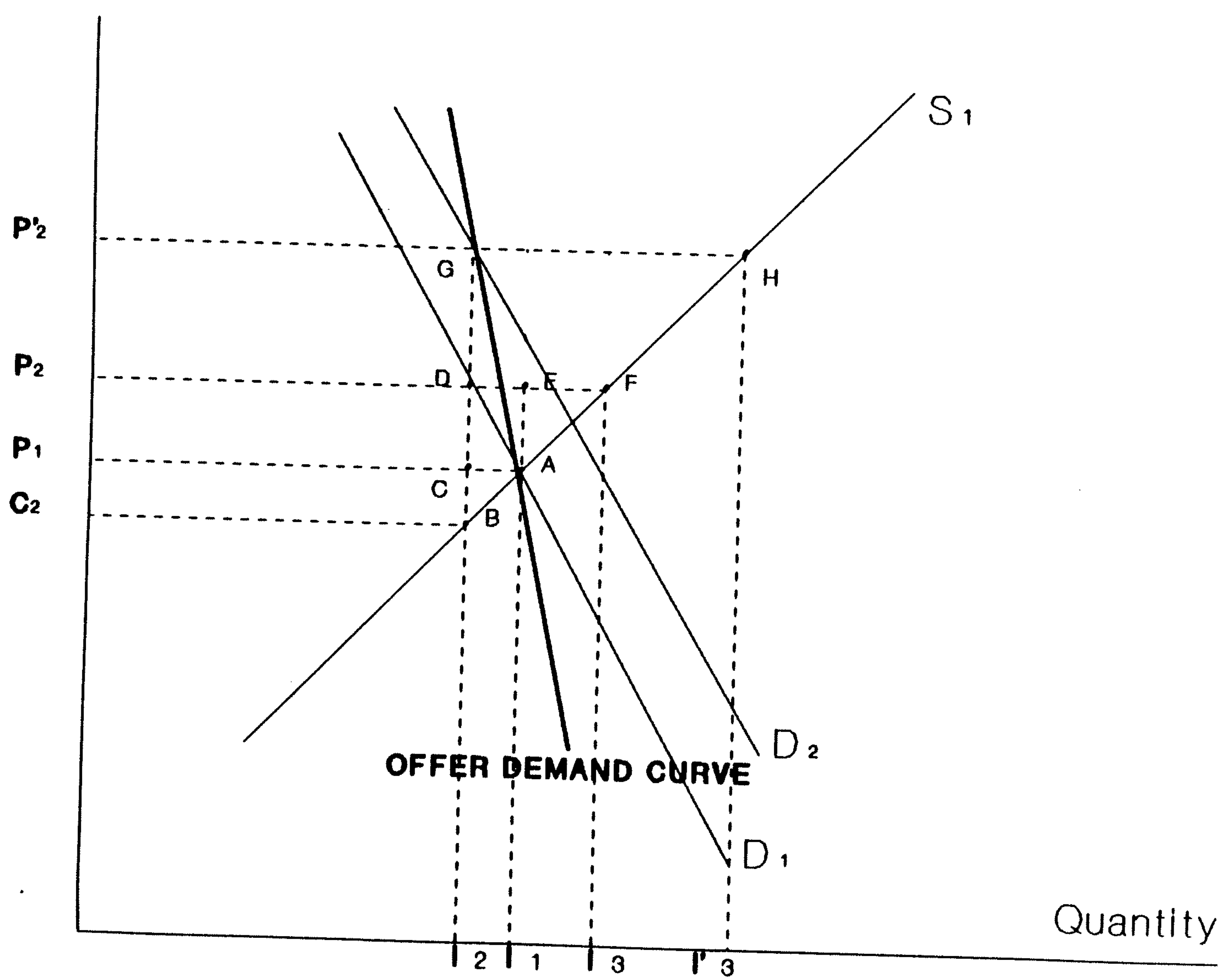
[5] The analysis of Krattenmaker and Salop (1987a at 87, 1987b at 33 using identical language) on this point is somewhat vague. They assert:

> If any revenues are knowingly sacrificed (by suppliers because of exclusion), the exclusionary rights purchaser surely must compensate suppliers to succeed in its strategy. However, the required compensation may be small. Moreover, if any compensation is needed, it generally can be financed out of the monopoly profits the excluding firm will gain.

The first sentence appears to say that the predator must make suppliers "whole" with respect to the pre-exclusion equilibrium. The conclusion of the second sentence, that such payments may be small, seems to be based on the false premise in the first sentence. The third sentence appears to be a tautology.

