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VERTICAL RESTRAINTS AND INTERBRAND COMPETITION

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Abstract

In a setting with two differentiated producers and identical retailers, we analyse how exclusionary vertical restraints such as exclusive territories and exclusive dealing may affect interbrand competition. The existing literature analyses producers' incentives to adopt these restraints separately, and concludes that (1) exclusive dealing clauses cannot be used to foreclose rivals and, (2) exclusive territories can be used to dampen interbrand competition. This suggests an antitrust policy that allows exclusive dealing clauses, and bans exclusive territories. We show that if producers are allowed to adopt both restraints, the fully collusive outcome can always be realised. Moreover, we show that a ban on exclusive territories will not affect welfare unless foreclosing exclusive dealing arrangements are made per se illegal. We show that welfare is maximised when foreclosing exclusive dealing arrangements and exclusive territories are per se illegal.

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1. Introduction

Vertical relationships between producers and retailers often involve the use of vertical restraints[1]. One class of vertical restraints is known as exclusionary practices, and includes practices such as exclusive territories and exclusive dealing. When a producer grants an exclusive territory to a retailer, he gives him the exclusive right to sell his product in a region. Exclusive dealing is adopted when a producer prohibits his retailers from carrying rival producers' products. The legal status of these practices varies from country to country, perhaps reflecting the disagreement between economists and antitrust commentators on the motives behind the practices[2]. In most countries however, the restraints are either legal *per se* or subject to a rule of reason.

On the one hand, it is argued that exclusionary vertical restraints will only be used if it can enhance efficiency in retail trade, and therefore these practices should be legal *per se*[3]. On the other hand, it is claimed that these practices may have anticompetitive effects. It is argued that exclusive territories, which by definition eliminates intrabrand competition, may serve to reduce (dampen) interbrand competition, and that exclusive dealing can be used to

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[1] See Katz (1989) for a comprehensive list of different vertical restraints and their economic incidence.

[2] Exclusive dealing has traditionally been regarded with far more suspicion than exclusive territories. In the US however, after first being illegal *per se*, both practices are currently jugded according to a rule of reason standard by U.S. Courts. In the European Union exclusive dealing is legal (provided that certain weak conditions are met), whereas exclusive territories are legal *per se*. For more details on the legal status of vertical retraints, see Ornstein (1989); OECD (1994) and Rey and Stiglitz (1988;1994).

[3] This view if often connected to the Chicago School [see Posner (1977), Bork (1978)]. The argument for exclusive territories is that retailers may provide customers with costly sales related services. When there are many retailers in a given territory, this may lead to an undersupply of these services due to a standard free-rider problem [Telser (1960)]. Therefore, it is argued, that the practice of exclusive territories should be *per se* legal. The traditional efficiency argument for exclusive dealing is that it can resolve a downstream moral hazard problem. For instance, producers may promote the product, and once customers are in the retail store, the retailer has an incentive to induce customers to a rival brand (which potentially carries a higher profit margin for the retailer) [see Marvel (1982), Bernheim and Whinston (1992b) and Besanko and Perry (1993)].

eliminate interbrand competition when a producer hire all retailers in a region as exclusive dealers (foreclosing exclusive dealing). Therefore it is argued, these restraints should be judged illegal. Focusing of the potential anticompetitive effects of exclusionary practices, the existing literature analyses the producers' incentives to adopt each of these practices separately.

Investigating the foreclosure argument for exclusive dealing, Bernheim and Whinston (1992a) find that exclusive dealing clauses cannot profitably be used to monopolise the market (foreclosure)[4]. In a setting with two differentiated producers and a single retailer, these authors find that the retailer will always be a common retailer for the producers. Moreover, Bernheim and Whinston (1992a) show that a ban on the possibility to offer exclusive dealing contracts will not affect the equilibrium outcome. The results of the analysis of Bernheim and Whinston (1992a) suggest that exclusive dealing arrangements should be judged *per se* legal. Rey and Stiglitz (1985; 1988; 1994) analyse the anticompetitive effect of exclusive territories. They find that producers will find it profitable to grant a dealer an exclusive territory, and that the practice will hurt welfare[5]. The analysis of Rey and Stiglitz (1994) suggests "a policy in which vertical restraints (exclusive territories, our remark) were considered presumptively illegal, unless there can be shown to be significant efficiency-enhancing effects." [Rey and Stiglitz (1994), p. 35].

Our point is that antitrust policy based on theoretical models that analyse these

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[4] See also Mathewson and Winter (1987).

[5] See also Lin (1990) and O'Brien and Shaffer (1993). Lin (1990) and his follower O'Brien and Shaffer (1993) analyse what Lin claimed to be a "dampening-of-competition-effect of exclusive dealing". However, Lin assumes that there is no intrabrand competition in retailing (an assumption retained by O'Brien and Shaffer). Then at most one retailer can sell a producer's product, which is equivalent to granting a dealer an exclusive territory. The producers' choice then is whether they should hire a common dealer with exclusive territories or separate dealers with exclusive territories. In equilibrium, producers will always grant exclusive territories to separate dealers. Therefore, we have chosen to classify these articles as analysing competitive impacts of exclusive territories.

restraints separately may easily be misguided. Given the legal status of exclusionary vertical restraints, a complete analysis of how these restraints influence interbrand competition should involve a model where *both* restraints can be used by the producers. A model of this kind should predict which of the two vertical restraints (if any) will be used in equilibrium. In particular, we argue that the prospects for foreclosing rivals by hiring all retailers as exclusive dealers (and by that becoming a monopolist) must be considered when analysing potential anticompetitive effects from exclusive territories. The purpose of this article is to analyse producers' incentives to adopt exclusive dealing and exclusive territories in a model where both restraints can be used.

