Anticompetitive Exclusive Dealing without Exclusion

Preliminary and Incomplete

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Abstract. I present a new theory of anticompetitive exclusive dealing. In it, exclusive deals do not serve to disadvantage rivals or exclude them from the market. In equilibrium, it is often the case that multiple suppliers each form their own exclusive networks, with other downstream firms remaining unaffiliated. Despite the lack of exclusion and competitor harm, competition is harmed: exclusive deals raise all prices and harm consumers. Both retailers and suppliers may benefit from the increase in industry profits. Indeed, exclusive deals may allow suppliers of homogenous goods to earn positive profits, whereas they would earn zero in the absence of exclusive deals.

In this article I present a new theory of anticompetitive exclusive dealing. In it, individual suppliers producing homogenous goods endogenously persuade imperfectly competitive retailers to enter into exclusive relations with them, resulting in disjoint networks of retailers, each of which is affiliated with a single supplier. Strikingly, exclusive deals serve neither to exclude nor disadvantage rivals. Rather, such deals provide each exclusive supplier with the incentive and ability to internalize competition amongst the retailers in its network. The equilibrium effect is that all retail prices increase, which may benefit both suppliers and retailers, but unambiguously harms consumers.

My theory provides an alternative to the prevailing or standard view of anticompetitive exclusive dealing, and in so doing dispenses with key limitations of that theory. The standard theory presumes that an incumbent supplier is able to make offers of exclusivity to downstream retailers prior to the arrival of a potential entrant, which is itself unable to make offers. As is well known, this bestows the incumbent supplier with an exogenous contracting advantage that allows it to exploit a negative contracting externality among the retailers, denying the entrant scale and thereby deterring entry. Thus, the goal of exclusive dealing is to exclude a rival from the market.

But in many real-world examples of (potentially) anticompetitive exclusive dealing, these assumptions and conclusions are invalid, for two reasons. First, an incumbent supplier's rival is already also an incumbent, and is thus able to compete for exclusivity; there is no

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inherent contracting advantage favoring the incumbent. Second, the rival is ultimately not excluded from the market, and indeed typically maintains meaningful market share. In fact, it is often the case that many downstream firms are not locked into exclusive deals, raising doubts that such contracts can deny scale to potential entrants.

To address the limitations of the foreclosure theory, I assume that no supplier has an inherent contracting advantage over another. In particular, in an initial stage, each supplier simultaneously makes exclusivity offers to whichever retailers it wishes. Additionally, I assume that there is no minimum efficient scale for suppliers, so that there is no prospect of one supplier driving another from the market; my theory is not about exclusion. An implication is that a retailer who rejects exclusivity is free to deal with all suppliers, and in equilibrium will have access to supplies at marginal cost.

My main results are as follows. First, what I term *partial exclusive dealing* may arise in equilibrium. In such an equilibrium, no supplier signs exclusive deals with all retailers, and no supplier is excluded from the market. Rather, each supplier has its own network of exclusive retailers, with other retailers remaining unaffiliated (that is, not signing any exclusive deal).

Exclusive contracts implement an industry outcome similar to that of downstream horizontal mergers. That is, when suppliers set transfer prices, they do so to internalize competition among their own exclusive retailers, just as a merged downstream entity setting prices at its outlets would recognize that a price cut at one would steal business from itself. Thus, an equilibrium exhibiting partial exclusion is like a situation in which downstream merger activity leads to the emergence of multiple larger firms. Ultimately, all retail prices increase, harming consumers.

A second main result, and a distinguishing feature of my theory, is that partial exclusion does no harm to competitors, but only harm to competition itself. That is, as suggested by the analogy to downstream mergers, exclusive deals are not weapons used against other firms in the industry. Rather, because such deals allow for the internalization of downstream competition within a given network, and so lead to higher prices within that network, these deals make it easier for other firms to earn high profits; exclusive deals are almost an invitation to other firms to charge higher prices. Indeed, the formation of an exclusive network is good news for retailers who do not join it, so that in equilibrium all firms benefit from exclusive deals. Only the end consumer suffers.

As mentioned above, partial exclusive dealing appears to be the norm in the real world, and so it is important that my theory provides an explanation not only of its effect but for why it emerges. Thus, another main result is explaining why *full exclusion*, in which all retailers sign with a single supplier, doesn't arise instead of partial exclusion. After all, partial exclusion doesn't fully eliminate retail competition, because each exclusive network competes against the others, as well as against any unaffiliated retailers. Hence, industry profits would be higher under full exclusion, just as a horizontal merger to monopoly would maximize combined industry profits.

The reason that full exclusion need not arise is that there is a negative contracting externality among the retailers. In particular, as the network of one supplier grows large, the retail price set by that network grows large, so that the value to remaining outside of that network also grows large. To secure participation by all retailers, this high outside value must be paid to each of them, which can be prohibitively costly. This is similar to the argument by Stigler (1950) for why merger to monopoly may not be an equilibrium outcome, and also similar to the argument for why cartels may not be able to sustain monopoly pricing.

Interestingly, the existence of a negative contracting externality among retailers is one feature that is shared by my theory and the foreclosure theory. However, the nature and implications of these externalities are very different. In the foreclosure theory, individual retailers are too willing to accept exclusive deals. This allows an incumbent supplier to execute a divide-and-conquer strategy, locking up enough downstream firms (often at minimal cost) to deter entry by another supplier. Downstream firms would jointly be better off if they could commit to rejecting exclusive deals.

In contrast, in my theory individual retailers are too hesitant to accept exclusive deals (because the value of being an outsider firm can be very high). As explained just above, this may prevent full exclusion from emerging in equilibrium, so that industry profits are not maximized. Indeed, retailers would jointly be better off if they could each commit to accepting an exclusive offer. If they did so, the equilibrium would exhibit all suppliers making exclusivity offers to all retailers, and all retailers signing deals with the same supplier. Not only would industry profits be maximized, but fierce bidding by suppliers would allow retailers to seize the entirety of these profits; because suppliers produce homogenous goods, they would earn zero profits.

In contrast, under partial exclusion, and as suggested above, all suppliers may earn positive profits, despite the fact that they produce identical physical products. The reason is that if suppliers don't think they can lock up the entire market without losing money, they won't try. This means that each supplier may offer contracts to disjoint sets of retailers. In this sense, suppliers aren't really competing at the stage in which exclusive networks are formed, and this allows them to earn positive profits.

Another perspective is as follows. Imagine that instead of merely selling physical products, the valuable service that suppliers actually offer is that of internalizing competition within downstream networks. Under full exclusion, each retailer is in effect offering the same service, namely of internalizing competition amongst all retailers. But no supplier has an advantage doing this, and so each earns zero profits under full exclusion.

But under partial exclusion, each supplier is offering a differentiated service. Namely, each supplier is offering to internalize competition within its own network, which is disjoint from those of other suppliers. This differentiation allows the suppliers to earn positive profits.

Ultimately, then, the existence of a negative contracting externality among retailers provides the closest connection between my theory and the foreclosure theory: the externality prevents retailers from implementing the outcome that is best for themselves, which suppliers may be able to exploit in order to increase their own profits. Of course, in the foreclosure theory, it is only the incumbent supplier that benefits (from retailers that are too willing to sign deals), to the detriment of the potential entrant, whereas in my theory all suppliers gain (from retailers that are too reluctant to sign deals), so long as there is not full exclusion.

I now briefly discuss related work. Seminal contributions to the foreclosure theory are Rasmusen, Ramseyer, and Wiley (1991) and Bernheim and Whinston (1998). Fumagalli and Motta (2006) explore foreclosure amongst competing retailers.

The internalization of such downstream competition is a crucial element of my theory.[1] Chen and Riordan (2007) also recognize that exclusive contracts may serve this role, in a model with two suppliers and two retailers. However, they argue that a necessary condition for exclusive contracts to serve this role is that one of the two upstream firms is vertically integrated with one of the downstream firms. Thus, as in the foreclosure literature, one supplier has an exogenous advantage over the second supplier, and in equilibrium the second supplier has no sales. In contrast, a key goal of my paper is to examine the role of exclusive contracts when no supplier has any exogenous advantage over another, and when all suppliers have access to end consumers in equilibrium.

