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Abstract

If a firm acquires stock in a competitor, further price competition may impose a penalty in the form of devalued holdings. The purchase, by penalizing price cuts, may help to support tacit collusion between firms. This paper establishes how the partial acquisition of outstanding common shares enables firms to accomplish this objective without formal coordination. However, this price-cutting disincentive is shown to be insignificant when the competitive overlaps between firms occur in markets that generate some fraction of total corporate profits.

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Introduction

Does purchase of part of the outstanding equity of a company by a competitor have any anticompetitive consequences? It is a fairly common business arrangement, yet one that has received little attention from economists. For some, however, the matter raises concern. For instance, in 1988, the Federal Trade Commission sought public comment on an exemption from Hart-Scott-Rodino premerger notification obligations for acquisitions below 10% of the outstanding stock of an issuer, regardless of purpose or dollar value.² Objections were raised on the grounds that even small acquisitions could result in common control and and therefore raise antitrust questions under section 7 of the Clayton Act, which prohibits the acquisition of "the whole or any part of the stock" of a corporation, where "the effect of any acquisition may be substantially to lessen competition, or to tend to create a monopoly."³ In Great Britain, the Mergers and Monopolies Commission office (MMC), the antitrust authority, forced the Kuwait Investment Office (KIO) to reduce its 22% holding in British Petroleum (BP) to 10%.⁴ Moreover, there

²53 Fed. Reg. 36,831 (1988) (proposed Sept. 22, 1988).

³15 U.S.C. § 18.

⁴"Kuwait Ordered to Reduce Holdings in BP to 10 Percent," International Petroleum Finance Vol. 11 No. 19(October 17, 1988).

have been several legal cases that view equity acquisitions by competitors as suspect.⁵ Recent work by Reynolds and Snapp (1986) and Bresnahan and Salop (1986) offer theoretical support for these actions. These authors suggest that partial ownership arrangements could result in less output and higher prices, even if ownership shares are relatively small. However, largely due to the static rigidity of the theoretical (Cournot) model⁶ used this work contributes little to the particular questions posed here beyond advancing and identifying several of the main issues.

The remainder of this paper analyzes the implications of partial equity acquisitions. The next section contains a discussion on how incentives change and reviews existing work on this topic. A model is then presented to establish rigorously how the acquisition of shares can be a 'facilitating device.' In addition, this section shows how this latter function can become insignificant when competitive overlaps decrease in importance. Following sections include a comment on the antitrust implications of the analysis, and to highlight the analytical device proposed, a cursory (and necessarily incomplete) look at the British

⁵For instance, F&M Shaefer Corp. v. C. Schmidt & Sons, Inc. 353 U.S. 586 (1957); Briggs Manufacturing Co. v. Crane Co., 185 F. Supp. 177, 181-182 (E.D. Mich), aff'd, 280 F.2nd 747 (6th Cir. 1960); Golden Grain Macaroni Co., 78 F.T.C. 63 (1971), aff'd in part and remanded in part, 472 F. 2nd 882 (2nd Cir. 1972), cert. denied, 412 U.S. 918 (1973); Crane Co. v. Harsco Corp. 509 F. Supp. 115, 123 (1981); See also P. Areeda and D. Turner, Antitrust Law 1203c, at 320 (1980).

⁶See Shapiro (1989) for a detailed overview of the problems of static models.

Petroleum-Kuwait Investment Office Case. The paper ends with a brief summary.

Acquiring a Competitor's Shares

In an oligopolistic market, a firm's partial ownership of a competitor will penalize that firm if it cuts prices and will therefore reduce the incentives to cut prices. A firm contemplating a selective price cut aimed at increasing its revenues would cut prices below the industry-wide 'accepted' prices only if it expects marginal profits on the additional sales made as a result of the cut. If the firm believes that its competitors will not retaliate promptly, by matching this lower price, the temptation to break the agreement and cut price may be substantial. If the firm is a shareholder in a competing firm, however, the decision structure is altered. The price-cutting firm could still make the additional sales, but it would suffer a loss due to the devaluation of its holdings in its competitor's performance.⁷ This occurs because gains from additional sales at the lower price are higher, if competitors continue to hold the higher industry-wide 'accepted' price, but reduced in direct proportion the size of the holdings. Even without the threat of retaliation, these considerations alone might be sufficient to render price cutting unprofitable. Under general conditions, the

⁷Under efficient markets this devaluation is instantaneous.

potential for deterring price-cutting behavior exists, but there are, as will be established, highly plausible circumstances where this deterrent is insignificant.

