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Rent Increasing Costs: The Antitrust Implications from a Paradox in Value Theory*

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ABSTRACT

This paper explains the anticompetitive consequences of horizontal restraints by analyzing how restrictions affect the cost conditions faced by individual members of the group. Our analysis assumes that the firms cannot collude to directly restrict output or raise price. A group of firms, however, may agree on restrictions that affect the costs of individual firms. By accepting restraints which raise the incremental costs of each firm, competitors can raise their profits. If the group has the ability to force entrants to join, then entry drives profits to zero but price is not reduced. If the group cannot force entrants to join the group, then entry forces price to minimum average cost for nonmembers. The analysis also demonstrates how advertising restrictions can act as a cost increasing device that raises profits of competing firms. The analysis produces new insights suggesting which kinds of horizontal restraints are likely to harm consumers and which are likely to produce efficiencies.

I. INTRODUCTION

Antitrust authorities have traditionally sought to prohibit obvious anticompetitive activities such as price-fixing, market sharing, and boycotts. The theoretical and empirical basis for challenging such activities is well understood. In the past 15 years, the Federal Trade Commission has brought an increasing number of cases that challenge other actions of state licensing boards and professional associations, which do not directly increase price or reduce output.[1] These new cases involved markets with many firms or professionals competing among themselves and low to moderate "traditional" entry impediments. Therefore, the ability to restrict output and raise price above marginal cost is severely limited. Economists have been slow to offer explanations of how firms can increase profits through trade restrictions in the face of few, if any, traditional entry impediments. This paper explains the anticompetitive consequences of horizontal restraints by analyzing how restrictions affect the cost conditions faced by individual members of the group.

If a large number of firms compete with respect to their output decisions, then price will equal marginal cost. Under this condition, the short-run profits of the firms would equal their output times the difference between marginal cost and average cost. The firms could cooperatively agree to increase marginal cost and profits would increase as long as marginal cost (which determine price) increased to a

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[1] The series of cases began with American Medical Association, 94 FTC 701 (1979), aff'd 638 F.2d 443 (2d Cir. 1980), aff'd by an equally divided Court, 445 U.S. 676 (1982). Other important decisions include FTC v. Indiana Federation of Dentists, 476 U.S. 447 (1986); Rhode Island Board of Accountancy, 107 FTC 293 (1986); and Massachusetts Board of Registration in Optometry, 110 FTC 549 (1988).

sufficiently greater extent than average cost to compensate for the reduction of sales by each firm. Therefore, competing firms may be able to increase profits by collectively raising their own costs.

Although the potential for increasing profits by raising costs has previously appeared in economic literature, our analysis goes beyond the previous understanding. The raising rivals' costs literature argues that raising competitors' marginal costs to a greater extent than their own average costs, firms raise price and increase profits.[2] But the results of this literature depend upon one competitor or group of competitors disadvantaging another group of competitors. In our analysis, all the firms are identical and they only affect their own costs. The results do not depend upon disadvantaging other competitors. In this respect, our analysis follows the work of Nelson (1957) which demonstrates that raising the price of a variable input can increase the returns to a fixed factor of production.[3] Some analyses of union behavior have used this concept to show how unions and firms can both benefit from higher wages.[4] Our analysis, however, shows that industry wide union contracts are just one of many methods for firms to increase profits.

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[2] See Salop and Scheffman (1983, 1987) and Krattenmaker and Salop (1986a, 1986b). These analyses are clearly the progeny of Williamson (1968).

[3] Salop, Scheffman and Schwartz (1984) demonstrated that under certain conditions even the disadvantaged rivals can benefit from cost increasing regulation.

[4] Maloney, McCormick and Tollison (1979) and Carroll (1981). Williamson (1968) bridges the raising rivals' costs literature and the literature on unions. Although the union wage rates extended to the entire industry, the alleged anticompetitive effects disadvantaged one group of producers.

For several reasons firms may find cost based strategies preferable to directly restricting output and raising price. Any agreement to raise price must be policed by the group. Secret price cuts or sales may defeat an agreement to restrict output, especially when a large number of competitors are necessary for an effective agreement. Indirect methods may be more costly, but easier to enforce. For example, it is probably easier to detect a firm advertising than it is to detect a selective price cut. Further, indirect methods may by self-enforcing. For instance, if union work rules are used to increase incremental costs, the self interest of union members may automatically lead firms to adhere to the restriction. Finally, we must consider legal constraints on firms. Agreements to limit output directly or fix price are illegal in the United States. Firms may choose more costly means to gain anticompetitive gains. The costs, therefore, could be thought of as dissipation of anticompetitive gains as opposed to increases in production costs. In this respect the theory is consistent with the work of Tullock (1967) and Posner (1975).

In section II below we use a linear demand curve and quadratic cost functions to examine the potential for adjusting costs to collect anticompetitive gains. Under certain conditions, firms do have the incentive to raise incremental costs. Further, entry of firms into the group drives profits to competitive levels but does not necessarily lead to any reduction in price. In section III we show how advertising restrictions may be a cost increasing strategy to raise profits. In section IV we present the policy implications of our results.

II. Horizontal Restraints with Perfect Competition

In this section we analyze horizontal restraints in markets that would otherwise be perfectly competitive. That is, markets with homogeneous goods and each firm is a price taker. By price taker we mean that each firm assumes that if it restricts output at the market price, another firm will make the sale instead. Although the goods are homogenous, the location of sellers and their prices are not necessarily known by consumers.