THE COST OF EXCLUSION

Figure 2



Thus, suppliers will require the trapezoid ABDE (representing their opportunity costs) not to produce in the range I_2 to I_1. Yet that is not the end of the predator's payments. Input suppliers in the range I_1 to I_3, seeing an attractive price P_2, will seek to sell their product. For instance, if the predator desires the input price to rise from $100 to $105, it will have to pay to exclude those firms who can produce the input at $103. Thus, even firms that did not produce at all in the pre-predation equilibrium must be compensated. These firms will require payment from the predator equal to the triangle AEF, generating a total cost to the predator of BDF.[6]

The analysis must be generalized for feedback effects, transaction costs, and bilateral monopoly. Recall that the demand curve D_1 is a curve derived from, among other things, the price of the final output, as implied by equation (2-2). Therefore, anticompetitive exclusion moves the demand for the input up and to the right, creating a new demand curve D_2. Input suppliers from I_2 to I_3' will have to be paid the triangle BGH to stop them from selling their inputs at price P_2'. Given this, an "offer curve" representing equilibrium prices for given levels of collusion can be drawn out, as is done in Figure 2.

Assuming all firms sell some marginal output, transaction costs may preclude the predator from entering into the most efficient exclusionary contracts. Thus, the predator must purchase additional exclusion at a higher price from the suppliers under contract to make up for the marginal output sold by independent suppliers. In equilibrium, the predator contracts with additional suppliers until the marginal cost associated with another contract equals the savings from purchasing less exclusion from the predator's existing suppliers. The choice of the optimal number of suppliers

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[6] In another article, Krattenmaker and Salop (1986b) define a market for exclusionary rights and consider the predator to be a monopsonist. This analysis is alleged to solve the problem of the supplier recognizing that the opportunity cost of the sale of exclusionary rights is the sale of output to the victims. Once the suppliers understand their opportunity to sell at the exclusionary price to victims, however, the market for exclusionary rights cannot be defined independent of the input market. The predator must compete for the purchase of exclusionary rights with the victims who are willing to purchase product.

depends on the elasticity of a firm's input supply curve, with the predator's incentive to prefer contracting with additional suppliers rather than inducing existing suppliers to restrict their output further increasing as the supply curve becomes less elastic. Overall, the transactions cost error introduced by using the triangle BGH to estimate the cost of exclusion is largest for markets with inelastic supply curves.

The predator also faces a potentially large number of bilateral monopoly negotiating problems in contracting with suppliers. Consider the supplier of the input at point F in Figure 2. Its reservation price for exclusion, which is used for calculating the costs of exclusion BGH, is equal to $P_2'-P_2$. The predator's reservation price is equal to the reservation price of its nearest substitute, the marginal input supplied at point B, which is greater than or equal to $P_2'-C_2$.[7] In such circumstances it is by no means clear what the final contract price would be, let alone what the transactions costs would be of reaching such contracts.[8]

Some implications can now be derived from the model. First, exclusion requires the market input supply curve be upward sloping. If the supply curve is perfectly elastic (constant costs), the cost of exclusion are infinite and the strategy could be dismissed without further analysis. Generally, the more elastic the input supply function, the more costly it is to exclude rivals and the less likely the strategy could be used.

Second, exclusion is less likely to be profitable when marginal contracting costs are high and when the firm-level input supply curves are inelastic. Contracting for

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[7] The reservation price will be greater if transaction costs deter the predator from purchasing input at the marginal price.

[8] The predator may also face problems of asymmetrical information. Consider a firm to the right of point H in Figure 2. Assume that the post-exclusion price of input is $105, the firm's costs are $107 per unit, and the predator does not know the supplier's cost structure. The potential supplier can ask the predator for an exclusionary payment. If the predator refuses, the firm can produce, taking a short-term loss but perhaps inducing the predator into making exclusionary payments. In either case, the predator may find it necessary to pay even inefficient suppliers to remain out of the market.

exclusion is least expensive in industries where the predator deals with a large number of suppliers whose supply curves are fairly elastic. As noted above, however, these are the type of industries where the opportunity costs of exclusion can be expected to be fairly high.

Third, exclusion strategies would be less expensive in industries with relatively elastic derived demand curves. In general, input demand curves are derived demand curves; input demands will be more elastic if the input makes up a large share of the cost of a product. Thus, predators are more likely to focus on costs that are important to the downstream victims.

