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# BUYER POWER AND EXCLUSION IN VERTICALLY RELATED MARKETS.

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# Buyer power and exclusion in vertically related markets*

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**Abstract**

We explore how the incentives for exclusion, both in upstream and downstream vertical markets, are related to the bargaining position of suppliers and retailers. We consider a model with a dominant upstream manufacturer and a competitive fringe of producers of imperfect substitutes offering their products to two differentiated downstream retailers. In this model we contrast the equilibrium outcome in two alternative situations. The first one is when the dominant supplier holds all the bargaining power, and this is compared with the outcome when the retailers have all the bargaining power. We show that exclusion occurs when interbrand and intrabrand competition is strong. Moreover, in contrast to the received literature, we find that when retailers have buyer power, this enhances welfare compared to when the manufacturer holds all the bargaining power.

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# 1 Introduction

Exclusion in vertical markets occurs when a seller or a buyer trades exclusively with one party. Exclusive purchasing is when a retailer trades exclusively with one manufacturer. On the other hand when a manufacturer decides to trade exclusively with one retailer, for instance in a given geographic region, this is denoted as exclusive territories or exclusive selling.

In vertically related markets exclusion has the potential to reduce social welfare and consumer surplus by increasing prices and reducing product variety. In this article we explore how the incentives for exclusion are related to the allocation of bargaining power between upstream manufacturers and downstream retailers. With differentiated manufacturers and retailers, exclusion can occur at both the upstream and downstream levels. Strong manufacturers may exclude both smaller upstream rivals and downstream retailers. Big retailers with strong bargaining power may also find it profitable to exclude smaller upstream producers and even rival retailers from distributing certain products.

The incentive to exclude rivals both in upstream and downstream markets, and its consequences for consumers and social welfare, are at the heart of a lively policy debate both in Europe and the US. This debate is partially concerned with the mere power of upstream and downstream firms, and partially concerned with specific contractual instruments that may facilitate the exclusion of rivals. One fear is that upstream firms with market power may enter into either explicit (or implicit) exclusive agreements with downstream retailers, or alternatively design wholesale contracts in such a way that retailers have the incentives to exclude upstream rivals. At the retail level the concern is that strong retailers may exploit their buyer power by auctioning exclusivity to competing manufacturers, or requiring high fixed payments from manufacturers with the exclusion of smaller upstream suppliers as a consequence. In addition, strong retailers may be able to exclude rival retailers from obtaining supplies.

The grocery market may serve as an example where both strong retailers and some strong upstream manufacturers are present. Over the last decades - and in most grocery markets around the world - the bargaining power has gradually shifted from the manufacturing sector to the retailers. The main reason for this shift is the consolidation of the retail sector that one has witnessed in grocery markets. In spite of this, there are still manufacturers that hold a strong position because they own strong brand names that can be regarded as so-called 'must-carry' for the retailers.

The grocery market also serves as an example of the application of advanced contractual instruments in wholesale contracts involving several vertical restraints, making contracts non-linear. In this market the use of fixed payments appears to be frequent. These payments are either charged to the suppliers by retailers - sometimes denoted as slotting allowances - or the other way around. There is some anecdotal evidence that the size and direction of fixed payments are related to the division of bargaining power between sellers and buyers. Policymakers largely regard these payments as instrumental in facilitating anticompetitive exclusion in both upstream and downstream markets. Consequently, policymakers in many countries seek to restrict the exploitation of buyer (or seller) power by regulating the possibility to use fixed fees as profit shifting devices. For example, the British regulation of the grocery market includes a ban on slotting fees. Another example is the Norwegian food chain commission, which recently suggested that a similar regulation should be considered for the grocery market in Norway.

This article explores how the incentives for exclusion, both in upstream and downstream markets, are related to the bargaining position of suppliers and retailers. We consider a model with a dominant upstream manufacturer and a competitive fringe of producers of imperfect substitutes offering their products to two differentiated downstream retailers. In this model we contrast the equilibrium outcome in two alternative situations. The first one is when the dominant supplier holds all the bargaining power, and this is compared with the outcome when the retailers have all the bargaining power. Bargaining power in our model is the ability to offer take-it-or-leave it contracts to the other party. By comparing the equilibrium outcomes in these two situations, we are able to gain some insight in how such a shift in bargaining power will affect the incentive to exclude and thereby social welfare and consumer surplus.

Our analysis is related to two strands of the literature on exclusion in vertical markets. First, our model is related to the literature on upstream exclusion; exclusive dealing. This literature investigates the Chicago doctrine (Bork, 1978; Posner, 1976), which basically states that exclusive dealing to dampen competition can never be profitable. Part of this literature investigates the potential for inefficient exclusion when buyers are final consumers (Aghion and Bolton, 1987; Bernheim and Whinston, 1998; O'Brien and Shaffer, 1997; Rasmusen et. al. (1991) and Segal and Whinston, 2000). The other part of this literature, and more related to our analysis, considers the case when buyers compete in a downstream market (Fumagalli and Motta, 2006, Abito and Wright, 2008 and Simpson and Wickelgren, 2007). Second, our analysis is related to recent literature on the potential for exclusion in downstream markets (Marx and Shaffer, 2007, Rey and Whinston, 2011; Miklos-Thal et al., 2011).

In our model the buyers compete in a downstream market and exclusion at either vertical level is driven by two basic factors; the degree of differentiation between upstream products (interbrand competition) on one side and differentiation between downstream retailers on the other (intrabrand competition), and the division of bargaining power between manufacturers and retailers. We find that both non-exclusionary and exclusionary equilibria exist under both seller and buyer power. Exclusion in our model occurs when either product and/or retailer differentiation is weak. However, we find that non-exclusionary equilibria can be sustained for a larger set of parameters for product and retail differentiation when the retailers have buyer power rather than when the bargaining power lies with the dominant manufacturer. This implies that retailer buyer power may enhance product variety. We also show that buyer power leads to lower prices compared with a situation where the manufacturer holds all the bargaining power.

With upstream bargaining power there is a trade-off for the dominant manufacturer between charging high wholesale prices and having more product variety. When differentiation is high, both upstream and downstream, no exclusion occurs in equilibrium. As the retailers, as well as the brands, become closer substitutes, the retailers are unable to sustain a high price on the competitive brand, and in turn this restricts the dominant manufacturer's ability to induce a high price for its product. At the same time, the value of variety is lower in this case. Hence, the manufacturer may want to use exclusive purchasing to reduce or eliminate competition from the competitive brand. This may result in partial foreclosure of the competitive brand. Moreover, we find that if intrabrand competition is strong enough, the dominant manufacturer may want to contract with only one retailer (exclusive selling); and if both interbrand and intrabrand competition are strong, the result may be complete foreclosure of either the competitive product, if interbrand competition is stronger, or one of the retailers, if intrabrand competition is stronger.

To some degree, our results resemble the Chicago school logic stating that one should expect that exclusion will occur only when it is efficient for the contracting parties. In our model the basic externalities arise from competition at both vertical levels, i.e. either competition between brands or between retailers. When competition at both levels becomes hard – in the sense that aggregate profit would be higher without competition at one level – then the agent causing the externality is excluded. However, the logic departs from the Chicago school when evaluating the consequences for social welfare. In our model social welfare is maximised under no exclusion, hence exclusion is always socially inefficient in our model.

When the manufacturer holds all the bargaining power our results also depart in a fundamental way from Fumagalli and Motta (2006)[1]. These authors – although in

[1] See also Rasmusen et al. (1991) and Segal and Whinston (2000).

a slightly different model – find that inefficient exclusion should not be expected when competition in the downstream market is hard. Instead, our results support the finding in Wright (2009) in a comment to Fumagalli and Motta's article; more intense downstream competition increases the likelihood of socially inefficient exclusion, a result that also has some intuitive appeal.

When retailers hold all the bargaining power, similar results apply; exclusionary equilibria arise when product and/or retail competition is hard enough. More important, with buyer power we find that non-exclusionary equilibria can be sustained for a larger set of parameter values than when the manufacturer holds all the bargaining power. This result is in some contrast to recent articles that investigate the effects of buyer power on downstream exclusion. Marx and Shaffer (2007) and Miklos-Thal et al. (2011) analyse the case where competing retailers make offers to a single manufacturer. Both papers explore the consequences of different contractual instruments under buyer power, specifically two-part and three-part tariffs and exclusive dealing provisions. When three-part tariffs or an exclusive dealing provision are feasible, Marx and Shaffer show that downstream exclusion (exclusive selling) always is an equilibrium outcome. In contrast, Miklos-Thal et al. find that if the retailers' offers instead can be made contingent on exclusivity or not, exclusion will occur only when retailers are very close substitutes.[2] This latter result resembles our result. However, the results in Marx and Shaffer and Miklos-Thal et al. indicate that, if anything, there will be more exclusion with buyer power than when the manufacturer has the bargaining power. We show that the key assumption leading to this conclusion is the upstream monopoly position of the manufacturer. When the dominant manufacturer is in competition with a fringe of smaller rivals, as in our model, the conclusion is reversed; buyer power leads to less exclusion.

The rest of the article is organised as follows. The next section presents the framework for our analysis. Section 3 analyses equilibrium outcomes when the seller has the bargaining power and the following section looks at the same under buyer power. Section 4 gives a conclusion.

# 2 The framework

We consider a market with two brands, A and B, that are distributed by two competing retailers, 1 and 2. Brand A is produced by a single manufacturer with market power (the

[2] If the retailers can use contingent offers and upfront payments (i.e., three-part tariffs), exclusion will never occur. See also Rey and Whinston (2011).

manufacturer). Whereas brand B, which we refer to as the competitive brand, is assumed to be supplied by a fringe of competitive firms, and offered to retailers at a price equal to marginal cost.[3] We assume that brands as well as retailers are imperfect substitutes in the eyes of the consumers.[4]

We will not put any ex-ante restrictions on the set of possible market configurations, and hence assume that, before contracts are entered into, each retailer has the ability to distribute both brands. If both retailers sell both brands (double common agency), then consumers are able to choose from a set $\Omega$ of four different "products", or product-service bundles, $\Omega = \{A1, B1, A2, B2\}$, where $\{A1, B1\}$ are distributed by retailer 1, and $\{A2, B2\}$ are distributed by retailer 2. To avoid confusion, we will refer to A and B as *brands*, and to $A1$, $B1$, $A2$ and $B2$ as *products* in the following.

We assume that the brands, as well as the retailers, are symmetrically differentiated. In order to make some comparisons and obtain some clear results, we are going to use the following linear model, where the inverse demand at retailer $j \neq k \in \{1, 2\}$ for brand $i \neq h \in \{A, B\}$ , is equal to

$$p_{ij}\left(q_{ij}, q_{hj}, q_{ik}, q_{hk}\right) = 1 - q_{ij} - bq_{hj} - dq_{ik} - bdq_{hk} \tag{1}$$

The parameter $b \in (0, 1)$ represents the degree of interbrand competition; when $b \to 0$, A and B become independent brands, whereas when $b \to 1$, they become closer substitutes. Similarly, the parameter $d \in (0, 1)$ represents the degree of intrabrand competition (substitutability between retailer services). Finally, we assume that the degree of competition between different brands in different stores, e.g. between product A1 and B2, is the product of the degree of interbrand and intrabrand competition, $bd \in (0, 1)$.[5] If all the products are sold ($q_{ij} > 0$ for all $ij \in \Omega$), then the direct demand for product $ij$ can be written

$$D_{ij}\left(p_{ij}, p_{hj}, p_{ik}, p_{hk}\right) = \beta - \lambda\left(p_{ij} - bp_{hj} - dp_{ik} + bdp_{hk}\right) \tag{2}$$

where $\beta = 1/\left(1 + b + d + bd\right)$ and $\lambda = 1/\left(1 - d^2 - b^2 + b^2d^2\right)$.[6] In the following we

[3] The competitive brand could for example represent the retailers' private labels.

[4] Differentiation between brands may be due to differences in taste, packaging, etc., whereas retailers may enjoy some market power due to due to differences in the type of services they offer, different geographic locations of the stores, etc.

[5] This demand system can be obtained from a representative consumer with a quadratic utility function. The same demand system is used in e.g. Dobson and Waterson (2007).

[6] The direct demand function is valid only as long as all four products are sold. E.g, when product $ik$ is not sold ($q_{ik} = 0$), then demand for the rest of the products become:
$D_{ij} = (1 + d)\left(\beta - \lambda\left(1 - d\right)p_{ij} + \lambda b\left(1 - d\right)p_{hj}\right)$

are going to use the notation $p_{ik} = \infty$, e.g. as in $D_{ij}(p_{ij}, p_{hj}, \infty, p_{hk})$, to indicate the situtation where a specific product, $ik$, is not sold.

## 2.1 Some preliminaries

We assume that unit production costs are constant and equal to $c \geq 0$ for each brand, A and B. Retailers have no costs other than the prices they pay when purchasing products in the intermediate market. Overall industry profit in the double common agency situation can then be written as $\Pi(p_{A1}, p_{B1}, p_{A2}, p_{B2}) = \sum_{ij \in \Omega}(p_{ij} - c) D_{ij}$, which has its maximum, $\Pi^M$, for symmetric prices $\mathbf{p}^M = (p^M, p^M, p^M, p^M)$, where $p^M = (1+c)/2$. Evaluated at the optimum, the first-order maximising condition for product A1 (symmetric for B1, A2 and B2) is

$$\left(p^M - c\right)\left[\sum_{ij \in \Omega} \partial_{p_{A1}} D_{ij}\right] + D_{A1}\left(\mathbf{p}^M\right) = 0, \tag{3}$$

where $\partial_{p_{A1}} D_{ij}$ is the partial derivative of the demand for product $ij \in \Omega$, with respect to the price of product A1. In the same fashion, we denote by $\Pi^X$ the maximum profit with a "mixed" configuration, where only *three* products are sold, $\Omega \backslash hk = \{ij, hj, ik\}$:

$$\begin{aligned} \Pi^X &= \Pi\left(p^M, p^M, p^M, \infty\right) \\ &= \max_{p_{ij}, p_{hj}, p_{ik}} \left[(p_{ij} - c) D_{ij} + (p_{hj} - c) D_{hj} + (p_{ik} - c) D_{ik}\right]_{p_{hk} = \infty} \end{aligned} \tag{4}$$

The industry profit with three products is maximised for the same prices equal to $p^M$. Evaluated at the optimum, the first-order conditions for each product are:

$$\begin{aligned} \left(p^M - c\right)\left[\partial_{p_{ij}} D_{ij} + \partial_{p_{ij}} D_{hj} + \partial_{p_{ij}} D_{ik}\right]_{p_{hk}=\infty} & \\ + D_{ij}\left(p^M, p^M, p^M, \infty\right) &= 0 \end{aligned} \tag{5}$$

$$\begin{aligned} \left(p^M - c\right)\left[\partial_{p_{hj}} D_{hj} + \partial_{p_{hj}} D_{ij} + \partial_{p_{hj}} D_{ik}\right]_{p_{hk}=\infty} & \\ + D_{hj}\left(p^M, p^M, \infty, p^M\right) &= 0 \end{aligned} \tag{6}$$

$$\begin{aligned} \left(p^M - c\right)\left[\partial_{p_{ik}} D_{ik} + \partial_{p_{ik}} D_{ij} + \partial_{p_{ik}} D_{hj}\right]_{p_{hk}=\infty} & \\ + D_{ik}\left(p^M, \infty, p^M, p^M\right) &= 0 \end{aligned} \tag{7}$$

Finally, we denote by $\Pi^U = \Pi\left(p^M, \infty, p^M, \infty\right)$ and $\Pi^D = \Pi\left(p^M, p^M, \infty, \infty\right)$ the max-

$D_{hj} = (1 - bd)(\beta - \lambda(1 + bd) p_{hj}) + \lambda b\left(1 - d^2\right) p_{ij} + \lambda d\left(1 - b^2\right) p_{hk}$
$D_{hk} = (1 + b)(\beta - \lambda(1 - b) p_{hk} + \lambda d(1 - b) p_{hj})$

imum profits when only one brand is sold (upstream monopoly) and when only one retailer is active (downstream monopoly), respectively. With the marginal cost normalised to zero ($c = 0$), overall maximum profits with four and three products, respectively, are equal to

$$\Pi^M = \frac{1}{(1+d)(1+b)} \quad ; \quad \Pi^X = \frac{3+d+b-bd}{4(1+d)(1+b)},$$

whereas the maximum profits for an upstream or downstream monopoly, respectively, are

$$\Pi^U = \frac{1}{2(1+d)} \quad ; \quad \Pi^D = \frac{1}{2(1+b)}.$$

Since products are imperfect substitutes, the following inequalities always hold: $\Pi^U + \Pi^D > \Pi^M > \Pi^X$, and $\Pi^X > \Pi^U$ and $\Pi^X > \Pi^D$.[7]

In general, the incentives of manufacturers and retailers are not perfectly aligned. The question of which party has the initiative when contracts are offered, may therefore be important. The answer has distributional consequences (who obtains more profit), but it may also have consequences for equilibrium prices and the level of total surplus generated. In turn, this may influence the equilibrium incentives to sustain different market configurations, such as double common agency versus any configuration with exclusive distribution.

To capture the possible differences in the incentives of manufacturers and retailers, we compare two extremes in the following: In the first case, *seller power*, bargaining power resides with the dominant manufacturer, who makes take-it-or-leave-it offers to the retailers. In the second case, *retailer power* (or buyer power), the two retailers have all the bargaining power, and make offers to the manufacturer. In both cases, bilateral efficient (two-part) tariffs are used when trading with the manufacturer, and in both cases product B is offered to the retailers at a per-unit price equal to the marginal cost. Finally, we allow any manufacturer-retailer contract to include provisions for exclusive purchasing (upstream exclusion) and/ or exclusive selling (downstream exclusion).