In this sense, the closest paper to my own is Calzolari and Denicolò (2013). They also seek to understand the role exclusive deals play when (symmetric) suppliers must compete for exclusivity. Unlike in my analysis, they do not consider competition between downstream players, who are taken to be end buyers. They show that exclusive deals are not accepted in equilibrium, but their presence nonetheless intensifies competition among suppliers, which is the opposite of what I find.[2]

The remainder of this article is as follows. Section 1 lays out the model and preliminary analysis. Section 2 presents the main results for the general model, which I discuss in Section 3. Section 4 presents additional results, with a particular focus on exactly what levels of partial exclusion arise in equilibrium, under a linear demand structure. Section 5 concludes.

[1]As discussed above, my approach builds on the theory of horizontal mergers; see Stigler (1950), Salant, Switzer, and Reynolds (1983), Perry and Porter (1985), and Deneckere and Davidson (1985).

[2]Also related are Calzolari and Denicolò (2014) and Johnson (2012), who also seek to move beyond the foreclosure theory of exclusive dealing. Calzolari and Denicolò (2014) reconsider the framework of Calzolari and Denicolò (2013), but with a dominant supplier. Johnson (2012) explores how adverse selection may allow an incumbent to use partial exclusion to defuse the threat posed by an entrant, even when the downstream is perfectly competitive.

1. Model

In this section I describe a model in which imperfectly competitive retailers potentially sign exclusive dealing contracts with upstream manufacturers of homogenous products, after which manufacturers set wholesale contracts, followed by price competition among retailers.

There are two upstream firms, A and B, each of which produces a homogenous good at a constant marginal cost, which I normalize to zero. There are $N \geq 2$ differentiated downstream firms, taken to be retailers that resell the goods of the manufacturers to end customers.

Because A and B produce undifferentiated products, demand can be described assuming that each retailer k sets a single retail price, p_k.[3] Given this, let the total number of shoppers at retailer n be given by

$$D_n(p_1, p_2, ..., p_N) = D(p_n, p_{-n}),$$

where p_{-n} is the vector of prices charged by other retailers. The demand function is symmetric, in that exchanging any two elements of the vector p_{-n} has no change on the demand facing n. In addition to being strictly decreasing in its own price and strictly increasing in the prices of other firms, the demand facing n satisfies certain standard technical properties. In particular,

$$\sum_k \frac{\partial D_n}{\partial p_k} < 0, \text{ and } \frac{\partial^2 D_n}{\partial p_n^2} + \sum_{k \neq n} \left| \frac{\partial^2 D_n}{\partial p_n \partial p_k} \right| < 0.$$

In a model without exclusive deals, in which all retailers were independent and had constant marginal costs, these conditions would be sufficient to ensure a unique equilibrium in prices.

I next describe the timing of the moves. After that, I describe beliefs.

1.1. **Timing.**

Here I describe the timing of events in detail. A graphical summary of the five stages of the game is provided in Figure 1.

First, each supplier simultaneously decides to which retailers (if any) it will extend exclusivity offers. An offer from supplier $i \in \{A, B\}$ to retailer n consists of a fixed transfer F_n^i that is paid to the retailer by i.[4] Whether n receives an offer from i is private information, known only to i and n. Retailers, upon receiving offers or not, form beliefs about which offers have been extended to other retailers; I describe these beliefs in detail below.

Second, all retailers that have received at least one offer of exclusivity simultaneously decide whether or not to accept an offer, and if so which offer to accept, where any retailer can accept at most one offer. Accepting an offer results in the relevant fixed payment being provided to

[3] p_k could also be taken as the lowest of the price charged for A's and the price charged for B's good, by retailer k.

[4] To be clear, suppliers are free to extend as many or as few offers as they wish, and each supplier is free to offer different payments to different retailers, if that supplier so chooses (that is, there is no requirement that $F_n^A = F_k^A$ for $n \neq k$).

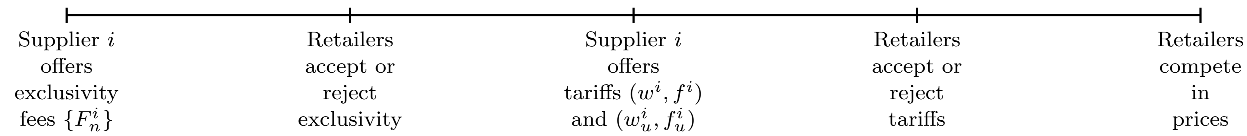


FIGURE 1. The Timeline

the retailer by the supplier whose contract has been accepted. At this point, it is publicly observed which retailers, if any, have accepted exclusive deals with which suppliers.[5]

Third, each supplier simultaneously offers a two-part tariff to those retailers that have accepted exclusive deals with it, and a separate two-part tariff to those retailers that are unaffiliated (that is, which have not accepted any exclusive offer). For $i \in \{A, B\}$, let (w^i, f^i) denote the contract offered to those retailers who have accepted an exclusive deal with i, and let (w_u^i, f_u^i) denote the contract made to unaffiliated retailers, where the first term in each contract is the per-unit wholesale cost and the second term is a fixed fee paid by the supplier to retailers that accept the contract. These contracts are privately observed by retailers, who then form beliefs about what other contracts have been offered; these beliefs are described in detail below.

Fourth, each retailer privately decides whether or not to accept any two-part tariff that has been offered to it. For a retailer that has accepted an exclusive deal with, say, A, this amounts to choosing whether to accept the offer (w^A, f^A) or not, but an unaffiliated retailer may accept neither, one, or both of the two contracts (w_u^A, f_u^A) and (w_u^B, f_u^B) that is has been offered (it can accept both because these are not exclusivity contracts). A retailer who accepts a contract from i then receives the corresponding fixed payment from i.

If a retailer chooses to reject all contracts offered to it at this stage, then it must remain inactive for the rest of the game, thereby selling zero units in future stages. However, such a firm is able to retain any exclusivity fees it may have been paid in an earlier stage.

In the fifth and final stage, each retailer that is active (that is, which has accepted at least one two-part tariff in stage four) chooses retail prices, and demand is realized. Retailers pay their suppliers according to the relevant per-unit transfer fees.[6]

1.2. **Beliefs.** I now describe how retailers' beliefs are influenced by the contractual offers they receive, and in particular how beliefs respond to out-of-equilibrium offers. Such offers

[5]Indeed, for technical reasons, I also assume that all offers that were made become public knowledge, after retailers have chosen to accept or reject any offers that were made. This ensures that there exist well-defined subgames to the overall game, based on how many retailers have accepted offers and with whom, and simplifies exposition and analysis.

[6]I assume that a retailer that has accepted a two-part tariff from both A and B can choose how to allocate its demand among those two suppliers.

can either come in the first stage, in the form of out-of-equilibrium offers of exclusivity, or in the third stage, in the form of out-of-equilibrium two-part tariffs.

I begin by describing beliefs held by firms at the end of stage 1, after they have received an out-of-equilibrium offer of exclusivity. There are two distinct scenarios. First, it is possible that equilibrium is such that n receives an offer from both A and B. In this case, I suppose retailers have passive beliefs. That is, if F_n^i is lower or higher than expected for at least one $i \in \{A, B\}$, then n does not revise its beliefs about what contracts have been offered to other retailers. n also has passive beliefs if a supplier fails to extend an offer.

The second possibility is that retailer n receives an offer from $i \in \{A, B\}$, but is not supposed to receive an offer from i in equilibrium. In this case, I suppose that n has *monopolization beliefs*: n believes that A has made offers to all retailers, and that all retailers $k \neq n$ will accept them.

Monopolization beliefs are more extreme than is needed for the qualitative nature of most of my results. However, in order to reach interesting results, retailers must be sufficiently suspicious of the motivations of a supplier who extends an offer of exclusivity when none is expected. Indeed, if retailers instead had passive beliefs in this regard, so that they made no inferences about a supplier's offers to other retailers upon receiving such an unexpected offer, then the only possible equilibrium of the overall game exhibits one supplier having exclusive deals with all retailers. Moreover, for many demand systems, there would exist no equilibrium whatsoever (in pure strategies).

I now describe beliefs formed by retailers at the end of the third stage. Note that the third stage begins a proper subgame, and that I require that any equilibrium of the overall game be subgame perfect.[7] Thus, references to out-of-equilibrium behavior for this stage of the game are with respect to the relevant third-stage subgame.