Finally, market share, a common measure of market power, affects the viability of an exclusion strategy. The predator's cost of exclusion is a cost which is insensitive to the predator's output; therefore it is more likely to be profitable if the cost is spread over a larger output, reducing its impact on average cost, as in equation (2-7). This implies that firms with large market shares are more likely to profit from exclusion.

It may appear that a simple supply and demand model obscures the strategic interactions between the predator and the suppliers. For example, if suppliers have incomplete information, the predator may have a first mover advantage which allows it to sign advantageous contracts with suppliers. Yet incomplete information with regard to strategic actions will not apply in any intertemporal equilibrium. Further, suppliers may grow more than a little suspicious when a firm offers to buy anticompetitive exclusion from them. Even if suppliers do not recognize a predator's exclusion strategy, potential victims may. The "victims" can react to such a strategy by offering suppliers contracts to produce their normal output. Under these circumstances, the price of exclusion would quickly be bid up to its equilibrium level (P_2' in Figure 2), even with asymmetric information. (See Boudreaux and DiLorenzo, 1990.)

Assuming the predator cannot exploit an information advantage, it might seek to exploit an ability to dictate the terms of trade. For example, the predator may consider initially offering an exclusionary contract to increase the market price. Once a group of suppliers have committed, the predator may offer the remaining suppliers a higher price for additional exclusion. Thus, the predator would profit on all the output it had under the initial contract. If the predator can make two-part offers, however, it is suboptimal for any suppliers to tender their output until the predator has credibly committed to renounce the opportunity. Such commitment, perhaps in the form of a most favored nations clause, would effectively preclude price discrimination.

Alternatively, the predator may be able to offer a contract contingent on the market clearing price exceeding the predator's contract price. Assume the predator picked a price and a contingency such that exclusion would be profitable. Suppliers are now involved in a game with each other. If sufficient firms tender to trigger the contingent contract, others would profit more by holding out. Refusing to tender is the dominant strategy, because holding out generates maximum profits if others tender and everyone breaks even if no one tenders. Thus, the predator is unlikely to be able to sign up enough suppliers for a profitable exclusion strategy. This is a classic free-rider story, with no single firm willing to sacrifice a share of the profits to create them for other suppliers. Here free riding protects competition.[9]

In conclusion, an exclusion strategy allows a predator to raise price to any level it chooses by purchasing exclusionary rights. Victims, however, can obtain the input at the same cost as the predator, but do not have to pay for exclusionary rights.

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[9] The predator could also try to make the contract contingent on all suppliers signing up. Although this would resolve the free-rider problem, it is difficult to make credible, because the predator would benefit from going through with the contract if most suppliers tender and rebidding the contract at a higher price if most suppliers do not tender. Unless the predator can credibly commit to both these obligations, suppliers will hold out for higher prices.

Further, paying for exclusionary rights may be a complicated task. The likelihood that exclusion will be profitable depends on a number of factors. In particular, the input supply curve must be upward sloping. The more upward sloping it is, however, the more transactions costs will increase for the predator. The more elastic the derived demand for the input, however, the less expensive such exclusion will be. Finally, since it is the average costs of exclusion that are important, firms with large market shares are more likely to engage in such exclusion.

The last point bears relevance on the Salop and Scheffman (1987) assertion that market power is not required for a successful RRC strategy. Two things that are necessary, however, are a special, more efficient production technology, and a large market share. Cases where a firm has both those attributes and does not possess market power would not appear to be that common.

IV. Collusive Raising Rivals' Cost Strategies

RRC advocates have advanced a second scenario in which the predator raises input costs by orchestrating an upstream cartel, instead of purchasing exclusionary rights to the upstream product. In Krattenmaker and Salop (1986a), the collusion scenario envisions that the predator will organize a supplier cartel by obtaining rights to sufficient input such that the remaining suppliers will tacitly collude.[10] The supplier cartel will charge a supra-competitive price to the downstream victims, while the predator's contracts provide a supply of input at a lower price than its competitors must pay. This inexpensive input guarantees that the predator will profit from the cartel, regardless of the outcome in the downstream market. Under

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[10] An alternative technique discussed by Krattenmaker and Salop (1986a) envisions the predator contracting with all the suppliers to sell product to the predator at a discount price, but to the victims at a monopoly price. The graph used by Krattenmaker and Salop (at 239) to model this situation, however, is identical to the one used to model supplier collusion (at 242). This situation appears to be a special case of the general model discussed above.

conditions discussed in Section II, the predator may profit further as the input market monopolization leads to higher prices in the downstream market.

