be of different sizes (the largest possible would combine all local markets into one national firm), I restrict upstream coalitions to be of equal, that is, symmetric, sizes.

I assume that exactly the same market process occurs as described in Section IIB. above, except that input price bargaining now takes place at the coalition level. Some new notation is necessary at this point. Let m_d, $d = 1...D$ be the size of downstream chain coalitions, so that m_d/M measures the proportion of the national market controlled by the dth coalition. Let n be the size of the representative supplier coalition, so that n/N is the proportion of all differentiated products controlled by each of the equally sized upstream coalitions.

My assumption that all of the retailers in each local market are combined into local monopoly coalitions fundamentally changes the bargaining game. If a supplier coalition fails to make a sale to the dth coalition, that supplier coalition can receive no revenues from m_d/M % of the national market. On the other hand, a downstream coalition risks the increment to its retail revenues which the products controlled by the nth coalition contribute.[5]

This circumstance suggests a range over which the input price contracts, *i.e.*, the $r_{ij}s$, may lie. I consider two extreme alternative models in order to identify the end points of these contract curves in terms of r, and the final market outcomes associated with them. In the "price taker" retailer model immediately below, equilibrium r is at the reservation level of the downstream coalition. In the "price maker" model, r is at the reservation level of the upstream coalition.

1. *Price Taking Retailers*

For each downstream coalition:

$$\Pi_{m_d} = \sum_{i=1}^{m_d} \sum_{j=1}^{N} [(p_{ij} - c) q_{ij} - Z_{ij}] \tag{14}$$

Maximization w.r.t. prices yields:

$$\frac{\partial \Pi_{m_d}}{\partial p_{ij}} = (p_{ij} - c)\frac{\partial q_{ij}}{\partial p_{ij}} + q_{ij} + (p_{ij} - c)\frac{\partial q_{i,-j}}{\partial p_{ij}} = 0 \tag{15}$$

for all i and j.

For the representative upstream coalition:

$$\Pi_n = \sum_{i=1}^{M}\sum_{j=1}^{N} Z_{ij} - K \tag{16}$$

To find equilibrium solutions, I again apply symmetry across markets and within markets and set (14) = 0. I further let (16) $= \delta > 0$ for upstream coalitions. That is, entry and exit of upstream firms is permitted, but I allow some level of excess profit per product to be earned by upstream coalitions before entry occurs. Also using (5) above, I obtain:

$$rpQM = (K + \delta)N \tag{17}$$

$$(p - c)\frac{\partial Q}{\partial P} + Q = 0 \tag{18}$$

$$(1 - r)pQ - cQ = 0 \tag{19}$$

which are three equation in p, N and r.

Using (4) the solutions are:

$$p^{**} = \frac{J + ac}{2a} \tag{20}$$

(21) $$r^{**} = \frac{p^{**} - c}{p^{**}}$$

(22) $$N^{**} = \left[\frac{(p^{**} - c)(J - \alpha p^{**})}{K + \delta} \right]^{\frac{1}{1-\beta}}$$

(23) $$Q^{**}M = \left[\frac{p^{**} - c}{K + \delta} \right]^{\frac{\beta}{1-\beta}} (J - \alpha p^{**})^{\frac{1}{1-\beta}}$$

where ** indicates the "price taker" monopoly solution. This solution is identical to that of the competitive case except for the replacement of p^* with p^{**} and the replacement of K with $K + \delta$. As we would expect, $p^{**} > p^*$ because of control over consumer markets by all local monopoly coalitions.[6]

2. Price Making Retailers

As a thought experiment, imagine that one retail chain coalition, m_1, manages to challenge the price making behavior of upstream firms, while other downstream coalitions remain as price takers. In this case, profits of coalition m_1 are:

(24) $$\Pi_{m_1} = \sum_{i=1}^{m_1} \sum_{j=1}^{N} [(p_{ij} - c) q_{ij} - Z_{ij}]$$

For the symmetric upstream coalitions I write:

(25) $$\Pi_n = \sum_{i=1}^{m_1} Z_{ij} + \sum_{i=m_i}^{M} Z_{ij} - K$$

All downstream coalitions maximize w.r.t retail prices as before. As an input price maker, however, m_1 also controls the Z_{ij}s relevant to the markets it controls. However, the Z_{ij}s affect the total number of different products that can be profitably produced, which in turn affects the price making coalition's profits.

At this point I make two further assumptions. First, I assume that successful bargains are actually struck for all available products in all local markets at some set of input prices. That is, $N_{m_1} = N_{-m_1} = N$, where $-m_1$ indicates all other price taking retailer coalitions. Secondly, I assume that the price making coalition makes symmetric bargains with supplier coalitions in all markets which it controls; that is, the downstream coalition makes bargains with each supplier coalition on the assumption that the same bargain will be made with all other suppliers. I can then write the following Lagrangian function for m_1:

$$(26) \qquad L_{m_1} = m_1[(p_{m_1} - c)Q_{m_1} - Z_{m_1}] + \lambda N[(m_1 Z_{m_1} + (M - m_1)Z_{m_1}) - (K + \delta)]$$

That is, the downstream coalition maximizes profits subject to the constraint that all upstream firms or coalitions must at least earn δ per product.