For the analysis we assume that the market demand is linear and it is represented by

(1) $$P(x) = a - bx$$

where P(x) is the market price and x represents the market output. We also assume that the market is supplied by N identical firms. The cost of each firm is represented by the following quadratic function:

(2) $$C(x_i) = F + c_1 x_i + \frac{1}{2} c_2 x_i^2$$

where F is the fixed cost of each firm, x_i is the output of each firm, and c_1 and c_2 are parameters of the cost function.

The fixed costs can be thought of in several ways. One way is that the fixed cost represents some entry impediment into the market. For example, for a doctor it may represent the cost of education amortized over the doctor's career. The group may have an incentive to raise such costs for future entrants. The economic incentive to engage in such cost raising strategies has been covered elsewhere (Salop & Scheffman, 1983, 1987) and we do not examine such strategies here. Another way to view

the costs is that they represent costs for forming the group with each member sharing the costs equally. When viewed in this context the effects of entry would have to be explicitly considered. Additional firms would lower the fixed costs which, in turn, lowers the fixed costs to the incumbent firms. In addition, the behavior that changes the total sum of the fixed costs is another area that could be analyzed. However, we assume F is fixed and does not vary across firms.

The cost function has several desirable properties for our analysis. To begin, it produces U shaped average costs curves so that market price and output solutions tend to be well behaved as long as costs are sufficiently low so that many firms supply the demand. Differentiating $C(x_i)$ with respect to x_i, which gives marginal cost, reveals the other desirable features.

$$(3) \qquad C'(x_i) = c_1 + c_2 x_i$$

The parameter c_1 simply shifts the marginal cost curve vertically. The parameter c_2 changes the slope of the marginal cost curve. Therefore, by changing c_1 and c_2, we can examine how restrictions which change the level and slope of the marginal cost curve affect output and price. For convenience, we refer to shifts in c_1 as changes in variable costs and changes in c_2 as changes in incremental costs or changes in the slope of the supply curve.

Making the final assumptions that firms maximize profits ($\pi(x_i) = P(\Sigma x_j) \cdot x_i - C(x_i)$) and act as price takers (price equals marginal cost), we can now solve for the individual firm short-run market output:

$$(4) \qquad x_i = \frac{a - c_1}{b \cdot N + c_2}$$

Expression (4) establishes the standard result that an individual firm's output decreases as the number of competitors increases and as marginal costs increase.

In the long-run, entry and exit can occur so that profits are driven to zero. Using a zero profit constraint and expression (6), we can determine the long-run individual firm output, market output, and the number of firms. We use this long-run solution as the point of departure for our analysis. Recall that we are analyzing the behavior of a group of competitors. Given the assumptions, the group has no control over the demand that it faces. Its only opportunity to collectively increase profits is to adopt rules that change the cost functions of the firms. Thus, in terms of the cost function (2), the group may undertake rules which change F, c_1, and c_2.

Consider the situation where the group has no market power. That is, price is fixed at a price $P(x)=a$. This could correspond to when there is a perfect substitute for the homogenous product or, more likely, when the group makes up a small percentage of the total producers of the good. In this situation there can be no anticompetitive effects from the group behavior. A perfect substitute for the group's production exists; therefore, consumers receive no consumer surplus from the group's production. The behavior of the group is at least benign from the consumer's perspective.

To see what actions the group might take, consider its goals and options. It desires to maximize group profits:

$$(5) \qquad \Pi = N \cdot (a \cdot x_i - F - c_1 x_i - (1/2) \cdot c_2 x_i^2)$$

The group has no control over a and by assumption x_i is controlled by each individual firm, not the group collectively. Thus, the group can only attempt to adjust the cost parameters (F, c_1, and c_2) to increase the profits of the individual members. From the structure of (5) it is obvious that the only way to increase profits is to lower costs. As a result, any group activity will seek to lower the costs of individual members.

Now consider the situation where the group has market power. By market power we mean that the demand curve facing the group is downward sloping ($b > 0$).[5] As before, individual members independently select output and thus determine the market price. The collective decision of the group involves attempting to adjust the cost conditions of individual firms. In terms of our model, the group selects F, c_1, and c_2 to maximize:

$$(6) \qquad \Pi = N \cdot ((a - bNx_i) \cdot x_i - F - c_1 x_i - (1/2) c_2 x_i^2)$$

subject to the constraint that each firms produces where price equals marginal cost. Substituting the constraint into (6) and using (4) gives

$$(7) \qquad \Pi = N \cdot \left[-F + (1/2) c_2 \cdot \left[\frac{a - c_1}{bN + c_2} \right]^2 \right]$$

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[5] Notice that this does not necessarily imply that the group of producers nor the product comprise a relevant product as described in the Department of Justice Merger Guidelines nor as a market is defined in Stigler and Sherwin (1985).

The Kuhn-Tucker conditions for a maximum are:

$$(8a) \qquad (F - F^o)\cdot\frac{\partial \Pi}{\partial F} = (F - F^o)\cdot(-1) = 0$$

$$(8b) \qquad (c_1 - c_1^o)\cdot\frac{\partial \Pi}{\partial c_1} = (c - c_1^o)\cdot(-c_2)\cdot\left[\frac{a - c_1}{bN + c_2}\right] = 0$$

$$(8c) \qquad (c_2 - c_2^o)\cdot\frac{\partial \Pi}{\partial c_2} = \frac{(c - c_2^o)}{2}\cdot\left[\frac{a - c_1}{bN + c_2}\right]^2\cdot\left[1 - \frac{2c_2}{bN + c_2}\right] = 0$$

where values denoted by the superscript o denote minimum values of the cost variables. The first two conditions clearly show that the group desires to lower its fixed costs and its variable costs. If either is above its constrained level, then the expressions are clearly negative. The group would have gone beyond its profit maximizing level of costs.