Like the exclusion scenario, the collusion theory has not been rigorously presented in the literature. Krattenmaker and Salop (1986a) model the monopolization by netting the predator's demand out of the market and assuming the change in structure was sufficient to trigger collusion among the remaining suppliers. This model assumes that some suppliers sell their output to the predator at a price below the equilibrium cartel price. Thus, it is profitable for all suppliers to hold out for higher prices and no monopolization may occur.

A more general model of collusion would simply consider the monopolization of the input market. To raise price, the predator must convince all suppliers to restrict output. In the initial equilibrium, the costs of collusion facing the suppliers must be greater than the available monopoly profits. By reducing these costs through restrictive contracts with some suppliers, the predator may generate a collusive equilibrium. The predator also profits if it is able to offer suppliers under contract a similar return and economize on collusion costs sufficiently to clear a return at the monopoly price. In equilibrium, suppliers must at least break even on the output restriction and be indifferent between contracting with the predator and remaining in the fringe. Of course, there is no guarantee that contracting with a portion of the suppliers will reduce the costs of collusion sufficiently to trigger a cartel. If the costs of collusion are large, the predator must subsidize the suppliers' collusion costs by sacrificing its share of the profits. It is possible that the cartel strategy will be so expensive that the predator incurs a net loss and a positive downstream return would be required to make the collusion strategy viable.[11]

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[11] As Mackay (1984) notes, monopolization through merger may not be possible even when barriers to entry are present. An analogous argument can be made for the monopolization through contract envisioned by the RRC advocates. If fringe firms act as price takers, the cartel coordinator must compensate them for their foregone profits at the monopoly price, while incurring the cost of all the monopoly output restriction. Mackay (1984 at 6) concludes a pure promoter (i.e. a downstream predator) cannot profit from monopolization, because the available monopoly profits are insufficient to compensate the

Competition for the position of predator could also dissipate the profits to cartelization. If the predator would profit from the cartel, other downstream firms would be expected to "bid" to cartelize the market. If all the downstream firms were equally endowed in the ability to orchestrate a cartel, the bidding for contracts would continue until all the profits were transferred to the suppliers.[12] Thus, for a predator to obtain supra-competitive profits in the collusion scenario, it must have an advantage over its downstream rivals.

For example, one source of such an advantage is market share.[13] Assuming a share advantage, a predator could obtain some of the profits from cartelization, but the magnitude would depend on the competitive pressure from its downstream rivals to pass all the profits back to the suppliers. In industries where the predator faced similar-sized rivals, it seems reasonable to conclude that the predator does not directly profit in the collusion scenario.

Not all supplier contracts will have a significant probability of having an anticompetitive effect. Since a merger between the predator and the contracting suppliers would maximize the predator's ability to tacitly collude with its remaining rivals, it seems reasonable to insist that an upstream horizontal merger covering the contracted capacity would be challenged under the Department of Justice Merger Guidelines (1984) before concluding that the predator has a chance to restrict supply

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fringe suppliers for entering the agreement. All the predator can do is offer an all-or-nothing contract, which will generate a hold-out problem, because each supplier can profit by holding out and insisting on a more advantageous deal. Although this problem may be overcome with a most-favored-nation's clause that guarantees the same terms to all suppliers, the firms will still hold out until they capture all the monopoly profits, because the predator is unable to commit to a one time offer. Our analysis avoids this problem by assuming the fringe firm will collude with the predator, an assumption which may allow the predator to profit from the cartel.

[12] This is the result found by OSS (1990).

[13] Market share could facilitate cartelization when it is more costly for a firm to resell than use contracted input. A large share allows a firm to contract for more input without suffering from the high costs of resale.

in the input market. This would require evidence of concentration, ease of collusion, and entry barriers.

In addition to the merger test, one should insist on some evidence that the contracts actually restrict the supply available to the victims. For example, the predator would have to sign exclusive contracts with suppliers who otherwise would be expected to produce more output than the predator could utilize. Moreover, the predator would not be expected to resell excess input to its rivals. Given that the anticompetitive theory is not based on a horizontal merger, it would be inappropriate to infer a problem from a hypothetical merger analysis without evidence of an output restriction.