Allowing for both restraints to be used will have significant impact on the equilibrium outcome, and also have important implications for antitrust policy. In particular, we show that when both restraints can be used by the producers, the collusive outcome will always arise in equilibrium. Forbidding the practice of exclusive territories when producers can use exclusive dealing to foreclose rivals, will not influence the competitive level in the market. Under such a legal regime (which is the regime that is proposed by the earlier literature), the collusive outcome will be achieved by the producers.

We show that only by making foreclosing exclusive dealing arrangements illegal *per se* welfare can be enhanced. This measure will not only in itself improve welfare, but will also enable legislators to rule efficiently against the practice of exclusive territories. When foreclosure is ruled out, forbidding exclusive territories will increase the competitive pressure, and producers only achieve a standard Nash Bertrand outcome with differentiated products. The insufficiency of a rule of reason approach to these practices also becomes apparent in our model. The reason is that the practices need not be observed in equilibrium. More specifically, foreclosing exclusive dealing outcomes are never observed. Moreover, when

foreclosure can occur, producers can do equally well without granting exclusive territories as when granting a dealer an exclusive territory. Therefore, if the legal judgement of these restraints is only implemented when they are actually observed (rule of reason approach), producers can easily adapt by avoiding their use.

The driving force behind our results is the *prospects of being foreclosed* by your rival when he hires all retailers as exclusive dealers, and not the actual use of foreclosing exclusive dealing arrangements. To get the intuition behind this, we need to consider the earlier literature in a bit more detail. The received literature on exclusive territories analyses a situation where two producers of differentiated products can delegate sales to several identical retailers. It is shown that producers will grant exclusive territories to separate dealers if full franchise extraction can be obtained (retailers earn zero profit) [Lin (1990); O'Brien and Shaffer (1993); Rey and Stiglitz (1994) (see footnote 5)].

We show that if producers also can adopt foreclosing exclusive dealing, this is no longer an equilibrium outcome. If retailers earn zero profit, each producer can offer all retailers a small amount of money to be his exclusive dealers (the rival producer is foreclosed)[6]. By taking the prospects of being foreclosed by its rival into account, we show that each producer can at most extract its product's incremental contribution to the industry profit in any possible configuration. Intuitively, if a producer tries to extract more profit, the rival producer and the retailers could make an agreement where they are better off when foreclosing this producer. The producers will therefore have incentives to offer wholesale

[6] Since the rival producer is foreclosed, the producer in the market will offer each retailer an exclusive contract with wholesale price equal to the monopoly price and pay each of them a small amount of money. The retailers sell the same product and perfect intrabrand competition removes the double marginalization problem [Spengler (1950)]. The producer will earn the monopoly profit of his product, and the equilibrium proposed by the earlier literature is broken.

contracts that induce retailers to set the joint collusive retail prices[7]. The reason is that when the industry profit is maximised, so is each product's incremental contribution to the industry profit. We show that as long as the number of retailers is finite, producers can achieve this outcome independent of how many retailers they use (i.e., irrespective of whether exclusive territories are adopted or not).

However, if foreclosing exclusive dealing arrangements are made illegal, the threat of foreclosing your rival is no longer credible. If exclusive territories are legal, producers will grant exclusive territories to separate dealers [O'Brien and Shaffer (1993), Rey and Stiglitz (1994)], and achieve imperfect collusion [Bonnano and Vickers (1988)][8]. By also making exclusive territories illegal, the unique equilibrium outcome is standard Nash Bertrand with differentiated products [Rey and Stiglitz (1994)]. From a competitive point of view, this suggests that foreclosing exclusive dealing arrangements and exclusive territories should be illegal *per se*.

With this introduction the article contains three sections. Section 2 proves our results for general demands and when wholesale contracts are two-part tariffs. The results are summarized in section 3. The appendix contains an example with linear demands.

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[7] This result resembles the result obtained in the literature on the foreclosure argument for exclusive dealing. The foreclosure argument for exclusive dealing has previously been analysed in a setting with two differentiated producers and a single retail outlet. This literature concludes that foreclosure can be profitable and even welfare enhancing if wholesale contracts are restricted to linear tariffs (i.e. a uniform wholesale price) [Mathewson and Winter (1987)], but never profitable if allowing for general wholesale contracts [Bernheim and Whinston (1992a)]. Bernheim and Whinston show that a collusive common agency outcome can be sustained, but due to the prospects of foreclosure producers can at most capture their product's incremental contribution to the industry profit.

[8] Bonanno and Vickers (1988) show that when two producers of differentiated products can choose whether to make sales themselves or delegate sales through separate dealers, both firms have an incentive to use dealers. If delegation is governed by two-part tariffs and that full franchise extraction is possible, it is shown that producers can achieve some level of collusion through delegation. Each producer has incentives to charge wholesale prices over marginal costs. This will induce the retail price of a product to rise, which again causes the retail price of the rival product to rise [because retail prices are strategic complements, see Bulow et al. (1985). See also Vickers (1985), Sklivas (1987) and Fershtman and Judd (1987).

2. A general model

Consider two manufacturers, $i = 1,2$, producing differentiated goods that can be sold through several retailers. As in the reviewed articles above, we assume that retailers are identical[9]. Next, we assume that when it comes to offering the retailers a contract, the number of retailers is fixed and finite. Clearly, to examine foreclosure the number of retailers must be finite. If this were not true and 'foreclosed' producers could immediatly turn to another retailer, then obviously foreclosure is not an issue[10].