Consider a retailer n that has accepted an exclusivity offer, say with firm A, but received an out-of-equilibrium tariff offer of (w^A, f^A) in stage three. Retailer n has symmetric beliefs in that it assumes all other firms that have exclusivity offers with A have received the same offer, and that those retailers will accept the offer. However, n has passive beliefs over the contracts offered by A to unaffiliated retailers.

Next, consider a retailer k who has not accepted any offer of exclusivity. When it receives an out-of-equilibrium offer, say from A, of (w_u^A, f_u^A), it assumes that all other unaffiliated retailers are also receiving this offer and will accept it. Retailer k has passive beliefs about the contracts offered by A to those retailers that have accepted exclusivity deals with A.

[7]More generally, there are decision nodes at other points in the game that are non-singleton information sets, and so I am also only considering perfect bayesian equilibria.

1.3. **Preliminary analysis.** Here I provide an assessment of equilibrium behavior in subgames where retailers have already accepted or rejected exclusive offers.

Suppose that N_A retailers have signed exclusive deals with A, and N_B have signed exclusive deals with B, where $N_A + N_B \leq N$. In an abuse of notation, also let N_A and N_B be the sets of retailers that have signed exclusive deals with A or B, respectively.

The initial stage of this subgame is for A and B to offer two-part tariffs to retailers. A, for example, offers a contract (w^A, f^A) to firms $n \in N_A$ and a contract (w_u^A, f_u^A) to firms k that have not signed any exclusive deal, and similarly for B. Then, retailers decide whether to accept or reject these, and then set retail prices.

Let (w_u^{A*}, f_u^{A*}) and (w_u^{B*}, f_u^{B*}) denote the equilibrium contracts offered to unaffiliated firms in this subgame. Because A and B produce homogenous products, in equilibrium they compete fiercely for the business of unaffiliated firms, at this stage. More precisely, in the equilibrium of any subgame, both A and B offer their products at marginal cost (which has been normalized to zero), and without fixed fee, to unaffiliated firms: $(w_u^{A*}, f_u^{A*}) = (w_u^{B*}, f_u^{B*}) = (0, 0)$.[8]

Therefore, in any equilibrium of any subgame, it is as if each supplier ignores profits from unaffiliated retailers, and instead focuses on maximizing the profits generated for it by its exclusive retailers. Because suppliers are able to use fixed fees to extract surplus from their exclusive retailers, each supplier optimally offers these retailers a contract that leads them to set the price that maximizes their profits combined with those of their supplier, given the prices of other retailers.[9]

Recall, however, that a retailer can choose to reject any contracts it has received at this stage. Doing so renders the retailer inactive for the rest of the game, so that it earns zero continuation profits, but (importantly) the retailer keeps any fees earlier paid to it for exclusivity. Hence, to secure participation from its exclusive retailers, a supplier must ensure that their continuation payoffs are non-negative. Note that this ensures that the overall payoff to any retailer that accepts an exclusive deal is, in the equilibrium of any subgame, equal to the exclusivity fee it accepted earlier in the game.

To be more precise, consider supplier A. This supplier takes as given the retail price p_k^B set by each retailer k affiliated with B, and also the prices of unaffiliated retailers, $\{p_k^u\}$. Through A's selection of the wholesale price w^A charged to its retailers, and appropriate

[8]It is important to keep in mind that the contracts offered at this stage cannot force exclusivity; such contracts were offered in stage one of the overall game, which has already taken place in this subgame. Thus, for example, a retailer is free to accept a contract that stipulates a fixed payment from one supplier, but conceivably not purchase any actual units from that supplier, instead buying them from the other.

[9]This follows from the assumptions on beliefs discussed in Section 1.2. In particular, recall that retailers who are exclusive to, say, A, believe that other retailers exclusive to A receive and accept the same contract that they are offered. Given the symmetry of demand, this is sufficient to ensure that A chooses to implement contracts that indeed maximize the combined profits of it and its exclusive retailers.

selection of the fixed fee f^A, A is able to induce its retailers to select whichever retail price p^A it chooses, and capture the resulting profits. Thus, it is as if A chooses p^A to maximize

$$\sum_{n \in N_A} p^A D(p^A, p_{-n}) = N_A p^A D(p^A, p_{-n}).$$

Note that, for each $n \in N_A$, p_{-n} contains the $N_A - 1$ prices charged by other retailers exclusive to A; p_A is part of p_{-n}, and A recognizes that changes to p^A influence the prices set by all its exclusive retailers. Also, p_{-n} contains the prices charged by retailers exclusive to B and unaffiliated retailers.

Similarly, B chooses p^B to maximize

$$\sum_{n \in N_B} p^B D(p^B, p_{-n}) = N_B p^B D(p^B, p_{-n}),$$

where here p_n denotes the vector that contains the $N_B - 1$ prices charged by other retailers exclusive to B; p_B is part of p_{-n}, and B recognizes that changes to p^B influence the prices set by all its exclusive retailers. Also, p_{-n} contains the prices charged by retailers exclusive to A and unaffiliated retailers.

Because each unaffiliated retailer obtains supplies at marginal cost in equilibrium, each such retailer n chooses p_n^u so as to maximize

$$p_n^u D(p_n^u, p_{-n}),$$

where here p_{-n} contains the N_A prices charged by retailers exclusive to A, the N_B prices charged by retailers exclusive to B, and the prices of all other unaffiliated firms $\{p_k^u\}_{k \neq n}$. Each unaffiliated retailer takes all prices as given, except its own.

I suppose that there is a unique equilibrium of any subgame, characterized by the unique solution to the relevant first-order conditions. This is the case, for example, if demand is linear (as defined in Section 4) or logit.

2. Main Results

In this section I provide analysis and the main results of the model described above. First, I assess how exclusive dealing affects retail prices, for arbitrary levels of exclusive dealing. This sets the intuition for the role of exclusive dealing and provides more insight into actual equilibrium outcomes.

Second, I explain when full exclusion is or is not an equilibrium outcome. That is, I explain when equilibrium does or does not exhibit a single supplier locking up all N retailers with exclusive deals. A major focus of this article is on how exclusive dealing my influence industry outcomes even when full exclusion does not arise, and so it is important to understand when and why this may be the case.

Third, I assess how equilibrium levels of exclusive dealing influence retailer profits. Fourth, I provide a related assessment for suppliers.

Note that the goal of this section is not to precisely identify exactly what the equilibrium levels of exclusive dealing are in all cases (although as mentioned I do assess when full exclusion does or does not arise). This issue is quite interesting and I take it up separately in Section 4 for the case of a parameterized linear system of demand.

2.1. **Exclusive deals and retail prices.** A straightforward but important observation is that an equilibrium of this retail-pricing game with exclusive deals yields retail prices that are identical to those that would emerge in a corresponding horizontal merger game in which inputs were available at marginal cost to all retailers. More precisely, suppose there are no exclusive deals, but instead that N_A retailers of the original N had merged into a jointly owned and operated entity, and (separately) N_B of the original retailers had merged into a jointly owned and operated entity, so that there were $N - N_A - N_B$ unmerged retailers. Also, suppose that each of these entities has access to supplies at marginal cost. Finally, suppose each of these entities simultaneously sets retail prices.

Then, the equilibrium retail prices of this auxiliary "merger subgame" would be identical to those of the exclusive-dealing subgame that I have been analyzing. That is, the merged entity formed from N_A retailers would charge the same retail prices as the constellation of N_A firms in exclusive deals with A, and similarly for B; unmerged firms would set prices equal to those of unaffiliated firms in the exclusive-dealing subgame.

This equivalence between prices under exclusive dealing and prices under horizontal mergers is quite intuitive, and is fundamental to the results of this article. It immediately reveals what the effect of exclusive deals on retail prices is.

Proposition 1. *Consider any subgame in which N_A retailers have signed exclusive deals with A and N_B retailers have signed exclusive deals with B. Then the following statements about equilibrium prices are true.*

(1) *Equilibrium retail prices for each retailer are strictly higher than in the subgame in which no exclusive deals have been signed, if at least one supplier has locked up at least two retailers (that is, if $\max[N_A, N_B] \geq 2$).*
(2) *Equilibrium retail prices are unaffected by exclusive dealing arrangements in which a supplier has only one retailer signed to an exclusive deal. That is, fixing, say, N_B, equilibrium retail prices in which A has one exclusive retailer ($N_A = 1$) are identical to equilibrium retail prices in which A has no exclusive retailers ($N_A = 0$).*
(3) *An increase in the number of retailers locked into exclusive deals strictly raises the retail prices charged by all firms. That is, an increase in N_A, while not reducing N_B,*

strictly raises all retail prices, assuming the new number of retailers locked into A is at least two. (A symmetric claim holds for increases in N_B.)