The last term is not so simple. The second term in brackets can be positive or negative depending upon whether $2c_2/(bN+c_2)$ is less than or greater than 1. Rearranging we find that the second term in brackets is positive whenever $b>c_2/N$. Now b is the absolute value of the slope of the demand curve and c_2/N is the slope of the supply curve of the group. Thus, whenever the demand curve is steeper than the group supply curve, the group has an incentive to raise the slope of the marginal cost

curve.[6] It will desire to increase the slope of the supply curve until it equals the (absolute value of) the slope of that demand curve.

Intuitively, the result indicates that the steeper the demand curve (i.e., the more inelastic it is at the market output), the more likely the firms have an incentive collectively to raise incremental costs. They have a greater incentive because the steeper the demand curve, the greater price will increase for any given reduction in output. The incentive to raise incremental costs also increases as the marginal cost curve is flatter. As the marginal cost curve becomes flatter, costs as a share of price increases near the market level of output and the net loss from restricting output (prices less marginal cost) declines. Therefore, it becomes more likely that firms have an incentive to raise artificially their incremental costs because they lose relatively little short-run profits on their foregone sales.

When groups increase profits by raising incremental costs, new firms will desire to enter the group to also earn supracompetitive profits. Entry would reduce the slope of the supply curve and decrease price. But because firms have higher incremental costs, price could not fall to competitive levels. In addition, the group would once again have an incentive to raise incremental costs. Given the higher incremental costs and the fixed costs, long-run profits would eventually be driven to zero.

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[6] This relationship is different from the one reported by Nelson (1957, p.391). Nelson showed that short-run profits (quasi-rents) would increase when the elasticity of demand was less than the ratio of average variable cost to the elasticity of marginal cost. In terms of our model, Nelson's relationship reduces to $2c_1/x + c_2/N < b$. The reason for the difference is that increasing an input price raises the costs of inframarginal units relative to the marginal units to a greater extent than raising c_2 alone. Nelson's result demonstrates that a restraint that raises (in terms of our model) c_1 as well as c_2 may be profitable.

Given each firm producing to where price equals marginal cost, c_2 equal to bN, and the zero profit constraint, we can solve for individual firm output, market output, and the number of firms:

$$(9a) \qquad x_i = \frac{4F}{a - c_1}$$

$$(9b) \qquad N \cdot x_i = \frac{a - c_1}{2b}$$

$$(9c) \qquad N = \frac{(a - c_1)^2}{8bF}$$

Relation (9b) depends only on the demand curve (parameters a and b) and on the minimum value of variable costs. The level of fixed costs are irrelevant because the group adjusts incremental costs (c_2) in order to hold the slope of the group supply curve (c_2/N) constant. The individual output (expression (9a)) shows some counter intuitive results. As expected, individual firm output increases as fixed costs increase. Individual firm output, however, falls as demand increases (a increases) by parallel shifts to the right and as the variable cost decreases. These counter intuitive results occur because entry of new firms more than captures the increase in demand (decrease in cost). Total output increases, but individual firm output falls. Finally, the number of firms (N) reacts as expected. The number of firms increases as demand shifts out and decreases as variable costs increase, demand rotates in and fixed costs increase.

The following example illustrates the dynamics. Let the demand curve intercept (a) equal 100 and the (negative) slope (b) equal 0.01. This demand curve is graphically depicted in figure 1. Further, let the

fixed costs (F) equal 300, variable costs (c_1) equal 50, and incremental costs (c_2) equal 0.24. Using expressions (1), (2), (4), and setting individual firm profits to zero, the long-run competitive equilibrium is for 76 firms to produce 50 units each at a market price of 62. This solution is graphically depicted as the intersection of the demand curve and the supply curve S in figure 1.

Because the supply curve is flatter than the demand curve, the 76 producers would have the incentive to raise incremental costs to raise profits. To maximize their profits, the producers would adopt restraints to raise c_2 to 0.76 which would shift the supply curve to S' in figure 1. Price would increase to 75 and individual firm profits would increase from 0 to approximately 11. The supracompetitive profits would attract entry which would shift the supply curve to S". With this supply curve there would be 102 firms, but price would fall to only about 71. No further entry into the group would occur because the each firm would be earning zero profits. Because S" is flatter than S', the 102 firms would have an incentive to further raise incremental costs. Using expressions (9), the ultimate solution is for 104 firms to produce and 24 units each at a price of 75, but each firm earning zero profits.

At the new market equilibrium with a supracompetitive price, each firm earns only a normal competitive profit because each firm has artificially high incremental costs and also produces less than an individual firm in a market without the anticompetitive restraint. The firms originally adopt the anticompetitive, cost-increasing practices because in the interim between first adopting the practices and the time of the last entrant, member firms earn supracompetitive profits. These

supracompetitive profits, although perhaps temporary, are the incentive to raise incremental costs.

Further, the group maintains the practices and decides not to lower costs because rescission would cause substantial losses. Recall that more firms make the supply curve flatter and that there are more firms at the supracompetitive price than at the initial competitive situation. Rescinding the rules would increase supply would beyond S in Figure 1 and both price and profits would fall below the competitive level, forcing the exit of many firms. To avoid the losses and exits, firms would attempt to prevent the recision of rules and groups would maintain anticompetitive practices.