Producers have constant and symmetric marginal costs (normalised to zero) and incur no fixed costs. When only product i is sold, let p^i be the retail price and let $D^i(p^i)$ be the demand for product i. Let subscripts on the demand function denote partial derivatives with respect to retail prices, for example $D^i_i(p^i) = \partial D^i(p^i)/\partial p^i$. Then $D^i_i(p^i) < 0$ and $D^i_{ii}(p^i) \leq 0$. When both products are sold, let $p = (p^1, p^2)$ denote retail prices for the goods, and the retail demand for good i is written $D^i(p)$. We assume that $D^i_i(p) < 0$ and $D^i_{ii}(p) \leq 0$, retail demand

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[9] There are several instances where this is not a realistic assumption, for example when drug stores have an identical product line but are not located at the same corner. However, a few examples illustrate that the assumption of identical retailers can often be realistic. First, for durable goods the location of retailers is of only minor importance for the consumers. For example, the transportation costs from one retailer of television sets to another may be insignificant relative to the price of a TV set. A second example is travel agencies. They are identically located in the sense that if you want to buy an air ticket, they can all be reached by picking up a phone and dial their numbers (the same argument applies for any standardized product). Second, for some goods we in fact observe that the retailers choose the same location. There are numerous local examples of such a location pattern. As noted in Tirole (1988), p. 286, a large number of furniture stores are located along the Fauborg Saint Antoine in Paris. The reason is that consumers find it convenient to search next door if they do not find the preferred item in a given store. Therefore, location in the same street increases aggregate demand for these stores.

[10] This assumption turns out to be crucial for our analysis, but it is an assumption that we find particularly realistic. It captures an important feature that we believe is inherent in many retail markets. Preparation of dealers for retail trade takes time and potential costs are involved. If a producer is refused by a dealer it is unlikely that he immediately can find alternative outlets for his product. It may even be that there are no alternative outlets. Of course, he could build his own retail store, but this is costly and time consuming. Moreover, building own retail stores is especially unlikely when products are sold through multiproduct retailers. Consider for example a small producer of some grocery product, looking for a supermarket chain to market his product. Not only are the number of existing supermarket chains limited, but it is also very unlikely that this small producer will set up his own retail network if he were refused by all existing chains.

for good i is decreasing and concave in the price of good i, and $D^i_j(p) > 0$ (goods are substitutes) and $D^i_{ij}(p) \geq 0$ (stability)[11]. Retailers are risk neutral and have no other costs than the payment specified by the producers' contracts. We assume that the products' demands are symmetric, i.e., $\forall\ p^1 = p^2 \in \mathbb{R}_+$: $D^1(p^1) = D^2(p^2)$ and $\forall\ (p^1, p^2) \in \mathbb{R}_+$: $D^1(p^1, p^2) = D^2(p^2, p^1)$.

We are interested in how the imposition of exclusive territories (ET) affects interbrand competition when producers are aware of the prospects of being foreclosed by its rival. We therefore construct a game in which we can have:

1. *Exclusive territories without exclusive dealing* (ET-no ED), i.e., producers hire a single dealer with an exclusive territory for both products,
2. *Exclusive territories with exclusive dealing* (ET-ED), i.e., producers hire separate dealers with exclusive territorial rigths,
3. *Foreclosing exclusive dealing*, i.e., one producer hires all retailers as exclusive dealers, and finally
4. *Interbrand competition without exclusive territories*, i.e., both producers have several dealers.

The basic game is as follows. At stage one the producers choose some retailers and prepare them for sale of the products in question. To avoid biasing the model toward a choice of a low number of retailers, we assume that the costs of preparing a retailer are zero[12].

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[11] This assumption, together with the assumption that products are substitutes, is a sufficient (but not necessary) condition to secure that the Nash equilibrium between two exclusive retailers is stable when wholesale contracts are two-part tariffs [see Bonnano and Vickers (1988), assumption 3; and Bulow et. al. (1985)].

[12] An argument for this assumption is that preparing retailers for retail trade involves a waiting cost only, and that the waiting cost is independent on the number of retailers a producer wants to prepare. If so, zero costs of preparation is just a normalization.

The crucial point is that once producers have chosen and prepared some retailers, the number of retailers is given and further entry into the retail sector is barred. If producers intend to grant exclusive territories to a single retailer (ET-no ED), they agree on a retailer and prepare this retailer. If producers intend to grant exclusive territories to separate dealers (ET-ED), they prepare one retailer each. If producers intend to have several retailers (no ET), each producer prepares a number of retailers $n_i \geq 1$ such that the sum of prepared retailers is less or equal to the total existing number of retailers N. When a number of retailers are prepared at the first stage, producers are locked into that number of retailers onwards[13].

At stage two producers offer contracts to retailers. In the exposition we will assume that wholesale contracts are observable two-part tariffs. We will show that these contracts are general enough for the producers to implement their first-best outcome[14]. Each contract, $T(q^i) = a^i + w^i q^i$, specifies a payment to be made from the retailer to producer *i* when the retailer signs this contract, and purchases quantity q^i. Contracts consist of a fixed part a^i (franchise fee) which can be both positive and negative, and a variable part $w^i q^i$, w^i being the constant per unit wholesale price[15]. If there is one prepared retailer from stage 1, producers simultaneously offer this retailer a contract. The retailer may accept both contracts, one contract or no contract at all. If each producer has prepared a number of retailers $n_i \geq 1$ at stage 1, there is a fixed number $n = \Sigma_i n_i$, $1 < n \leq N$, of prepared retailers available. Each producer may then either offer contracts to the retailers he prepared at stage 1, or offer all n retailers an exclusive

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[13] Readers that feel uncomfortable with the first stage of our game, should note that removing this stage would not alter our results. We have chosen to include this stage because we believe that this feature is close to what actually happens in retail markets, and second because it highlights very clearly the similarities of the environments facing producers when exclusive territories are intended and when these are not intended. When removing stage 1, the only important assumption necessary for our results is that the total number of existing retailers, N, is finite.