Proposition 1 indicates that, with very limited exceptions, exclusive dealing has unambiguously anticompetitive effects: such deals lead all retailers—including unaffiliated ones—to strictly increase their prices. Clearly, the reason is that exclusive deals, just like horizontal mergers, cause downstream firms within a given supplier's network to internalize the competition between the firms within that network; the mitigation of this pricing externality naturally leads to higher prices.

Note that downstream competition is typically not fully quelled. Unless all retailers have signed exclusive deals with the same supplier, downstream competition remains. In particular, each exclusive network competes against both the other exclusive network, as well as against unaffiliated firms. And, unaffiliated firms compete against the other unaffiliated firms as well as against the exclusive networks of A and B. In other words, it is only competition within networks that is internalized by exclusive deals, just as this is the only competition internalized by horizontal mergers.

The only type of exclusive deal that does not increase prices is that in which a supplier has an exclusive deal with a single retailer; such a deal is by itself competitively neutral. Such partnerships have no impact on downstream competition for the simple fact that they do not lead to any internalization of downstream competition.

Proposition 1 is intuitive. It is nonetheless important to further emphasize that the only impact of exclusive deals on prices comes from the effect I have been discussing. In particular, heightened prices are not the result of a double-markup problem arising from the inability of suppliers to utilize two-part tariffs: such tariffs are available, but do not lead to marginal-cost pricing (unless a supplier has but a single exclusive retailer). Also, the wholesale price offered by a supplier to its exclusive retailers is not observed by other retailers. Thus, the effects from the literature on strategic delegation, such as Bonanno and Vickers (1988), are absent.[10] Indeed, as mentioned above, equilibrium prices in all subgames are identical to those that would emerge if horizontal mergers of the appropriate size had occurred, and all retailers had access to a perfectly competitive supply market.

2.2. **Full exclusion or partial exclusion?** Having established that exclusive deals work in a manner similar to horizontal mergers, a natural question is whether the equilibrium of

[10]Recall that in that literature, strategic delegation allows a collection of players to commit to an action that does not maximize its joint payoffs given the equilibrium actions of other players. However, such commitment nonetheless is valuable, precisely because it changes the equilibrium actions of other players. Here, because the equilibrium price does maximize the joint payoffs of an exclusive network, given the prices set by other retailers, the strategic delegation effect is absent.

the overall game exhibits full exclusion, that is, whether all retailers sign exclusive deals with the same supplier. Clearly, such an outcome would maximize industry profits.

Nonetheless, full exclusion need not be an equilibrium, and indeed often is not. Part of the reason is that the value to a retailer of being the lone remaining outsider from a large exclusive network is typically quite high, exactly because such an exclusive network will work to internalize competition amongst its members and thereby raise prices; the outsider may be able to free-ride profitably on the efforts of the network.

This logic is not complete, however, because no matter how large the value of being the outsider is, the value to the network of mitigating the externality imposed by that outsider is larger still. That is, there is always an exclusivity fee that a lone outsider would accept, and which would be profitable for the network to offer. Thus, the second part of the logic for why full exclusion need not be an equilibrium is that the supplier engaging in full exclusion must compensate each and every retailer as if that retailer were threatening to be the lone outsider. After all, each retailer does have the option of declining the exclusive offer tendered to it, thereby becoming the lone outsider.

Thus, for full exclusion to be an equilibrium outcome, it must be that the average (that is, per retailer) profits generated by a fully exclusive network exceed the value that any given retailer could obtain by being the lone outsider. This is related to the logic of Stigler (1950), in his assessment of horizontal mergers. Thus, full exclusion may not be an equilibrium for the same reason that an industry may not merge to monopoly.

More formally, let $\pi^u(N_A, N_B)$ denote the profits of an unaffiliated retailer, given that there are N_A retailers exclusive to A and N_B exclusive to B. If supplier A, say, is engaging in equilibrium full exclusion, then any retailer knows that if it rejects any exclusivity deals, it can secure itself $\pi^u(N-1, 0)$. Thus, $\pi^u(N-1, 0)$ is the lowest possible payment per retailer that A must offer in order to obtain exclusivity.

If $\pi^A(N_A, N_B)$ denotes the gross profits (that is, neglecting exclusivity fees) of A, then for full exclusion to be profitable in equilibrium it must be that

$$\pi^A(N, 0) > N\pi^u(N-1, 0) \iff \frac{\pi^A(N, 0)}{N} > \pi^u(N-1, 0).$$

This indicates that the average value of industry monopoly must exceed the value of being a lone outsider.[11] It turns out that this condition is both necessary and sufficient for full exclusion to be the equilibrium outcome.

[11] In contrast, the fact that it is jointly profitable to absorb the lone outside retailer can be written as

$$\pi^A(N, 0) - [\pi^A(N-1, 0) + \pi^u(N-1, 0)] \geq 0,$$

which is always true.

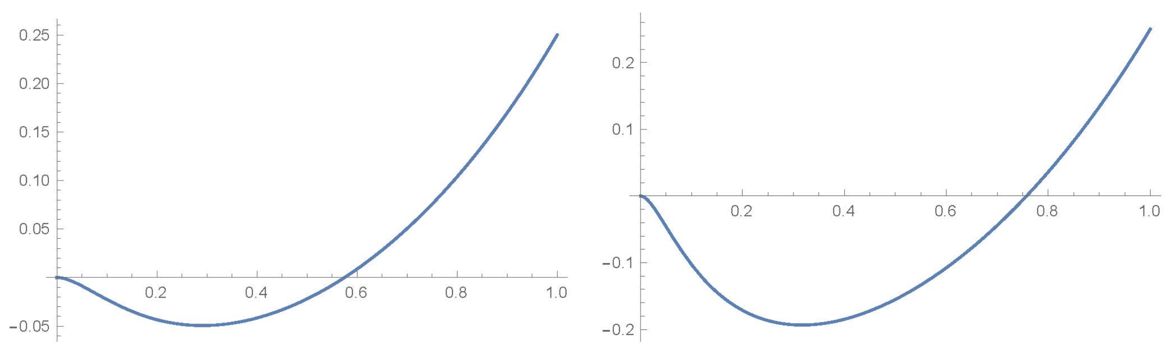
Proposition 2. *Suppose that*

$$\frac{\pi^A(N,0)}{N} > \pi^u(N-1,0).$$

Then the equilibrium of the overall game exhibits full exclusion: all retailers sign exclusive deals with the same supplier. If this condition does not hold, then there is no equilibrium with full exclusion.

As an illustrative example, consider the case of linear demand. I introduce this case in detail in Section 4, but for now it is sufficient to know that $\gamma \in [0,1]$ is a parameter measuring the substitutability of retailers, with $\gamma = 0$ indicating that retailers are local monopolists, and $\gamma = 1$ indicating that retailers are perfectly undifferentiated.

Figure 2 shows the net profits for a supplier that has signed all N retailers to exclusive deals, for various values of N, in the case of linear demand. That is, it shows $\pi^A(N,0) - N\pi^u(N-1,0)$. As can be seen, the profits of this supplier are negative unless γ is sufficiently large, that is, unless retailers are sufficiently close substitutes for one another.



(a) $N = 6$ (b) $N = 10$

FIGURE 2. Monopolized industry profits minus $N\pi^u(N,0)$, as a function of retailer-substitutability parameter $\gamma \in [0,1]$, in the linear demand model of Section 4.

This means that full exclusion cannot be an equilibrium outcome unless γ is sufficiently high. However, when γ is sufficiently high, then the outside value of a lone retailer is low, because—even with all other retailers locked into a single supplier—price competition is intense and profits are low. On the other hand, the value of monopoly is still high, so that a full-exclusion outcome can be sustained in equilibrium.

In cases where full exclusion is not an equilibrium, partial exclusion may arise, so that some retailers join A and other retailers join B, with some retailers possibly remaining unaffiliated. Given this prospect, it is sensible to explore how exclusive deals influence overall industry profits, and the distribution of them, for cases other than full exclusion.