For the RRC collusion strategy to be viable, and to offer something new to antitrust enforcement, the predator must use a legal tactic that results in an anticompetitive effect. Assuming the facts fit the collusion scenario, however, critics (such as Liebeler, 1987, and Brennan, 1988) have asked why the horizontal agreement to restrict output is not already illegal under the antitrust laws. The RRC scenario seems to involve a horizontal conspiracy to restrict output which can be enjoined under current antitrust laws using previously available legal and economic theories. Thus no new antitrust analysis is necessary to deal with anticompetitive behavior of this type.

V. Vertical Integration and Raising Rivals' Costs

Ordover, Saloner and Salop (1990) present another RRC model that focuses on competition between two vertically related duopolists after a pair of the firms vertically integrates. In this model, the anticompetitive profits accrue to the upstream firms either through a high purchase price or a high input price. While this model exploits a vertical relationship to raise consumer prices, both the "predator" and the victim suffer equal losses. Instead of a profitable strategy, RRC becomes the outcome of a "prisoner's dilemma" in which the predator's actions are unprofitable.

This vertical foreclosure model applies only in special cases and even in these special cases, the parties are not committed to employ the strategies incorporated in the model.

A summary of the OSS model is as follows: There are two upstream firms U1 and U2 producing a homogeneous product with constant returns to scale, and two downstream firms D1 and D2 producing heterogeneous goods that compete with one another. U1 and U2 are engaged in Bertrand competition selling the input at price c, and D1 and D2 are engaged in Bertrand competition for their heterogeneous products.

D1 now acquires U1, becoming F1.[14] F1 then commits not to sell upstream product to D2 below a certain price m plus epsilon, where m is greater than c. U2 then uses its monopoly price to sell input to D2 at price m.[15] D2 is forced to raise the price of its output, and F1 then follows.

If D2 were able to buy U2 it would be able eliminate the anticompetitive problem. As long as U2's price increase is "small", however, it is not profitable for D2 to offer U2 enough money to outweigh U2's current monopoly profits. If the price of the input rises high enough, however, the resulting anticompetitive distortion allows D2 profitably to acquire U2. F1 may prevent this by picking a sufficiently low level of m to preclude a second acquisition. If both firms integrate, the competitive equilibrium is restored and the incentive for the vertical merger disappears.

Even compared to the strategies discussed in Sections II through IV, the OSS vertical model applies to an unusually small range of situations. First, the model is limited to a duopoly market structure. If the model is generalized to three or more firms, Bertrand competition, either between two or more integrated firms or between

[14] Both D1 and D2 face a "prisoner's dilemma" when deciding whether to launch a takeover bid for the upstream firm. Although a bidding war ensures that the acquisition will be unprofitable, either firm can profit if it is the only one to attempt a takeover.

[15] Actually, U2 and D2 are bilateral monopolists. This reduces the scope of the anticompetitive price increase, since D2 is likely to be able to negotiate for a price between c and m.

two or more independent firms at each level of production, will generate the competitive outcome.

Second, the results of the model depend on the assumption of Bertrand competition in the initial equilibrium. If the upstream market is less than competitive, the gains to the vertical merger will tend to disappear.[16] For instance, if the two upstream firms are engaged in a Cournot game, the anticompetitive profits they are gaining are greater than in the OSS model and no vertical integration will occur.

Third, the model assumes away entry. If entry can occur relatively quickly, the profits to the vertical merger tend to disappear. Fourth, the analysis abstracts from the efficiencies associated with vertical integration. The merger could be efficient if it allows the vertically related firms to reduce transactions costs (as in Williamson, 1979) or avoid the double marginalization problem described by Spengler (1950). (Given the necessary market structure, double marginalization problems would appear to be quite likely.) These efficiencies may well outweigh the small anticompetitive effect postulated in the OSS model.[17]

Finally, the model requires the downstream goods to be heterogeneous. As the heterogeneous goods approach homogeneity, the anticompetitive effect declines, with no effect under pure homogeneity (OSS at 138).

Overall, the model does not apply to a wide fact situation (two and only two firms at each level, Bertrand competition at both levels, difficult entry, only a small amount of efficiencies through vertical integration, and heterogeneous products). Thus, as it stands, the OSS model generates a small price increase in a few situations.

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[16] Likewise, if the downstream market is less competitive, the main effect of the vertical merger is the transfer of profits from the downstream to the upstream firms.

[17] OSS partially recognize these points by assuming away the double marginalization problem (at 129) and considering a less efficient source of input (at 133).