[14] Note, however, that other contracts can also be used to implement the equilibrium outcome of our model. For example, simple forcing contracts will also suffice.

[15] See Rey and Stiglitz (1994) for informational requirements jsutifying constant marginal wholesale prices.

contract trying to foreclose its rival producer.

At stage three the retailers accept and/or refuse the contracts offered to them, and contracts are made public. If a single retailer is prepared at stage 1, the retailer accepts the best contract or combination of contracts offered to him and sets retail price(s). If several retailers are prepared at stage 1, due to contract observability, each retailer may condition his strategy on the contracts signed by rival retailers. Each retailer accepts the best contract offered to him, and set retail price simultaneously with rival retailers.

Before starting to analyse this game, we define the monopoly profit and the joint collusive profit. When product i is the only product that is sold, define the monopoly profit of product i:

$$\pi_i^m = \max_{p^i} p^i D^i(p^i) \tag{1}$$

Since demands are symmetric, we have that $\pi_1^m = \pi_2^m$. When both products are being sold, define the joint collusive profit:

$$\pi^* = \max_{p} \sum_i p^i D^i(p) \tag{2}$$

Because products are substitutes, we have:

$$\pi_1^m + \pi_2^m > \pi^* > \pi_i^m > 0 \quad i = 1,2 \tag{3}$$

Inequality (3) implies that introducting a new product will increase the collusive industry profit. Moreover, it implies that each product contributes more in incremental profit to the industry when sold alone than when both products are sold.

In our search for a subgame perfect equilibrium in the specified game, we assume first that producers intend to grant dealers exclusive territories. This means that we start by ruling out the possibility that each producers prepare more than one retailer at stage 1. The next

subsection derives subgame perfect equilibria in this restricted game.

2.1 Distribution with exclusive territories

Assume that the producers intend to grant exclusive territories. Then at stage 1 either producers prepare a single retailer (no ED), or they prepare two retailers intending to grant exclusive territories to separate retailers (ED).

I. ED subgame.

At stage 2 there are two retailers available. Both retailers accept the best contract (given the contract of the rival retailer) that yields a non-negative profit for the retailer. Define $U_k \geq 0$ as the rent earned by retailer k = A, B. Note that retail rent is to be determined endogeneously in this model. Due to symmetry we must have that $U_A = U_B$. Furthermore, let $U = U_A + U_B$. At stage 2 each producer can either propose a contract to the retailer he prepared, or try to foreclose its rival by hiring both retailers. Let $\Pi_i(n)$ denote producer i's maximum profit when hiring $n \in \{1,2\}$ retailers as exclusive dealers.

Ia. One producer hires both retailers.

If producer j hires both retailers as exclusive dealers, he offers each of them a two-part tariff. Then let $w^j = (w^{jA}, w^{jB})$ and $p^j = (p^{jA}, p^{jB})$ be wholesale and retail prices. Retailers then sell a homogeneous good and demand facing retailer k selling product j, for k, l = A, B, $k \neq l$, is:

$$D^{jk}(p^j) = \begin{cases} D^j(p^j) \text{ if } p^{jk} < p^{jl} \\ \frac{D^j(p^j)}{2} \text{ if } p^{jk} = p^{jl} \\ 0 \quad otherwise \end{cases} \tag{4}$$

Retailers solve:

$$\max_{p^{jk}} (p^{jk} - w^{jk}) D^{jk}(p^j) - a^{jk}, \quad k = A,B \tag{5}$$

Let $\bar{p}^j = (\bar{p}^{jA}, \bar{p}^{jB})$ be the retail prices (these will generally depend on w^j) that solve the retailers' first-order conditions, and define the industry profit now:

$$\bar{\pi}^j(w^j) = \sum_k \bar{p}^{jk} D^{jk}(\bar{p}^j) \tag{6}$$

Since retailers compete as Bertrand duopolists with a homogeneous good, they will set retail prices equal to marginal costs. Then it is straightforward to verify that wholesale prices should be set equal to the monopoly price of product *j*. Noting that retail marginal costs are equal to the wholesale price, it follows by definition that the maximum profit of producer *j* when he forecloses its rival will be:

$$\Pi_j(2) = \pi_j^m - U \tag{7}$$

where retailers receive utility U by means of transfers from producer *j* (i.e., negative fixed fees).

Ib. Producers hire a retailer each

Next, let us assume that each producer offers his retailer a two-part tariff. Let $w = (w^{iA}, w^{jB})$ and $p = (p^{iA}, p^{jB})$ denote wholesale and retail prices in this case. Then retailer A's maximisation problem becomes:

$$\max_{p^{iA}} (p^{iA} - w^{iA}) D^{i}(p) - a^{iA} \tag{8}$$

and similarly for retailer B. Assuming that both contracts are accepted, let $\hat{p} = (\hat{p}^{iA}, \hat{p}^{jB})$ denote retail prices that solve the retailers' first-order conditions. The industry profit is written:

$$\hat{\pi}(w) = \hat{\pi}_i(w) + \hat{\pi}_j(w) = \hat{p}^{iA} D^{iA}(\hat{p}) + \hat{p}^{jB} D^{jB}(\hat{p}) \tag{9}$$

By definition, producer j earns:

$$\Pi_j(1) = \hat{\pi}_j(w) - U_B \tag{10}$$

Ic. Equilibrium in the ED-subgame

Combining equations (7) and (10), producer j would not foreclose its rival by hiring both retailers as exclusive dealers iff:

$$U_A \geq U_A^* \equiv \pi_j^m - \hat{\pi}_j(w) \tag{11}$$

U_A^* is the minimum amount of profit that manufacturer i must leave his retailer to prevent the rival manufacturer from hiring this retailer as well. Therefore, when the producers hire an exclusive retailer each they will at most earn

$$\Pi_i(1) = \hat{\pi}_i(w) - (\pi_j^m - \hat{\pi}_j(w)) = \hat{\pi}(w) - \pi_j^m \tag{12}$$