[7] Whether $\Pi^U > \Pi^D$ or $\Pi^U < \Pi^D$ depends on the degree of interbrand ($b$) versus intrabrand differentiation ($d$).

# 3 Seller power

We start with the case where the dominant manufacturer offers contracts to the two retailers.[8] We consider the following four-stage game:

1. (The contracting stage.) The manufacturer offers (public) two-part tariffs to the retailers. The total price paid by retailer $j$ for $q_{Aj}$ units of product A, is $T_j(q_{Aj}) = F_j + w_j q_{Aj}$, where $w_j$ is a wholesale price and $F_j$ is a fixed fee. The fixed fee can either be positive (a franchise fee) or negative (a slotting allowance), and we assume that it is paid irrespective of the level of final sales, i.e. $T_j(0) = F_j$.[9] The manufacturer can offer a common contract to both retailers (double common agency) or to just one retailer (*exclusive selling*). In addition, one or both contract offers may include a provision for *exclusive purchasing*, in which case the retailer(s) will be forced to sell product A only.

2. (The accept-or-reject stage.) After having observed all the contract offers, each retailer simultaneously and independently either accept or reject the manufacturer's terms. If all the contracts are accepted, the game proceeds directly to stage 4.

3. (The recontracting stage.) If the manufacturer made offers to both retailers at stage 1, and only one retailer accepted, then the manufacturer is allowed to offer the accepting retailer a new contract.[10]

4. (The pricing stage.) The retailers compete on prices in the downstream market, according to the terms and provisions in their contracts with the manufacturer.

[8] This part of the analysis is related in particular to a recent paper by Inderst and Shaffer (2010). They study the situation where a dominant manufacturer make contract offers to competing retailers that also sell a substitute product. Inderst and Shaffer demonstrate how the manufacturer may use market-share contracts to restore the industry maximising outcome. These contracts makes the retailers' payments to the manufacturer dependent on how much they sell of the substitute good. We assume that the manufacturer makes use of exclusive contracts instead. Exclusive contracts may be easier to monitor, and hence more credible for both the manufacturer and the retailer, than for example a commitment from the retailers to give the manufacturer's brand a specific in-store market share (Rey and Tirole, 2007).

[9] This is unlike Marx and Shaffer (2007) and Miklós-Thal et al. (2011), who analyse the use of three-part tariffs that combine an upfront payment $S_j$ to the retailer, with a *conditional* two-part tariff $T_j$ where $T_j = 0$ if the retailer buys nothing from the manufacturer. Both papers analyse the situation where retailers make offers to a common manufacturer.

[10] We could also assume that, at this stage, if the manufacturer made an offer to only one retailer at stage 1, and the retailer rejected the offer at stage 2, the manufacturer receives a chance to make an offer to the rival retailer at the recontracting stage. This would not affect any of our results. We therefore assume that the manufacturer is not allowed to make another offer in this case.

We purposely restrict attention to two-part tariffs in the contracting game, since we are interested in cases where firms are unable to maximise overall profits when all four products are sold. If the manufacturer was able to use additional restraints, e.g. resale price maintenance or market-share contracts, then this could serve to restore the industry maximising outcome, which would make exclusive contracting superfluous. See e.g. Rey and Vergé (2010) and Inderst and Shaffer (2010), who demonstrate how such restraints can restore the industry maximising outcome.

We solve the game backwards in the usual way, looking for the subgame-perfect equilibria. Before we move on, it is useful to introduce some notation: Given that both retailers are offered contracts at stage 1, with terms $\{w_1, F_1\}$ and $\{w_2, F_2\}$ respectively, and provided that both retailers accept, we can write retailer $j$'s profit at stage 4, $j \in \{1, 2\}$, as

$$\Pi_r^j = \max_{p_{Aj}, p_{Bj}} \{(p_{Aj} - w_j) D_{Aj} + (p_{Bj} - c) D_{Bj} - F_j\}$$

We denote by $\pi(w_1, c; w_2, c)$ and $\pi(w_2, c; w_1, c)$ the resulting equilibrium flow payoffs for retailer 1 and 2, respectively. Hence, we can write retailer $j$'s equilibrium profits at stage 4 as $\pi(w_j, c; w_k, c) - F_j$. Similarly, we denote by $D_{Aj}(w_j, c, w_k, c)$ and $D_{Bj}(c, w_j, c, w_k)$ the resulting demand for products $Aj$ and $Bj$ respectively, $j, k \in \{1, 2\}$, $j \neq k$. When exclusivity provisions are used, we replace the respective term(s) in these functions with $\infty$, to indicate the situations where the corresponding products are not sold.[11]

## 3.1 Equilibrium analysis

Consider first the subgame where the manufacturer offers a contract to only one retailer (exclusive selling). Suppose that this retailer is retailer 1, and that the retailer accepts the contract. (The case is symmetric if retailer 2 were receiving the offer.) There are two options: Either the manufacturer offers a 'common agency' contract (a common contract), in which case retailer 1 is allowed to sell both brands A and B; alternatively, the contract could include an exclusive purchasing provision, in which case retailer 1 is not allowed to sell brand B.

[11] We denote by $\pi(w_1, c; \infty, c)$ and $\pi(\infty, c; w_2, c)$ be the flow payoffs for retailer 1 and 2 when retailer 2 is not selling brand $A$; and by $\pi(w_1, c; w_2, \infty)$ and $\pi(w_2, \infty; w_1, c)$ the flow payoffs when retailer 2 is not selling brand $B$. We write as $\pi(w_1, \infty; \infty, c)$ and $\pi(\infty, c; w_2, \infty)$ the flow payoffs of 1 and 2 when retailer 1 is selling brand $A$ only, and retailer 2 is selling brand $B$ only. (These cases are symmetric when switching retailer 1 with retailer 2.)

Similarly, we denote by $\pi(w_1, \infty; w_2, \infty)$ and $\pi(w_2, \infty; w_1, \infty)$ the flow payoff for retailer 1 and 2 when both retailers sell brand A only, and by $\pi(\infty, c; \infty, c)$ the flow payoff for each retailer when they both sell brand $B$ only.

**Exclusive selling without exclusive purchasing** Suppose first that the manufacturer offers the retailer a common contract. If retailer 1 accepts, three products are sold in equilibrium, $\{A1, B1, B2\}$. The retailers' equilibrium profits at stage 4 are then $\pi(w_1, c; \infty, c) - F_1$ for retailer 1 and $\pi(\infty, c; w_1, c)$ for retailer 2. The manufacturer's maximisation problem at the contracting stage can then be written

$$\max_{w_1, F_1} [F_1 + (w_1 - c) D_{A1}(w_1, c, \infty, c)]$$
$$\text{s.t. } \pi(w_1, c; \infty, c) - F_1 \geq \overline{\pi}_r \ , \tag{8}$$

where $\overline{\pi}_r$ is retailer 1's reservation profit – i.e. the profit that the retailer earns when (at stage 2) it rejects the contract offer from the manufacturer. In case the retailer rejects the offer, the game proceeds directly to stage 4, where each retailer sells the competitive brand; in this case, the retailers earn the profit $\pi(\infty, c; \infty, c)$ each. Retailer 1's participation constraint can therefore be written $\pi(w_1, c; \infty, c) - F_1 \geq \pi(\infty, c; \infty, c)$; this constraint is clearly binding, since there is no incentive for the manufacturer to leave its retailer more surplus than it needs to accept the offer. We can therefore rewrite (8) as

$$\max_{w_1} \{\Pi(w_1, c, \infty, c) - \pi(\infty, c; w_1, c)\} - \pi(\infty, c; \infty, c) \tag{9}$$

where $\Pi(w_1, c, \infty, c)$ is the overall industry profit with three products $\{A1, B1, B2\}$, i.e. the manufacturer maximises its joint profit with retailer 1. It can be shown that, with our linear demand system, (9) is maximised for $w_1 = c$. Hence, in the subgame with exclusive selling (without exclusive purchasing), the retailers earn the profits $\Pi_r^1 = \pi(\infty, c; \infty, c)$ and $\Pi_r^2 = \pi(\infty, c; c, c)$, respectively, whereas the manufacturer earns the profit $\Pi_A = \pi(c, c; \infty, c) - \pi(\infty, c; \infty, c) > 0$,[12] i.e. the manufacturer earns its incremental contribution to the profit of the retailer that has 'exclusive selling rights' to brand A.

**Exclusive selling and exclusive purchasing** Suppose instead that the manufacturer offers retailer 1 an exclusive purchasing contract, and that the retailer accepts. In this case, the retailers sell different brands $\{A1, B2\}$. Maximisation by the retailers results in profits $\Pi_r^1 = \pi(w_1, \infty; \infty, c) - F_1$ to retailer 1 and $\Pi_r^2 = \pi(\infty, c; w_1, \infty)$ to retailer 2, where $\pi(w_1, \infty; \infty, c) < \pi(\infty, c; w_1, \infty)$ when $w_1 > c$, and $\pi(c, \infty; \infty, c) = \pi(\infty, c; c, \infty)$.

[12] With our linear demand system, the following always holds: $\pi(\infty, c; \infty, c) = \pi(\infty, c; c, c)$.

Again the manufacturer sets $\{w_1, F_1\}$ so as to maximise its joint profit with retailer 1,

$$\begin{aligned} &\max_{w_1, F_1} \left[F_1 + (w_1 - c)\, D_{A1}(w_1, \infty, \infty, c)\right] \\ &\text{s.t. } \pi(w_1, \infty; \infty, c) - F_1 \geq \pi(\infty, c; \infty, c) \ , \end{aligned} \tag{10}$$

which we can rewrite

$$\max_{w_1} \{\Pi(w_1, \infty, \infty, c) - \pi(\infty, c; w_1, \infty)\} - \pi(\infty, c; \infty, c) \tag{11}$$

where $\Pi(w_1, c, \infty, c)$ is the overall industry profit when the retailers sell different brands, $\{A1, B2\}$. The joint profit of the manufacturer and its retailer in this case is maximised for a wholesale price $w_1 > c$. It should come as no surprise that the outcome of this maximisation problem is the wholesale price $w_1 = w_l^* > c$ which gives the Stackelberg leader price in a game where the retailer selling brand A is the price leader (and vertically integrated with the manufacturer), and the retailer selling brand B is the follower. Hence, maximising (11) is equivalent to

$$\max_{p_A} (p_A - c)\, D\left(p_A, \infty, \infty, p_B^b(p_A)\right), \tag{12}$$

where $p_B^b(p_A)$ is the rival retailer's best response to the price $p_A$. In this case, the joint profit of the manufacturer and its exclusive retailer is the Stackelberg leader profit, $\pi_l^* = (p_l^* - c)\, D\left(p_l^*, \infty, \infty, p_f^*\right)$, whereas the rival retailer earns the Stackelberg follower profit, $\pi_f^* = \left(p_f^* - c\right) D\left(p_f^*, \infty, \infty, p_l^*\right)$, where $p_l^* > p_f^*$ and $\pi_f^* > \pi_l^*$. Let $\pi^E$ denote the maximum joint profit of the manufacturer and its retailer with exclusive selling, i.e., $\pi^E = \max\{\pi(c, c; \infty, c), \pi_l^*\}$. Let $\Pi_r^O$ be the (equilibrium) profit of the retailer without a contract with the manufacturer. We then have the following result.

**Lemma 1.** *(Exclusive selling) The maximum profit that the manufacturer and a retailer make under an exclusive selling agreement is* $\pi^E \equiv \max\{\pi(c,c;\infty,c), \pi_l^*\}$*, where* $\pi_l^*$ *is their joint (Stackelberg leader) profit when they also sign an exclusive purchasing agreement. With exclusive selling, the manufacturer earns the profit* $\Pi_A = \pi^E - \pi(\infty,c;\infty,c) > 0$*, whereas the profit of the retailer without a contract is*

$$\Pi_r^O = \begin{cases} \pi(\infty,c;c,c) & \text{if} \quad \pi(c,c;\infty,c) > \pi_l^* \\ \pi_f^* & \quad \textit{otherwise} \end{cases},$$

*where* $\pi_f^*$ *is the Stackelberg follower profit. Moreover,* $\Pi_r^O$ *is the reservation profit (outside option) for each retailer in the subgame where both receive an offer from the manufacturer at stage 1.*

Proof. Appendix A.

For the retailer who does not receive a contract offer at stage 1, say retailer 2, the subgame with exclusive selling is equivalent to the subgame where *i)* both retailers receive an offer, but where *ii)* retailer 2 (retailer 1) rejects (accepts) the manufacturer's offer at stage 2. In this case, the manufacturer will propose a new contract to retailer 1 at the recontracting stage. This new contract always maximises the joint profit of the pair $A-1$, which means that the manufacturer and the retailer earn the joint profit $\pi^E$. The profit of retailer 2 is therefore equal to $\Pi_r^O$, also in this case.

The equilibrium with exclusive selling is always somewhat competitive, in the sense that prices are below the integrated level, i.e. we have both $p_{B1}^*(c,c,c,\infty) = p_{B2}^*(c,\infty,c,c) \leq p_{A1}^*(c,c,\infty,c) < p^M$ when $\pi(c,c;\infty,c) > \pi_l^*$, and $p_{B2}^* = p_f^* < p_{A1}^* = p_l^* < p^M$ when $\pi(c,c;\infty,c) \leq \pi_l^*$.

**Double common agency** Suppose instead that the manufacturer offers (symmetric) contract terms $\{w, F\}$ to both retailers at stage 1, without any provisions for exclusivity.[13] If the retailers accept, we can write retailer 1's maximisation problem at stage 4 (symmetric for retailer 2) as

$$\max_{p_{A1},p_{B1}} \{(p_{A1}-w)D_{A1} + (p_{B1}-c)D_{B1} - F\}, \tag{13}$$

[13] Since consumer demands at retailer 1 and 2 are perfectly symmetric, the manufacturer would never want to offer discriminatory contracts that has $w_1 \neq w_2$ and $F_1 \neq F_2$.

which yields the following first-order maximising conditions

$$(p_{A1} - w)\,\partial_{p_{A1}} D_{A1} + (p_{B1} - c)\,\partial_{p_{A1}} D_{B1} + D_{A1} = 0 \tag{14}$$

and

$$(p_{A1} - w)\,\partial_{p_{B1}} D_{A1} + (p_{B1} - c)\,\partial_{p_{B1}} D_{B1} + D_{B1} = 0. \tag{15}$$

Maximisation by the retailers results in profits equal to $\pi(w, c; w, c) - F$ for each retailer at stage 4. At stage 2, each retailer accepts the manufacturer's initial offer as long as they earn at least $\Pi_r^O$ each from accepting (Lemma 1), i.e. both retailers accept as long as $\pi(w, c; w, c) - F \geq \Pi_r^O$. Accordingly, we can write the manufacturer's maximisation problem at stage 1 as

$$\begin{aligned} &\max_{w,F} 2\left[F + (w - c)\, D_A(w, c, w, c)\right] \\ &\text{s.t. } \pi(w, c; w, c) - F \geq \Pi_r^O\ , \end{aligned} \tag{16}$$

which we rewrite as (the participation constraints are binding)

$$\max_{w} \Pi(w, c, w, c) - 2\Pi_r^O, \tag{17}$$

where $\Pi(w, c, w, c)$ is industry profit as a function of wholesale prices. The first-order maximising condition for the manufacturer is then simply $\partial_w \Pi = 0$. I.e., the manufacturer sets the wholesale prices so as to maximise the overall industry profits. However, because the retailers are selling the competitive brand, the manufacturer is unable to achieve the integrated profit $\Pi^M$. To see this, compare the retailer's first-order conditions (14) and (15) with the maximising conditions of the fully integrated firm (3). In doing so, we find that the following conditions have to hold if the manufacturer is to induce retailer 1 (symmetric for retailer 2) to charge the industry maximising price $p^M$ for each brand A and B:[14]

$$-\frac{\partial_{p_{A1}} D_{A2} + \partial_{p_{A1}} D_{B2}}{\partial_{p_{A1}} D_{A1}} = \frac{w - c}{p^M - c} \tag{18}$$

$$-\frac{\partial_{p_{B1}} D_{B2} + \partial_{p_{B1}} D_{A2}}{\partial_{p_{B1}} D_{A1}} = \frac{w - c}{p^M - c} \tag{19}$$

[14] Condition (18) and (19) are equivalent to condition (15) and (16) in Inderst and Shaffer (2010, p. 722) for the case of price competition.

Condition (18) is a familiar one: Since the own-price effect is negative, $\partial_{p_{A1}} D_{A1} < 0$, the condition says that to dampen competition for the manufacturer's brand, and induce a higher price $p_{A1}$, the manufacturer should *reduce* the retailers' markup by setting the wholesale price above marginal cost, $w > c$. On the other hand, since the cross-price effect is positive, $\partial_{p_{B1}} D_{A1} > 0$, condition (19) says that to induce a higher price $p_{B1}$ for the competitive brand, the manufacturer should *increase* the retailers' markup on brand A, by setting the wholesale price below the marginal cost, $w < c$. Since the manufacturer cannot satisfy both conditions, equilibrium prices are therefore always below the integrated level $p^M$. We denote by $w = w^*$ the equilibrium (symmetric) wholesale price that solves the manufacturer's problem (13) and by $p_A^{CS}$ and $p_B^{CS}$ the equilibrium retail prices for each brand. Let $\Pi^{CS} = \Pi(w^*, c, w^*, c)$ be the resulting industry profit in the double common agency situation.