Even this, however, is not the end of the story. The OSS analysis does not fully consider the ability of its firms to commit to various strategies. Most important is the assumption that the integrated firm can credibly commit not to sell to the downstream firm.[18] Otherwise, simultaneous pricing of the input by both upstream firms will result in a competitive equilibrium. (See OSS at 135.) Given that the model assumes the unintegrated upstream firms cannot commit to refraining from competition, it would appear necessary to show how the vertical merger changes these incentives. Instead, OSS simply assume the change in incentives and conclude a vertical merger is anticompetitive. The incentives of the integrated firm to commit to an anticompetitive strategy are no greater than the pre-merger unintegrated firm's desire to switch from a Bertrand to a Cournot game. Without a complete explanation of why the "rules of the game" change after vertical integration, the model's postulated vertical integration would seem superfluous to the generated anticompetitive result. Indeed, given this changes in the rules of the game, the small range of circumstances where the anticompetitive conclusion applies is quite surprising. The "Chicago School" conclusion on vertical integration would appear to be extremely robust.

The OSS model fails to resolve the issue of which supplier is able to gain the largest share of the profits. OSS (at 137) note the acquired upstream firm is better off than the independent upstream firm.[19] This implies that both firms should try to be taken over (this appears to be the reverse of a hold-out problem). As the model is configured, the first mover wins the game and is able to deter the second firm from undertaking an immediate merger. The downstream firms, however, can change the rules of the game by offering renegotiable (or open-ended) purchase contracts

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[18] For a similar discussion of the lack of commitment see Hart and Tirole (1990 at 256-258).

[19] The value of the independent upstream firm is diminished by the inefficiencies in the implicit in raising the input price above the competitive level to capture profits from the unintegrated downstream firm.

contingent on the other firm remaining independent.[20] These contracts prevent either firm from committing to the purchase and convert a sequential game with a clear solution to a simultaneous "game of chicken". In this game, each upstream firm will try to commit to an acquisition strategy so that its rival will remain independent. Assuming each firm is equally situated, the best both firms can do is solve for the optimal probability of a takeover. Thus, in some cases both firms will sell out, while in other cases neither firm will sell out. The exact probabilities depend on the profitability of the various strategies.[21] Even this equilibrium may be difficult to establish given the one-shot nature of the game. Both firms have an incentive to try to maximize profits by merging and if both try to merge there will be no anticompetitive effect. Thus, if downstream firms can offer contingent contracts, the reverse holdout problem can generate a equilibrium in which no merger takes place.

Finally, if the downstream firms are able to commit not to integrate backwards (for example by both firms writing an unattainable super-majority approval of a takeover into its charter) the upstream firms must bid for the downstream firms. As OSS (at 139, footnote 17) discuss, if the heterogeneous downstream goods are sufficiently "far" apart in product space, the unintegrated upstream firm will gain more profits from the acquisition than the integrated firm. This asymmetry will generate a hold-out problem for upstream acquisition, as each upstream firm will wait for the other to engage in an acquisition.[22] Absent the holdout problem, both downstream firms will require poison pill defenses contingent on each other's poison pill to defeat the acquisition strategy.

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[20] Since the downstream firms suffer losses after the vertical mergers one would expect them to use counterstrategies to reduce the probability that a merger will take place.

[21] OSS (p. 139 at footnote 16) recognize, but do not explain this problem.

[22] If the upstream firms cannot convert the sequential game to a simultaneous game, no merger will occur.

The OSS model does not appear to be a significant contribution to the RRC literature. Without an explanation of how a vertical merger changes the commitments of the upstream firms, the OSS analysis seems to be of little value. Even if such commitment could be shown, the problems of the limited applicability of the model, limited competitive injury, and counterstrategies for the injured downstream firms remain.

VI. Examining Raising Rivals' Cost Cases

While RRC appears to be a viable economic theory, the discussion above indicates that it may not apply widely to events in the economy. The two most famous RRC cases are *Klor's* and *Pennington.*[23] An examination of the relevant facts in these two cases, however, reveals important weaknesses in the RRC approach.[24]

In *Klor's*, several manufacturers of appliances entered into separate understandings with San Francisco department store Broadway Hale not to sell their products to Broadway Hale's next-door neighbor, Klor's. Such exclusionary agreements are theorized in the RRC analysis to raise prices to consumers. The other facts of the case, however, do not suggest that any consumer injury resulted. As the Appeals Court noted (at 255 F.2d. 223), there were numerous other popular brands of appliances available to Klor's that were not included in these agreements.[25] Further, it is clear that consumers had retail choices other than Broadway-Hale and Klor's. In

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[23] *Klor's, Inc. v. Broadway-Hale Stores, Inc.* 255 F.2d 214 (1958), reversed, 359 U.S. 207 (1959), *United Mine Workers v. Pennington*, 325 F. 2d 804 (1963), reversed, 381 U.S. 657 (1965).