Why would a firm, which stands to gain more by cutting prices, choose to restrict its options by purchasing such a deterrent? The answer may be, along with the reason for the existence of other 'facilitating practices' suggested by Salop (1986), Cooper (1986), Holt and Scheffman (1987) and Hay (1982), that by purchasing shares in a competitor a firm establishes mutual confidence of adherence to the oligopoly price - the industry-wide 'accepted' price. As Hay (1982, 456) discusses it, the firm may have no intention of being the first to defect, that is, of being the first to cut prices, but may find it difficult to convince its rivals of its sincerity. Its rivals may have every intention of keeping the tacit understanding and cooperating in maintaining the price at the 'accepted' level but, due to the incentive structure outlined, find it in their best interest to be the first to cut prices not because of greed but out of fear that a rival might beat them to the punch. Thus the importance of signaling commitment to upholding the collusive, pareto superior, status quo. By purchasing shares in a competitor, an action that has the potential of inflicting substantial losses on the acquiring firm, a firm constrains its own future actions, thereby effectively persuading its rivals that it will not initiate a price war. This action establishes the mutual confidence

necessary to launch a period of noncompetitive pricing.

Antitrust apprehensions are, to varying degrees, tempered by the presence of a well established and dynamic competitive fringe,⁸ a fact that does not go unnoticed by the firms themselves. Thus when the acquiring firm is a fringe producer, the "willing-to-cooperate" signal carries more significance than if the acquiring firm competed on equal terms. Moreover, cooperation among all firms may not be necessary for supracompetitive pricing when a dominant firm is present. A dominant firm and a group of cooperating fringe firms (or even one fringe firm) may succeed in sustaining a price increase by themselves. If the supply elasticity of the nonparticipating fringe firms is small enough, they may even behave competitively without defeating the price increase.

The Literature

In constraining its own future actions the firm aims to make its 'tacit' agreement self-enforcing. This is an example of what Williamson and Schelling call "hands-tying" - behavior that make an action more credible by putting it out of the promisor's power to breach without incurring costs he would otherwise have avoided (Kronman, 1985).⁹

⁸See Landes and Posner (1981) and the D.O.J. Merger Guidelines, (1984).

⁹Note the analytical equivalence between the "precommitment" discussed here and "hands-tying." Kronman (1985) views

The Cournot-type model developed by Reynolds and Snapp (1986),¹⁰ is a standard static model of oligopoly¹¹ and only indirectly applicable to the problem outlined here largely because its focus is on the economics of joint ventures. Reynolds and Snapp do, however, correctly observe the importance of tempering fringe competitors' incentives to cheat and note that this could be accomplished "... by partial ownership of the dominant firm by fringe firms."¹² Farrell and Shapiro (1990), explore the consequences in an oligopolistic market of one firm buying a share of stock in one of its rivals. They note, as I do here, that, "asset transactions of this type alter the incentives of the oligopolists but do not change production possibilities at any facility or firm."¹³ Both of these papers show that increased cross ownership yields a more collusive outcome - an output closer to the monopoly outcome. Malueg (1990), also assumes symmetric cross ownership by industry participants and shows that, for some demand conditions, increasing the degree of cross ownership in the market may decrease the likelihood of collusion. In contrast to

"hands-tying" as one of several methods that would reduce transactional insecurity.

¹⁰ See also Bresnahan and Salop (1986).

¹¹ See Shapiro (1989) for attacks on the logical flaws behind conjectural variations which disqualifies them as a bona fide theory of oligopoly.