Equation (12) gives the maximum profit that each producer can extract in the ED subgame. Producer i's maximisation problem then becomes:

$$\max_{w^{iA}} \hat{\pi}(w) - \pi_j^m \tag{13}$$

Noting that the last part in (13) is independent of w^{iA}, we see that each producer has an

incentive to set wholesale prices in a way that induces the retailers to realise the fully collusive industry profit. In equilibrium each producer earns:

$$\Pi_i^{ED} = \pi^* - \pi_j^m \tag{14}$$

The equilibrium amount of profit is extracted by the producers partially through the wholesale prices (which are above producer marginal costs) and through fixed fees that are either positive or negative[16]. If a producer deviates by charging a higher fixed fee (or offering a lower fixed fee when these are negative), aggregate retail rent earned by both retailers would become lower. This will give the rival producer an incentive to hire both retailers. To prevent the rival producer from foreclosing him, each producer must let its retailer earn a minimum amount of profit.

II. No-ED subgame

At stage 2 there is only one retailer available, and we supress the *k*-notation. Each producer offers the retailer a two-part tariff. The retailer either accepts one of the contracts, both contracts or no contract at all.

IIa. One producer hires the retailer as an exclusive dealer

When the retailer only sells product *j* his maximised profit is given by:

$$U^j = \Pi^j(w^j) - a^j \equiv \max_{p^j} (p^j - w^j)D^j(p^j) - a^j \tag{15}$$

where U^j denotes retail maximised profit and $\Pi^j(w^j)$ denotes maximised *gross* retail profit when the retailer carries brand *j* exclusively. Then it is well known that producer *j* should

[16]See the appendix for a linear demand example.

induce the retailer to set the monopoly price by offering him a wholesale price equal to zero and extract profit through the fixed fee ('sell-out' contract) [see Tirole (1988), chapter 4]. By definition, producer *j* can at most earn $\pi_j^m - U^j$.

IIb. The retailer sells both products

When the retailer accepts both contracts, his maximised profit is written:

$$U^{ij} = \Pi^{ij}(w) - \sum_i a^i \equiv \max_p \sum_i (p^i - w^i) D^i(p) - \sum_i a^i \qquad (16)$$

where U^{ij} denotes the retailer's maximised profit and $\Pi^{ij}(w)$ denotes the retailer's maximised *gross* profit when the retailer carries both products. Assuming that the retailer accepts selling both products, let $\tilde{p} = (\tilde{p}^1, \tilde{p}^2)$ be the solution to the retailer's first-order conditions.

IIc. Equilibrium in the no-ED subgame.

When setting his fixed fee, each producer must ensure that its rival has no incentives to hire the retailer as an exclusive dealer. Producer *i* knows that the retailer cannot be hired as an exclusive dealer when $U^{ij} \geq \max(U^i, U^j)$, i.e., when his maximised profit of selling both products is higher than his maximised profits of selling only one product. Inserting from (15) and (16) this is true iff:

$$a^i \leq \Pi^{ij}(w) - \Pi^{ij}(w^j) \qquad (17)$$

The fixed fee of producer *i* can at most extract the incremental gross retail profit created by the sale of product *i*. Put differently, if a^i tries to extract more than this, producer *j* (and the retailer) will be better off when the retailer is an exclusive dealer for product *j* (producer *i* is foreclosed). Producer *i*'s maximisation problem then becomes:

$$\max_{w^i} \; w^i D^i(\tilde{p}) + \Pi^{ij}(w) - \Pi^{ij}(w^j) \tag{18}$$

Noting that the last term is independent of w^i and that $\partial\Pi^{ij}(w)/\partial w^i = -D^i(.)$ (applying the envelope theorem), the (sufficient) first-order condition for producer i is written:

$$w^i D_i^i(\tilde{p})\frac{d\tilde{p}^i}{dw^i} + w^i D_j^i(\tilde{p})\frac{d\tilde{p}^j}{dw^i} = 0 \tag{19}$$

To examine this first-order condition, the following result will be useful:

Lemma 1: *For all* $p^i > w^i$ *we have:*

$$\frac{d\tilde{p}^i}{dw^i} > 0, \quad \frac{d\tilde{p}^j}{dw^i} < 0 \tag{20}$$

Proof: From the first-order conditions to the retailer's problem we know that optimal retail prices solve:

$$D^i(\tilde{p}) + (\tilde{p}^i - w^i)D_i^i(\tilde{p}) + (\tilde{p}^j - w^j)D_i^j(\tilde{p}) = 0 \tag{21}$$

Using the implicit function theorem and our assumptions we get:

$$\frac{d\tilde{p}^i}{dw^i} = \frac{D_i^i(\tilde{p})}{2D_i^i(\tilde{p}) + (\tilde{p}^i - w^i)D_{ii}^i(\tilde{p}) + (\tilde{p}^j - w^j)D_{ii}^j(\tilde{p})} > 0 \tag{22}$$

and

$$\frac{d\tilde{p}^j}{dw^i} = \frac{D_i^i(\tilde{p})}{D_j^i(\tilde{p}) + (\tilde{p}^i - w^i)D_{ij}^i(\tilde{p}) + D_i^j(\tilde{p}) + (\tilde{p}^j - w^j)D_{ij}^j(\tilde{p})} < 0 \tag{23}$$

QED.