The group faces one additional constraint on its behavior: The profits of each firm in the group must be as great as profits of firms not in the group, or else no members would stay in the group. Consider the situation when (1) all firms are in the group and (2) profits have been driven to zero. We now ask whether a firm would enter the market. Because the profits of the group members have been driven to zero, the entrant could not profitably enter as a group participant. The entrant, however, may be able to enter as an independent firm. If the price is below the long-run price prior to the group, then an independent firm could not enter profitably. If price were above the long-run price that existed prior to the group, an independent firm could enter profitably. Because the price is higher than the long-run competitive price, the firm would produce more than firms at the long-run level of output. This would lead to excess profits which would either attract additional entry or lead to defections from the group.

Therefore, without having an exclusive right to the market, the group cannot raise price above the long-run price prior to (or, without) the group. This also implies that the group (without an exclusive right) would not simply raise costs in order to raise profits. That is, the group must in some fashion lower costs to its members. Further, there must be some economies to the costs reduction, or else single firms, or some smaller group of firms, could achieve the cost reduction and profitably offer a lower price. At the same time, there must be some production or organizational diseconomies or else a single large firm could enter and achieve the economies and offer a lower price. Given lower costs under these conditions, the group may then have an incentive to increase the slope of its supply function.

Figure 2 illustrates the potential for anticompetitive gains. We begin with figure 2(a). Suppose a group of firms are producing at their long-run desired levels. In the figure, let S represent the short-run supply curve of the group. The long-run supply is the horizontal line equal to price P. The short-run profits (quasi-rents) of the group are represented by the triangular area ABP. Further, suppose through collective action the group can lower its variable costs so that the short-run supply curve shifts out to S'. The result is that output increases from Q to Q', price falls from P to P', and short-run profits increase from the triangular area ABP to the triangular area ECP'. But notice that consumers benefit to a much greater extent than the firms do. The consumer benefits of the cost reduction lower price on the initial quantity purchased ((P-P')Q) plus the benefits from additional purchases ((1/2)(P-P')(Q'-Q)). In the figure, the consumer benefits are

represented by the trapezoid P'CBP. The group gains by its increase in profits which are represented by trapezoid ADCP' in figure 2(a).

Given the costs and demand curves, after the cost reduction the group would have an incentive to restrict output by increasing the slope of the short-run supply curve. In the situation depicted in Figure 2, the group could increase short-run profits by raising incremental costs until the supply curve intersects the demand curve at point B as shown in part (b). The profit maximizing supply curve is represented by line S". The group could not raise price above P in the long-run because independent firms (whose total average costs equal P) would enter and drive price back to P.

But it is not obvious that raising price to P is necessarily anticompetitive. It is possible that the restraints which raise incremental costs are essential for the group to recover the fixed costs necessary to reduce variable cost. By banning such restraints, the variable cost reduction may not be profitable because consumers would capture most of the benefits. In such situations it would be desirable to have the restraints because they can allow lower real resource use without reducing consumer welfare. It is also possible, however, that restrictions would give group members supracompetitive profits and that preventing the restriction would benefit consumers. Given the price increasing aspects of raising incremental costs, such restrictions might only be allowed if "but for" the restriction the lower variable cost would not have occurred. Therefore, a careful factual investigation is necessary to determine whether a particular restriction actually harms consumers.

Finally, entry by rival groups provides a source of competition. For example, consider a real estate multiple listing services (MLS). Real estate brokers agree to pool their listings on computer so that each broker has a much larger selection of homes in which to offer perspective buyers. The greater selection of homes for buyers and the greater sales coverage for sellers clearly improves the performance of the real estate market. As a result, buyers and sellers naturally tend to use brokers that are members of the MLS. Discount brokers have often been excluded from the MLS and continue to use traditional forms of brokerage.

If consumers prefer discount brokers, MLS members achieve supracompetitive profits by excluding discount brokers, and there is no barrier to developing an MLS, then the excluded discount brokers can simply begin a rival MLS. Because consumers prefer discount brokers, the discount MLS should thrive as consumers flock to the discount MLS brokers. To survive, the prices of the traditional brokers would have to adjust to a competitive level.

The necessary conditions for rival groups, however, may not always be met. For example, there may be substantial economies of scale or scope that can only be captured by one group. In such cases, antitrust intervention may be warranted.

When groups of competitors decide to adopt rules or practices that artificially raise incremental costs, they essentially decide to forego the least-cost method of supplying consumers. The return for the increase in costs is that price increases by more than the increase in average costs, which produces greater profits. Each firm produces where price equals its marginal cost given the rules, but its marginal cost

(and thus price) is greater than the marginal cost of the least-cost method of production. In this respect, the analysis is similar to traditional analyses of output restrictions where competitors directly raise price above marginal cost. Our analysis, however, is different in three respects: (1) firms indirectly raise price through increases in incremental costs; (2) to raise prices indirectly, the group must either convey market power or some cost advantage; and (3) entry does not necessarily drive price to the least-cost solution.