I take up these issues below, but first, as a brief aside, note a simple case in which full exclusion always occurs.[12]

Corollary 1. *If there are two retailers ($N = 2$), then there is full exclusion in equilibrium.*

The intuition for this result is simple. When there are a total of two retailers, full exclusion leads to monopoly pricing, but a firm that considers rejecting an exclusive offer knows that its profits will be no higher than if no exclusive deals were offered at all. In other words, by defecting from an exclusive network, the remaining network is so small (it contains one firm) that it cannot internalize any competition. Thus, the defecting firm cannot free-ride on the efforts of the network to raise prices. Because of this, full exclusion always occurs.

Another way of seeing this corollary is recalling that, for any N, it must be that

$$\pi^A(N,0) - [\pi^A(N-1,0) + \pi^u(N-1,0)] > 0. \tag{1}$$

This simply says that joint profits increase if the lone outside firm joins an exclusive network containing all other firms, and follows from the fact, shown in Proposition 1, that heightened levels of exclusive dealing raise prices (along with the observation that prices never increase above the industry-maximizing level).

When $N = 2$, $\pi^A(N-1,0) = \pi^A(1,0) = \pi^u(1,0)$. This just says that if A has an exclusive partnership with only one retailer, and there are only two total in total, the combined profits of A and its retailer are the same as that of the unaffiliated retailer (which, recall, will have access to inputs at marginal cost and no fixed fee). In other words, as shown earlier, exclusive deals involving a single retailer have no effect on equilibrium. Using this equality and Equation (1) above yields

$$\pi^A(2,0) - 2\pi^u(1,0) > 0 \iff \frac{\pi^A(2,0)}{2} > \pi^u(1,0),$$

and the result follows from Proposition 2.

2.3. **Exclusive deals and retailer profits.** In this section I assess the impact of exclusive deals on the overall profitability of retailers. I've already shown that exclusive deals tend to raise the prices of all retailers, and hence it is intuitive that all retailers are better off in the presence of exclusive deals. Indeed, for unaffiliated retailers, the fact that exclusive deals involving other retailers leads all prices to increase is itself sufficient to guarantee that their profits increase—presuming, of course, that at least one supplier has at least two retailers locked into exclusive deals, so that the relevant conclusion of Proposition 1 applies.

The argument for why affiliated retailers earn higher profits is slightly more complicated. The reason is that such retailers earn zero continuation profits, pursuant to their acceptance

[12] It is interesting that an implication of Corollary 1 is that any study seeking to explain partial exclusion may be doomed, if it assumes there are only two retailers (an assumption that is commonly made).

of an exclusive deal, because their exclusive supplier extracts such profits with the fixed component of the contract offered at that stage. Thus, the overall profit of such a retailer is equal to the exclusivity fee they received in stage two.

To show that the equilibrium fee that exclusive retailers receive is sufficiently high that they are better off than in the absence of exclusive deals, consider retailer n who in equilibrium accepts a contract from, say, A, stipulating a fee F_n^A. Suppose the equilibrium levels of exclusive deals are given by N_A and N_B. This retailer believes that if it rejects A's offer (and chooses to be unaffiliated), there will be a total of $N_A - 1$ retailers who sign exclusivity deals with A and N_B who sign with B, so that n's total profits would be $\pi^u(N_A - 1, N_B)$.

Thus, in such an equilibrium it must be that

$$F_n^A \geq \pi^u(N_A - 1, N_B).$$

Now, in the absence of exclusive deals, all retailers are unaffiliated and the profits of each are $\pi^u(0,0)$, and so the result follows if this is smaller than $\pi^u(N_A - 1, N_B)$. To show that this must be so, recall that Proposition 1 shows that exclusive dealing raises prices, so long as it involves at least two firms locked into the same supplier. But this is exactly the desired condition:

$$\pi^u(N_A - 1, N_B) > \pi^u(0,0) \iff N_A > 2 \text{ or } N_B \geq 2.$$

Proposition 3. *Suppose that in equilibrium at least one supplier signs exclusive deals with at least three retailers, or that both suppliers sign exclusive deals with at least two retailers. Then the following statements are true.*

(1) *All retailers earn strictly higher profits than they would if exclusive deals were banned.*
(2) *Fixing the number of retailers who have exclusive deals with a given retailer, an increase in the equilibrium number of retailers who have exclusive deals with the other retailer raises the profits of all retailers.*
(3) *Unaffiliated retailers earn higher profits than affiliated retailers.*

Proposition 3, along with earlier discussions, strongly hints that retailers exert a negative externality on one another. After all, exclusive deals raise industry profits and retailer profits, and moreover industry profits would be maximized with full exclusion. Nonetheless, some retailers may chose to remain outside of exclusive networks in equilibrium.

This externality turns out to be very important not only for overall industry profits, but for the ability of suppliers to earn profits. I now turn to this issue.

2.4. **Exclusive deals and supplier profits.** In this section I show that exclusive dealing may increase the profits of suppliers, but need not. It may be somewhat surprising that suppliers can earn positive equilibrium profits. After all, A and B produce undifferentiated products (which ensures they earn zero profits in the absence of exclusivity deals). Moreover, A and B must pay retailers to accept exclusivity, and extend their offers to retailers at the same time. Thus, neither supplier has an inherent advantage at the contracting table, unlike in most prior work on the foreclosure theory of exclusive dealing (such as Rasmusen, Ramseyer, and Wiley (1991) and Bernheim and Whinston (1998)).

Whether suppliers earn positive or instead zero profits turns out to hinge closely on whether there is full or instead partial exclusion in equilibrium. First consider the case in which full exclusion occurs in equilibrium (recall that a simple necessary and sufficient condition exists for this to be the case, which is given in Proposition 2).

Proposition 4. *Suppose that full exclusion occurs in equilibrium, so that all N retailers sign exclusive deals with the same supplier. Then suppliers earn zero profits (although industry profits are maximized). Suppliers also earn zero profits if there is no exclusive dealing.*

Because full exclusion allows the relevant supplier to completely internalize downstream competition, industry profits are maximized under full exclusion. Nonetheless, even the supplier that secures deals with all downstream firms earns zero profits overall. The reason is simply that the other supplier bids up the exclusivity fee that retailers demand.

Indeed, in a full-exclusion equilibrium both A and B offer identical exclusive deals to each of the N retailers (and all retailers accept an offer from the same supplier). These contracts stipulate exclusivity fees equal to a $1/N$ share of the (maximized) industry profits: $F_n^{A*} = F_n^{B*} = \pi^A(N,0)/N$, for each n; retailers capture all of the industry profits. Note that, in all but knife-edge situations, these exclusivity fees strictly exceed the profits that any retailer could gain if it rejected the offers made to it: $F_n^{A*} = F_n^{B*} = \pi^A(N,0)/N > \pi^u(N-1,0)$.

In marked contrast, under partial exclusion, it need not be the case that suppliers make offers to the same retailers. That is, it may be that suppliers extend offers to disjoint sets of retailers, so that they are not competing against one another for exclusivity.[13]

The fact that partial exclusion may involve such disjoint offers has strong consequences for the profitability of suppliers. I will refer to such equilibria as "equilibria with disjoint exclusivity offers." To be precise, in such an equilibrium, A doesn't make any offers to retailers that B is making offers to, and B doesn't make any offers to retailers that A is making offers to.[14]

Proposition 5. *Consider any equilibrium with partial exclusion, so that neither supplier signs exclusive deals with all N retailers, and with disjoint offers. Then, generically, any*

[13]Indeed, in any equilibrium in which both A and B have exclusive networks, it cannot be the case that all the retailers in, say, B's network also receive exclusive offers from A.

[14]Note that full exclusion is necessarily not in the class of equilibria with disjoint offers.

supplier with at least two exclusive retailers earns positive profits (but a supplier with less than two exclusive retailers earns zero profits).

To better understand Propositions 4 and 5, recall that retailers exert a negative contracting externality on one another, at the stage where they decide whether or not to accept exclusive deals. In particular, the best outcome for retailers is for full exclusion to emerge. Indeed, for any demand system, full exclusion would emerge if retailers could resolve this contracting externality amongst themselves. They could do this, for example, if they could jointly commit to not remaining unaffiliated, such as by committing to accepting the highest exclusivity offer made. So committing would lead both suppliers to compete fiercely for exclusivity with all retailers, with equilibrium exhibiting full exclusion and retailers extracting the entirety of (maximized) industry surplus.