Maximization w.r.t. p_{m_1}, Z_{m_1}, λ, and N yields $\lambda = 1$; Also using (5), the following solutions are obtained:

$$(27) \qquad \frac{\partial L}{\partial p_{m_1}} = (p_{m_1} - c)\frac{\partial Q_{m_1}}{\partial P_{m_1}} + Q_{m_1} = 0$$

$$(28) \qquad \frac{\partial L}{\partial \lambda} = m_1 r_{m_1} p_{m_1} Q_{m_1} + (M - m_1) r_{-m_1} p_{-m_1} Q_{-m_1} - (K + \delta) = 0$$

$$(29) \quad \frac{\partial L}{\partial N} = m_1 \left[(p_{m_1} - c) \frac{\partial Q_{m_1}}{\partial N} \right] + (M - m_1) \left[(p_{m_1} - c) \frac{\partial Q_{-m_1}}{\partial N} \right] = 0$$

There is no reason for price making behavior in one market to affect the equilibrium in other price taking local markets, so I can use (18) and (19) for the M - m_1 price taking markets:

$$(30) \quad (p_{-m_1} - c) \frac{\partial Q_{-m_1}}{\partial p_{-m_1}} + Q_{-m_1} = 0$$

$$(31) \quad (1 - r_{-m_1})(p_{-m_1} - c) Q_{-m_1} = 0$$

These are five equations in five unknowns, $p_{m_1}, p_{-m_1}, r_{m_1}, r_{-m_1}$, and N, which solve to the following:

$$(32) \quad p^{***}_{m_1} = p^{***}_{-m_1} = p^{**} = \frac{J - \alpha c}{2\alpha}$$

$$(33) \quad r^{***}_{m_1} = \beta \frac{m_1}{M} \left[\frac{p^{**} - c}{p^{**}} \right]$$

$$(34) \quad r^{***}_{-m_1} = r^{**} = \frac{p^{**} - c}{p^{**}}$$

$$(35) \quad N^{***} = \left[\frac{\left(\beta \frac{m_1}{M} + \frac{M - m_1}{M} \right) (p^{**} - c)(J - \alpha p^{**})}{K + \delta} \right]^{\frac{1}{1-\beta}}$$

$$(36) \qquad Q^{***}M = (J - \alpha p^{**})^{\frac{1}{1-\beta}} \left[\frac{\left(\beta \frac{m_1}{M} + \frac{M - m_1}{M}\right)(p^{**} - c)(J - \alpha p^{**})}{K + \delta} \right]^{\frac{\beta}{1-\beta}}$$

where *** indicates the price maker solution.

Comparing these results with those of the price taker model above, note that retail prices remain unchanged (since they are independent of N). However, $r_{m_1}^{***}$ falls to a fraction of r^{**}, and $N^{***} < N^{**}$, these differences depending on the magnitudes of β and m_1/M. The essential feature of these differences is that the price making coalition's actions have a negative externality effect on product variety. The price making coalition behaves myopically, considering only the relatively marginal impact of its setting of r on the supply of differentiated products which can be made available by upstream firms. The price making coalition thus perceives a relatively inelastic supply of differentiated products.

If m_1 is very small, then $r_{m_1}^{***}$ goes to zero. That is, the actions of a price making retailer coalition with a very small national market share will have a negligible effect on product variety. At the other extreme, if $m_1 = M$, then $N^{***} = \beta N^{**}$. The latter solution represents that of a national retailer chain coalition; the externality problem of local myopic behavior thus disappears. In can easily be shown, in fact, that a national retailer coalition which engages in price making behavior results in an equilibrium which maximizes joint industry profits.

Note finally, however, that if price making behavior were successfully practiced by all of many local monopoly retailer coalitions, the cumulative effects of myopic behavior could essentially prevent the industry from functioning.[7]

3. *Summary: The Contract Curve*

The "price taker" and "price maker" models essentially establish the extreme points of a set of contract curves which retailer and supplier coalitions face in their negotiations over input price.

Figure (1) illustrates the set of possible contract curves in terms of r for the case in which $(p^{**}-c)/p^{**} = .8$, and $\beta = .5$. Reflecting the solution of the "price maker" model, the reservation price of the representative upstream coalition, and thus the lower limit of r, increases with m_1/M, as indicated by the line AB. The line CD shows the reservation price of any sized retailer coalition; this reservation price does not vary with m_1/M due to the assumption of constant returns to scale downstream. Finally, the line EF is drawn to illustrate the relevant contract curve where $m_1/M = .25$.