¹² Reynolds and Snapp (1986) p.149.

¹³ Farrell and Shapiro, 1990, p.285.

these papers the results here do not assume symmetric cross ownership which, for the most part, drives the results.

The Model

This section shows that under plausible conditions there exists some minimum equity percentage that effectively deters price-cutting behavior by the acquiring firm. When the firms compete in markets that contribute a small fraction to corporate profits, what I call localized markets, then, for the equity holdings to act as a deterrent to price-cutting behavior, the minimum shares threshold increases inversely proportional to the fraction of profits contributed.

In this model there are two firms, designated A and B. There is no possibility of entry and exit. The duopolists produce differentiated, nondurable goods in an effort to serve a single market. The demand and cost conditions that they face remain unchanged over time. Assume that a firm (Firm A) acquires a percentage (β) of the outstanding shares of a competitor (Firm B). Cooperation here assumes that firms do not formally collude, but adopt strategies that can lead to cooperation over time. The value of holdings (β) increases if the firms maintain collusive behavior and, conversely, depreciate if the firms compete. This assumes that increases (or decreases) in Firm B's gross earnings accrue fully to its shareholders. In addition, these shares

depreciate if Firm A cuts prices whether Firm B retaliates or not.

These 2 firms meet in a sequence of identical stage games. Let $S^0 = (s_1, s_2)$ and $\Pi^0 = (\pi_1, \pi_2)$ be the strategy and profit vectors. There exists a different feasible vector of strategies, S^C , with profits, Π^C , which strongly dominates S^0 . This latter strategy can be supported as an equilibrium of the infinite iteration game with strategies in which defectors from the cooperative equilibrium are punished. However, the punishments must be credible in the sense that if the defection does occur the other firm will actually carry out the punishment; that is, the game must be subgame perfect. A common way of achieving this is to make the punishment a finite reversion to the one-period equilibrium strategies. Here, punishment would involve firms adopting the one-shot Bertrand equilibrium prices for some fixed number of periods.

Firm B's trigger strategy is to cooperate if A cooperates but to defect to single period Nash-Cournot behavior in prices if it notices that A defects. In this model each firm chooses its price in each period from among a finite set of prices. Each firm can select either a collusive price (P_c) or the Bertrand marginal cost price (P_d). A pricing outcome is denoted by the specific pair of prices chosen by the rivals where Firm A's price is entered first. Thus, the price pair (P_d, P_c) indicates that Firm A is charging the Bertrand price while Firm B maintains

the industry wide collusive price. It follows that $\pi_a(P_d, P_c) > \pi_a(P_c, P_c) > \pi_a(P_d, P_d) > \pi_a(P_c, P_d)$. Denote then $\pi_a(P_c, P_c)$ as payoffs to Firm A from cooperative behavior.

Does it pay for A to defect unilaterally given that Firm B continues to cooperate? Whether Firm A obtains a net gain from such a move depends on his gains, the discount rate, the reaction delay, and the size of his equity participation in Firm B. In general, it is possible to support the cooperative allocation as a perfect equilibrium of the infinitely repeated game using trigger strategies, provided the following holds for both firms,

$$\pi_i(P_d, P_c) + \delta/(1-\delta)\pi_i(P_d, P_d) \leq \pi_i(P_c, P_c)/(1-\delta) \quad (1)$$

where δ is the discount rate.

What effect does the equity participation have on preempting defection? γ_a is the net gain to firm A of defecting in period 1 assuming Firm B is committed to a trigger strategy. Then,