[24] Brennan (1988, at 100-101) advances similar arguments as possibilities in two footnotes. For *Klor's*, he traces the argument to Bork (1978 at 331-332) and for *Pennington* the argument starts with Williamson (1968 at 88). We believe that the evidence strongly suggests our analysis is the explanation for the activities in question. Although our analysis is not entirely new, the existing literature and sentiment in the antitrust community demonstrates confusion with respect to these cases and revisiting them thus appears appropriate.

[25] In televisions, the agreements covered 7 of 27 brands, in refrigerators, 3 of 21, in stoves, 5 of 28, and in washers and dryers, 2 of 32.

San Francisco's Mission District alone there were 53 dealers selling the brands referred to in the complaint, 43 of them right on Mission Street along with the parties in the case.[26]

It is straightforward to deduce that *Klor's* was not an example of an RRC strategy used to generate anticompetitive injury. What would appear to have been motivating the exclusionary contracts was Broadway-Hale's desire to eliminate the free rider problems (as described by Telser, 1960) associated with Klor's nearby location. Thus, it would seem that the proper lesson to be drawn from *Klor's* is that there are important efficiencies that can be generated through exclusive arrangements. Krattenmaker and Salop (1987a at 76) assert that courts may allow for efficiency defenses only in extreme circumstances. If this is the case, the use of the RRC methodology in antitrust litigation may impose significant economic harm.

In *Pennington*, coal mines that were capital intensive were theorized to have conspired with the United Mine Workers to raise the price of labor in order to comparatively disadvantage labor intensive coal mines. The case met the needed criteria for RRC. As Williamson (1968 at 102-113) describes, the industry consisted to a large degree of firms with a "special" technology with a restriction on output protected by Stiglerian barriers (naturally generated coal mines that were capital intensive with a natural limit on output) who could get together, via the union, to affect their rivals. The excluded input, labor, was an important input of their rivals' production function, implying that the implicit demand for labor was relatively elastic (as in Figure 2). The union, by the nature of its contracts, could prevent the

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[26] The Supreme Court did find for *Klor's*, calling the agreements a "group boycott", and reversed the District Court's summary judgement for the defendant and remanded for trial. (The Court did not dispute any of the facts cited above.) We were unable to find any record of further legal proceedings. The Court's decision seems to have contributed more to confusing the legal doctrine of "boycott" than refining it. The Court appears to have recognized this confusion and attempted to clarify it 26 years later in *Northwest Wholesale Stationers, Inc. v. Pacific Stationery and Printing Co.*, 472 U.S. 284 (1985).

labor-intensive firms from seeking out lower cost substitutes and thus reduce the costs of exclusion for the predating firm.

Yet something is missing from this logic. The union, through its antitrust immunity, would appear to have all the monopoly power it needed. No conspiracy with capital intensive coal operators seems necessary for the union to extract all the rents it can from all coal operators. As Justice Goldberg asked in his vigorous dissent from the Court's opinion,[27] "... absent the alleged conspiracy, would the wage rate and fringe benefits have been lower?"

The relevant facts appear to support this contention. It is important to note that the Supreme Court did not rule on the merits of the case. Rather, it ruled that if the theory described above was borne out by the facts, the United Mine Workers would not be protected by the labor antitrust exemption and would be subject to antitrust damages. The case was then remanded to the District Court. Upon remand, the District Court found insufficient evidence to prove that a conspiracy had taken place.[28] In particular, it appeared that the union had a longstanding unilateral policy of one industry-wide wage. Thus, the record suggests no union-management conspiracy ever occurred.

VI. Conclusion

Modelling both upstream and downstream markets generates important limitations for the application of the RRC paradigm. In particular, one firm (or a small group of firms) must have special cost advantages for an anticompetitive exclusionary strategy to be profitable. Further, Stiglerian barriers to entry must usually exist to prevent other firms from duplicating the low cost technology.

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[27] *United Mine Workers v. Pennington*, 381 U.S. 657, 719 (Goldberg, J., dissenting from opinion and concurring in result).

[28] See *Lewis v. Pennington*, 257 F. Supp. 815 (1966) and Williamson (1968 at 88).

Finally, the costs of exclusion in the upstream market cannot be so large that they dissipate all the profits.