E. The Bargaining Game

Consider a given chain coalition which is bargaining with a given upstream coalition. What determines the point along the relevant contract curve at which a deal will be transacted? Having established the relevant contract curve (or core) of the bargaining game, I hypothesize the following general solution:

$$r^e = r^{***} + g(r^{**} - r^{***}) \tag{37}$$

where the subscript, e, indicates the equilibrium solution. I define the function $g = g(m_1/M, n/N)$, such that $0 < g < 1$ and $\partial g/\partial(m_1/M) < 0$ and $\partial g/\partial(n/N) > 0$. That is, bargaining power is determined by the relative national market shares of the upstream and downstream coalitions.

The function (37) reflects a central postulate of cooperative game theory: that relative bargaining power in a bilateral game is inversely related to how much either party has to lose if no deal is struck. Figures 2A-B illustrate how the proportions of total revenues which supplier and retailer coalitions have at risk in a given transaction vary

with their respective national market shares (given the parameter values which are indicated on those figures). As shown in Figure 2A, the supplier coalition's proportion of revenues at risk increases linearly as m_1/M increases, while those of the retailer coalition remain constant. Conversely, Figure 2B shows that as n/N increases, the retailer coalition's proportion of revenues at risk increases at an increasing rate, depending on β, while those of the supplier coalition remain constant.

Equilibrium product variety is therefore affected by relative national market shares of supplier and retailer coalitions. Other things equal, for example, an increase in m_1/M reduces $r^e_{m_1}$ for all upstream suppliers. The upstream firms which survive this change have to make deals in other local markets which in the aggregate are sufficient to cover $K + \delta$. This can only occur by means of supplier attrition.

While this model is basically set out as a cooperative game, there are differences with the usual formulation. First, while the upper limit of the contract curve, $r = (p^{**}-c)/p^{**}$, is also the retailer coalition's threat point, the lower limit of the contract curve, $\beta m_1/M[(p^{**}-c)/p^{**}]$, is not the threat point of an individual supplier coalition in the usual sense. That is, if no deal is struck, the upstream coalition effectively realizes a division of profits equivalent to $r = 0$ (its threat point). However, it would be irrational for the retailer coalition to force r below $\beta m_1/M[(p^{**}- c)/p^{**}]$, given the assumption that identical deals are struck with all other supplier coalitions.

A second difference is that while any bargain in r must be locally Pareto superior for the two parties to find it in their interest, any bargain in r below $(p^{**}-c)/p^{**}$ is not necessarily Pareto superior at the national market level (unless $m_1 = M$). The latter result may occur due to the negative externality on product variety which affects retailers in other markets.

An important feature of the present model which is clear from (37) and Figure (1) is that r^e could fall below the industry profit maximizing equilibrium point as defined by $\beta(p^{**}-c/p^{**})$.

A specific logit function demonstrates this possibility. Let

$$(38) \qquad g = \frac{2}{1+e^{-x}} - 1\,,\ where\, x = \frac{n/N}{m_1/M}$$

As x goes to 0, g goes to zero. As x becomes very large, g goes to 1. The function g thus varies monotonically between 0 and 1, depending on the relative market share of the upstream and downstream firms as hypothesized. Figure (3) illustrates how g varies with changes in x according to (38).

Figure (4) illustrates (37), given (38), for several alternative given values of n/N, the representative supplier coalition's national market share. Again, I assume $(p^{**}-c)/p^{**} = .8$ and $\beta = .5$. Figure (4) shows that in cases where market shares are relatively low upstream (specifically, where $n/N < .2$), r^e falls below $\beta/(p^{**}-c/p^{**})$, the industry profit maximizing optimum, for some values of m_1/M.

The specific function described is of course arbitrary and illustrative. I have not attempted to show the most "reasonable" or "fair" specific solution in the Nash sense, and I have not, of course, attempted to specify the complete multi-lateral input price bargaining game.

Two key points of the model I have specified, however, emerge. First, the model demonstrates that the profitability of accumulating monopoly/monopsony power downstream is relatively high in comparison to an industry in which upstream economies of scale do not obtain. This will be the case, at least, as long as it is assumed that the increase in bargaining power to be obtained from a given increase in national market share is independent of the length of the contract curve itself. A second point of the model is that myopic behavior of downstream firms can reduce product variety below the industry profit maximizing level. This creates an incentive for firms to form structural or other relationships which limit the externality effects of myopic behavior.

F. Vertical Integration and Cooperative Behavior

Without a more completely specified multi-lateral bargaining model, I cannot analytically demonstrate incentives or effects of vertical coalitions between a single retailer coalition and a single supplier coalition. It is clear, however, that vertical integration potentially resolves the problem of myopic behavior by retailer coalition.

Basically, the myopia problem is that a given retailer coalition does not take into account the effects of its actions on profits of other retailer coalitions. Any means by which this problem can be reduced can increase joint profits of all the retailer coalitions combined. It can be easily shown that a vertically integrated national cartel of all retailers and suppliers would produce the industry-profit maximizing level of product variety by setting $r^e = \beta(p^{**}-c)/p^{**}$. In the absence of such a coalition, however, vertical integration can facilitate tacit or explicit agreements which lead toward this end. For example, integrated suppliers might agree to "trade access" to each others' controlled local markets. Such behavior would seem far more difficult to coordinate without vertical ownership relations.