**Lemma 2.** *(Double common agency) In the double common agency situation, the manufacturer sets a uniform wholesale price equal to* $w^* = d(1-b)/2$ *(*$c = 0$*). The resulting resale equilibrium has prices below the integrated level,* $c < p_B^{CS} < p_A^{CS} < p^M$*, and total industry profit equal to*

$$\Pi^{CS} = \frac{8(1-d) + (1-b)d^2}{2(1+b)(1+d)(2-d)^2} < \Pi^M$$

*In the double common agency situation, the manufacturer earns the profit* $\Pi_A = \Pi^{CS} - 2\Pi_r^O$*, which is positive only as long as the degree of both interbrand and intrabrand competition is low enough.*

Proof. Appendix A.

Intuitively, the manufacturer would like to set its wholesale price high to control downstream competition for its own product. However, since the manufacturer can not simultaneously raise the price for brand B, any increase in the price for brand A has the undesirable effect of diverting consumer demand to the competitive brand. This softens the manufacturer's incentives to increase its wholesale price. All retail prices are therefore slightly competitive in equilibrium in the double common agency situation.

**Exclusive purchasing** For the manufacturer, the worst case for double common agency, as well as for exclusive selling, is when products as well as retailers are perfect substitutes; the subgame equilibrium then has all the prices equal to marginal cost. Under double common agency, the problem for the manufacturer is that retailers compete too hard when setting their prices for the competitive product. In the absence of more complex (and costly) alternatives, the manufacturer may amend the situation by including a provision for exclusive purchasing in one or both contract offers.[15] If one retailer commits to selling brand A only, then this will reduce competition and increase the price on the competitive product, which in turn allows the manufacturer to profitably induce a higher own-price. To see this, suppose first that the manufacturer proposes a non-exclusive contract to one retailer (the common retailer), and an exclusive purchasing contract to the other retailer (the exclusive retailer). Suppose retailer 1 is the common retailer with contract terms $\{w_1, F_1\}$, and that retailer 2 is the exclusive retailer with contract terms $\{w_2, F_2\}$. If both retailers accept, only three products are sold in equilibrium, $\{A1, B1, A2\}$. The retailers' respective maximisation problems at stage 4, are then

$$\max_{p_{A1},p_{B1}} \Big\{ (p_{A1} - w_1) D_{A1} (p_{A1}, p_{B1}, p_{A2}, \infty) + (p_{B1} - c) D_{B1} (p_{B1}, p_{A1}, \infty, p_{A2}) - F_1 \Big\} \tag{20}$$

for retailer 1, and

$$\max_{p_{A2}} (p_{A2} - w_2) D_{A2} (p_{A2}, \infty, p_{A1}, p_{B1}) - F_2 \tag{21}$$

for retailer 2. Notice that in this subgame, retailer 2 is active only as long as $w_2$ is low enough. As before, each retailer will accept the contract terms as long as each of them earns at least the outside option: The participation constraints in this case are $\pi (w_1, c; w_2, \infty) - F_1 \geq \Pi_r^O$ for retailer 1 and $\pi (w_2, \infty; w_1, c) - F_2 \geq \Pi_r^O$ for retailer 2. Again the manufacturer sets its fixed fees $F_1$ and $F_2$ so as to extract all of the retailers' surplus, net of their outside options, and then sets the wholesale prices $w_1$ and $w_2$ to maximise overall profits. The following first-order conditions characterise the Nash equilibrium at stage 4 as long as both retailers are active:

$$(p_{A1} - w_1) \partial_{p_{A1}} D_{A1} + (p_{B1} - c) \partial_{p_{A1}} D_{B1} + D_{A1} = 0 \big|_{p_{B2}=\infty} \tag{22}$$

$$(p_{A1} - w_1) \partial_{p_{B1}} D_{A1} + (p_{B1} - c) \partial_{p_{B1}} D_{B1} + D_{B1} = 0 \big|_{p_{B2}=\infty} \tag{23}$$

$$(p_{A2} - w_2) \partial_{p_{A2}} D_{A2} + D_{A2} = 0 \big|_{p_{B2}=\infty} \tag{24}$$

[15] As shown the by Inderst and Shaffer (2010), the dominant manufacturer may restore the integrated profit by offering each retailer a market-share contract, where the payment depends on how much the retailer sells of both product A and B. Exclusive contracts are just extreme versions of market-share contracts, and are generally not suitable to induce the integrated outcome (unless products are perfect substitutes) – since that would require all channels to be active. On the other hand, exclusive contracting may be cheaper to monitor and enforce than more complex contracts with horizontal elements, and may therefore provide a more credible (second-best) alternative.

In comparing the retailers' maximising conditions (22)-(24) with those of the integrated firm, (5)-(7), we find that, to induce the integrated price $p^M$ on all three products, the manufacturer has to satisfy the following three conditions:

$$-\frac{\partial_{p_{A1}} D_{A2}}{\partial_{p_{A1}} D_{A1}}\bigg|_{p_{B2}=\infty} = \frac{w_1 - c}{p^M - c} \tag{25}$$

$$-\frac{\partial_{p_{B1}} D_{A2}}{\partial_{p_{B1}} D_{A1}}\bigg|_{p_{B2}=\infty} = \frac{w_1 - c}{p^M - c} \tag{26}$$

$$-\frac{\partial_{p_{A2}} D_{A1} + \partial_{p_{A2}} D_{B1}}{\partial_{p_{A2}} D_{A2}}\bigg|_{p_{B2}=\infty} = \frac{w_2 - c}{p^M - c} \tag{27}$$

Similar to the case with double common agency, conditions (25) and (27) state that each retailer's wholesale price has to be above the marginal cost to achieve the integrated price for brand A. On the other hand, because $\partial_{p_{B1}} D_{A1} > 0$, condition (26) says that the wholesale price to the common retailer, $w_1$, should be *below* the marginal cost in order to induce a higher price on brand B. Hence, again the manufacturer is unable to get the retailers to charge the integrated price $p^M$ for all products. We denote by $w_2 = w^E$ and $w_1 = w^N$ the manufacturer's optimal wholesale price to the exclusive and the common retailer respectively, where $c < w^N < w^E$ as long as both retailers are active, i.e. as long as $D_{A2} > 0$. We denote by $p_A^E$, $p_A^N$ and $p_B^N$ the corresponding retail prices.

**Lemma 3.** *(Mixed configurations) The manufacturer is able to dampen retail intrabrand competition for the competitive brand by offering one retailer an exclusive contract* $\{w^E, F^E\}$ *and the other retailer a non-exclusive contract* $\{w^N, F^N\}$*, where* $c < w^N < w^E$*. Provided that both retailers are active, the resale equilibrium has prices below the integrated level, but higher than in the double common agency situation,* $p_A^{CS} < p_B^N < p_A^N = p_A^E < p^M$*. The industry profit is then equal to*

$$\Pi^{XS} = \frac{(1 - bd)\,[6 + 2b + 2d + db\,(2b + 2d - bd + 4)]}{2\,(1 + d)\,(1 + b)\,(4 - 3b^2 d^2)} < \Pi^X$$

*With a mixed configuration, the manufacturer earns the profit* $\Pi_A = \Pi^{XS} - 2\Pi_r^O > 0$*.*

Proof. Appendix A.

As long as there is some competition at the downstream level, the manufacturer is unable to induce the integrated price for both brands. By offering one retailer an exclusive contract, however, the manufacturer is able to reduce intrabrand competition for the competitive brand, which allows for a price increase for both brands compared to the double common agency situation.

To achieve prices equal to $p^M$, the manufacturer would have to induce a monopoly at either the upstream or the downstream level: First, notice that it follows from the retailers' participation constraints above that the exclusive retailer is willing to accept any wholesale price $w_2 \in [c, \infty)$, as long as $F_2 \leq -\Pi_r^O$. Hence, the manufacturer could offer the common retailer a wholesale price $w_1 = c$, and set the wholesale price $w_2$ of the exclusive retailer equal to infinity. This effectively precludes the exclusive retailer from competing in the downstream market, and allows for the common retailer to set the integrated price $p^M$ forboth brands. Gross of the fixed fee, the common retailer then earns the downstream monopoly profit $\pi(c, c; \infty, \infty) = \Pi^D$. To extract as much surplus as possible, and at the same time induce both retailers to accept these contract terms, the manufacturer should in this case offer the exclusive retailer a slotting allowance, $F_2 = -\Pi_r^O < 0$, and charge the common (active) retailer a franchise fee, $F_2 = \Pi^D - \Pi_r^O > 0$.

**Lemma 4.** *(Downstream monopoly) The manufacturer is able to achieve the downstream monopoly outcome, by offering one retailer an exclusive purchasing contract* $\{\infty, F^E\}$*, where* $F^E = -\Pi_r^O$*, and by offering the rival retailer a non-exclusive contract* $\{w^N, F^N\}$*, where* $w^N = c$ *and* $F^N = \Pi^D - \Pi_r^O$*. The resale price equilibrium then has prices* $p_A = p_B = p^M$ *and industry profit equal to* $\Pi^D$*. When inducing a downstream monopoly, the manufacturer earns the profit* $\Pi_A = \Pi^D - 2\Pi_r^O$*, which is positive as long as the degree of both interbrand and intrabrand competition is high enough.*

Proof. Appendix A.

Offering one retailer an exclusive selling contract is not sufficient to induce the downstream monopoly outcome in our model, since the rival retailer would still be able to sell the competitive product (Lemma 1). The only way for the manufacturer to achieve the downstream monopoly outcome, is therefore to have both a common and an exclusive retailer, and then charge the exclusive retailer a sufficiently high wholesale price to prevent it from undercutting the common retailer's monopoly price $p^M$.

Alternatively, the manufacturer could induce the upstream monopoly outcome by offering each retailer a contract $\{w, F\}$ that includes an exclusive purchasing provision, and hence exclude the competitive brand altogether. If both retailers accept the contract offer, then each retailer sells only the manufacturer's brand (single-sourcing). Retailer $j$'s maximisation problem at stage 4 is then

$$\max_{p_{Aj}} (p_{Aj} - w) D_{Aj}(p_{Aj}, \infty, p_{Ak}, \infty) - F \tag{28}$$

which gives the first order condition

$$\left(p^M - w\right) \partial_{p_{Aj}} D_{Aj}\big|_{p_{B1}=p_{B2}=\infty} + D_A\left(p^M, \infty, p^M, \infty\right) = 0 \tag{29}$$

evaluated at the price $p^M$ for $j \in \{1, 2\}$. It is then a simple task for the manufacturer to adjust the wholesale price $w$ such that (29) holds for both retailers. We denote by $w = w^U$ the (optimal) wholesale price for the manufacturer in this case. As before, each retailer will accept the contract as long as $\pi\left(w^U, \infty; w^U, \infty\right) - F \geq \Pi_r^O$. This proves the following result.

**Lemma 5.** *The manufacturer is able to achieve the upstream monopoly outcome, by offering each retailer an exclusive purchasing contract with terms* $\left\{w^U, F^U\right\}$*, where* $w^U = d/2$ *(*$c = 0$*). The resale price equilibrium then has prices* $p_{A1} = p_{A2} = p^M$ *and industry profit equal to* $\Pi^U$*. When inducing an upstream monopoly, the manufacturer earns the profit* $\Pi_A = \Pi^D - 2\Pi_r^O$*, which is positive as long as the degree of both interbrand and intrabrand competition is high enough.*

This is a well known result in vertical models where an upstream monopolist makes (public) offers to competing retailers. When both retailers are bound by provisions for exclusive purchasing, the manufacturer can charge wholesale prices that are high enough to induce each retailer to set the integrated price $p^M$, without having to worry about losing demand to rival brands. The manufacturer can then use its fixed fees to induce each retailer to accept the exclusive contracts.

The following two propositions summarise our subgame perfect equilibria respectively when $\pi\left(c, c; c, \infty\right) > \pi_l^*$ and $\pi\left(c, c; c, \infty\right) \leq \pi_l^*$.

**Proposition 1.** *The following cases depict the equilibrium market configurations when* $\pi\left(c, c; c, \infty\right) > \pi_l^*$*.*

- *Double common agency. An equilibrium exists where each retailer carries both brands, as long as* $\Pi^{CS} \geq \Pi^{XS}$*.*
- *Mixed configurations. An equilibrium exists where one retailer carries both brands and the rival carries the manufacturer's brand, as long as* $\Pi^{XS} \geq \max\left\{\Pi^{CS}, \Pi^U\right\}$*.*
- *Upstream monopoly (single sourcing). An equilibrium exists where each retailer carries only the manufacturer's brand, as long as* $\Pi^U \geq \Pi^{XS}$*.*

Proof. Appendix A.

For the manufacturer, there is a trade-off between charging higher wholesale prices, and having more product variety. When the two brands, as well as the retailers, are poor substitutes ($b, d \to 0$), the value of variety is high; at the same time the retail prices are close to the integrated level, even when all four products are sold. Hence, no exclusion occurs in this case. As the retailers, as well as the brands, become closer substitutes, the retailers are unable to sustain a high price on the competitive brand, and in turn this restricts the manufacturer's ability to induce a high price for brand A. At the same time, the value of variety is lower in this case. Hence, the manufacturer may want to use exclusive purchasing to reduce intrabrand competition for the competitive brand. This may result in either partial foreclosure of the competitive brand (mixed configurations), or complete foreclosure (upstream monopoly) when interbrand competition is fierce enough.

**Proposition 2.** *The following cases depict the equilibrium market configurations when* $\pi(c, c; c, \infty) \leq \pi_l^*$.

- *Mixed single sourcing. An equilibrium exists where one retailer carries the manufacturer's brand and the other retailer carries the competitive brand, as long as* $\pi_l^* - \pi(\infty, c, \infty, c) \geq \max\{\Pi^U, \Pi^D\} - 2\pi_f^*$.
- *Downstream monopoly. An equilibrium exists where one retailer is active and carries both brands, as long as* $\Pi^D - 2\pi_f^* \geq \max\{\Pi^U - 2\pi_f^*, \pi_l^* - \pi(\infty, c, \infty, c)\}$
- *Upstream monopoly (single sourcing). An equilibrium exists where each retailer carries only the manufacturer's brand as long as* $\Pi^U \geq \max\{\Pi^D - 2\pi_f^*, \pi_l^* - \pi(\infty, c, \infty, c)\}$.

Proof. Appendix A.

A comparison of the retailer's profits when intrabrand (and interbrand) competition is relatively strong, i.e. when $\pi(c, c; c, \infty) \leq \pi_l^*$, suggests that there is both a gain and a cost for the manufacturer of contracting with both retailers. The gain for the manufacturer is $\max\{\Pi^U, \Pi^D\} - \pi_f^* - \pi_l^* > 0$, which is the increase in the overall industry profits when inducing either the upstream or downstream monopoly profits; the equilibrium with exclusive selling yields Stackelberg leader-follower profits, which involve more competition and lower profits as long as both interbrand and intrabrand competition is strong. On the other hand, there is also a cost for the manufacturer, equal to $\pi_f^* - \pi(\infty, c, \infty, c) > 0$, which is the increase in retailer compensation when inducing either an upstream monopoly or a downstream monopoly. When the cost outweighs the gain, the manufacturer prefers

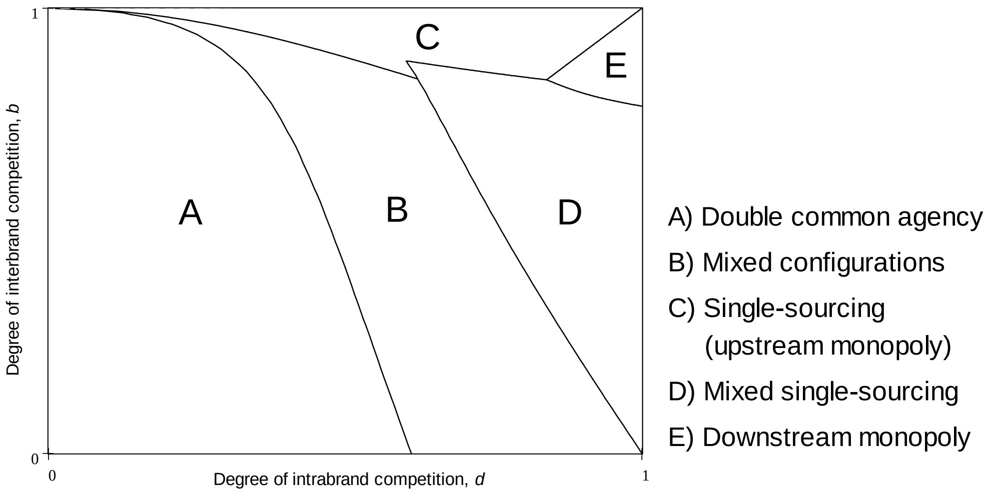


Figure 1: Equilibrium market configurations when the manufacturer makes the offers.

exclusive selling (mixed single sourcing).[16] However, as both interbrand and intrabrand competition becomes stronger ($b, d \to 1$), we have both $\pi_f^* - \pi(\infty, c, \infty, c) \to 0$ and $\pi_f^* + \pi_l^* \to 0$, i.e. the Stackelberg leader-follower profits approach the profits under Bertrand competition, and the gains then outweighs the costs for the manufacturer; the result is then complete foreclosure of either the competitive brand, if interbrand competition is stronger, or one of the retailers, if intrabrand competition is stronger. Fig. 1 illustrates the results in Propositions 1 and 2.