III. The Theory Applied to Advertising Restrictions

A large percentage of the horizontal restraints cases brought by the FTC in the last 10 years sought in some fashion to eliminate advertising restrictions. Many of the cases involved professional associations that had rules or codes of ethics that either prohibited advertising or severely restricted the ability of the members to advertise. Two explanations have arisen for these restrictions. One explanation is that the restrictions make large scale entry more difficult and thus preserve high prices of smaller firms.[7] The other is that less advertising raises individual search costs of individual consumers.[8] The higher search costs, in turn, make consumer purchases less sensitive to price increases -- i.e., the demand for the product is less elastic. With the less elastic demand, firms naturally raise their prices.

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[7] Bond et al. (1980).

[8] Schroeter et al. (1987).

These explanations fail to capture all the economic incentives to restrict advertising. Advertising restrictions often only affect members of the associations, there are often competitors not bound by the rules. As such, they cannot disadvantage nonmembers attempting large scale entry. Further, even if restricting entrants was a motive, restrictions still affect competition among the incumbents. As with the raising rivals' costs explanation, the search theory explanation rests upon the restriction affecting the demand for the products and services of the group. Although this demand effect may occur, demand effects are not necessarily the cause of the anticompetitive gain to the group. We now examine the effects on competition among incumbents and show that such advertising restrictions could be a cost raising strategy to increase profits.

One of the first economic models of advertising is presented in Stigler's (1961) seminal article on the economics of information. In Stigler's model and its progeny, a firm selects price and advertising expenditures which in part determine the firm's level of sales. Advertising can provide consumers with information such as selling location, business hours and price. For a given price, greater advertising increases the number of consumers that are familiar with the firm and therefore increases the sales of the firm. The firm advertises up to the point were the net revenue from the additional sales from advertising equals the increase in costs from additional advertising. An advertising restriction would lower the efficacy of advertising; that is, reduce the level of sales for a given level of advertising expenditures. The lower advertising efficacy from the restriction would mean that the

firm would advertise less. Alternatively, one could state that an advertising restriction increases the costs of attracting additional customers and therefore the firm would reduce it sales.

Analytically, Stigler's theory posits that a firm's sales are a function of price and the level of advertising. Thus, let sales (x) be a function of price (p), advertising expenditures (A), and a parameter (α) representing the efficacy of advertising, $x=x(p,A;\alpha)$. The greater is α, the greater the sales for any price and level of advertising ($\partial x/\partial\alpha>0$). An advertising restriction would lower α and make a given level advertising expenditure less effective. For example, a restriction on price advertising may reduce the returns to advertising because although consumers may learn of the availability of a product, they would not know their purchase cost.[9]

In our model of horizontal restraints, a significant number of competitive firms independently determine that if they do not make a sale to a customer another firm will make the sale to the customer. Firms sell where price equals marginal cost and the market determines the price; hence, firms choose sales (x) rather than price or level of advertising expenditures. Firms may still have an incentive to advertise. For example, consumers may know the market price, but not know the selling locations or hours of operation. Consumers presumably would be willing to search out such information, but competition for

[9] Restrictions which improve the truthfulness of advertising could make advertising more effective (Sauer and Leffler, 1990). Hence, in some circumstances groups may have the incentive not to police or even perhaps promote deceptive advertising practices.

customers among firms may lead to the firms supplying the information to customers.

We must modify the general model of advertising to account for this type of market behavior. Because no firm has the ability to independently set price, price is no longer a choice of the firm but becomes a parameter for the firm. In addition, because the firms in our model choose the level of sales, advertising expenditures must become a function of the level of sales rather than sales being a function of advertising. A feature of the advertising model is that firms advertise only in the range where sales are an increasing function of advertising.[10] Thus, one may solve for the inverse function of advertising expenditures as a function of sales: $A=A(x;\alpha)$.

To have anticompetitive effects under our theory it is necessary that an advertising restraint increases the incremental costs of sales. The increase in incremental costs leads to each firm reducing output. As a result, market output declines and price increases. In terms of the advertising function it is necessary that the increase in advertising expenditures from increasing sales increases with the restriction. Mathematically, it is necessary that $\partial^2 A/\partial x\partial\alpha$ is negative (i.e., the advertising restriction, which lowers α, raises incremental costs). Although this condition is not necessarily met in the maximization problem, two conditions which ensure that it is met appear plausible.[11]

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[10] See equations (8) and (9) of Stigler (1961).

[11] $\partial^2 A/\partial x\partial\alpha = (x_\alpha x_{AA} A_x - x_{A\alpha})/(x_A)^2$. Therefore, a necessary condition is that either x_{AA} is negative or $x_{A\alpha}$ is positive where the subscripts represent partial derivatives. A sufficient condition is that x_{AA} is negative and $x_{A\alpha}$ is positive. The partial x_{AA} being negative simply

(continued...)

The first is that additional advertising expenditures produce fewer sales than initial advertising expenditures (diminishing returns to advertising). The second condition is that the incremental sales from additional advertising increase as α increases. Both of these conditions would appear to be met under reasonable conditions. Therefore, it is plausible that an advertising restriction (which would lower α) would raise the incremental costs of firms.

The following relationship provides an example of sales as a function of advertising:

$$(10) \qquad x_i = \alpha A_i^{(1/2)}$$

where x_i is the sales that result from advertising, A_i is the amount of advertising expenditure, and α is parameter ($0 \leq \alpha$) representing the efficacy of advertising. Advertising restrictions effectively limit the returns from the advertising. In terms of relationship (10), restrictions lower α. That is, for an given level of expenditures, fewer sales occur. Suppose initially that α equals 2. Advertising expenditures of 100 (A_i=100) would imply sales of 20 (x_i=20). If a restriction decreased the returns to advertising so that α fell to 1.5, then expenditures of 100 would produce a reduced level of sales of 15.