III. DISCUSSION AND CONCLUSIONS

I have set out a model of input price determination which demonstrates that under reasonable assumptions, incentives to accumulate monopsony power, within local markets and across local markets, tend to be relatively high in industries characterized by conditions of increasing returns to scale upstream, such as consumer information industries. Myopic exploitation of monopsony power by downstream firms with less than 100% of the national market may also reduce product variety below industry profit maximizing levels. Vertical integration or cooperative behavior among downstream and upstream coalition can serve to internalize the negative externality of myopic behavior by an individual monopsonist coalition, returning the industry toward a joint profit maximizing equilibrium.

Of course, a critical ingredient of retail level monopsony power in any industry is the lack of viable alternative outlets for product suppliers within local market areas. Media "retailers" such as radio and television broadcast stations, for example, have relatively low market shares at the local level (FCC, 1980). Also, the development of alternative technologies for distribution of motion pictures and video products tends to diminish the significance of monopsony power in industries such as cable television, even if they appear to be concentrated at local market levels. Other determinants of market structure, including economies of optimum scale and vertical contracting efficiencies are obviously important as well.

The "free rider" model nevertheless suggests a rationale for recent structural developments in the cable television industry which I outlined above. While the power of cable systems to raise prices in the consumer market is controversial, it is evident that many cable networks and their program suppliers currently have no viable means of distribution to consumers other than via cable systems. Notable is the strategy of the largest MSO, TCI, Inc. in accumulating minority ownership interests in eight other MSOs and a number of individual cable systems (United Artists Cable Communications, Inc., 1988). A subsidiary of TCI, Inc., Satellite Service, Inc. reportedly had the purpose of negotiating on behalf of all of these "affiliates of TCI" with program suppliers in wholesale rate negotiations. (P. I- 5). Available anecdotal data, at least, supports the view that larger MSOs, especially TCI, receive relatively extreme discounts in the per-subscriber fees which they pay back to program suppliers. (National Telecommunications and Information Agency, 1988). TCI's apparent influence in the program supply market can be similarly interpreted.

The widespread practice of "spreading equity" in network cable firms among the larger MSOs is also consistent with the model. The relatively small minority shares which characterize many MSO-network relationships (in particular, TCI's shares of at least 10 of its 13 affiliated networks were below 50%, and at least eight of these were below

25%) seem to suggest that resolution of double marginalization or realization of similar vertical contracting efficiencies are insufficient explanations for integration. The sharing of such relationships among different MSOs might be expected, however, to facilitate the coordination of MSO behavior by limiting opportunistic input price setting behavior by larger MSOs.

The model also suggests a rationale for historical development of market structure and behavior in the theatrical motion picture industry. In 1945, the U.S. government brought to trial eight motion picture distributors, five of which were integrated with movie theater chains. These integrated theater chains were the five largest in the nation and they accounted for 70% of all "first run" box office receipts. Notably, theater ownership was relatively concentrated at the local market level. In 15 (or 18%) of the largest 85 U.S. cities for which data were available, 100% of first run seating capacity was controlled by one chain, and in 63 (or 74%) of these cities, one chain was dominant, controlling over 50% of first run capacity (Loew's Exhibit L-13). The government's case, which was basically accepted in *U.S. v. Paramount Pictures, Inc.* et al, was that the integrated distributors essentially operated as a cartel in order to exchange access to each other's controlled theater markets, but to the exclusion of independently owned distributors and theaters. (Conant, 1960).[8] The "free rider" model suggests the likelihood that one purpose of the extensive vertical integration between distributors and exhibitors and their apparent cartel behavior was to limit opportunistic price setting behavior by the larger theater circuits.

The model also suggests historical insight into the Associated Press news cooperative. The AP was formed in the 19th Century to coordinate the sharing of news and information generated by newspaper members within local market areas across the U.S. Rather rigid pricing structures governed the terms and conditions by which newspapers were obliged to make this information available to other members (Rosewater, 1930). Schmanske (1986) discusses the relatively strong influence which

some members (a number of which were owned by newspaper chains) appeared to play in establishing the terms and conditions of information exchange. The AP's chief competitor, on the other hand, United Press International, was not vertically integrated with its newspaper customers, and sold its products by means of individual negotiation with them. The "free rider" model suggests that a role in the greater market success of AP may have been its greater ability to cooperatively control opportunistic input price setting by more powerful newspaper members.

One must be cautious in using this model to predict the effects of chain coalitions or other structural relationships on consumer welfare, even if no contracting efficiencies are at stake. The key issue in this analysis is the optimal amount of product variety. It is well-known that optimal variety depends on the structure of final demand functions, so that any change in variety due to a change in market structure could make consumers better or worse off in economic terms (Spence, 1976; Dixit and Stiglitz, 1977). Clearly, however, the negative effects of monopsony power on product diversity may reach anticompetitive levels. Also, one might argue on "First Amendment" grounds that there is a social value to the preservation of maximum product diversity in consumer information industries, per se.