Using lemma 1 it is straightforward to verify that the only wholesale prices that solve (19)

are $w^i = 0$. The intuition is that each producer maximises the joint profit created by the sales of both products minus a fixed amount. It is then optimal for each producer to sell at a wholesale price equal to marginal cost, which induces the retailer to realise the collusive industry profit. However, due to the incentives to foreclosure, each producer can at most capture the incremental contribution of his product to the collusive industry profit. In the subgame perfect equilibrium, the payoff of producer *i* is:

$$\Pi_i^{no\ ED} = \pi^* - \pi_j^m > 0 \qquad (24)$$

By inequality (3) this payoff is strictly positive. The retailer earns $\pi^* - \Sigma_i \Pi_i^{no\ ED} = \pi_1^m + \pi_2^m - \pi^*$, which is strictly positive (from (3)). If producer *i* charges more than the incremental contribution of his product in the no ED subgame, the retailer and the rival producer will foreclose producer *i*.

Then we have shown the following result:

Proposition 1: *Let us assume that each producer at most prepares a single retailer at stage 1. Then there are two subgame perfect equilibrium outcomes: 1) the producers grant exclusive territories to a single common retailer; 2) the producers grant exclusive territories to one exclusive retailer each. In both outcomes the collusive industry profit is realised, and producers earn their product's incremental contribution to the industry profit.*

Proof: Immediate from the text by comparing (14) and (24).

Let us compare the result in proposition 1 with the results obtained by O'Brien and Shaffer (1993). This article analyses a game where two producers either can have a single common retailer or can have one separate retailer each. O'Brien and Shaffer (1993) conclude

that producers will strictly prefer to have separate dealers with exclusive territories to a single common retailer with exclusive territories. Crucial for this result is that it is assumed that there cannot be intrabrand competition at the retail level. Therefore, a producer can at most have one retailer sell its product. O'Brien and Shaffer argue that if producers have prepared a single retailer at stage 1, this retailer must earn positive profit, because he can always threaten to refuse one product. To put it differently: if the retailer earns no profit, a producer will foreclose its rival and hire the retailer as an exclusive dealer. In equilibrium, each producer induces the retailer to realise the collusive profit and captures the incremental profit generated by his product. If there are two retailers after stage 1, foreclosure cannot occur in O'Brien and Shaffer (1993) because it is assumed that a producer at most can have a single retailer. Then a producer can earn all profit generated by the sale of his product (full franchise extraction). By delegating the sale to one retailer each imperfect collusion is achieved, but retail prices will be below the fully collusive level [Bonnano and Vickers (1988)]. In a linear demand example, O'Brien and Shaffer (1993) show that producers will always prefer having separate dealers.

In this section we have shown that when foreclosure through exclusive dealing also can occur, it cannot be an equilibrium that retailers earn no profit. To avoid foreclosure the retailers must earn the same aggregate profit as the single retailer in the ED subgame. Therefore, and this in contrast to O'Brien and Shaffer (1993) [see also Lin (1990)], producers will be indifferent between having a single dealer with exclusive territories and separate dealers with exclusive territories.

2.2 Distribution without exclusive territories

Let us assume that there initially exist N >> 2 retailers, and that each producer has prepared $n_i > 1$ retailers at stage 1, such that $\sum_i n_i = n \leq N$. At stage 2 producer *i* either offers contracts to the n_i retailers he prepared at stage 1, or offers an exclusive contract to all n retailers. Let $U^j \geq 0$ denote the individual rent that is earned by each retailer who contracts with producer *j*. If producer *j* decides to foreclose its rival, he sells his product at the monopoly price and distributes profits through (negative) fixed fees. Then, by definition producer *j* earns:

$$\Pi_j(n) = \pi_j^m - n_1 U^1 - n_2 U^2 \tag{25}$$

When producer *j* does not foreclose and hires n_j retailers, $j = 1,2$, all retailers are offered two-part tariffs. Let producer 1's retailers be indexed by $v = 1, .., n1$, and producer 2's retailers by $u = 1, ..., n2$, and let $\hat{p} = (\hat{p}^{11},..., \hat{p}^{1n1}, \hat{p}^{21},..., \hat{p}^{2n2})$ denote retail prices that solve the retailers' first-order conditions. Exploiting the symmetry of our model, let $\hat{\pi}_1(w) = \hat{p}^{1v}D^{1v}(\hat{p})$ denote the symmetric profit realised by producer 1's n_1 identical retailers, and similarly let $\hat{\pi}_2(w) = \hat{p}^{2u}D^{2u}(\hat{p})$ denote the symmetric profit realised by producer 2's n_2 identical retailers. The industry profit is written:

$$\hat{\pi}(w) = n_1 \hat{\pi}_1(w) + n_2 \hat{\pi}_2(w) \tag{26}$$

By definition producer *j* earns:

$$\Pi_j(n_j) = n_j \hat{\pi}_j(w) - n_j U^j \tag{27}$$

Comparing (25) and (27) for $j = 1,2$, we get that producer *j* will be better off hiring n_j exclusive retailers and not foreclose its rival, iff:

$$n_i U^i \geq \pi_j^m - n_j \hat{\pi}_j(w) \tag{28}$$

Producer *i* extracts profits from its retailers so that (28) holds with equality, and each producer will choose wholesale prices to maximise:

$$\Pi_i(n_i) = n_i \hat{\pi}_i(w) - n_i U^i = n_i \hat{\pi}_i(w) - \pi_j^m + n_j \hat{\pi}_j(w) = \hat{\pi}(w) - \pi_j^m \tag{29}$$

Note again that the last term in (29) is independent of the wholesale price chosen by producer *i*. Therefore, both producers have incentives to offer wholesale prices that induce all retailers to maximise the joint industry profit. Since several retailers are selling each producer's product, intrabrand competition drives margins to zero at the retail level. Therefore, producers should offer contracts with wholesale prices equal to joint collusive prices, and distribute profits with negative fixed fees. Because retailers are identical, the industry profit is not expanded by using more retailers, and producer *i* earns $\pi^* - \pi_j^m$.