However, because retailers cannot so commit, and because each cares only about its own profits, the temptation to remain unaffiliated can be quite strong. Consequently, full exclusion only emerges under the condition given in Proposition 2. When this condition is violated, partial exclusion may arise instead, and suppliers may receive positive profits, although industry profits are not maximized. Obviously, this is bad for retailers, but good for suppliers (and consumers).

This reasoning reveals that the negative contracting externality among retailers is crucial for the ability of suppliers to earn positive equilibrium profits. A negative contracting externality among retailers is also essential in the foreclosure theory of exclusive dealing. However, the details of these externalities, and indeed whether they predict retailers jointly engage in too little or too much exclusive dealing, are very different. I discuss this in Section 3 below.

I now provide a different intuition for why suppliers earn zero profits under full exclusion, but positive profits under partial exclusion. This intuition is based on reinterpreting what suppliers are actually selling. In particular, instead of imagining that they are selling undifferentiated physical products, instead imagine that they are selling the service of internalizing downstream competition. Under this interpretation, it is easy to see why the profits of suppliers depend crucially on whether there is full or instead partial exclusion.

When there is full exclusion, both A and B are selling exactly the same service, which is internalization of downstream competition among all N retailers. This service is, clearly, very valuable. However, because both A and B can provide this service equally well, they are in essence undifferentiated; all industry profits flow to retailers.

Contrast this to a situation of partial exclusion, in which A and B are locking up disjoint networks. In this scenario, the suppliers are offering differentiated products. In particular, A is offering the service of internalizing competition within its exclusive network, while B is offering the service of internalizing competition within its exclusive network (which is disjoint from A's). This differentiation allows the suppliers to earn positive profits.

For example, I show in Section 4 that there are demand systems in which suppliers would earn negative profits if they attempted to lock up all N retailers, but where in equilibrium each supplier locks up $N/2$ of the retailers—and earns positive profits. Industry profits in the second situation are, of course, lower, but so are the outside values of firms accepting such deals.

3. Discussion

Above I presented a new but simple theory of exclusive dealing. In this section I reiterate the key elements of my theory, and then relate it to other work.

In my analysis, exclusive dealing has clear anticompetitive effects, raising the prices charged by all downstream outlets and increasing industry profit. Prices increase because exclusive deals give a supplier the ability and incentive to internalize downstream price competition among the retailers in its exclusive network.

The effect on prices and industry profits can be substantial. In Section 4 (see Figure 4 of that section) I provide an example in which partial exclusion increases prices by as much as forty percent in equilibrium.

The anticompetitive effect identified by me requires that suppliers indeed form networks. That is, the existence of an exclusive deal between but a single retailer and a supplier has no effect on industry outcomes. Similarly, it is necessary that competition exists between members of a given supplier's network. According to my theory, then, minimal levels of exclusive dealing, or exclusive dealing involving networks whose members would not reasonably be in competition, cannot be taken as anticompetitive.

3.1. **Relation to the foreclosure theory of exclusive dealing.** Some notable differences between my theory and the foreclosure theory are as follows.

First, the foreclosure theory assumes that a supplier's objective in using exclusive dealing is (obviously) to foreclose a potential upstream entrant, by denying that entrant sufficient scale to profitably operate, thereby deterring entry. Exclusive deals cannot be profitable for the incumbent unless entry is indeed deterred. Additionally, the foreclosing supplier is presumed to have an inherent contracting advantage over the potential entrant, in that the potential entrant is not present at the time the incumbent offers exclusive deals, or, similarly, cannot make counteroffers to downstream firms.

In contrast, the goal of exclusive dealing is not exclusion in my theory, and similarly it is not necessary for a supplier to deny its rival access to the downstream in order for exclusive dealing to be profitable. Instead, exclusive dealing allows suppliers to internalize downstream competition. Moreover, suppliers earn zero profits in those equilibria that involve a single supplier fully denying its rival access to the downstream, which is exactly the opposite of what happens in the foreclosure theory. Rather, as discussed earlier, suppliers only earn positive profits when both have access to the downstream market.

A second major difference is the effect of exclusive dealing on downstream players. In the foreclosure theory, at least some (if not all) downstream players are harmed by exclusive dealing, because they are denied access to lower-cost products. In my theory, the situation is more subtle. It is certainly true that end consumers are harmed by exclusive dealing. However, no retailers are harmed, and instead all retailers have higher profits. Indeed, in my assessment, retailers are better off precisely because exclusive dealing denies them access to lower-cost inputs; this is the means by which suppliers internalize downstream competition within their networks.

Most broadly, then, a key feature of my model is that exclusive deals are not weapons used by some firms against others. Thus, such deals do not harm competitors, but rather only harm competition.

This leads to the third major difference, which is that, absent exclusive dealing, retailers compete against one another in my analysis. Without this competition, there is no role for exclusive dealing. In contrast, the foreclosure theory typically assumes downstream firms are end buyers (and hence not in competition with other downstream firms). In fact, Fumagalli and Motta (2006) argue that downstream competition eliminates the ability of an incumbent supplier to foreclose entry.[15]

There is one important similarity between my theory and the foreclosure theory, which is that both involve a negative contracting externality among retailers. However, the nature of this externality, and its implications, are entirely different.

In particular, in the foreclosure theory, the incumbent supplier executes a divide-and-conquer strategy to push exclusive deals onto retailers in equilibrium. The negative contracting externality among retailers is that, from the standpoint of retailers, they are too willing to accept exclusive deals. That is, retailers would be jointly better off if they could agree to reject such deals.

In contrast, in my theory, exclusive deals always raise retailer profits, so that, if anything, retailers are too hesitant to accept such deals. If instead retailers could agree always to accept some exclusive deal, then in equilibrium both suppliers would bid for all retailers, and a single exclusive network containing all retailers would emerge in equilibrium. Industry profits would be maximized, and retailers would capture the entirety of these profits.

[15] Johnson (2012) seeks to clarify their contribution, arguing that a sufficiently high number of downstream retailers is required before an entrant can, in equilibrium, be guaranteed access to the market.

Instead, what often happens is that retailers prefer to remain outside of a single large exclusive network, and this lowers industry profits (compared to full exclusion) and allows suppliers to capture a share of profits. Thus, the negative contracting externality works in the opposite direction of that in the foreclosure theory.

Closely related to the idea of foreclosure is that of raising the costs of rivals. Krattenmaker and Salop (1986) discuss various possibilities particular to exclusive dealing, building on the fundamental insight of Salop and Scheffman (1983). A common feature of these theories, as in the foreclosure theory, is that exclusive deals between some set of firms place other firms at a competitive disadvantage in the market. This does not occur in my model: unaffiliated firms have access to inputs at (constant) marginal cost. Indeed, as observed above, unaffiliated firms are strict beneficiaries of exclusive deals involving other firms, as this allows them to free-ride on the price increases implemented by those exclusive networks.

3.2. **Relation to other theories of exclusive dealing.** Perhaps the most closely related work is Calzolari and Denicolò (2014), which also seeks to move past the existing foreclosure theory. Their model features a dominant firm and a competitive fringe, but the fringe is always active in the market. Thus, there is no inherent contracting advantage for the dominant firm, and the fringe is not foreclosed.

Although both approaches have similar goals at a broad conceptual level, they differ in several ways. One such difference is that, as mentioned, they consider a dominant firm, which is not the focus of my analysis. More importantly, there is no competition among downstream players in their work, whereas such competition is absolutely required for exclusive dealing to have an effect in my model. Rather, downstream buyers in their model have a preference for variety, and the dominant firm's product is differentiated from that of the fringe. When buyers are also heterogeneous, the dominant firm can use exclusive deals to extract more surplus from buyers.

Another article that seeks to address one of the problems with the foreclosure theory is Johnson (2012). In that work, I provide an explanation for why exclusive deals with some but not all retailers can benefit an incumbent supplier, even though an entrant has access to a perfectly competitive retail segment. The key insight is that, if there is an adverse selection problem regarding the entrant's quality, and if there is a pivotal retailer who can vouch for the quality of the entrant, then the incumbent supplier may profitably be able to bribe that retailer to not carry the entrant's product.