$\gamma_a =$

$$\begin{aligned} & \pi_a(P_d, P_c) - \pi_a(P_c, P_c) - \delta/(1-\delta)[\pi_a(P_c, P_c) - \pi_a(P_d, P_d)] - \\ & \beta[\pi_b(P_c, P_c) - \pi_b(P_d, P_c)] - \beta\delta/(1-\delta)[\pi_b(P_c, P_c) - \pi_b(P_d, P_d)] \quad (2) \end{aligned}$$

where the terms in the third line represent the net contribution, β , of the acquired shares to Firm A's gains from cutting prices.¹⁴ From here it is possible to reevaluate the "no defection" condition outlined in (1) above with this new consideration. From (2) above,

$$\delta \geq \frac{\pi_a(P_d, P_c) - \pi_a(P_c, P_c) - \beta[\pi_b(P_c, P_c) - \pi_b(P_c, P_d)]}{\pi_a(P_d, P_c) - \pi_a(P_c, P_c) - \beta[\pi_b(P_d, P_d) - \pi_b(P_c, P_d)]} \quad (3)$$

The rightmost terms in both the denominator and numerator are infinite convergent series due to the infinite stage nature of the game. Call it $S(\pi_b, P)$ or S_b . Thus, the equilibrium condition under the partial equity position is,

$$\delta \geq \frac{\pi_a(P_d, P_c) - \pi_a(P_c, P_c) - \beta S_b}{\pi_a(P_d, P_c) - \pi_a(P_c, P_c) - \beta S_b^0} \quad (4)$$

This implies that the larger the loss to Firm B if A defects, i.e. the potential loss brought about by A's price-cutting action, the less likely - in terms of reduced incentives, other things being equal, will unilateral price-cutting yield a gain to Firm A.

¹⁴The model assumes that increases in Firm B's gross earnings accrue fully to shareholders.

By purchasing β the acquiring firm proceeds beyond merely signaling its willingness to avoid price-cutting behavior, to effectively committing itself, by realigning its incentive structure, to favor the collusive, preferred, outcome. This action establishes the necessary mutual trust necessary (but not sufficient) for successfully maintaining supracompetitive prices.

Localized Competition

What happens if the duopolists compete only in some local geographic markets which contribute some fraction Θ of total corporate profits? This section will show that, the 'facilitating device' role of the shareholdings diminishes in effectiveness the smaller the competitive overlaps between firms A and B. In other words the threshold percentage of holdings which would deter active price competition (and concern antitrust authorities) becomes smaller as the proportion of corporate profit contributed by a market decreases.

Assume that the relative contribution to profits (ρ_b) of a market in which the two firms compete is some fraction Θ of B's corporate profits (π_b), i.e. $\rho_b = \Theta\pi_b$. Then the result above suggests that under these conditions the following proposition holds:

Proposition 1: Under the assumptions described above, if

duopolists compete in markets that generate a fraction Θ of total corporate profits then the required holdings needed to reduce the incentives to cut prices and serve as a facilitating device must increase as Θ becomes smaller.

Proof: See Appendix

There can, then, be no a priori general rule beyond recognizing that the effectiveness of holding a competitor's shares as a facilitating device will vary as the competitive overlaps vary.

Antitrust Implications

These results suggest that, in a situation akin to the one analyzed in this paper where the firms compete only in relatively small markets, initial antitrust concern should focus on the relative contribution of these markets to corporate profits. This approach captures the essential features of the problem because it recognizes that the partial acquisition changes local manager's incentives (if it does so at all) but does so as a function of his local competitors contribution to corporate profits and not vice versa. Because losses that would have an effective influence on decisions have been shown to be implausible there should be, likewise, no reason for unduly burdensome antitrust scrutiny. In general, however, the situation here, as is the case for the facilitating practices noted, poses a dilemma for policy. Each of these devices, within some limits, also has a benign or efficiency explanation.

The British Petroleum-Kuwait Investment Office Case

In early 1987 the British government announced that it intended to sell of its 31.5% remaining stake in BP.¹⁵ The KIO, which had stated on several occasions that it had no intention of seeking any influence on BP's management, bought up stock to a level of 21.6% of the total shares outstanding.¹⁶ The Monopolies and Mergers Commission however, ruled that KIO's interest in BP "may be expected to operate against the public interest," (MMC, 1988, p.2 and p.46) and ordered the KIO to reduce their holdings down to 9.9%. While clearly limited in scope the approach proposed here can nonetheless offer some insight into the anticompetitive concerns of this case.