We see that in equilibrium producer *i* will leave exactly $\pi_j^m - n_j\hat{\pi}_j(w)$ to his n_i retailers to avoid foreclosure. Rearranging (28) by dividing on both sides with n_i displays that the equilibrium rent earned by each retailer hired by producer *i* in this subgame is decreasing in the number of retailers that producer *i* hires. However, the total profit for the n_i retailers serving producer *i* is identical to the profit earned by one retailer in section 2.1 when there are only two retailers from stage 1.

We have shown that irrespectively of whether producers grant exclusive territories or not, the intensity of interbrand competition remains unchanged. When retail profit is low and all retailers can be hired by a single producer at low cost in terms of leaving them profit, there is an incentive to foreclose. To avoid this, each producer must leave a certain amount of profit at the retail level. We have shown that the necessary amount of profit that each producer must leave to his retailers, corresponds exactly to the extraction of each product's

incremental contribution to the industry profit as a whole. Given this, each producer's interests are aligned with the joint interests of all players in the industry (except the consumers). The producers will offer wholesale contracts that maximise the joint industry profit.

Our results so far are summarized in the following proposition:

Proposition 2: *Assume that producers can adopt exclusive territories and foreclosing exclusive dealing. When there is a finite number of retailers, the equilibrium outcome may or may not involve the use of exclusive territories. Foreclosure by using exclusive dealing will never occur. The collusive industry profit is realised in all equilibria, and each producer earns his product's incremental contribution to the collusive industry profit.*

It follows immediately from our analysis so far that making exclusive territories illegal *per se* will not affect the degree of interbrand competition. As long as foreclosure through exclusive dealing can occur, producers can achieve the collusive outcome when they each have more than one retailer (just as shown in section 2.2). Moreover, if exclusive dealing is subject to a rule of reason approach, the practice will never be brought to a court simply because it is never adopted by the producers.

It is the lack of credibility of the producers' promise to give retailers exclusive territories that drives our results. If foreclosure is ruled out because foreclosing exclusive dealing contracts are illegal *per se*, producers may add the necessary credibility to their promise. Then it follows directly from the analysis' of O'Brien and Shaffer (1993) and Rey and Stiglitz (1994) that producers will grant exclusive territories to separate dealers. By delegating sales to separate dealers, producers can achieve imperfect collusion [just as shown

by Bonnano and Vickers (1988)]. If we furthermore assume that exclusive dealing is illegal *per se*, we have from the analysis of Rey and Stiglitz (1994) that a ban on exclusive territories will work pro-competitive. When each producer uses several retailers, producers can only achieve the standard Nash Bertrand outcome with differentiated products. The argument is that when several retailers carry a product, pure intrabrand competition will drive retail margins down to zero. In other words, retail prices will be equal to the wholesale prices chosen by the producers. As noted by Rey and Stiglitz (1994), p. 7: "This situation is formally identical to the situation where producers fix the consumer's price and therefore compete directly against each other."

The implications for antitrust policy of our analysis are summarised in the following proposition.

Proposition 3: *If both foreclosing exclusive dealing and exclusive territories are per se legal or subject to a rule of reason, or if exclusive dealing is subject to a rule of reason (or legal per se) and exclusive territories are illegal per se, producers will realise the fully collusive outcome. Only if foreclosing exclusive dealing is made illegal per se, welfare can be improved. Moreover, if foreclosing exclusive dealing is illegal per se, a ban on exclusive territories will improve the social surplus.*

3. Concluding remarks

In this paper we have explored producers' incentives to adopt exclusionary practices and their impacts on interbrand competition. Because these vertical restraints are closely interlinked, have similar legal status and the alleged motives behind them are similar, we have

argued that a complete analysis of the impacts of these restraints should involve a model where both restraints can be used by the producers.

From our analysis several important implications for antitrust policy emerge. Earlier contributions in the literature examining anticompetitive effects of exclusive dealing and exclusive territories have analysed these restraints separately. From this literature antitrust practioneers may be led to believe that: (1) banning exclusive dealing arrangements will not influence interbrand competition and, (2) making exclusive territories illegal *per se* will increase the competitive pressure and improve welfare. This suggests a rule of reason approach (or legality *per se*) for exclusive dealing and that exclusive territories should be jugded illegal (or subject to a rule of reason). In contrast, we conclude that exclusive dealing arrangements that foreclose rivals from a market should be made illegal *per se*, because only then can a rule of reason approach or illegality *per se* of exclusive territories be effective. The importance of forbidding foreclosing exclusive dealing arrangements is not the danger that foreclosure will occur, but rather to make producers unable to threaten to do so. In this article we have shown that it is exactly the threat of foreclosure that enables producers to sustain the collusive outcome.

The fact that foreclosing exclusive dealing arrangements will never occur in equilibrium makes it evident why a rule of reason approach to the practice is inappropriate. Antitrust policy should not be worried about the possibility that foreclosure occurs, instead one should be worried about the effects from producers threatening to foreclose its rivals. Moreover, if foreclosing exclusive dealing arrangements are not illegal *per se*, antritrust policy towards exclusive territories becomes impotent. By making foreclosing exclusive dealing illegal *per se* will in itself improve welfare as compared to the situation where foreclosure can occur. Only when this measure is implemented courts can hope to have an effective

competition policy by judging on the practice of exclusive territories. Exclusive dealing in itself, i.e., that retailers carry one product exclusively, does not pose problem (unless there is only one retailer). The point is that it should be made explicit that the use of exclusive dealing arrangements to foreclose is *per se* illegal.