For this advertising function, we can calculate the dual cost function which relates costs (advertising expenditures) to the level of sales. Rearranging (10) so that costs are a function of sales:

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[11](...continued)
implies that there are diminishing returns to advertising. The partial $x_{A\alpha}$ being positive implies that the marginal benefits to advertising increase from an increase in α. Both of these results appear reasonable.

(11) $A_i = (1/\alpha)^2 \cdot x_i^2$

This cost function is in the same form as the last term in our original cost function (2). In fact, α falling from 2 to 1.5 from an advertising restriction is equivalent to the slope of each firm's marginal cost curve (c_2) increasing from 1/2 to 8/9. Thus, restrictions which force firms to use less effective forms of advertising can be cost raising devices that raise short-run profits and hurt consumers by raising prices.

To apply this advertising function to the analysis of section II, we must aggregate the implicit cost function across firms. A sufficient condition for aggregation is that a constant proportion of customers come at the expense of competitors. Although the market supply curve will not in general be the horizontal summation of the individual firms marginal costs curves, the shape of the curve the qualitative relationships between α and output would be preserved. The simplest case would occur when no customers come at the expense of competitors. In this case the market supply curve is the aggregate of the marginal cost curves and the theory of section II would directly apply. Notice that in this simple case the price and output effect result from changing individual cost curves, not from a direct reduction of competition among competitors (e.g., stealing customers).

Empirical evidence is consistent with the predictions of our analysis of advertising restrictions. The analysis predicts that restrictions will raise price and reduce output. Studies of the price effects of advertising restrictions in professional occupations

consistently have found that restrictions raise prices.[12] In addition, some studies suggest that increased advertising does increase the total quantity sold, although the magnitude of the effect is in doubt.[13]

IV. Policy Implications

The preceding analysis demonstrates that competitors can raise prices and short-run profits by agreeing to restraints that raise costs. As such, under certain conditions restraints among competitors (horizontal restraints) can have anticompetitive effects. We now review the implications of the analysis for finding anticompetitive effects.

Implication 1: *To have anticompetitive effects, the group must possess some form of "market power."*

This implication follows immediately from equation (5) where we consider situations where the group has "no market power." In these situations, the only way to increase short-run profits is to lower costs. Therefore, when groups do not posses market power, group activity should be not be illegal. The very fact that the group has no market power automatically implies that the group behavior is efficient.

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[12] See Benham (1972), Cady (1976), Bond et al. (1980), Feldman and Begun (1980), Glazer (1981), Kwoka (1984), and Schroeter et al. (1987).

[13] Cigarette advertising has been extensively studied. Although many studies find no or little aggregate effects, others do find statistically significant effects. See, for example, Doron (1979), Bishop and Yoo (1985), and Porter (1986). Studies of markets shares of individual brands more consistently find significant effects. See Lambin (1976), Grabowski (1977), and Brown (1978). This suggests that simple aggregation of individual marginal costs curves will not yield the market supply curve.

Our definition of market power, however, is much broader than others. By market power we mean that a group has some control over its price (i.e., the demand curve facing the group in some relevant range must slope downward). Even if a group cannot raise price, it may have already fully exercised its ability to raise price. [14] Consider figure 2 where the group has adjusted costs so that S" represents its short-run supply curve. The group could not raise price above P because of competition from fringe firms. This does not imply that there are no anticompetitive effects. It simply implies that group has fully exercised its ability to raise price. By eliminating the group practice that increases the slope of the supply curve, consumers could benefit substantially as competition among the group members drives down price.

By providing some cost reduction, the group can confer itself with market power. This is not the only condition, however, in which anticompetitive effects could occur. The analysis in Section II (and depicted in figure 2), takes place in the context of identical firms and easy entry so that the long-run supply response of independent firms sets a ceiling on price. If the number of independent firms is fixed for some period, then anticompetitive effects could occur within the period that it would take for a significant number of independent firms to enter the market. Further, if the independent firms were not identical, but varied in costs, then the number of fringe firms would depend upon the price level. In such cases, the group would face downward sloping demand in

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[14] To automatically conclude that the group has no market power is akin to the fallacy of broadening antitrust markets when a monopolist has raised price to the monopoly level. See Landes and Posner (1981, pp. 960-1).

the long-run and would have market power as we have used the term in this paper.

Implication 2: *For a cooperative activity to be anticompetitive, it must raise the incremental costs of member firms.*

In Massachusetts Board of Optometry (Mass. Board), the Federal Trade Commission outlined a series of screens that it would use before it would engage in a full rule of reason inquiry of the challenged practice. The first screen is whether the practice is inherently suspect. If it is not inherently suspect, then a full rule of reason inquiry is required. If it is inherently suspect, and there is no plausible efficiency justification, the Commission may hold the practice unlawful.

In our analysis, raising the incremental costs is the only group action that can harm consumers and that is consistent with profit maximization. Therefore, to be inherently suspect, the practice or restriction must raise costs at the margin to a greater extent than it raises costs overall. An advertising restriction, for example, would be inherently suspect. As discussed in the previous section, our analysis provides an explanation of how advertising restrictions raise price. Further, the analysis is consistent with empirical evidence of the effects of advertising restrictions.