Besanko and Perry (1993) consider spatially differentiated retailers, each of which exogenously has an exclusive contract with one of two differentiated upstream suppliers. They show that exclusive contracts reduce the elasticities between retailers, and may lead to higher prices, although they argue that overall surplus is likely to go up due to fixed-cost savings.

In addition to exclusivity being exogenous in their model but endogenous is mine, another difference is that exclusive networks do not work to internalize competition as in my analysis. Rather, each retailer is spatially insulated from retailers that have exclusive deals with the same supplier, and so there is no pricing externality to internalize.

4. The Model with Linear Demand

In this section I explore equilibrium outcomes for the Spence-Dixit-Vives linear demand system. This allows me to provide more detail regarding the relevant economic forces, as well as explicitly identify the equilibrium levels of exclusive dealing as functions of the underlying demand parameters.

The demand for retailer n is given by

$$D_n(p_n, p_{-n}) = a - bp_n + c \sum_{k \neq n} p_k,$$

where $a = \frac{1}{1+(N-1)\gamma}$, $b = \left(\frac{1+(N-2)\gamma}{(1+(N-1)\gamma)(1-\gamma)}\right)$, and $c = \left(\frac{\gamma}{(1+(N-1)\gamma)(1-\gamma)}\right)$ The parameter $\gamma \in [0, 1]$ measures retailer substitutability. When $\gamma = 0$, retailers are local monopolists, but increases in γ raise competition until, at $\gamma = 1$, retailers are undifferentiated.

I begin by demonstrating that there are demand systems in which no exclusive dealing emerges at all, over a wide range of parameters. This is striking, given that exclusive dealing can significantly increase industry profits.

Consider the case of four retailers ($N = 4$). When retailers are sufficiently substitutable, so that γ is high, then it is possible to maintain exclusion. Indeed, full exclusion is the only possible equilibrium whenever $\gamma > 0.69$. For lower values of γ, however, there is no equilibrium in which retailers sign exclusive deals.

The following proposition states this formally. Note that numerical values (such as critical values of γ) given in this section are all approximate.

Proposition 6. *Suppose $N = 4$. For $\gamma > 0.69$, there is full exclusion in equilibrium. For $\gamma < 0.69$, no exclusive deals are signed. For any γ, suppliers earn zero profits.*

It is surprising that no exclusive deals emerge for $\gamma < 0.69$. The reason is that the fees that retailers would demand for low levels of exclusivity are sufficiently low that suppliers and retailers would both benefit. For example, consider a hypothetical equilibrium in which each supplier signs two retailers, $N_A = N_B = 2$. A retailer contemplating accepting such a deal with, say, A knows that it could decline, and compete against one firm that has an exclusive with A and two that have exclusive contracts with B. Doing so would yield $\pi^u(1, 2)$ for this firm, and so A would need to offer this amount as a fee to convince the retailer to sign.

Retailers receiving this amount from A, and no offer from B, would accept A's offer. A would earn positive profits, because it can be shown that

$$\pi^A(2,2) - 2\pi^u(1,2) > 0,$$

for all values of γ. Similarly, B could offer the same fees to its two retailers, who—expecting such offers—would be willing to accept, in the absence of a higher offer from A. B would also earn positive profits.

Why is this low level of exclusive dealing not an equilibrium? The reason is that it is too tempting for suppliers to seek to expand their networks and to practice full exclusion. That is, from the above supposed equilibrium, A (and similarly B) would find it profitable to make exclusive offers to all four retailers, thereby locking up the entire downstream market. This is true even though the two retailers slated to receive offers from B would demand a very high fee from A. Indeed, because retailers receiving unexpected offers from A believe that A is trying to monopolize the entire market, each such retailer demands the amount that it could earn by rejecting all exclusive offers and remaining the lone unaffiliated firm. Still, A would find it profitable to make these high offers to B's retailers, while still making lower offers to its own retailers. This is true for any γ.

Clearly, then, such partial exclusion cannot be an equilibrium. But, as indicated in Proposition 6, full exclusion cannot be an equilibrium, either, for $\gamma < 0.69$. That is, a supplier who must pay all four retailers the value of being the lone unaffiliated firm would make negative profits. Hence, for these values of γ, no exclusion whatsoever can occur in equilibrium. Conceptually, from an equilibrium with no exclusion, any retailer who receives an exclusivity offer expects that the supplier offering the deal is trying to lock up the entire market. This raises the costs to suppliers, and works to sustain no-exclusion as an equilibrium.

The logic above shows that the negative contracting externality among retailers can have somewhat subtle effects. In particular, this negative externality does not only prevent full exclusion from occurring in many cases, it indirectly prevents lower levels of exclusion from arising. That is, it may prevent lower levels of exclusion from being an equilibrium, even when the contracting externality amongst retailers at those lower levels is mild enough that they would be willing to join small exclusive networks at fees low enough that suppliers would be willing to offer them.

I now consider the case in which $N = 10$. In this scenario, a much more interesting set of possible equilibria arises. To focus, I limit my attention to equilibria in which either full exclusion arises, or in which each supplier signs $k \in \{0, 1, 2, .., 5\}$ retailers to exclusive deals, $N_A = N_B = k$, with disjoint exclusivity offers. Additionally, in cases where there are multiple equilibria (with different levels of k) for a given value of γ, I select the one with the largest value of k. Define $k(\gamma) \in \{0, 1, 2, .., 5\}$ to be this maximum possible (symmetric) equilibrium level of partial exclusion.

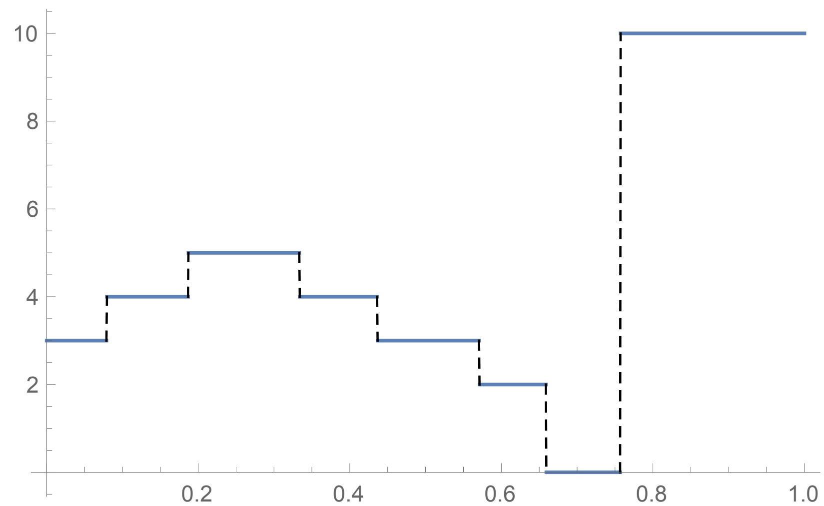


FIGURE 3. The maximum possible level of equilibrium exclusion, as a function of γ, for $N = 10$. For values of $\gamma < .7571$, the graph indicates the largest possible number of retailers that *each* supplier may sign in equilibrium. For $\gamma > .7571$, full exclusion occurs.

Figure 3 shows how the level of equilibrium exclusion varies with γ. $k(\gamma)$ is first increasing, and then decreasing. In particular, it begins at three, then gradually rises to five, before gradually falling all the way to zero; for $\gamma > .7571$, full exclusion occurs.

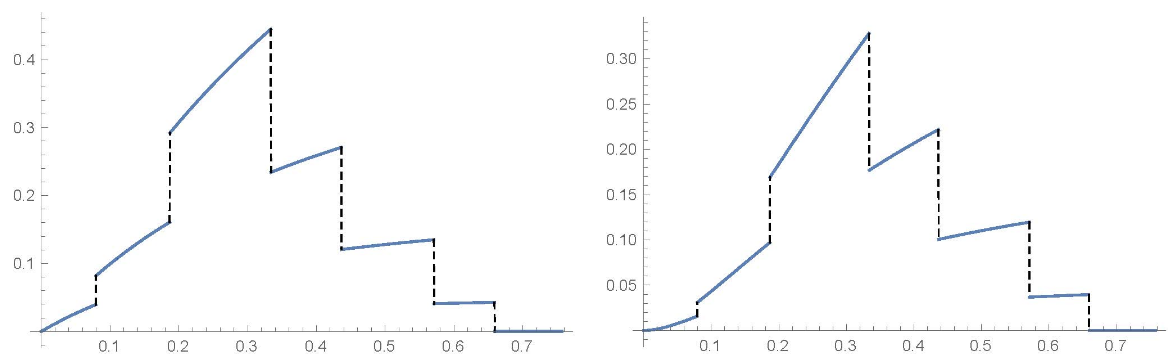
There are two economic forces that constrain the level of equilibrium partial exclusion, and which one is operative depends on the value of γ. The first is familiar from the discussion of the case with $N = 4$, and is operative for higher values of γ (say for values above 0.3337). Here, suppliers are tempted to expand to a level of full exclusion. The second force constrains for lower values of γ (say for values beneath 0.1868), and is the need for suppliers to make non-negative profits.