If downstream monopsony power does reach anticompetitive levels, the model further implies that vertical integration, or even collusive behavior, can be beneficial to consumers by limiting opportunistic input price setting behavior by individual retail firms with monopsony power. In this model, vertical integration or collusion can only increase variety.

Apart from the particular assumption of upstream economies of scale that I have made to describe consumer information industries, the "free rider" model provides theoretical justification for the notion that local monopsony power can be "compounded" through retail chain ownership in separate local markets. A general implication of this result is that the "relevant market" in antitrust controversies is not necessary confined

to the local geographic area in which the business activities in question take place. Expressed another way, monopsonization of a local market area does not necessarily imply power over input price.

FOOTNOTES

[1]Typical among several stories related in the Wall Street Journal article about TCI's "hardball" tactics with program suppliers, TCI is alleged to have bid in 1990 (through a subsidiary) to buy The Learning Channel, a basic cable network. When a deal with another bidder at $40 million seemed imminent, TCI reportedly ordered its cable systems to drop The Learning Channel from their program menus. The other bidder then withdrew its offer and TCI's subsidiary, the article relates, bought the network for $31 million.

[2]There is a substantial literature on monopsony and vertical integration, but it focuses on the theoretical effects of monopsony on efficient vertical contracting. For surveys, see Scherer and Ross (1990, ch. 14) and Perry (1989).

[3]Of course, cable television systems rarely compete with each other at the local level, either because of technological economies of scale or the perception of them by franchising authorities.This initial model, however, sets out a benchmark case with which subsequent models of locally monopolized/monopsonized markets can be compared.

[4]This is an unrealistic assumption in that a cable television system or other retailer of information products typically makes sunk cost investments which reflect anticipated demand. Assuming fixed costs downstream, however, greatly complicates equilibrium conditions of the model without adding to its substantive conclusions.

[5]Even if upstream entry is possible, which I assume to be the case, successful entrants must attract revenues from all local markets combined to cover fixed production costs plus prevailing profit margins. An individual local monopsonist thus

cannot anticipate that if a bargain with one supplier potential fails, the incremental reduction in the number of products it offers to consumers will be made up by a new supplier.

[6]Note here that in comparing (21) with (12), resulting product diversity could be higher than in the competitive model. Other things equal, local retailer coalitions now earn higher revenues from higher prices. But if higher prices in turn have a relatively small dampening effect on Q, (*i.e.*, if α is small), and δ is not large, N^{**} may be greater than N^{*}. While this event would seem unlikely in practice, an increase in product variety due to local market concentration therefore cannot be precluded on *a priori* terms.

[7]If all retailer coalitions are of size m_1 and practice price making behavior, then:

$$N^{****} = N_{m_1} [M - (M - m_1)\beta]^{\frac{1}{\beta - 1}},$$

$$r^{****} = \beta \left(\frac{p^{**} - c}{p^{**}}\right) [M - (M - m_1)\beta]^{\frac{1}{\beta - 1}},$$

$$Q^{****} M = Q_{m_1} [M - (M - m_1)\beta]^{\frac{1}{\beta - 1}},$$

All of these expressions go to zero as m_1 *goes to 0*.

[8]This conclusion is generally consistent with that of Conant, although he offers no formal model or discussion of the "myopia" or product variety problems.