Implication 3: *Anticompetitive effects of mandatory groups are likely to be significantly greater than the effects of voluntary groups.*

The analysis indicates that the anticompetitive effects of mandatory groups are likely to be significantly greater than the effects of

voluntary groups. State licensing boards are probably the clearest example of mandatory groups. In states with licensing boards, every practitioner in a licensed profession has to be licensed by the board and must adhere to the rules and regulations of the board. In such situations, the board may be able to raise price in an anticompetitive manner. In fact, it is possible to raise price up to the monopoly price.[15] In addition, even if the board cannot restrict entry, entry may not lead to price returning to the competitive level. As shown in Section II above, the group can raise costs so that entry does not reduce price.

Voluntary groups, however, are constrained by entry of independent firms. Therefore, the group cannot raise price above the competitive level that would exist without the group. This does not mean, however, that government intervention is never warranted. The group could simultaneously enact procompetitive and anticompetitive practices. (In terms of our model, lower F and c_1 while increasing c_2.) By using the antitrust laws to prohibit anticompetitive practices, the government may be able to better ensure that the group activity benefits consumers. This leads us to our fourth implication.

Implication 4: *In practice, differentiating between anticompetitive practices and procompetitive practices is difficult.*

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[15] Given straight line demand curves and constant marginal costs (c_2=0), a group would have the incentive to raise prices (by increasing incremental costs) up to the monopoly price. If the supply curve is upward sloping (c_2>0), the desired price would be below the monopoly price.

Even if we knew with certainty whether a practice increased the slope of an individual cost curve, two problems arise in determining whether consumers benefit or not from the practice. First, some practices are apt to decrease fixed and average variable costs as they increase incremental costs. For example, an agreement among competitors not to advertise soft-drinks may lower the average costs of selling soft-drinks, but it would make it more difficult for each competitor to increase sales. That is, such an agreement would decrease average variable costs as it increased incremental costs.

An agreement by real estate brokers to place certain classes of listings on a multiple listing service would reduce their average costs of matching home buyers and sellers. The agreement could also make the cost of selling a home outside the multiple listing service very expensive because many brokers would look exclusively to the multiple listing service when seeking new listings. On balance, the average lower costs may outweigh the cost increasing effect of the restriction on some sales, resulting in a lower average price due to the registration. Thus, challenging every practice that raised incremental costs in some instances could hurt consumers.

Second, actions that appear to be separate from cost reductions can benefit consumers. Under certain circumstances, allowing groups to increase their members' incremental costs may provide an incentive for their members to undertake overall costs reductions. In figure 2, for example, the cost reduction provides benefits equal to the area ADCBP. The group, however, would collect only the amount represented by area ADCP'. By allowing the group to increase its incremental costs, the

benefits to the group more closely match the benefits to the group and consumers collectively. Therefore, the group would be more likely to undertake the cost reduction. In the figure, consumers do not benefit from the cost reduction because price remains at P. In equally plausible situations, however, consumers would benefit because the group would have a lower price than existed before.

Implications 5: *For a horizontal restraint to be anticompetitive, it need not directly restrain competition for individual customers.*

The analysis presented in section II considers changes in costs that increase short-run profits. As such, it is not limited to restraints which directly limit competition for individual customers. All that is necessary for anticompetitive effects is that the restraint raises incremental costs. Although firms do compete to be the lowest cost provider, this is an indirect form of competition. Limits on indirect forms of competition can have anticompetitive effects equal to limits on direct forms of competition.

In summary, we have shown that a group of competing firms may be able to collectively increase their profits by raising their incremental costs. Entry of firms into the group may drive profits to zero, but entry into the group does not necessarily mean that price will fall back to the long-run competitive level. Even when firms outside the group constrain price to the long-run competitive level, the group may be able to increase profits by raising incremental costs.

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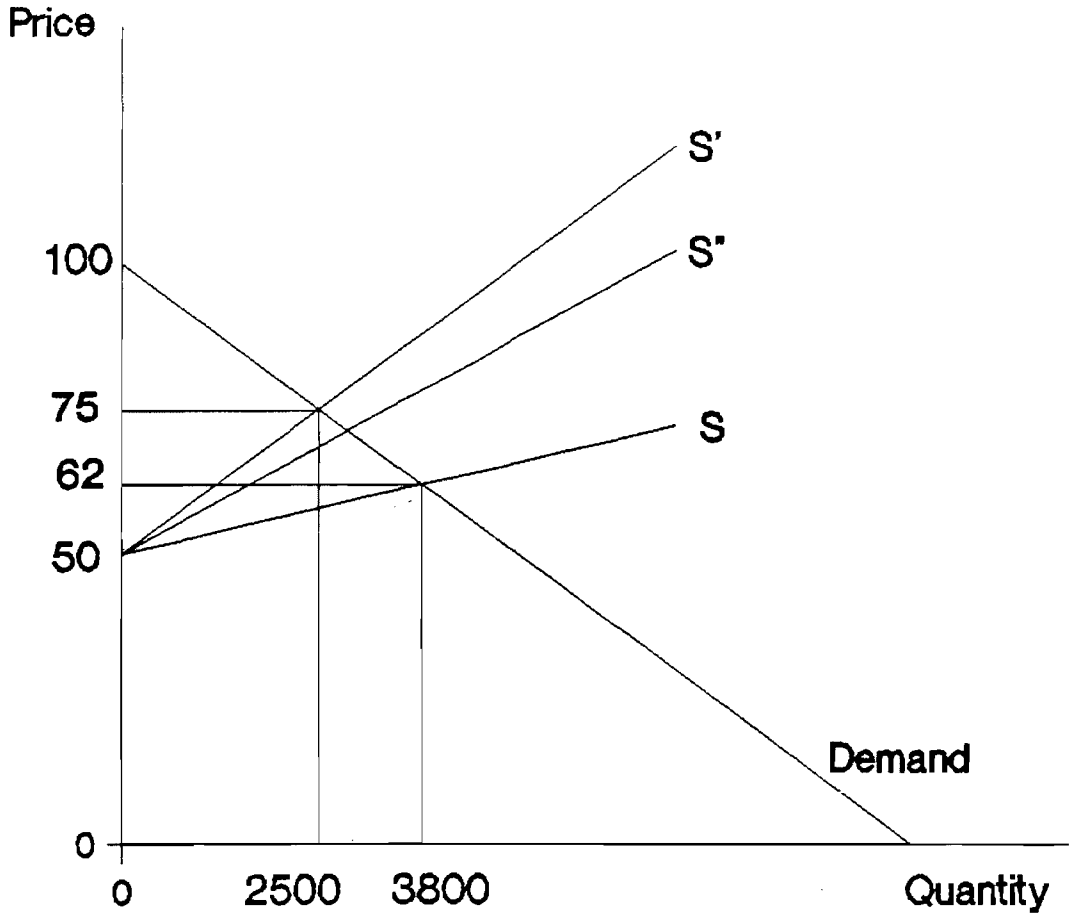