I now explain these forces and their effects in a bit more detail. In the region where γ is relatively low, the fees required for each supplier to lock up five retailers are sufficiently high that suppliers cannot earn positive profits by so doing. Equilibrium therefore involves each supplier locking up $N_A = N_B = k < 5$, where k is smaller as γ is smaller. Thinking about this from the perspective of increases in γ, one can say that it is less expensive in equilibrium to convince retailers to join a network when γ is higher. After all, there is more value to internalizing competition, and staying outside a network may have a larger impact on prices and hence profits of such unaffiliated firms. This second effect means that the fee that must be paid to secure exclusivity is lower.

When γ becomes larger (but still small enough that full exclusion does not occur), the restriction that suppliers earn non-negative profits no longer binds. However, it is tempting for suppliers to seek full exclusion, rather than making disjoint offers to only a few firms. To make such deviations unprofitable for suppliers, the level of partial exclusion must become smaller; $k(\gamma)$ must fall.

When there is less exclusion in equilibrium, the cost of reaching for full exclusion is higher, because it requires signing up a larger number of additional retailers. In particular, $N - k$ more retailers must be signed up than specified in equilibrium, where each of these additional retailers, upon receiving an out-of-equilibrium offer, believes full exclusion is occurring and hence demands the fee associated with being the lone unaffiliated firm.

Eventually, once γ exceeds 0.6591, the temptation to fully exclude is so great that no level of (symmetric) partial exclusion can be maintained. However, it is also not possible for full exclusion to generate non-negative supplier profits. Hence, in this region no exclusion arises at all. Finally, for $\gamma > 0.7571$, full exclusion is actually sustainable as an equilibrium, and indeed emerges.



(a) Average Price Increases from Exclusive Dealing. (b) Industry Profit Increases from Exclusive Dealing

FIGURE 4. The ratios of equilibrium prices or profits to those if exclusive dealing is not allowed. These are plotted as a function of γ, in the linear model with $N = 10$. For each γ, the highest level of exclusion that forms an equilibrium is considered.

Figure 4 shows how exclusive dealing influences average industry prices and total industry profits. As can be seen, price and profit increases are larger as the level of partial exclusion is larger. Indeed, for values of γ where each supplier signs five retailers, average price increases can exceed forty percent, and the increase in industry profit can exceed thirty percent.

In a given region of γ where the level of exclusion is constant, price and profit increases are increasing with γ. For example, as γ ranges from 0.0792 to 0.1868, each supplier locks up four retailers, and two are unaffiliated, and prices and profits both increase. This makes sense, given that the role of partial exclusion is to internalize retail competition, and given that higher γ values correspond to higher levels of retailer substitutability.

The proposition below summarizes some of the results presented above.

Proposition 7. *Suppose that* $N = 10$*. Then the maximum level of symmetric exclusion is first increasing and then decreasing in* γ*. For each* $k \in \{0, 1, 2, ..., 5\}$*,* $N_A = N_B = k$ *is an equilibrium for some values of* γ*. For* $\gamma > 0.7571$*, there is full exclusion. For* $\gamma < 0.6591$*, suppliers earn positive profits on all but a zero-measure subset, but for higher values of* γ *suppliers earn zero profits.*

5. Conclusion

I have presented a new and simple theory of exclusive dealing. It addresses an environment not considered by the prevailing theory of anticompetitive exclusive dealing, which emphasizes foreclosure. In particular, my approach accommodates the realistic prospect that all suppliers are able to compete for exclusivity deals if they wish, and that such deals do not have the effect of either denying entry to rivals nor of driving such rivals form the market.

Indeed, exclusive deals in my theory are not weapons used against other firms. Such deals do not disadvantage rivals, and instead raise the profits of all firms. Consumers are harmed by higher prices, however.

Although I have focused on exclusive deals, the underlying mechanism that I identify seems likely to hold in alternate contexts. That is, there are likely a variety of vertical restraints that have similar effects. For example, consider the role of vertical integration.

Previous analyses of vertical integration suggest that it may raise prices, if un-integrated downstream firms face higher input prices as a result (see Krattenmaker and Salop (1986) and Ordover, Saloner, and Salop (1990) for discussion and analysis of this "Frankenstein Monster" theory). Thus, this theory is one in which vertical integration by some firms is a weapon against others.

But, my approach suggests vertical integration can raise prices, even without placing other firms at a disadvantage. So long as there are more downstream firms than suppliers, some upstream firms may vertically integrate with multiple downstream firms without denying other upstream firms access to the downstream market. So long as the downstream is imperfectly competitive, then there is an incentive for the vertically integrated firm to raise the price charged through its subsidiaries. This is true even if it continues to compete aggressively for the business of un-integrated downstream firms.

Such a theory would also predict the potential emergence of multiple suppliers each integrated with multiple downstream firms, with some downstream firms perhaps remaining un-integrated. All firms might benefit from such integration, but consumers would suffer.

Finally, I have focused on the case of symmetric firms. But the basic intuition of the role of exclusive dealing that I have identified seems likely to persist in asymmetric environments. However, the details may differ, and interesting new results may (possibly) emerge.

References

Bernheim, B. D., and M. D. Whinston (1998): "Exclusive Dealing," *Journal of Political Economy*, 106(1), 64 – 103.

Besanko, D., and M. K. Perry (1993): "Exclusive dealing in a spatial model of retail competition," *International Journal of Industrial Organization*, 12, pp. 297–329.

Bonanno, G., and J. Vickers (1988): "Vertical Separation," *The Journal of Industrial Economics*, 36(3), pp. 257–265.

Calzolari, G., and V. Denicolò (2013): "Competition with Exclusive Contracts and Market-Share Discounts," *American Economic Review*, 103(6), 2384–2411.

——— (2014): "Exclusive contracts and market dominance," *Working paper*.

Chen, Y., and M. H. Riordan (2007): "Vertical integration, exclusive dealing, and expost cartelization," *The RAND Journal of Economics*, 38(1), 1–21.

Deneckere, R., and C. Davidson (1985): "Incentives to Form Coalitions with Bertrand Competition," *The RAND Journal of Economics*, 16(4), pp. 473–486.

Fumagalli, C., and M. Motta (2006): "Exclusive Dealing and Entry, When Buyers Compete," *American Economic Review*, 96(3), 785 – 795.

Johnson, J. P. (2012): "Adverse Selection and Partial Exclusive Dealing," *Working paper*.

Krattenmaker, T. G., and S. C. Salop (1986): "Anticompetitive Exclusion: Raising Rivals' Costs to Achieve Power over Price," *The Yale Law Journal*, 96(2), pp. 209–293.

Ordover, J. A., G. Saloner, and S. C. Salop (1990): "Equilibrium Vertical Foreclosure," *The American Economic Review*, 80(1), pp. 127–142.

Perry, M. K., and R. H. Porter (1985): "Oligopoly and the Incentive for Horizontal Merger," *The American Economic Review*, 75(1), pp. 219–227.

Rasmusen, E. B., J. M. Ramseyer, and J. Wiley (1991): "Naked Exclusion," *American Economic Review*, 81(5), 1137 – 1145.

Salant, S. W., S. Switzer, and R. J. Reynolds (1983): "Losses from Horizontal Merger: The Effects of an Exogenous Change in Industry Structure on Cournot-Nash Equilibrium," *The Quarterly Journal of Economics*, 98(2), pp. 185–199.

Salop, S. C., and D. T. Scheffman (1983): "Raising Rivals' Costs," *The American Economic Review*, 73(2), pp. 267–271.

Stigler, G. J. (1950): "Monopoly and Oligopoly by Merger," *The American Economic Review*, 40(2), pp. 23–34.