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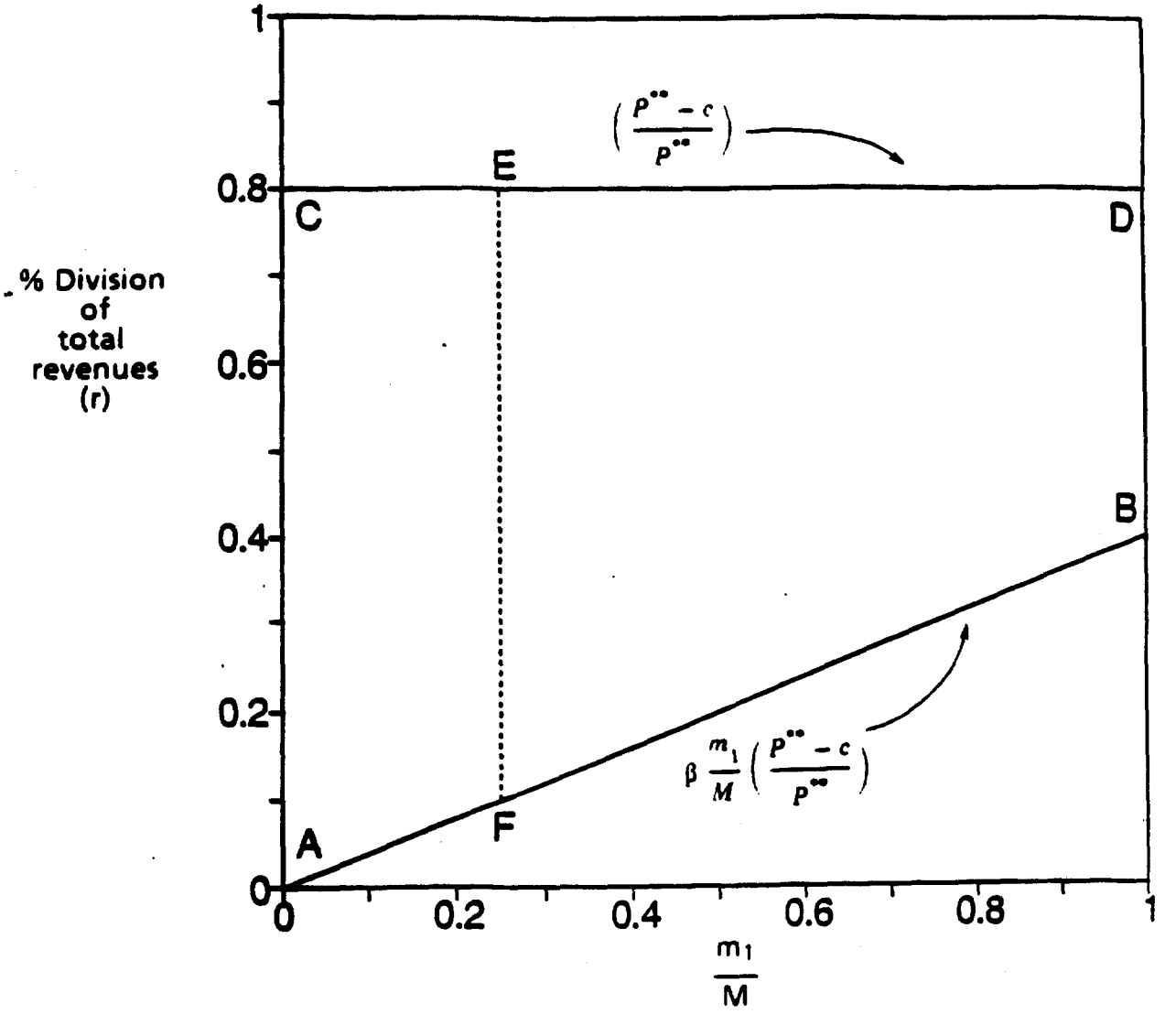
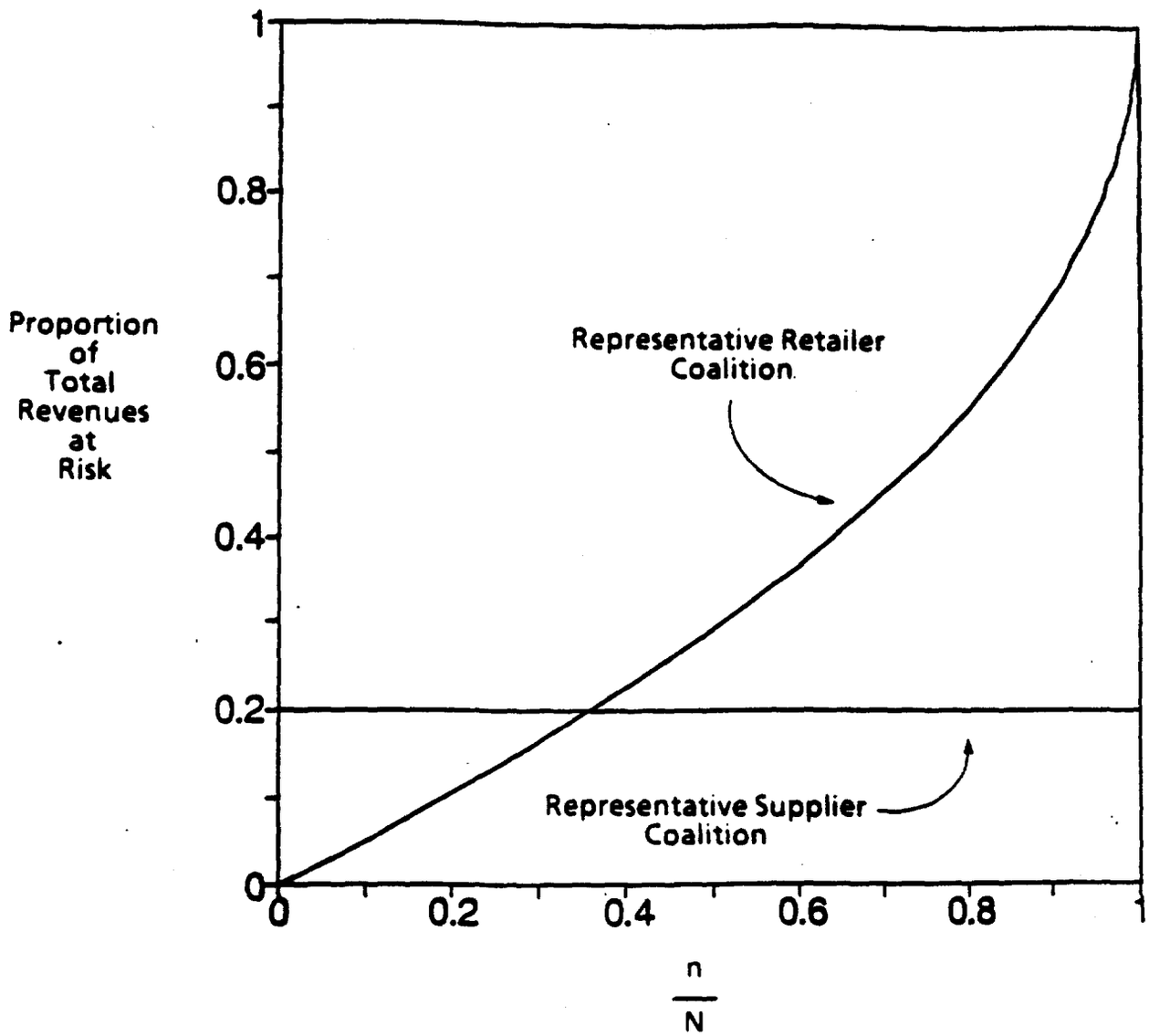
Figure 1.
Potential Contract Curves:
% Division of Revenue vs. National Market
Share of Representative Retailer Chain Coalition