Restricting the use of exclusive purchasing contracts may enhance welfare when it is the manufacturer that makes the offers. Moreover, this is the case even if not simultaneously restricting the use of exclusive selling. The key to this understanding is that, without exclusive purchasing provisions, retailers are in a prisoners' dilemma where neither of them is able to commit to not selling the competitive brand.[17] Furthermore, as long as both retailers are selling the competitive brand, it is straightforward to show that the manufacturer always benefits from also distributing its brand through both stores.[18]

[16]The reason that the retailer compensation increases, is that, when competition is relatively fierce ($\pi_l^* \geq \pi(c, c; \infty, c)$), and the manufacturer contracts with both retailers, each retailer considers a unilateral deviation where it earns the Stackelberg follower profit $\pi_f^*$, where $\pi_f^* > \pi_l^* \geq \pi(c, c; \infty, c) > \pi(\infty, c; \infty, c)$ when (interbrand and intrabrand) differentiation is low. Hence, each retailer has to earn at least $\pi_f^*$ when accepting the manufacturer's offer.

[17]This is the case irrespective of whether a retailer has an exclusive selling contract with the manufacturer

[18]When there is a ban on exclusive purchasing, each retailer's reservation profit is equal to $\overline{\pi}_r \equiv \pi(\infty, c; c, c)$ irrespective of whether the manufacturer contracts both retailers. The manufacturer's profit

Hence, with a ban on exclusive purchasing, consumers may gain from both higher product variety *and* lower prices.

# 4 Retailer power

In situations where a monopolist manufacturer makes offers to competing retailers, or when competing manufacturers make offers to a monopolist retailer (O'Brien and Shaffer, 1997; Bernheim and Whinston, 1998), two-part tariffs are sufficient to induce the industry maximising outcome, and no exclusion occurs in equilibrium. In contrast, when there is competition at both levels – as for example when retailers also sell private labels that are substitutes for the manufacturer's brand – then two-part tariffs do not suffice to achieve the industry maximising outcome, and exclusion therefore occurs for a large range of parameter values – even if it is the manufacturer who makes the contract offers (Propositions 1 and 2). This is a relevant backdrop when examining whether there is more exclusivity when instead it is the retailers that dictate the contract terms.

In this section we assume that the retailers make the offers to the manufacturer. As in the case with seller power, we assume that the contracts are two-part tariffs, and that they may include exclusive purchasing and/or exclusive selling requirements.

It is a known result that when each retailer makes a single (non-contingent) contract offer to the manufacturer, and each offer consists of a fixed fee and a wholesale price, then there is no pure strategy equilibrium where both retailers sell the manufacturer's brand: Based on intuition, in every equilibrium with common agency the manufacturer should be indifferent between accepting both retailers' offers or only one retailer's offer. If not, then either retailer could increase its profit by offering a smaller fixed fee and still have the manufacturer accept both offers. Each retailer, on the other hand, is clearly better off if the manufacturer accepts only its offer, since the retailer would then be a monopolist. Hence, each retailer has an incentive to deviate to an exclusive selling contract (if allowed), or to slightly adjust its offer so as to induce the manufacturer to reject the rival's offer. If exclusive selling contracts are allowed, the only pure strategy equilibrium therefore has the manufacturer dealing with only one retailer.[19] This result is counter-intuitive,

is therefore $\pi(c, c; \infty, c) - \overline{\pi}_r$ under exclusive selling, and $\Pi^{CS} - 2\overline{\pi}_r$ under double common agency. It can be shown that the inequality $\Pi^{CS} \geq \pi(\infty, c; c, c) + \pi(c, c; \infty, c)$ always holds; this implies that the manufacturer always prefers a double common agency in this case.

[19] If explicit exclusive agreements are banned, then the retailer could slightly change its contract terms so as to make the manufacturer accept only its offer. There is then no pure strategy equilibrium in the game.

since it suggests that retailers are unable to coexist, even under the smallest degree of competition.

In contrast, if each retailer's offer can be contingent on whether it obtains the manufacturer's brand exclusively, as in Bernheim and Whinston's (1998) seminal paper, then a (double) common agency equilibrium can be restored for some range of parameter values.[20] In the following we therefore assume that the retailers' make use of such contingent contracts. The game then unfolds as follows:[21]

1. (The contracting stage.) Retailers simultaneously make (public) take-it-or-leave-it offers to the manufacturer. Each retailer's contract offer may be contingent on whether the retailer obtains product A exclusively: In this case, retailer $j \in \{1, 2\}$ offers a pair of two-part tariffs $\left(T_j^C, T_j^E\right)$ where $T_j^C$ applies if A is sold by both retailers (common agency) and $T_j^E$ applies if retailer $j$ obtains brand A exclusively (exclusive selling). In addition, we allow each retailer's offer to include a provision for exclusive purchasing, in which case the retailer makes a commitment not to sell the competitive brand. A retailer is also allowed not to make an offer to the manufacturer.

2. (The accept or reject stage.) After having observed both retailers' offers, the manufacturer decides whether to accept both offers $\left\{T_1^C, T_2^C\right\}$, only one of the offers, $T_1^E$ or $T_2^E$, or none of the offers.

3. (The pricing stage) Retailers compete on prices in the downstream market in accordance with their contract terms.

Notice that in this game, there is no recontracting stage. When the manufacturer makes the offers, renegotiation occurs when the manufacturer's offer is rejected by one of the retailers. On the other hand, when the retailers make the offers, for the retailer there is no contract to renegotiate should the manufacturer reject its offer (the retailer then sells the competitive brand). Moreover, since each retailer's contract offer is contingent on whether or not the manufacturer deals with the rival, there is no reason to renegotiate the contract should the manufacturer reject the rival's offer – provided that each retailer's

[20] Bernheim and Whinston (1998) study the case where two competing manufacturers make (contingent) offers to a common retailer. However, to sustain a common agency equilibrium, offers do not need to be contingent on exclusivity in their model.

[21] This is similar to the game assumed in Miklos-Thal et al. (2011), with the exception that the retailers in our model use two-part tariffs (not three-part tariffs). In addition, the retailers in our model may sell a substitute brand, hence there is competition at both levels in our model. The contracts offers to the the manufacturer may therefore include exclusive purchasing as well as exclusive selling provisions.

offer is optimally designed for either situation, common agency or exclusivity. We therefore make the following assumption:

**Assumption 1.** *The retailers' exclusive offers, $T_1^E$ and $T_2^E$, are renegotiation proof: If retailer $k \in \{1,2\}$ withdraws its offers $\left\{T_k^C, T_k^E\right\}$, or if the manufacturer rejects retailer $k$'s offers, then the pair $A - j$ cannot increase their joint profit by renegotiating the contract $T_j^E$. This assumption implies that the contract $T_j^E$ yields a joint profit equal to $\pi^E$ (Lemma 1) for the manufacturer and retailer $j$.*

Since common agency equilibria are sustained by the retailers' "out-of-equilibrium" offers, $T_1^E$ and $T_2^E$, Assumption 1 is potentially important. It simply requires that these offers are optimally designed (i.e. credible).

## 4.1 Equilibrium analysis

Unlike the case when the manufacturer makes the offers, the equilibria need not be unique. For example, if a retailer insists on getting exclusive selling rights to brand A, then the rival retailer will have to compete for the same exclusive selling rights. For that reason, there always exists an equilibrium with exclusivity – even if the retailers, as well as the two brands, are virtually independent. Our strategy for solving the game is therefore to find for what range of parameter values the retailers can sustain a double common agency equilibrium, and then compare it with the situation when the manufacturer makes the offers. As in Bernheim and Whinston (1998), we restrict attention to equilibria that are Pareto-undominated for the retailers.

**Double common agency** Suppose the retailers at stage 1 offer the manufacturer (double) common agency contracts with terms $\{w_1, F_1\}$ and $\{w_2, F_2\}$, respectively. If the manufacturer accepts the contracts, competition at the last stage gives equilibrium flow payoffs equal to $\pi(w_1, c; w_2, c)$ and $\pi(w_2, c; w_1, c)$ for retailers 1 and 2 respectively. Let $u_1^E$ (respectively $u_2^E$) be the profit that the manufacturer receives by accepting retailer 1's (respectively 2's) exclusive selling contract $T_1^E$ (respectively $T_2^E$).

At the contracting stage, retailer 1 will maximise its own profit, subject to the condition that the manufacturer accepts each retailers' common agency contract and none of the exclusive offers. We can then write retailer 1's maximisation problem (symmetric for retailer 2) as

$$\max_{w_1,F_1} \left\{\pi_1 \left(w_1, c; w_2, c\right) - F_1\right\}$$
$$\text{s.t.} \sum_{j\in\{1,2\}} \left\{\left(w_j - c\right) D_{Aj} \left(w_j, c, w_k, c\right) + F_j\right\} \geq \max\left\{u_1^E, u_2^E\right\} \tag{30}$$

Similar to the case when the manufacturer made the offers, each retailer should set its fixed fee such that the manufacturer's incentive constraint holds with equality – i.e. the manufacturer should (weakly) prefer to accept the common contracts instead of one of the exclusive offers. Hence, we can rewrite the retailer's maximisation problem as

$$\max_{w_1} \left\{\Pi \left(w_1, c, w_2, c\right) - \pi_2 \left(w_2, c; w_1, c\right)\right\} + F_2 - \max\left\{u_1^E, u_2^E\right\}, \tag{31}$$

Retailer $j \in \{1, 2\}$ therefore offers a contract that maximises its joint profit with the manufacturer. (Note that the latter also trivially implies that both retailers always are active in equilibrium.[22]) Due to symmetry, we then have the first order condition $\partial_{w_j}\Pi - \partial_{w_j}\pi_k = 0$ for each retailer, $j \in \{1, 2\}$, $j \neq k$, at stage 1. Note that as long as both retailers have positive sales and markups on brand A, we have $\partial_{w_j}\pi_k > 0$. Furthermore, if each retailer's wholesale price is equal to the industry maximising wholesale price, $w_1 = w_2 = w^*$, then we have $\partial_{w_j}\Pi = 0$ (Lemma 2). However, since $\partial_{w_j}\pi_k > 0$, it follows that the wholesale price cannot be equal to $w^*$ in equilibrium when the retailers make the offers; the equilibrium wholesale prices are therefore below the industry maximising level. We denote by $w_1 = w_2 = \widetilde{w}$ the wholesale prices that solve the retailers' problems at stage 1, and let $p_A^{CR}$ and $p_B^{CR}$ denote the corresponding retail prices at each store. Furthermore, let $\pi^{CR} = \pi\left(\widetilde{w}, c; \widetilde{w}, c\right)$ be each retailer's profit gross of the fixed fee, and $\Pi^{CR} = \Pi\left(\widetilde{w}, c, \widetilde{w}, c\right)$ the resulting industry profit.

[22] This is unlike the case when the manufacturer makes the offers. It is easy to show that any offer that maximises the joint profit of the pair $A - j$, yields $D_{Aj} > 0$ in equilibrium. Moreover, if a retailer's offer is not accepted by the manufacturer, then the retailer always sells the competitive brand. Hence, the retailer is always active.

**Lemma 6.** *In the double common agency situation, each retailer sets its wholesale price equal to* $\widetilde{w} = d^2(1-b)/4 < w^*$ $(c=0)$*. The resulting resale equilibrium has prices that are lower than when the manufacturer makes the offers,* $c < p_B^{CR} = p_B^{CS} < p_A^{CR} < p_A^{CS}$*. The total industry profit is equal to*

$$\Pi^{CR} = \frac{32(1-d) + d^3(1-b)(4-d)}{8(1+b)(1+d)(2-d)^2} < \Pi^{CS} < \Pi^M$$

Proof. Appendix B.

The intuition for this result is straightforward: In equilibrium, each retailer makes an offer that maximises its joint profit with the manufacturer. The retailer then fails to take into account the effect of its own wholesale price on the rival's equilibrium flow payoff. The equilibrium wholesale prices are therefore lower than the industry maximising wholesale price.

To sustain a double common agency equilibrium with contingent contracts, each pair $A-j$ have to jointly earn at least as much as they could by deviating to an exclusive selling contract, i.e. each pair have to earn more than $\pi^E$, where $\pi^E$ is the maximum joint profit of the manufacturer and a retailer when they have an exclusive selling agreement, as specified by Lemma 1.

To determine when a double common agency equilibrium exists, we start with the case $\pi^E = \pi(c,c;\infty,c) > \pi_l^*$: Without loss of generality, let $F_1^E = F_2^E = F^E$ denote the profit that the manufacturer could obtain by accepting one of the exclusive offers. To prevent either retailer from profitably inducing exclusivity, the following condition then has to hold

$$\pi^{CR} - F^C \geq \pi(c,c;\infty,c) - F^E, \tag{32}$$

where $F^C$ is the (symmetric) fixed fee offered by each retailer to the manufacturer under double common agency. Since the manufacturer should be indifferent between accepting both retailers' offers and only one offer, we have $F^E = \Delta^C + 2F^C \geq 0$ in equilibrium, where $\Delta^C = 2(\widetilde{w}-c)D(\widetilde{w},c,\widetilde{w},c)$ is the manufacturer's equilibrium flow payoff if it accepts the common agency contracts. Hence, to obtain brand A exclusively, retailer $j \in \{1,2\}$ would have to marginally increase its exclusive bid, $F_j^E > F^E$, and/ or marginally reduce its common offer, $F_j^C < F^C$, which clearly is not profitable as long as (32) holds. By substituting $F^E = \Delta^C + 2F^C$ into (32) and rearranging, we obtain

$$\pi^{CR} + \Delta^C + F^C \geq \pi(c,c;\infty,c), \tag{33}$$

which states that a retailer's joint profit with the manufacturer (the left-hand side) has to be higher than their joint profit if they sign an exclusive deal. This condition implies that the fixed fee paid by the rival retailer ($F^C$) has to be high enough for a deviation to be unprofitable. By solving the inequality for the fixed fee, we get

$$F^C \geq \pi(c, c; \infty, c) - \pi^{CR} - \Delta^C \equiv \underline{F}, \tag{34}$$

where $\underline{F}$ is the minimum fixed fee needed to sustain a double common agency equilibrium. However, since a retailer could always withdraw its offer and earn the profit $\Pi_r^O = \pi(\infty, c; c, c)$, the following condition also has to hold

$$F^C \leq \pi^{CR} - \pi(\infty, c; c, c) \equiv \overline{F}, \tag{35}$$

where $\overline{F}$ is the maximum fixed fee that a retailer is willing to pay to obtain a (common) contract. Hence, as long as $\overline{F} \geq \underline{F}$ there exist (symmetric) fixed fees that can sustain a double common agency equilibrium. By rearranging the condition, we obtain

$$\Pi^{CR} \geq \pi(c, c; \infty, c) + \pi(\infty, c; c, c) \equiv \Pi^{XR}, \tag{36}$$

which says that the total profit $\Pi^{CR}$ when the manufacturer deals with both retailers, has to be higher than the overall profit $\Pi^{XR}$ in the mixed configuration where the manufacturer deals with only one retailer, where $\Pi^{XR} < \Pi^{XS} < \Pi^X$.

Suppose instead that $\pi(c, c; \infty, c) \leq \pi_l^*$. By the same logic as before, the joint profit of the manufacturer and a retailer have to be higher under double common agency than their profit if they sign an exclusive contract, $\pi^{CR} + \Delta^C + F^C \geq \pi_l^*$ – which we can solve in turn for the minimum fixed fee $\underline{F}$. However, as long as $u_1^E, u_2^E \geq 0$, either retailer can now withdraw its contract offer and earn the Stackelberg follower profit, $\Pi_r^O = \pi_f^*$.[23] Since each retailer has to earn at least $\pi_f^*$ to prevent it from deviating, and since $\pi_f^* > \pi_l^*$, the relevant condition for a double common agency equilibrium to exist is therefore $\Pi^{CR} - 2\pi_f^* \geq 0$. However, since $\Pi^{CR} - 2\pi(c, c; \infty, c) \leq 0$, the latter condition clearly cannot hold if also $\pi_f^* > \pi_l^* \geq \pi(c, c; \infty, c)$. Therefore there exists no double common agency equilibrium in this case.

For the sake of completeness, we should also check the joint incentives (under double common agency) for the manufacturer and a retailer to deviate to an exclusive purchasing

[23] Assumption 1 requires that $u_1^E, u_2^E \geq 0$. If $u_j^E < 0$, and and retailer $k$ withdraws its offers, then $u_j^E < 0$ cannot be optimal, since the retailer could set $u_j^E = 0$ to make the manufacturer accept its exclusive contract, which yields a joint profit $\pi_l^* > \pi(\infty, c; \infty, c)$.

agreement. This is never profitable as long as the following inequality holds.

$$\Pi^{CR} - \pi^{CR} \geq \max_{w} \left\{ \Pi\left(w, \infty, \widetilde{w}, c\right) - \pi\left(\widetilde{w}, c; w, \infty\right) \right\} \tag{37}$$

Removing the competitive brand from the store reduces the retailers' sales and markup, whereas it increases the sales and markup for the manufacturer. It can therefore only be profitable if the upstream margins are high and downstream margins are small – i.e., when downstream competition is fierce enough. Furthermore, it can be shown that condition (37) always holds as long as both $\Pi^{CR} \geq \Pi^{XR}$ and $\pi\left(c, c; \infty, c\right) > \pi_l^*$. The following proposition summarises the discussion so far.