Figure 1 -- Increasing Incremental Costs

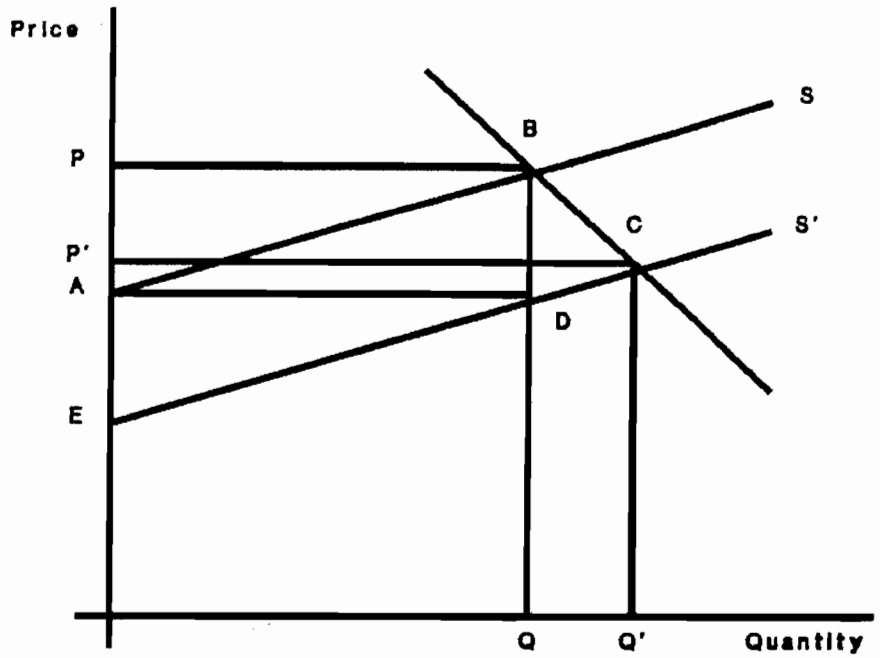

Figure 2(a) -- Cost Reduction

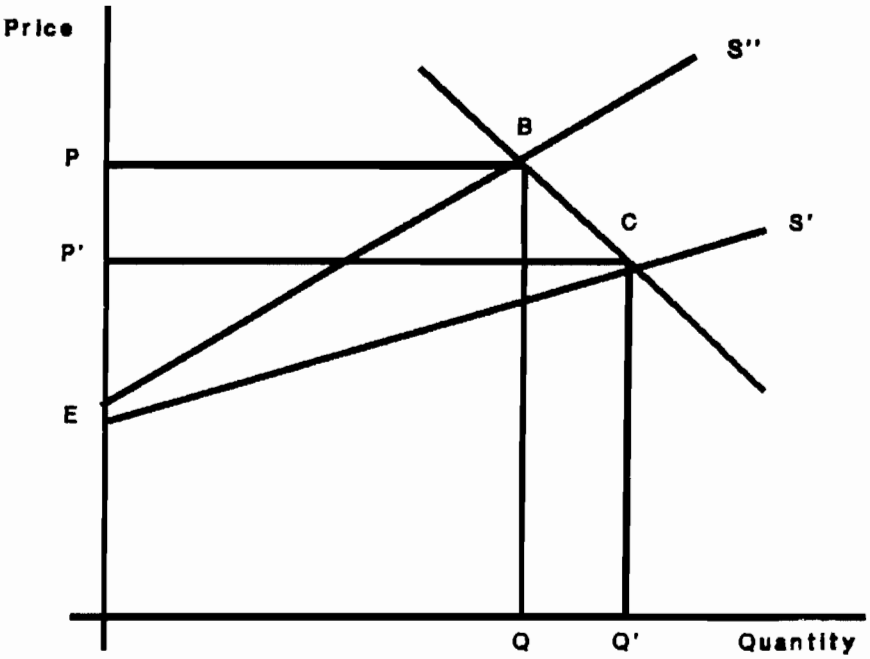

Figure 2(b) -- Price Increase