The costs of exclusion are likely to be high given the predator must make large payments to actual and potential input suppliers to induce them not to produce. Alternatively, in certain situations, a predator may be able to orchestrate an upstream cartel to restrict output. Although this alternative appears less expensive than purchasing exclusion, it requires a collusive structure in the input market and involves activity already actionable under traditional antitrust theory. Both exclusion and collusion strategies will prove profitable for the predator under only limited circumstances. Overall, as Director and Levi (1956) suggested, the conditions necessary for profitable predation are so narrow that they are unlikely to pose broad anticompetitive threats. Indeed, after considering the efficiency effects of such vertical restraints, as in the *Klor's* case, it may well be welfare enhancing simply not to use raising rivals' costs as a general antitrust enforcement strategy.

Bibliography

Brennan, Timothy J., "Understanding Raising Rivals' Costs," Antitrust Bulletin 33 (1986) 95-113.

Bork, Robert, The Antitrust Paradox (Basic Books: New York, 1978).

Boudreaux, Donald J. and DiLorenzo, Thomas J., "Raising Rivals' Costs: Competition or Predation?", mimeo, George Mason University Department of Economics (1989).

Director, Aaron, and Edward H. Levi, "Law and the Future: Trade Regulation," Northwestern University Law Review 51 (1956) 281-296.

Easterbrook, Frank, "On Identifying Exclusionary Conduct," Notre Dame Law Review 61 (1986) 972-980.

Hart, Oliver, and Jean Tirole, "Vertical Integration and Market Foreclosure," Brookings Papers on Economic Activity: Microeconomics, 2 (1990) 205-286.

Krattenmaker, Thomas G., and Steven C. Salop, "Anticompetitive Exclusion: Raising Rivals' Costs to Achieve Power over Price," Yale Law Journal 96 (1986) 209-93. (a)

Krattenmaker, Thomas G., and Steven C. Salop, "Competition and Cooperation in the Market for Exclusionary Rights," American Economic Review 76:2 (May 1986) 109-113. (b)

Krattenmaker, Thomas G., and Steven C. Salop, "Analyzing Anticompetitive Exclusion," Antitrust Law Journal, 56:1 (1987) 71-89. (a)

Krattenmaker, Thomas G., and Steven C. Salop, "Exclusion and Antitrust," Regulation 11:3/4 (1987) 29-33, 40. (b)

Langenfeld, James A., and John R. Morris, "The Economic Basis for Horizontal Restraints Cases Brought by the Federal Trade Commission on the 1980's," mimeo, Federal Trade Commission (1990).

Liebeler, Wesley J., "Exclusion and Efficiency," Regulation 11:3/4 (1987) 34-40.

Mackay, Robert J., "Mergers for Monopoly: Problems of Expectations and Commitments," Federal Trade Commission Working Paper No. 112 (July 1984).

Ordover, Jaunsz A., Garth Saloner, and Steven C. Salop, "Equilibrium Vertical Foreclosure," American Economic Review 80:1 (March 1990) 127-142.

Salop, Steven C. and David T. Scheffman, "Raising Rivals' Costs," American Economic Review 73:2 (May 1983) 267-271.

Salop, Steven C. and David T. Scheffman, "Multi-Market Strategies in a Dominant Firm Industry," Federal Trade Commission Working Paper No. 100 (April 1984).

Salop, Steven C. and David T. Scheffman, "Cost-Raising Strategies," Journal of Industrial Economics 36:1 (September 1987) 19-34.

Scheffman, David T., "The Application of Raising Rivals' Costs Theory to Antitrust." Comments made at the 36th Annual Meeting of the Antitrust Section of the American Bar Association (1988).

Spengler, Joseph J, "Vertical Integration and Antitrust Policy," Journal of Political Economy 68 (1950) 347-52.

Stigler, George, The Organization of Industry (Richard Irwin: Homewood, Ill., 1968).

Telser, Lester G., "Why Should Manufacturers Want Fair Trade," Journal of Law and Economics 3 (1960) 86-105.

U.S. Department of Justice, "Merger Guidelines," Antitrust and Trade Regulation Report, No. 1169, Special Supplement (June 14, 1984).

Williamson, Oliver, "Wage Rates as a Barrier to Entry: The *Pennington* Case," Quarterly Journal of Economics 85 (February, 1968) 85-116.

Williamson, Oliver, "Assessing Vertical Market Restrictions: Antitrust Ramifications of the Transactions Cost Approach," University of Pennsylvania Law Review 127 (1979) 953-993.