**Proposition 3.** *When retailers make the offers, there exist double common agency equilibria that are Pareto-undominated (for the retailers), as long as both $\pi\left(c, c; \infty, c\right) > \pi_l^*$ and*

$$\Pi^{CR} \geq \pi\left(c, c; \infty, c\right) + \pi\left(\infty, c; c, c\right) \equiv \Pi^{XR}$$

*If either condition fails, then there is no (Pareto-undominated) equilibrium where all products are sold.*

Proof. Appendix B.

The following corollary then follows directly from Proposition 1 and 3.

**Corollary 1.** *Double common agency equilibria exist for a wider range of parameter values when the retailers make the offers.*

There exist an infinite number of (symmetric) double common agency equilibria as long as both conditions in Proposition 3 hold. The most preferred equilibrium for the retailers, however, is the one where each of them pays the minimum fixed fee $\underline{F}$, in which case each retailer earns the profit

$$\Pi_r = \pi^{CR} - \underline{F} \Longleftrightarrow \Pi_r = \Pi^{CR} - \Pi^{XR} + \Pi_r^O. \tag{38}$$

Hence, in this case each retailer earns its incremental contribution to the total profit also from selling brand A (relative to the retailer only selling the competitive brand), $\Pi^{CR} - \Pi^{XR}$, plus its outside option, $\Pi_r^O = \pi\left(\infty, c; c, c\right)$. Hence, if the retailer's incremental contribution from also selling brand A is negative, $\Pi^{CR} - \Pi^{XR} < 0$, then this would imply that each retailer earns less than its outside option, even if paying the minimum fee $\underline{F}$.

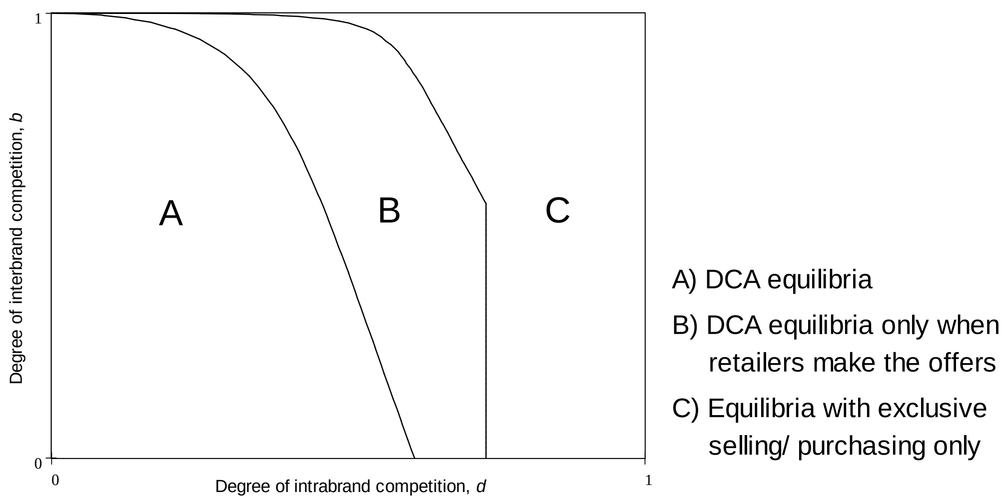


Figure 2: Double common agency equilibria exist for a wider range of parameter values when the retailers make the offers.

This clearly cannot be the case, and hence there is no equilibrium with double common agency in this case.

Corollary 1 is illustrated in Figure 2. Even though the overall profit is smaller in the double common agency situation when retailers make the offers, there is still less exclusivity compared to the situation when the manufacturer makes the offers. The key to this result is that when the retailers make the offers, each of them fails to consider the positive effect of signing an exclusive purchasing agreement on the rival's equilibrium flow payoff; in the same way that each retailer fails to take into account the positive effect of committing to a higher wholesale price on the rival's profit. Hence, it is less likely that exclusive purchasing agreements will be used when retailers make the offers; conversely, there is a higher chance that an exclusive selling provision will be used, since each retailer may have an incentive to try to prevent its rival from selling the manufacturer's brand.

When either condition in Proposition 3 fails, then there are only exclusionary equilibria. In the following we identify three Pareto-undominated equilibria with exclusivity, depending on the relative degree of downstream versus upstream competition.

**Mixed configurations** When the degree of intrabrand (interbrand) competition is sufficiently high (low), then we have both $\pi(c, c; \infty, c) > \pi_l^*$ and $\Pi^{CR} < \Pi^{XR}$, in which case there only exist equilibria in mixed configurations, where one retailer sells both brands and the other retailer sells the competitive brand. In this case, each retailer bids

$$F^E = \pi(c, c; \infty, c) - \pi(\infty, c; c, c) \tag{39}$$

to obtain an exclusive selling agreement. The manufacturer accepts one of the offers, and earns the profit $\Pi_A = F^E$, while each retailer earns its outside option, $\Pi_r = \pi(\infty, c; c, c)$. Since $\pi(c, c; \infty, c) > \pi_l^*$, the manufacturer and the retailer who's contract is accepted, cannot do better by also signing an exclusive purchasing agreement. Moreover, the retailer that is without a contract, cannot do better by increasing its bid $F^E$ – since the retailer would then earn less than its outside option. Similarly, the retailer whose offer is accepted, cannot do better by reducing its bid $F^E$, since it would still only earn its outside option.

**Equilibria with single sourcing** When $\pi(c, c; \infty, c) \leq \pi_l^*$, the only undominated equilibria imply that each retailer single-sources; i.e. either the retailers carry different brands, in which case we have either $\{A1, B2\}$ or $\{B1, A2\}$, or each retailer carries the manufacturer's brand, in which case we have $\{A1, A2\}$:

First, it can be shown that there always exists an equilibrium where the retailers carry different brands. In this case, one retailer (say retailer 1) offers a contract to the manufacturer that includes both an exclusive purchasing provision and a provision for exclusive selling, while the other retailer (say retailer 2) refrains from offering a contract to the manufacturer. The retailers then earn the profits $\Pi_r^1 = \pi_l^*$ and $\Pi_r^2 = \pi_f^*$, respectively, while the manufacturer earns nothing. Since $\pi(\infty, c; \infty, c) < \pi(c, c; \infty, c) \leq \pi_l^*$, the manufacturer and retailer 1 cannot increase their joint profit by waiving the exclusive purchasing agreement, and retailer 1 cannot increase its profit by withdrawing its contract offer. Moreover, since $\pi_f^* > \pi_l^* \geq \pi(c, c; \infty, c)$, retailer 2 cannot increase its profit by bidding to obtain an exclusive contract with the manufacturer.

If the degree of interbrand competition is sufficiently strong, then an equilibrium also exists in which the competitive brand is foreclosed and each retailer only carries the manufacturer's brand. In this case, retailer $j \in \{1, 2\}$ offers a (common) contract, $T_j^C$, that includes a provision for exclusive purchasing, and where $T_j^C$ maximises the joint profit of $A - j$ with respect to the wholesale price $w_j$:

$$\max_{w_j} \left\{ \Pi(w_j, \infty, w_k, \infty) - \pi_k(w_k, \infty; w_j, \infty) \right\} + F_k - \max\left\{u_1^E, u_2^E\right\} \tag{40}$$

Since $\partial_{w_j} \pi_k > 0$, the resulting equilibrium yields symmetric wholesale prices, $w_1 = w_2 = \widetilde{w}^U = d^2/4$ (when $c = 0$), where $c < \widetilde{w} < \widetilde{w}^U < w^U$. We let $\Pi^{UR} = \Pi\left(\widetilde{w}^U, \infty, \widetilde{w}^U, \infty\right)$

be the total industry profit in this case, where $\Pi^{UR} < \Pi^{U}$. Furthermore, we let $\pi^{UR} = \pi\left(\widetilde{w}^{U}, \infty; \widetilde{w}^{U}, \infty\right)$ be each retailer's equilibrium profit gross of the fixed fee. For this to constitute an equilibrium, it is both a necessary and sufficient condition that neither pair, $A-1$ or $A-2$, can increase their joint profit by waiving the exclusive purchasing agreement and deviate to a mixed configuration where the retailer is allowed to sell the competitive brand B:

$$\Pi^{UR} - \pi^{UR} \geq \max_{w} \left\{ \Pi\left(w, c, \widetilde{w}^{U}, \infty\right) - \pi_k\left(\widetilde{w}^{U}, \infty; w, \infty\right) \right\} \equiv \overline{X}_{A-j} \tag{41}$$

This condition always holds as long as the degree of interbrand competition is sufficiently strong. For example, it is clearly not profitable to drop the exclusive purchasing agreement if the brands are perfect substitutes; there is then no value in being able to sell the competitive brand (since the brands are identical), while there is clearly a value in committing to a wholesale price above cost, $w > c$. In this case, there exists a symmetric equilibrium where each retailer earns the profit $\Pi_r = \Pi^{UR}/2$, while the manufacturer earns nothing.

The following proposition summarises our equilibria with exclusivity when the retailers make the offers:

**Proposition 4.** *The following cases depict the Pareto-undominated (for the retailers) equilibrium market configurations when either* $\pi_l^* \geq \pi(c, c; \infty, c)$ *(and) or* $\Pi^{CR} < \Pi^{XR}$.

- *Mixed configurations. One retailer carries both brands and the other retailer carries the competitive brand as long as both* $\Pi^{CR} < \Pi^{XR}$ *and* $\pi_l^* < \pi(c, c; \infty, c)$.
- *Mixed single sourcing. One retailer carries the manufacturer's brand and the other retailer carries the competitive brand as long as both* $\pi_l^* \geq \pi(c, c; \infty, c)$ *and* $\Pi^{UR} - \pi^{UR} < \overline{X}_{A-1} = \overline{X}_{A-2}$.
- *Upstream monopoly (single sourcing). Each retailer carries only the manufacturer's brand as long as* $\Pi^{UR} - \pi^{UR} \geq \overline{X}_{A-1} = \overline{X}_{A-2}$.

Proof. Appendix B.

Proposition 3 and 4 are illustrated in Figure 3. When the retailers are allowed to offer tariffs that are contingent on exclusivity, then, for a certain parameter range, there exist offers that gives each pair $A-1$ and $A-2$ a higher joint profit under double common agency than either pair could achieve under exclusive selling. Hence, it may also be

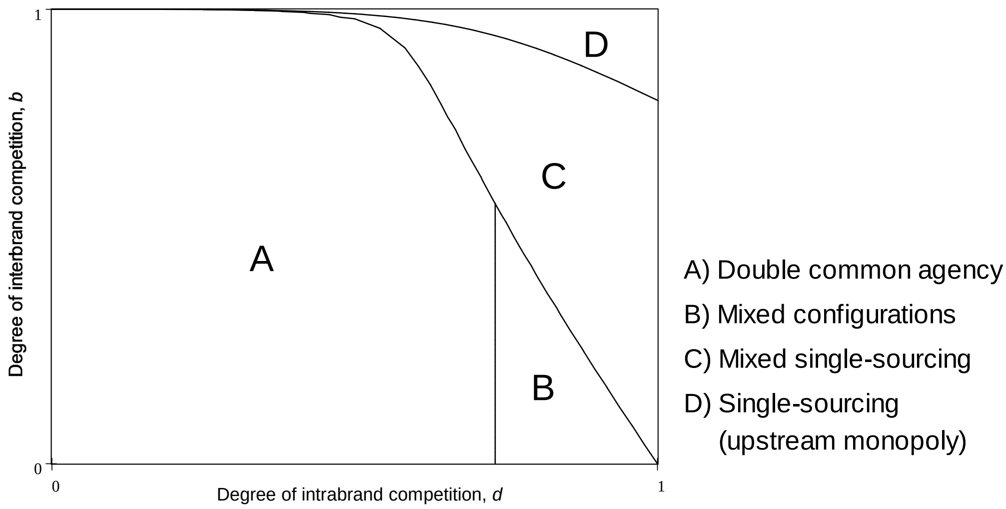


Figure 3: Equilibrium market configurations when the retailers make the offers.

possible to sustain a full distribution equilibrium.[24] However, as the degree of interbrand and/or intrabrand competition increases, the overall profit in a double common agency situation may no longer be high enough to prevent deviations to exclusivity. In this case, a retailer may want to use either an exclusive purchasing contract, to commit to a higher price on brand A, or an exclusive selling provision, to prevent the rival retailer from selling the manufacturer's brand.

Our results suggests that a ban on exclusive purchasing may enhance welfare, even if the retailers have all the bargaining power. Again the reason is that the retailers are unable to commit to not selling the competitive brand if they are not allowed to use such provisions. A ban on exclusive purchasing will not necessarily lead to full distribution of both brands, however, since there may still be an incentive for retailers to compete for an exclusive selling contract with the manufacturer whenever the degree of intrabrand competition is strong enough (i.e. whenever $\Pi^{CR} < \Pi^{XR}$). Moreover, since double common agency equilibria are sustained by each retailer's explicit "threat" of deviation to an exclusive selling agreement, the welfare consequence of restricting the use of such provisions is now unclear at best; a ban on exclusive selling may have the unintentional effect of causing more exclusivity.[25]

[24]Unlike the case with non-contingent offers; the manufacturer's joint profit with a retailer is then always higher with exclusive selling.

[25]See also Miklos-Thal et al. (2011).

# 5 Conclusions

In this article we have analysed how the incentives for exclusion, both in upstream and downstream markets, are related to the bargaining position of suppliers and retailers. Whereas most of the earlier literature has focused either on exclusion in upstream markets or in downstream markets, our model encapsulates both possibilities. In a model with a dominant upstream manufacturer and a competitive fringe of producers of imperfect substitutes. we have contrasted the equilibrium outcome in two alternative situations. The first one is when the manufacturer holds all the bargaining power, and this is compared with the outcome when the retailers have all the bargaining power.

We find that exclusionary equilibria exist when competition - either upstream or downstream - is hard enough. With upstream bargaining power these results depart from parts of the received literature (e.g. Fumagalli and Motta, 2006), who predict that exclusion should not occur when competition is hard. Our second main finding is that buyer power leads to less exclusion than when the bargaining power resides with the upstream manufacturer. This result is in contrast to some recent contributions (Marx and Shaffer (2007) and Miklos-Thal et al. (2011)), whose results suggest that there will be more exclusivity when retailers make the offers, rather than when manufacturers make the offers. This calls into question the welfare effects of buyer power, since the above papers indicate that more bargaining power to the retailers may lead to both higher prices and less choice for the consumer. Our results show that the key feature leading to this conclusion, is that, in the framework of both papers above, the manufacturer is assumed to be a monopolist. We find that their conclusion is reversed when the manufacturer faces competition from a fringe of competitive rivals. Then the manufacturer may want to use exclusivity provisions to limit the distribution of the competitive brand, and sometimes even to foreclose one of its retailers (to induce a downstream monopoly). In addition, we find that the manufacturer sometimes finds it optimal to contract with only one of the retailers (exclusive selling). As a consequence, equilibria with full distribution of both brands (double common agency) exists for a larger parameter range in our model when the retailers have buyer power, rather than when the manufacturer has the upper hand. We therefore come to the opposite conclusion, that buyer power may in fact often improve social welfare, since it may lead to both lower prices *and* higher product variety.

The key to our results is the fact that we distinguish between different types of exclusivity provisions – i.e. exclusive purchasing versus exclusive selling.[26] In our model, both

[26]This distinction is not possible in the framework of Marx and Shaffer (2007) and Miklos-Thal et al. (2011), since the manufacturer in their model is a monopolist.

the manufacturer, as well as the retailers, may want to use exclusive purchasing contracts in order to dampen downstream competition. However, unlike exclusive selling provisions, options to explicitly engage in exclusive purchasing are not necessary to sustain double common agency equilibria in our model. Hence, a restriction on the use of exclusive purchasing may improve social welfare, whether it is the retailers or the manufacturer that make the contract offers, while a restriction on the use of exclusive selling provisions may reduce social welfare, a result in seemingly stark opposition to current antitrust policy in for instance the European Union. It is also worth noting that, if we only consider exclusive selling contracts, then the result in Miklos-Thal et al. (2011) is reproduced in our model; there will then be exclusion of a retailer (although not complete) whenever the retailers make the offers, provided there is sufficient intrabrand competition, while exclusion never occurs if it is the manufacturer that makes the offers instead.

Although we feel that it may often be more appropriate to assume an asymmetric upstream industry, as in our model, with a dominant manufacturer competing against a fringe of competitive rivals, it could be interesting to also investigate the case of an asymmetric downstream industry. The mirror image of our framework would be two manufacturers, A and B, that both have some market power, an who distribute their brands at two retail locations, 1 and 2, assuming there is a retail bottleneck (a dominant retailer) at only one of the locations. In this case, we should get the (reverse) result that it may be socially beneficial to restrict the use of exclusive selling provisions – while a ban on exclusive purchasing may be harmful (since manufacturers would need exclusive purchasing options to sustain a common agency equilibrium). Furthermore, we believe that our result of there being less exclusivity under buyer power may also be reversed in this case.