Assumptions: $\frac{P^{**} - c}{P^{**}} = .8;\ \beta = .5$

Figure 2B.
Proportion of Total Revenue at Risk vs. National Market Share of a Representative Supplier Coalition



Assumptions: $\frac{m_1}{M} = 2; \beta = 5$

Figure 3.

The Function: $g = g\left(\frac{n/N}{m_1/M}\right)$

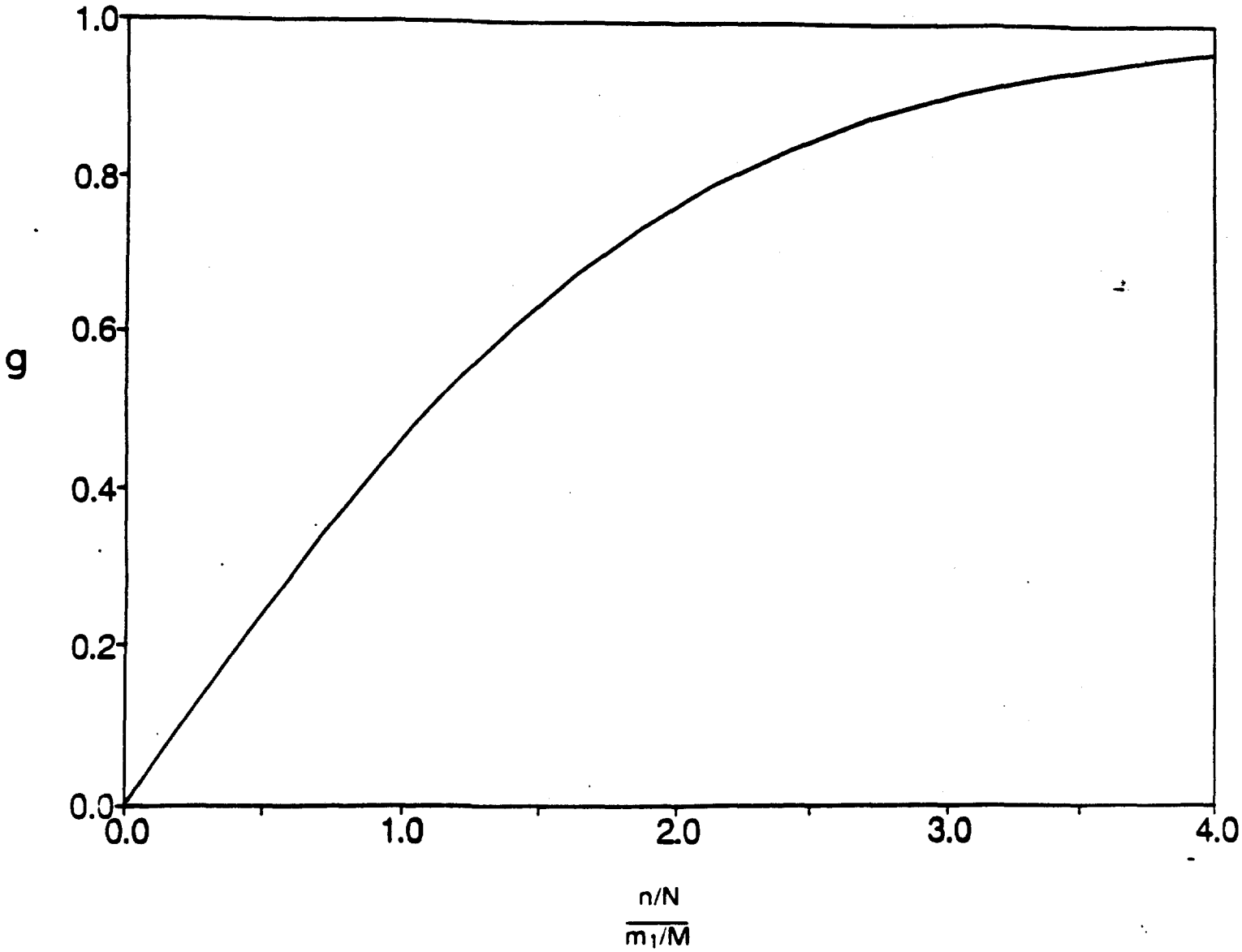