What are the implications for the practice of exclusive territories? If foreclosing exclusive dealing is illegal *per se*, it is clear that from a competitive perspective exclusive territories should be illegal. However, if there can be shown to be significant efficiency-enhancing effects that cannot be achieved without exclusive territories, and that outweight the negative anticompetitive effects, a rule of reason approach may be appropriate.

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Appendix: A linear demand example

Consider the case where there are at most two retailers after stage 1, k = A,B. Let the final demands for the products be given by[17]

$$p^i = 1 - q^i - b\, q^j, \quad i,j = 1,2,\ i \neq j \tag{A1}$$

where the parameter $0 < b < 1$ measures the degree of substitutability between the products. When b is close to one products are close substitutes and b close to zero indicates nearly independent products. When only product i is sold the demand is written

$$q^i = D^i(p^i) = 1 - p^i, \quad i = 1 \text{ or } 2 \tag{A2}$$

and the monopoly price is written

$$p^{im} = \underset{p^i}{argmax}\ p_i(1 - p^i) = \frac{1}{2} \tag{A3}$$

and the monopoly profit $\pi_1^m = \pi_2^m = 1/4$. When both products are sold the demand for each product is given by:

$$q^i = D^i(p) = \frac{1}{1+b} - \frac{1}{1-b^2}\, p^i + \frac{b}{1-b^2}\, p^j, \quad i,j = 1,2\ ,\ i \neq j \tag{A4}$$

and the joint collusive prices are:

$$p^* = (p^{1*}, p^{2*}) = \underset{p}{argmax}\ [p^1 D^1(p) + p^2 D^2(p)] = (\frac{1}{2}, \frac{1}{2}) \tag{A5}$$

and the joint collusive profit is written:

$$\pi^* = \frac{1}{2(1+b)} < \frac{1}{2}, \quad b \in (0,1) \tag{A6}$$

and inequality (3) is satisfied.

Consider the ED subgame. As noted in section 3.1, when one product is sold through

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[17] We have chosen a somewhat different formulation of the demand functions than Lin (1990) and O'Brien and Shaffer (1993). These authors use $q_i(p_i,p_j) = 1 - p_i + a\, p_j$, where $1 > a > 0$ measures the degree of substitutability between the products, a higher parameter a indicating more homogeneous products. This is nothing but a normalization of our demand system.

both retailers, the monopoly profit is realised. In the delegation game wholesale prices are set to 1/2, retail prices $p_i = 1/2$ and the retailers earn a gross profit (gross of the fixed fee) of zero. Then fixed fees can be equal or less than zero.

When the producers hire an exclusive retailer each, the producers offer each retailer a two-part tariff $T(q^{ik}) = a^{ik} + w^{ik}q^{ik}$. Inserting (A.4) in problem (8), and solving the FOC's we get the retail prices:

$$\hat{p}^{iA} = \frac{2 - b - b^2 + 2\,w^{iA} + b\,w^{jB}}{4 - b^2} \tag{A7}$$

and symmetrictly for retailer B selling product j. Inserting these retail prices in (13), and solving both producers' first-order conditions yields:

$$w^{iA} = w^{jB} = \frac{b}{2} \tag{A8}$$

By inserting the optimal wholesale prices from (A8) in (A7) it is easily verified that retailers set the collusive retail prices. Let $D^i(1/2, 1/2)$ be the demand for product i when both retailers set the collusive prices. From (A4) we get $D^i(1/2, 1/2) = 1/(2(1+b))$. Then from (14) we have that:

$$\Pi_i^{ED} = a^{iA} + \frac{b}{2} D^i\left(\frac{1}{2},\frac{1}{2}\right) = \pi^* - \pi_j^m = \frac{1 - b}{4(1 + b)} \tag{A9}$$

and solving for a^{iA} we get:

$$a^{iA} = \frac{1 - 2b}{4(1 + b)} \tag{A10}$$

We see that when products are homogeneous enough ($b > 1/2$) the fixed fee becomes negative. In the ED subgame retailers earn:

$$\begin{aligned} U_k &= \frac{b}{4(1 + b)}, \quad k = A,B \\ U &= \frac{b}{2(1 + b)} \end{aligned} \tag{A11}$$

When products are homogeneous ($b = 1$), wholesale prices are equal to the collusive prices. The joint collusive profit is equal to the monopoly profit of any of the products, 1/4. Each

retailer earns the channel profit of 1/8, entirely through a fixed payment from his producer (a negative fixed fee). Producers earn zero as their product's incremental contribution to the industry profit is zero. When products are independent in demand (b = 0), wholesale prices equal producer marginal costs. In this case each retailer earns a gross profit of 1/4 (equal to the monopoly profit of each product), and producers extract all retail profit through the fixed fee.

When the producers have prepared a single common retailer at stage 1 (no ED), each of them can charge (from (19)):

$$\Pi_i^{no\ ED} = \pi^* - \pi^m = \frac{1 - b}{4(1 + b)} > 0 \ , \quad b \in (0,1) \tag{A12}$$

which is entirely extracted through the fixed fee (wholesale prices are equal to zero). The retailer realises the joint collusive profit and earns:

$$U^{ij} = \pi^* - a^1 - a^2 = \frac{b}{2(1 + b)} \tag{A13}$$

and producers are indifferent between having separate dealers and having a single common dealer. In both subgames each producer can when foreclosing its rival at most earn:

$$\Pi_i = \pi_i^m - U = \frac{1}{4} - \frac{b}{2(1 + b)} = \frac{1 - b}{4(1 + b)} \tag{A14}$$

which is exactly what he earns by not foreclosing.

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