# Appendix A: Seller power

**Proof of Lemma 1 (exclusive selling)** We normalise $c = 0$. At stage 1 the manufacturer offers a contract $\{w_1, F_1\}$ only to retailer 1 (the case is symmetric if it is retailer 2). Suppose first that the contract is not an exclusive purchasing contract, in which case retailer 1 is allowed to sell brand B. We then have $q_{A1}, q_{B1}, q_{B2} > 0$, and $q_{A2} = 0$. This gives the following demand at stage 4

$$
\begin{aligned}
D_{A1} &= (1+d)\left(\beta - \lambda(1-d)p_{A1} + \lambda b(1-d)p_{B1}\right) \\
D_{B1} &= (1-bd)\left(\beta - \lambda(1+bd)p_{B1}\right) \\
&\quad + \lambda b\left(1-d^2\right)p_{A1} + \lambda d\left(1-b^2\right)p_{B2} \\
D_{B2} &= (1+b)\left(\beta - \lambda(1-b)p_{B2} + \lambda d(1-b)p_{B1}\right)
\end{aligned}
\tag{42}
$$

where $\beta = 1/(1+b+d+bd)$ and $\lambda = 1/(1-d^2-b^2+b^2d^2)$. The retailers' profits at stage 4 are $\Pi_r^1 = (p_{A1}-w_1)D_{A1} + p_{B1}D_{B1} - F_1$ and $\Pi_r^2 = p_{B2}D_{B2}$. Maximisation by the retailers yields prices $p_{A1} = [(2-d)(1+w_1) - bd]/[2(2-d)]$ and $p_{B1} = p_{B2} = (1-d)/(2-d)$. Substituting into the demand functions and the retailers' profit functions gives the flow payoffs $\pi(w_1, c; \infty, c)$ (for retailer 1), $\pi(\infty, c; w_1, c)$ (for retailer 2), and $w_1 D_{A1}(w_1, c, \infty, c)$ for the manufacturer. The joint profit of the manufacturer and retailer 1 is then

$$
\begin{aligned}
\pi(w_1, c; \infty, c) + w_1 D_{A1}(w_1, c, \infty, c) &= \frac{(8 + d^3 - 4bd - 3d^2 - 4d + 3bd^2 - bd^3)}{4(1+b)(1+d)(2-d)^2} \\
&\quad - \frac{w_1^2}{4(1+b)(1-b)}
\end{aligned}
\tag{43}
$$

which is decreasing in $w_1$ for $w_1 > 0$ (and increasing in $w_1$ for $w_1 < 0$). Maximising (43) (which is equivalent to (8) or (9)) w.r.t. $w_1$ therefore yields $w_1 = 0\,(= c)$. Accordingly, the equilibrium joint profit of the manufacturer and retailer 1, and the profit of retailer 2, are equal to

$$
\Pi_r^1 = \pi(c, c; \infty, c) = \frac{(8 + d^3 - 4bd - 3d^2 - 4d + 3bd^2 - bd^3)}{4(1+b)(1+d)(2-d)^2} \tag{44}
$$

$$
\Pi_r^2 = \pi(\infty, c; c, c) = \frac{1-d}{(1+d)(2-d)^2} \quad (= \pi(\infty, c; \infty, c)) \tag{45}
$$

Suppose instead that the contract is an exclusive purchasing contract, and that the retailer accepts (in which case we have $q_{A1}, q_{B2} > 0$ and $q_{B1} = q_{A2} = 0$). Consumer demands at stage 4 are then

$$
D_{A1} = \frac{1 - \sigma - p_{A1} + \sigma p_{B2}}{1-\sigma^2} \text{ and } D_{B2} = \frac{1 - \sigma - p_{B2} + \sigma p_{A1}}{1-\sigma^2}, \tag{46}
$$

where $\sigma = bd$, and the retailers' profits are $\Pi_r^1 = (p_{A1} - w_1)D_{A1} - F_1$ and $\Pi_r^2 = p_{B2}D_{B2}$. Maximisation by the retailers yields prices $p_{A1} = (2 - \sigma - \sigma^2 + 2w_1)/(4 - \sigma^2)$

and $p_{B2} = \left(2-\sigma-\sigma^2+\sigma w_1\right)/\left(4-\sigma^2\right)$. Substituting these into the demand functions and the retailers' profit functions gives the flow payoffs $\pi\left(w_1,\infty;\infty,c\right)$ (for retailer 1) and $\pi\left(\infty,c;w_1,\infty\right)$ (for retailer 2), and $w_1 D_{A1}\left(w_1,\infty,\infty,c\right)$ for the manufacturer. The joint profit of the manufacturer and retailer 1 is then

$$\begin{aligned}\pi\left(w_1,\infty;\infty,c\right)+w_1 D_{A1}\left(w_1,\infty,\infty,c\right) &= -\frac{w_1\left(4w_1-2\sigma^2 w_1-2\sigma^2+\sigma^3+\sigma^4\right)}{\left(1-\sigma\right)\left(1+\sigma\right)\left(2-\sigma\right)^2\left(2+\sigma\right)^2} \\ &\quad +\frac{1-\sigma}{\left(1+\sigma\right)\left(2-\sigma\right)^2} \qquad (47)\end{aligned}$$

Maximising (47) (which is equivalent to (11)) w.r.t. $w_1$ yields $w_1 = w_l^* = \left(1-\sigma\right)\left(2+\sigma\right)\sigma^2 / \left[4\left(2-\sigma^2\right)\right] > 0$. Substituting this into the retail prices gives the Stackelberg leader and follower prices; $p_{A1} = p_l^* = \left(1-\sigma\right)\left(2+\sigma\right)/\left[2\left(2-\sigma^2\right)\right]$ and $p_{B2} = p_f^* = \left(1-\sigma\right)\left(4+2\sigma-\sigma^2\right)/\left[4\left(2-\sigma^2\right)\right]$. The joint profit of the manufacturer and retailer 1 therefore amounts to the Stackelberg leader profits $\pi_l^*$ in a game where $A-1$ are vertically integrated and act as a price leader, and $B-2$ is the follower. Retailer 2 therefore earns the Stackelberg follower profits $\pi_f^*$:

$$\pi_l^* = \pi\left(w_l^*,\infty;\infty,c\right)+w_l^* D_{A1}\left(w_l^*,\infty,\infty,c\right) = \frac{\left(1-\sigma\right)\left(2+\sigma\right)^2}{8\left(1+\sigma\right)\left(2-\sigma^2\right)} \qquad (48)$$

$$\pi_f^* = \pi\left(\infty,c;w_l^*,\infty\right) = \frac{\left(1-\sigma\right)\left(4+2\sigma-\sigma^2\right)^2}{16\left(1+\sigma\right)\left(2-\sigma^2\right)^2} \qquad (49)$$

Retailer 1 will accept any exclusive selling contract that yields $\Pi_r^1 \geq \pi\left(\infty,c;\infty,c\right)$. The manufacturer therefore sets $F_1$ such that $\Pi_r^1 = \pi\left(\infty,c;\infty,c\right)$ in both situations (with or without exclusive purchasing). It follows that the manufacturer earns the profit $\pi\left(c,c;\infty,c\right)-\pi\left(\infty,c;\infty,c\right) > 0$ without exclusive purchasing, and the profit $\pi_l^*-\pi\left(\infty,c;\infty,c\right) > 0$ with exclusive purchasing; the manufacturer therefore strictly prefers to offer an exclusive purchasing contract if $\pi_l^* > \pi\left(c,c;\infty,c\right)$. The equilibrium joint profit of the manufacturer and its retailer under exclusive selling is therefore $\pi^E = \max\left\{\pi\left(c,c;\infty,c\right),\pi_l^*\right\}$. It follows that the profit of the retailer without a contract, is

$$\Pi_r^O = \begin{cases}\pi\left(\infty,c;c,c\right) & \text{if } \pi\left(c,c;\infty,c\right)\geq\pi_l^* \\ \pi_f^* & \text{otherwise}\end{cases} \qquad (50)$$

For use later in the appendix, we define

$$\Pi^{XR} \equiv \pi\left(c,c;\infty,c\right)+\pi\left(\infty,c;c,c\right), \qquad (51)$$

which is the total industry profit under exclusive selling for the case $\pi_l^* \leq \pi(c, c; \infty, c)$.

If both retailers are offered contracts at stage 1, but retailer 2 rejects the contract at stage 2 (retailer 1 accepts), then the manufacturer and retailer 1 will agree on a new contract at stage 3. This contract maximises the joint profit of the manufacturer and retailer 1.[27] This means that the pair $A-1$ always earn a joint profit of $\pi^E$ in this subgame as well. Which means that retailer 2 earns $\Pi_r^O$. For retailer 2, these two subgames are therefore equivalent. **Q.E.D.**

**Proof of Lemma 2 (double common agency)** We normalise $c = 0$. The manufacturer's problem ((16) and (17)) is to set wholesale prices $\{w_1, w_2\}$ so as to maximise total industry profits, and adjust the fixed fees $\{F_1, F_2\}$ so that each retailer earns no more than its outside option, $\Pi_r^O$ (Lemma 1). By symmetry, we can set $w_1 = w_2 = w$ and $F_1 = F_2 = F$. Under double common agency ($q_{ij} > 0$ for all $ij \in \Omega$), consumer demand for product $ij \in \Omega$ is equal to

$$D_{ij} = \frac{1 - d - b + bd - p_{ij} + bp_{hj} + dp_{ik} - bdp_{hk}}{1 - d^2 - b^2 + b^2 d^2}, \tag{52}$$

Retailer $j$'s profit at stage 4 is $\Pi_r^j = (p_{Aj} - w) D_{Aj} + p_{Bj} D_{Bj} - F$, $j \in \{1, 2\}$. Maximisation by the retailers yields prices $p_A^* = (1 - d + w) / (2 - d)$ and $p_B^* = (1 - d) / (2 - d)$ at each store. By substituting these into the demand functions, we obtain the following overall industry profit.

$$\Pi(w, c, w, c) = \sum_{ij \in \Omega} p_{ij} D_{ij} \Bigg|_{p_{ij} = p_i^*} = \frac{2(2 + 2bd - 2d - 2b + dw - bdw - w^2)}{(1 + b)(1 + d)(1 - b)(2 - d)^2} \tag{53}$$

Maximising $\Pi(w, c, w, c) - 2\Pi_r^O$ w.r.t. $w$ yields $w^* = d(1 - b)/2$. By substituting $w^*$ into (53), we obtain

$$\Pi(w^*, c, w^*, c) = \Pi^{CS} = \frac{8(1 - d) + (1 - b) d^2}{2(1 + b)(1 + d)(2 - d)^2} \leq \Pi^M. \tag{54}$$

The equilibrium retail prices $\left(p_A^{CS}, p_B^{CS}\right)$ then satisfy $0 < p_B^{CS} = (1 - d) / (2 - d) < p_A^{CS} = [2 - (1 + b) d] / [2(2 - d)] < 1/2 = p^M$. The manufacturer's profit in the double common agency situation is $\Pi_A = \Pi^{CS} - 2\Pi_r^O$ (follows from Lemma 1). Hence, as long as both inter-

[27] It does not matter whether we assume that the original contract no longer applies in this case, or if we assume that the original contract still binds but may be renegotiated. Either way, negotiations between the manufacturer and retailer 1 at stage 3 will result in joint profit maximisation.

brand and intrabrand competition is low enough ($\pi_l \leq \pi(c, c; \infty, c)$), the manufacturer's profit is equal to

$$\Pi_A = \Pi^{CS} - 2\pi(\infty, c; c, c) = \frac{1-b}{2(1+d)(1+b)} > 0 \tag{55}$$

When interbrand and intrabrand competition is strong, we have $\Pi_A = \Pi^{CS} - 2\pi_f^*$, which is negative when $\pi_l^* > \pi(c, c; \infty, c)$. E.g., when $b = .5$ and $d = 1$, we have $\pi_l^* > \pi(c, c; \infty, c)$ and $\Pi_A = -0.22364$. **Q.E.D.**

**Proof of Lemma 3. (Mixed configuration)** We normalise $c = 0$. The manufacturer offers two contracts $\{w_1, F_1\}$ and $\{w_2, F_2\}$. The contract to retailer 1 is a common contract, whereas retailer 2 is bound by an exclusive purchasing provision. We assume that the terms $\{w_1, w_2\}$ are such that both retailers have positive demand. (We then have $q_{A1}, q_{B1}, q_{A2} > 0$ and $q_{B2} = 0$.) This gives the following demand at stage 4

$$\begin{aligned} D_{A1} &= (1-bd)(\beta - \lambda(1+bd)p_{A1}) \\ &\quad + \lambda b\left(1-d^2\right)p_{B1} + \lambda d\left(1-b^2\right)p_{A2} \\ D_{B1} &= \frac{1-b-p_{B1}+bp_{A1}}{1-b^2} \\ D_{A2} &= \frac{1-d-p_{A2}+dp_{A1}}{1-d^2} \end{aligned} \tag{56}$$

The retailers' profits at stage 4 are $\Pi_r^1 = (p_{A1} - w_1) D_{A1} + p_{B1} D_{B1} - F_1$ and $\Pi_r^2 = (p_{A2} - w_2) D_{A2} - F_2$. Maximisation by the retailers yields the prices

$$\begin{aligned} p_{A1} &= \frac{1-d}{2-d} + \frac{2w_1 + dw_2}{(2+d)(2-d)} \\ p_{B1} &= \frac{1-d}{2-d} + \frac{d((2+d)(1-b) + 2bw_2 + dbw_1)}{2(2-d)(2+d)} \\ p_{A2} &= \frac{1-d}{2-d} + \frac{2w_2 + dw_1}{(2+d)(2-d)} \end{aligned} \tag{57}$$

Substituting these into the demand functions, yields an overall industry profit equal to

$$\begin{aligned} \Pi(w_1, c, w_2, \infty) &= \frac{(2-d-d^2+2w_1+dw_2)x_1}{2(1+b)(1+d)(1-b)(1-d)(2+d)^2(2-d)^2} \\ &+ \frac{(1-b+bw_1)x_2}{4(1-b)(1+b)(2+d)(2-d)} + \frac{(2-d-d^2+2w_2+dw_1)x_3}{(1-d)(1+d)(2+d)^2(2-d)^2} \end{aligned} \tag{58}$$

where $x_2 = 4 - d^2 - bd^2 + 2bdw_2 - 2bd + bd^2 w_1$, $x_3 = 2 - d - d^2 + dw_1 - 2w_2 + d^2 w_2$ and

$$x_1 = (2+d)\left(2 + bd^2 - bd\right)\beta\lambda^{-1} - w_1\left(4 + b^2d^4 - 3b^2d^2 - 2d^2\right) + 2w_2 d(1+b)(1-b) \quad (59)$$

Maximising (58) w.r.t. $w_1$ and $w_2$ yields

$$w_1 = w^N = \frac{2(1+b)(1-b)d}{4 - 3b^2d^2} \text{ and } w_2 = w^E = \frac{d}{2}\left(1 - \frac{d^3b^2}{4 - 3b^2d^2}\right) \quad (60)$$

where

$$w^E - w^N = \frac{b^2 d(1-d)(2+d)^2}{2(4 - 3b^2d^2)} \geq 0. \quad (61)$$

By substituting $w^E$ and $w^N$ into the retail prices, we get

$$\begin{aligned} p_{A1} &= p_A^N = \frac{1}{2}\left(1 - \frac{b^2 d(2 - d^2)}{4 - 3b^2d^2}\right) \\ p_{B1} &= p_B^N = \frac{1}{2}\left(1 - \frac{bd(2 - b^2d^2)}{4 - 3b^2d^2}\right) \\ p_{A2} &= p_A^E = \frac{1}{2}\left(1 - \frac{d^2b^2}{4 - 3b^2d^2}\right) \end{aligned} \quad (62)$$

where $p_A^{CS} < p_B^N < p_A^N < p_A^E < p^M$ as long as $b, d \in (0,1)$. By substituting $w_1 = w^N$ and $w_2 = w^E$ into (58), we get the equilibrium industry profit:

$$\begin{aligned} \Pi\left(w^N, c, w^E, \infty\right) &= \Pi^{XS} = \frac{(1-bd)(6 + 2b + 2d + db(2b + 2d - bd + 4))}{2(1+d)(1+b)(4 - 3b^2d^2)} \\ &\leq \frac{3 + d + b - bd}{4(1+d)(1+b)} = \Pi^X \end{aligned} \quad (63)$$

The manufacturer's profit in the mixed configuration (when partially foreclosing brand B) is $\Pi_A = \Pi^{XS} - 2\Pi_r^O$ (follows from Lemma 1). An implicit plot of $\Pi^{XS} - 2\pi_f^* = 0$ reveals that this profit always is positive. **Q.E.D.**

**Proof of Lemma 4. (Downstream monopoly)** We normalise $c = 0$. It follows from Lemma 1 that a retailer who is bound by an exclusive purchasing provision, say retailer 2, will accept any contract terms that yield a profit at least equal to $\Pi_r^O$. The contract $\{w_2, F_2\} = \left\{\infty, -\Pi_r^O\right\}$ is such a contract. I.e., the manufacturer can use an exclusive purchasing agreement with retailer 2 and then set $w_2 \to \infty$ and $w_1 = c$ to induce $D_{A2} = 0\,(= D_{B2})$ at stage 4 irrespective of the level of $p_{A1}$ and $p_{B1}$. Retailer 1 is then free to set the integrated prices for both brands: In this situation, consumer demands for the two products $\{A1, B1\}$ are equal to

$$D_{A1} = \frac{1-b-p_{A1}+bp_{B1}}{1-b^2} \quad (64)$$

$$D_{B1} = \frac{1-b-p_{B1}+bp_{A1}}{1-b^2} \quad (65)$$

and retailer 1's profit is $\Pi_r^1 = p_{A1}D_{A1} + p_{B1}D_{B1} - F_1$, which is maximised for prices $p_{A1} = p_{B1} = p^M = 1/2$. By substituting these into the demand functions, we obtain the industry profit

$$\Pi^D = \pi(c, c; \infty, \infty) = \frac{1}{2(1+b)}. \quad (66)$$

If retailer 2 accepts the (exclusive purchasing) contract $\{\infty, F_2\}$, then retailer 1 will also accept the (common) contract $\{c, F_1\}$ as long as $\pi(c, c; \infty, \infty) - F_1 \geq \Pi_r^O$, i.e. as long as $\Pi^D - \Pi_r^O \geq F_1$. The manufacturer can therefore set $F_1 = \Pi^D - \Pi_r^O$ and $F_2 = -\Pi_r^O$ to induce both retailers to accept. The manufacturer then earns the profit $\Pi_A = \Pi^D - 2\Pi_r^O$, which is positive as long as intrabrand (and interbrand) competition is strong enough. For example, with $b = .9$ and $d = 1$, we have $\Pi_A = 0.14748$. **Q.E.D.**