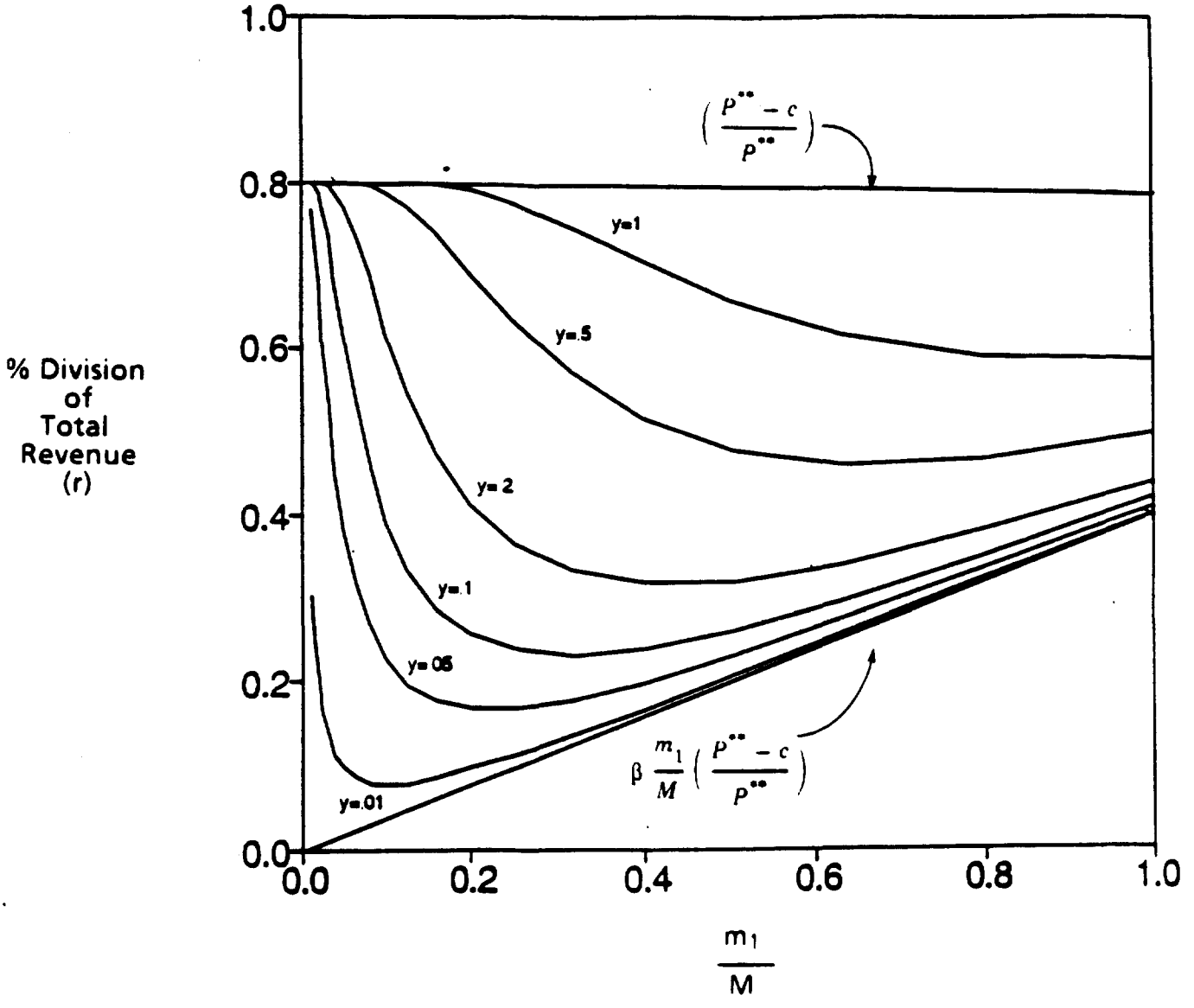


Figure 4.
Equilibrium Input Prices:
% Division of Revenues vs. National Market Share of Representative Retailer Chain Coalition for Various National Market Shares of Representative Supplier Coalitions.
(y = n/N)



Assumptions: $\frac{P^{**}-c}{P^{**}} = .8;\ \beta = .5$