The main competitive overlaps between KIO through the Kuwait Petroleum Corporation ("KPC") were refining and distribution.¹⁷ In 1987, BP Oil International's¹⁸ ("BPOI") operating profit totaled

¹⁵The government had previously reduced its interest in BP from over 50% to 31.5% and made clear of its intention of total divestment as part of their privatization program.

¹⁶See The Monopolies and Mergers Commission, "The Government of Kuwait and The British Petroleum Company plc," London: Her Majesty's Stationery Office, October 1988.

¹⁷This assumes that the KIO which is, in principle, a holding company, exercise control over the companies in its portfolio. The MMC analysis assumes this.

¹⁸This is the division of BP responsible for marketing oil, refined petroleum products, and associated goods and services to wholesalers and retail customers.

\$703 million. BPOI contributed 30.8% of BP's profit after taxation and minority interests which was \$2,281 million in 1987. Assuming that any losses accruing to BP from heightened competition *in refining and distribution* by KPC is passed on to shareholders, KPC's disincentives to compete vigorously are, at its highest (and most generous) approximation, 21.6% of 30.8% of \$2,281 million, hardly an onerous burden. The assumptions, to even admit this result, are enormous. The most critical are that, a) all other divisions of BP remain at constant levels, b) the disincentive noted is for one year only and disregards the repeated nature of the relation, and, c) dividends per share reflect earning per share exactly. The disincentives, when scrutinized closely, appear to be insignificant. So, as the theoretical analysis indicates, a given level of holdings held by one firm in a competitors business proves to be less troublesome when the competitive overlaps between the competitors contribute a fraction of total profits.

Efficiencies, on the other hand, the that could have emerged from the acquisition seem substantial. BP needed long term access to crude oil which Kuwait had and Kuwait, in turn, needed excess refining capacity and the distribution network in the main consuming countries that BP possessed.

On balance, it seems unlikely that Kuwait has any leverage

that would oblige BP to act against its best interests. In fact, the similarity of interests leads one to believe that what antitrust authorities should be concerned about is the possibility of tacit collusion. A quick glance however, indicates that the acquisition does not confer Kuwait any additional ability to bring about this collaboration that it might not already have.

Conclusions

If a firm acquires some of a competitors shares, lowering price later imposes a penalty in the form of devalued holdings. By penalizing the incentive to cut prices, a policy of partial acquisition may help to support tacit collusion between firms. This paper shows how the partial acquisition enables firms to accomplish these objectives without formal coordination. However, when competition occurs only in localized markets that generate a fraction of total profits then, the minimum shareholdings needed to reduce the incentive to defect must increase inversely proportional to this fraction. For small markets that generate a small fraction of total corporate profits the required minimum percentage of shares that would be required to enforce a tacit agreement, and concern antitrust authorities, may have to be unreasonably large. The case study provided, the partial acquisition of British Petroleum by the Kuwait Investment Office, while admittedly broad, serves to highlight the theoretical point.

Appendix

Proof of Proposition 1:

Proof: The following condition follows from the equilibrium condition for the general case:¹⁹

$$\beta \geq \frac{[\pi_a(P_d, P_c) - \pi_a(P_c, P_c)]}{[\pi_b(P_c, P_c) - \pi_b(P_c, P_d)]} \quad (\text{A1})$$

In a localized market then,

$$\beta \geq \frac{[\rho_a(P_d, P_c) - \rho_a(P_c, P_c)]}{[\rho_b(P_c, P_c) - \rho_b(P_c, P_d)]} \quad (\text{A2})$$

and, when $\rho_b = \Theta\pi_b$,

$$\beta \geq \frac{[\rho_a(P_d, P_c) - \rho_a(P_c, P_c)]}{[\Theta\pi_b(P_c, P_c) - \Theta\pi_b(P_c, P_d)]} \quad (\text{A3})$$

and $\beta \rightarrow \infty$ as $\Theta \rightarrow 0$. QED.

¹⁹ Assume $\delta = 0$ with no loss of generality.

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Some Antitrust ...

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