**Proof of Lemma 5. (Upstream monopoly)** Straightforward.

**Proof of Proposition 1.** From Lemma 1-5 we know that the retailers earn the profit $\pi(\infty, c; c, c) = \pi(\infty, c; \infty, c)$ in all subgames, whereas the manufacturer earns the remainder. Since $\Pi^{XS} > \Pi^{XR}$, the optimal choice for the manufacturer reduces to $\max\{\Pi^{CS}, \Pi^{XS}, \Pi^U, \Pi^D\}$. A pairwise comparison of the industry profits under the different strategies, reveals that $\max\{\Pi^{CS}, \Pi^{XS}, \Pi^U\} > \Pi^D$ when $\pi_l^* < \pi(c, c; \infty, c)$ A pariwise comparison of $\Pi^{CS}, \Pi^{XS}$ and $\Pi^U$, yields Figure 4, which shows that the manufacturer prefers i) a double common agency (no exclusion) when $\Pi^{CS} > \Pi^{XS}$, ii) a mixed configuration (partial foreclosure of the competitive brand) when both $\Pi^{XS} > \Pi^{CS}$ and $\Pi^{XS} > \Pi^U$ (indifferent between double common agency and partial foreclosure when $\Pi^{CS} = \Pi^{XS}$), and iii) an upstream monopoly (complete foreclosure of the competitive brand) when $\Pi^U > \Pi^{XS}$ (indifferent between partial and full foreclosure when $\Pi^{XS} = \Pi^U$). **Q.E.D.**

**Proof of Proposition 2.** From Lemma 1-5 we know that the retailers earn the joint profit $\pi(\infty, c; \infty, c) + \pi_f^*$ in the subgame with exclusive selling, whereas they earn the joint profit $2\pi_f^*$ if the manufacturer contracts with both of them. The manufacturer earns the remainder. A pairwise comparison of the industry profits under the different strategies, reveals that $\Pi^{CS} < \max\{\Pi^{XS}, \Pi^U, \Pi^D\}$ when $\pi_l^* \geq \pi(c, c; \infty, c)$. The manufacturer's

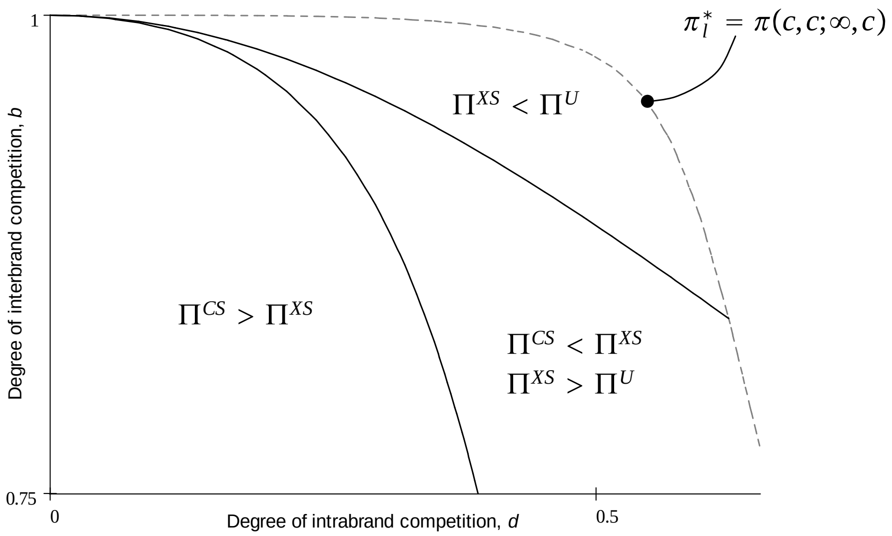


Figure 4: Seller power. Comparison of profits when $\pi_l^* < \pi(c, c; \infty, c)$.

profit can therefore be written $\max\left\{\Pi^{XS}, \Pi^U, \Pi^D\right\} - 2\pi_f^*$ when contracting with both manufacturers, and $\pi_l^* - \pi(\infty, c; \infty, c)$ with exclusive selling. Pairwise comparison reveals that $\pi_l^* - \pi(\infty, c; \infty, c) > \Pi^{XS} - 2\pi_f^*$ when $\Pi^{XS} > \max\left\{\Pi^U, \Pi^D\right\}$. We can therfore conclude that the manufacturer strictly prefers i) exclusive selling (mixed single sourcing) when

$$\pi_l^* - \pi(\infty, c; \infty, c) > \max\left\{\Pi^U, \Pi^D\right\} - 2\pi_f^*, \tag{67}$$

ii) a downstream monopoly when both $\Pi^D > \Pi^U$ and

$$\Pi^D - 2\pi_f^* > \pi_l^* - \pi(\infty, c; \infty, c) \tag{68}$$

and iii) an upstream monopoly (single sourcing) when both $\Pi^U > \Pi^D$ and

$$\Pi^U - 2\pi_f^* > \pi_l^* - \pi(\infty, c; \infty, c) \tag{69}$$

This yields Figure 5. Combining Figure 4 and 5, gives us Figure 1. **Q.E.D.**

# 6 Appendix B: Retailer power

**Proof of Lemma 6** We normalise $c = 0$. Demand for product $ij \in \Omega$ is given by (52). The profit of retailer $j \in \{1, 2\}$ at stage 4 is $\Pi_r^j = (p_{Aj} - w_j) D_{Aj} + p_{Bj} D_{Bj} - F_j$.

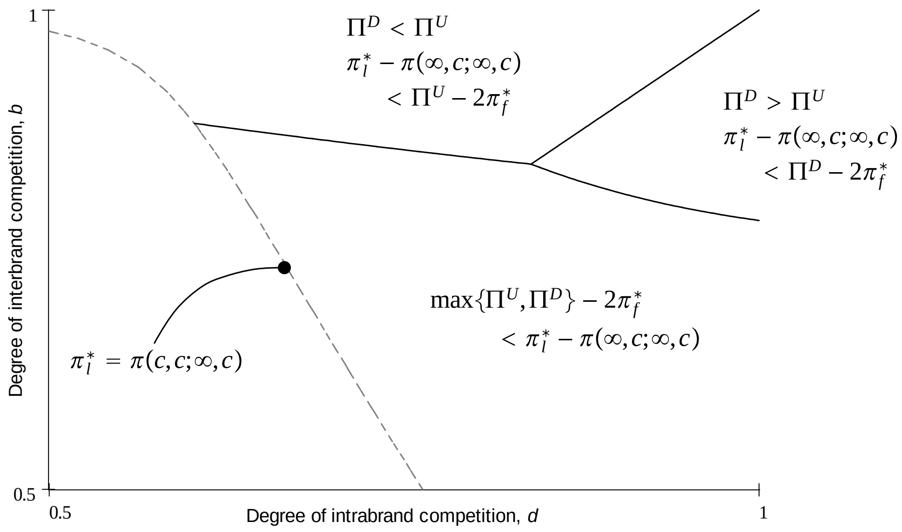


Figure 5: Seller power. Comparison of profits when $\pi_l^* > \pi(c, c; \infty, c)$.

Maximisation by the retailers yields a price for brand B equal to $p_B^* = (1-d)/(2-d)$ at each store, and a price for brand A at retailer $j \in \{1,2\}$ equal to

$$p_{Aj}^*(w_j, w_k) = \frac{1-d}{2-d} + \frac{2w_j + dw_k}{(2-d)(2+d)} \tag{70}$$

Inserting these into the retailers demand functions, yields the following flow payoff for retailer $j \in \{1,2\}$

$$\begin{aligned}\pi(w_j, c; w_k, c) &= \left(\frac{1}{\rho} - \frac{(2-d^2)w_j - dw_k}{\theta\rho}\right)\left(\frac{1-d}{2-d} - \frac{(2-d^2)w_j - dw_k}{(2-d)(2+d)}\right) \\ &\quad + \left(\frac{1}{\rho} + b\frac{(2-d^2)w_j - dw_k}{\theta\rho}\right)\frac{1-d}{2-d}\end{aligned} \tag{71}$$

where $\theta = (1-d)(1-b)(2+d)$ and $\rho = (1+b)(1+d)(2-d)$, and the following flow payoff for the manufacturer.

$$\Delta(w_1, c, w_2, c) = \left(\frac{1}{\rho} - \frac{(2-d^2)w_1 - dw_2}{\theta\rho}\right)w_1 + \left(\frac{1}{\rho} - \frac{(2-d^2)w_2 - dw_1}{\theta\rho}\right)w_2 \tag{72}$$

At stage 1, retailer $j \in \{1,2\}$ sets $w_j$ so as to maximise its joint profit with the manufacturer, subject to the condition that the manufacturer accepts the non-exclusive contract offers (see (30) and (31))

$$\max_{w_j} \{\pi (w_j, c; w_k, c) + \Delta (w_j, c, w_k, c)\} + F_k - \max \{u_1^E, u_2^E\} \tag{73}$$

Maximisation by the retailers yields a symmetric wholesale price $w_1 = w_2 = \widetilde{w} = d^2 (1-b)/4$, where $\widetilde{w} < w^*$. Inserting this into the retailers' flow payoffs in (71), yields the following equlibrium flow payoff for each retailer

$$\pi^{CR} = \pi (\widetilde{w}, c; \widetilde{w}, c) = \frac{(1-d)(32-(1-b)(8-d^2)d^2)}{16(1+b)(1+d)(2-d)^2} \tag{74}$$

and the following equilibrium flow payoff for the manufacturer

$$\Delta^C = \Delta (\widetilde{w}, c, \widetilde{w}, c) = \frac{(1-b)(2+d)d^2}{8(1+b)(1+d)} \tag{75}$$

The overall industry profit is then equal to

$$\Pi^{CR} = \Pi (\widetilde{w}, c, \widetilde{w}, c) = 2\pi^{CR} + \Delta^C = \frac{32(1-d) + d^3(1-b)(4-d)}{8(1+b)(1+d)(2-d)^2} < \Pi^{CS} \tag{76}$$

**Q.E.D.**

**Proof of Proposition 3** We normalise $c = 0$. To complete the proof, it is sufficient to show that as long as $\pi_l^* < \pi (c, c; \infty, c)$ and $\Pi^{CR} \geq \Pi^{XR}$, then

**i)** a retailer and a manufacturer cannot increase their joint profit by deviating to an exclusive purchasing agreement, and

**ii)** there are no equilibria with exclusive selling or exclusive purchasing, which Pareto dominate (for the retailers) the double common agency equilibria.

The joint profit of the manufacturer and a retailer (say retailer 2) in the double common agency situation, is

$$\Delta^C + \pi^{CR} + F^C = \Pi^{CR} - \pi^{CR} + F^C \tag{77}$$

The maximum joint profit for the manufacturer and retailer 2 when deviating instead to an exclusive purchasing agreement, is

$$\begin{aligned} &\max_{w_2} \{\Delta (\widetilde{w}, c, w_2, \infty) + \pi (w_2, \infty; \widetilde{w}, c)\} + F^C \\ &\quad = \max_{w_2} \{\Pi (\widetilde{w}, c, w_2, \infty) - \pi (\widetilde{w}, c; w_2, \infty)\} + F^C \end{aligned} \tag{78}$$

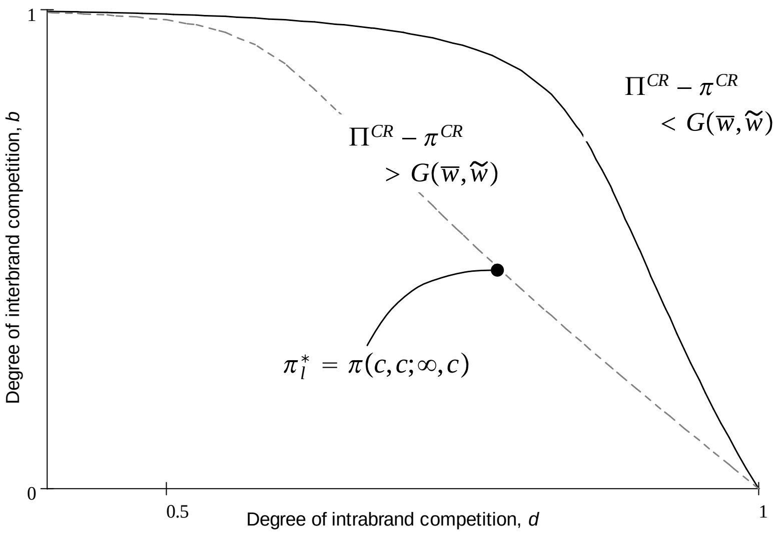


Figure 6: Retailer power. Double common agency. To the left of the solid line, a unilateral deviation (by a retailer) to exclusive purchasing is not profitable.

Let $\Pi(\widetilde{w}, c, w_2, \infty) - \pi(\widetilde{w}, c; w_2, \infty) \equiv G(w_2, \widetilde{w})$. We use the demand functions, prices and total industry profit function obtained in the proof of Lemma 3. Maximising $G(w_2, \widetilde{w})$ w.r.t. $w_2$ then yields the wholesale price $w_2 = \overline{w} = (2 - bd - d^2)\, d^2 / (8 - 4d^2)$, where $\overline{w} > \widetilde{w}$. After substituting $\overline{w}$ for $w_2$ in $G(w_2, \widetilde{w})$, the inequality $G(\overline{w}, \widetilde{w}) > \Pi^{CR} - \pi^{CR}$ determines when a deviation to exclusive purchasing is profitable. We have plotted $G(\overline{w}, \widetilde{w}) = \Pi^{CR} - \pi^{CR}$ in Figure 6, which shows that the deviation is never profitable as long as $\pi_l^* < \pi(c, c; \infty, c)$. This completes the proof that there exist double common agency equilibria as long as both $\pi_l^* < \pi(c, c; \infty, c)$ and $\Pi^{CR} \geq \Pi^{XR}$.

Moreover, we have to show that there exist double common agency equilibria which Pareto dominate (for the retailers) all equilibria with exclusive purchasing or exclusive selling. First, it can be shown that, as long as $\pi_l^* < \pi(c, c; \infty, c)$, there exist no equilibria where one retailer (say retailer 2) sells only the manufacturer's brand, and the other retailer (retailer 1) sells both brands, i.e., where e.g. the products $\{A1, B1, A2\}$ are sold. In this situation, the equilibrium wholesale prices are given by

$$\max_{w_1} \{\Pi(w_1, c, w_2, \infty) - \pi(w_2, \infty; w_1, c)\} + F_2 - \max\left(u_1^E, u_2^E\right) \tag{79}$$

and

$$\max_{w_2}\left\{\Pi\left(w_1, c, w_2, \infty\right)-\pi\left(w_1, c ; w_2, \infty\right)\right\}+F_1-\max\left(u_1^E, u_2^E\right)$$
$$=\max_{w_2} G\left(w_2, w_1\right)+F_1-\max\left(u_1^E, u_2^E\right) \tag{80}$$

Solving (79) and (80) w.r.t $w_1$ and $w_2$, yields:

$$w_1 = v^* = \frac{2(1+b)(1-b) d^2}{8-b^2 d^2\left(6-d^2\right)} \tag{81}$$
$$w_2 = v^{**} = \frac{\left(8-4 b^2 d-d^2 b^2(d+3)(2-d)\right) d^2}{4\left(8-b^2 d^2\left(6-d^2\right)\right)} \tag{82}$$

Substituting $v^*$ and $v^{**}$ for $w_1$ and $w_2$ in $G\left(w_2, w_1\right)$, yields the joint profit of the manufacturer and retailer 2, $G\left(v^{**}, v^*\right)+F_1$. For this to consitute an equilibrium, it must be jointly unprofitable for the manufacturer and retailer 2 to deviate to a contract which allows retailer 2 to sell brand B. The following condition therefore has to hold:

$$G\left(v^{**}, v^*\right) \geq \max_{w_2}\left\{\Pi\left(v^*, c, w_2, c\right)-\pi\left(v^*, c ; w_2, c\right)\right\} \tag{83}$$

The solution to $\max_{w_2}\left\{\Pi\left(v^*, c, w_2, c\right)-\pi\left(v^*, c ; w_2, c\right)\right\}$ is the wholesale price

$$w_2=v^{\prime}=\frac{(1-b)\left(16-8 d^2+d b\left(8-(1-d)(2+d)\left(6-d^2\right) d b\right)\right) d^2}{4\left(8-\left(6-d^2\right) d^2 b^2\right)\left(2-d^2\right)} \tag{84}$$

The condition for a deviation to be unprofitable is therefore $G\left(v^{**}, v^*\right)>\Pi\left(v^*, c, v^{\prime}, c\right)-\pi\left(v^*, c ; v^{\prime}, c\right)$. We have plotted $G\left(v^{**}, v^*\right)=\Pi\left(v^*, c, v^{\prime}, c\right)-\pi\left(v^*, c ; v^{\prime}, c\right)$ in Figure 7, which shows that, as long as $\pi_l^*<\pi(c, c ; \infty, c)$, the deviation is always profitable.

We can conclude that, when $\pi_l^*<\pi(c, c ; \infty, c)$, there exists no equilibrium where both retailers sell brand A, and only one retailer sells the competitive brand B. In the same fashion, it can be shown that there exists no equilibrium where both retailers sign an exclusive purchasing contract: In this situation, the equilibrium wholesale prices are given by

$$\max_{w_j}\left\{\Pi\left(w_j, \infty, w_k, \infty\right)-\pi\left(w_k, \infty ; w_j, \infty\right)\right\}+F_k-\max\left(u_1^E, u_2^E\right) \tag{85}$$

for $j, k \in\{1,2\}$, $k \neq j$, which yields $w_1=w_2=\widetilde{w}^U=d^2 / 4$. For this to constitute an equilibrium, it must be jointly unprofitable for the manufacturer and a retailer (say retailer 1) to deviate to a (common) contract, which would allow retailer 1 to sell brand

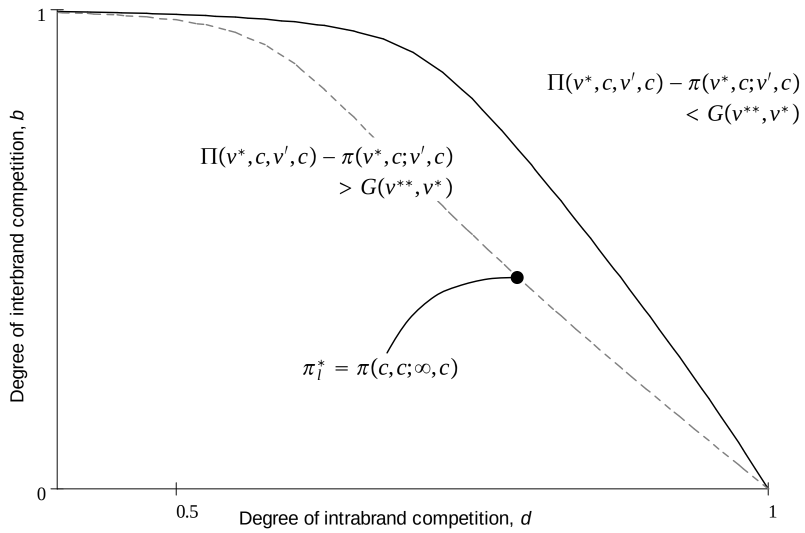


Figure 7: Retailer power. Mixed configuration, where one retailer sells both brands, and the rival retailer sells brand A only. To the left of the solid line, a deviation to double common agency is profitable for the retailer who is selling brand A only.

B. Their joint profit with an exclusive purchasing contract is

$$\begin{aligned} &\Pi\left(\widetilde{w}^U, \infty, \widetilde{w}^U, \infty\right) - \pi\left(\widetilde{w}^U, \infty; \widetilde{w}^U, \infty\right) + F_2 \\ &= \Pi^{UR} - \pi^{UR} + F_2 \ , \\ &= \frac{(2+d)(2-d)}{8(1+d)} - \frac{(1-d)(2+d)^2}{16(1+d)} + F_2 \ , \end{aligned} \tag{86}$$

whereas their joint profit when waiving the exclusive purchasing agreement is

$$\begin{aligned} &\Pi\left(w_1, c, \widetilde{w}^U, \infty\right) - \pi\left(\widetilde{w}^U, \infty; w_1, c\right) + F_2 \\ &= X_{A-1}\left(w_1, \widetilde{w}^U\right) + F_2 \end{aligned} \tag{87}$$

Maximising $X_{A-1}\left(w_1, \widetilde{w}^U\right)$ w.r.t. $w_1$, yields

$$w_1 = \widetilde{v} = \frac{2(1+b)(1-b)(2-d^2)d^2}{16 - 8d^2 - d^2b^2(16 + d^4 - 9d^2)} \tag{88}$$

Substituting $w_1$ for $\widetilde{v}$ in $X_{A-1}\left(w_1, \widetilde{w}^U\right) + F_2$ yields the maximum profit for the manufacturer and retailer 1 when deviating to a common contract: $X_{A-1}\left(\widetilde{v}, \widetilde{w}^U\right) + F_2 = \overline{X}_{A-1} + F_2$.

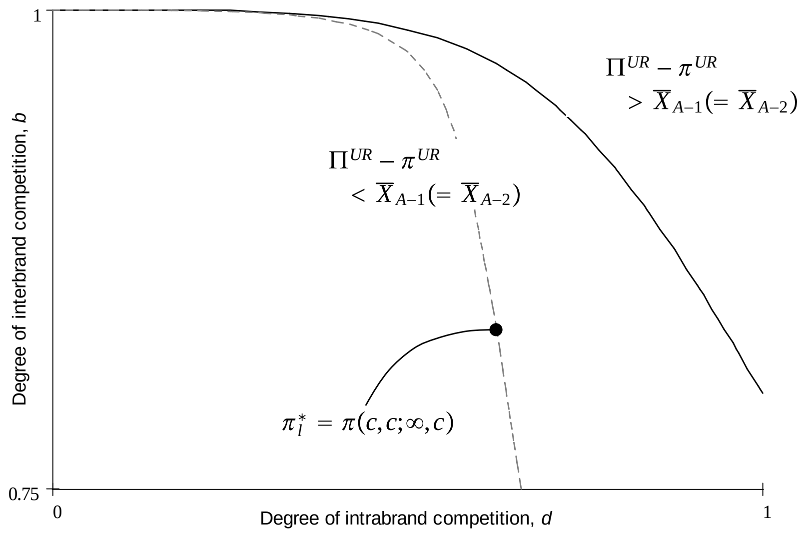


Figure 8: Retailer power. Single sourcing (upstream monopoly). Below the solid line, it is profitable for a retailer to waive the exclusive purchasing provision – to be able to sell both brands.

The condition for this deviation to be unprofitable, is therefore

$$\Pi^{UR} - \pi^{UR} > \overline{X}_{A-1} (= \overline{X}_{A-2} \text{ by symmetry}) \tag{89}$$

We have plotted $\Pi^{UR} - \pi^{UR} = \overline{X}_{A-1}$ in Figure 8, which shows that the deviation is always profitable as long as $\pi_l^* < \pi(c, c; \infty, c)$.

We can conclude that, when both $\pi_l^* < \pi(c, c; \infty, c)$ and $\Pi^{CR} \geq \Pi^{XR}$, there exist only i) double common agency equilibria and ii) equilibria with exclusive selling. To see that the double common agency equilibria are Pareto undominated in this case, note that, in any equilibrium with exclusive selling, both the retailer that is without a contract, and the retailer that wins the exclusive selling contract, earns the profit $\pi(\infty, c; c, c)$. On the other hand, of all the double common agency equilibria, the one which is least preferred by the retailers, is the one where each retailer pays the maximum fixed fee, $\overline{F} = \pi^{CR} - \pi(\infty, c; c, c)$, and earns the profit $\Pi_r = \pi^{CR} - \overline{F} = \pi(\infty, c; c, c)$. In all the other double common agency equilibria, the retailers earn a strictly higher profits, $\Pi_r > \pi(\infty, c; c, c)$, given that $\underline{F} < \overline{F}$, which holds iff $\Pi^{CR} > \Pi^{XR}$. **Q.E.D.**

**Proof of Proposition 4** As long as both $\pi_l^* < \pi(c, c; \infty, c)$ and $\Pi^{CR} < \Pi^{XR}$, there only exist equilibria where one retailer sells both brands and the other retailer sells the

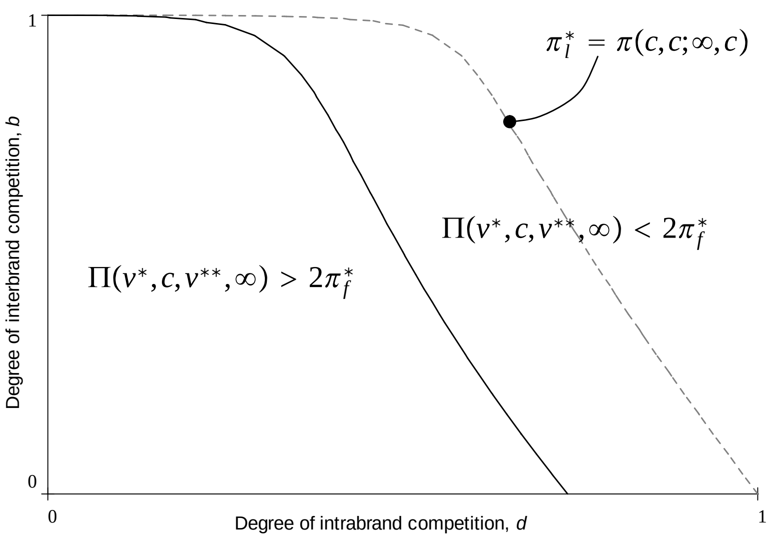


Figure 9: Retailer power. Mixed configuration, where one retailer sells both brands, and the rival retailer sells brand A only. To the right of the solid line, it is profitable for one of the retailers to deviate to mixed single-sourcing.

competitive brand. In this case, each retailer bids $F^E = 2\pi\left(c, c; \infty, c\right) - \Pi^{CR}$ to obtain brand A exclusively, and each retailer earns $\pi\left(\infty, c; c, c\right)$. Since $\pi_l^* < \pi\left(c, c; \infty, c\right)$, mixed single sourcing cannot be an equilibrium; and by the same logic, a deviation to exclusive purchasing for the retailer that has exclusive selling rights to brand A, cannot be profitable. Moreover, since each retailer earns the profit $\pi\left(\infty, c; c, c\right)$, neither retailer can increase its profit by withdrawing or increasing its exclusive offer. (It follows from the proof of Proposition 3 that there are no equilibria in this case where both retailers sell brand A and only one retailer sells brand B, nor any equilibria with single-sourcing (upstream monopoly).)

Suppose instead that $\pi_l^* \geq \pi\left(c, c; \infty, c\right)$. First we show that there is no equilibrium where both retailers sell brand A and only one retailer sells brand B. For this to constitute an equilibrium, we showed in the proof of Proposition 3 that the following condition has to hold.

$$G\left(v^{**}, v^*\right) \geq \Pi\left(v^*, c, v', c\right) - \pi\left(v^*, c; v', c\right) \tag{90}$$

Suppose the condition in (90) holds (see Fig. 7). In addition, the condition $\Pi\left(v^*, c, v^{**}, \infty\right) \geq 2\pi_f^*$ has to hold. Otherwise, at least one of the retailers has an incentive to withdraw its offer to obtain the Stackelberg follower profit $\pi_f^*$. We have plotted $\Pi\left(v^*, c, v^{**}, \infty\right) = 2\pi_f^*$ in Figure 9, which shows that the condition never holds as long as $\pi_l^* \geq \pi\left(c, c; \infty, c\right)$.

We can conclude that when $\pi_l^* \geq \pi(c, c; \infty, c)$, there exist no equilibria where only one retailer sells brand B and both retailers sell brand A. Our candidate equillibria are therefore i) equilibria with single-sourcing, where both retailers sell brand A only (upstream monopoly), and ii) equilibria with mixed single-sourcing, where the retailers sell different brands $\{A1, B2\}$ or $\{B1, A2\}$.

First, note that equilibria with mixed single-sourcing exist: A retailer, say retailer 2, can always refrain from making an offer to the manufacturer. Retailer 1's best response is then to offer a contract, $\{w_l^*, F_l^*\}$, which includes both an exclusive selling and exclusive purchasing provision, and where $F_l^* = -w_l^* D_{A1}(w_l^*, \infty, \infty, c)$. This contract induces a profit $\Pi_r^1 = \pi_l^*$ for retailer 1, whereas the manufacturer earns zero. Retailer 2 then earns the Stackelberg follower profit $\pi_f^*$. Since $\pi_l^* \geq \pi(c, c; \infty, c)$, retailer 1 and the manufacturer cannot increase their joint profit by waiving the exclusive purchasing agreement, and since $\pi_f^* > \pi_l^*$, retailer 2 cannot increase its profit by competing to obtain a contract with the manufacturer.

There is also an equilibrium with single sourcing, where each retailer only sells the manufacturer's brand. (89) gives a necessary condition for single sourcing to constitute an equilibrium. This condition is illustrated in Figure 8. In addition, we have as a condition that each retailer has to earn at least the Stackelberg follower profit $\pi_f^*$; otherwise, one of the retailers could increase its profit by refraining from making an offer to the manufacturer. The second condition is therefore

$$\Pi^{UR} - 2\pi_f^* \geq 0 \tag{91}$$

Since $\pi_f^* > \pi_l^*$, the retailers have no incentive to compete for an exclusive selling contract in this case, and the profit of the manufacturer is therefore zero. Figure 10 illustrates conditions (89) and (91). It shows that condition (89) is the relevant condition.

Since $\Pi^{UR} - 2\pi_f^* > 0$ when (89) holds, it follows that, whenever both equilibria exist, the equilibrium with mixed-single sourcing is dominated by the equilibrium with single-sourcing (upstream monopoly). **Q.E.D.**

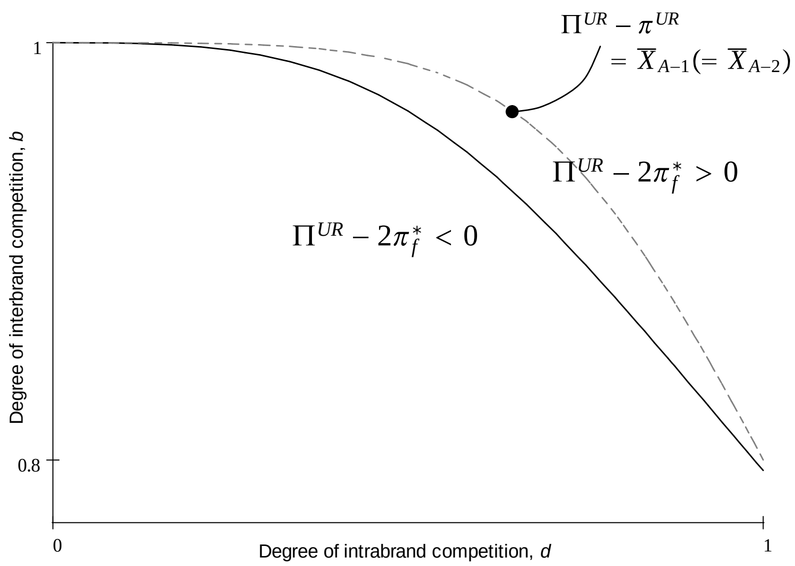


Figure 10: Retailer power. Single sourcing (upstream monopoly). Above the solid line, it is not profitable for a retailer to deviate, by refraining from offering a contract to the manufacturer, in order to obtain the Stackelberg follower profit $\pi_f^*$.

# References


Abito, J. M. and Wright, J. (2008). Exclusive dealing with imperfect downstream competition. International Journal of Industrial Organization, (26), 227-246.

Aghion, P., Bolton, P. (1987). Contracts as a barrier to entry. American Economic Review (77), 388–401.

Bernheim, D. and Whinston, M. D. (1998). Exclusive dealing. Journal of Political Economy, (106), 64-103.

Bork, R. H. (1978). The antitrust paradox: A policy at war with itself. New York: Basic books.

Dobson, P. and Waterson, M. (2007). The competition effects of industry-wide vertical price fixing in bilateral oligopoly. International Journal of Industrial Organization (25), 935-962.

Fumagalli, C. and Motta, M. (2006). Exclusive dealing and entry, when buyers compete. American Economic Review, (96), 785-795.

Inderst, R. and Shaffer, G. (2010). Market-share contracts as facilitating practices. RAND Journal of Economics, (41), 709-729.

Marx, L. M., Shaffer, G. (2007). Upfront payments and exclusion in downstream markets. RAND Journal of Economics (38), 823–843.

Miklós-Thal, J., Rey, P. and Vergé, T. (2011). Buyer Power and Intrabrand Coordination. Journal of the European Economic Association (9), 721–741.

O'Brien, D.P., Shaffer, G. (1997). Nonlinear supply contracts, exclusive dealing, and equilibrium market foreclosure. Journal of Economics & Management Strategy, (6), 755-785.

Posner, R. A. (1976). Antitrust law: An economic perspective. Chicago: University of Chicago Press.

Rasmusen, E. B., Ramseyer, J., Mark, J. and Wiley, J. S. Jr. (1991). Naked exclusion. American Economic Review, (81), 1137-1145.

Rey, P. and Tirole, J. (2007). A primer on foreclosure. In Armstrong, M. and Porter R. (eds.) Handbook of Industrial Organization III, North Holland, p. 2145-2220.

Rey, P. and Vergé, T. (2010). Resale price maintenance and interlocking relationships. The Journal of Industrial Economics, (58), 928-961.

Rey, P. and Whinston, M. D. (2011). Does retailer power lead to exclusion? IDEI Working Papers, no 666.

Segal, I. R. and Whinston, M. D. (2000). Naked exclusion: Comment. American Economic Review, 2000, (90), 296-309.

Simpson, J. and Wickelgren, A. L.(2007). Naked Exclusion, Efficient Breach, and Downstream Competition.The American Economic Review, (97), 1305-1320.

Wright, J. (2009). Exclusive dealing and entry, when buyers compete: Comment. American Economic Review, (99), 1070-1081.

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