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COVER LETTER

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HIGHLIGHTS

- We model the effects of exclusive contracts in vertically integrated markets where both the upstream and the downstream market are characterized as oligopolies and manufacturers produce vertically differentiated products.
- If the extent of consumers' heterogeneity is small, manufacturers offer exclusive contracts unilaterally.
- if consumers' valuation differ significantly both manufacturers engage in exclusive contracting.

Exclusive contracts with vertically differentiated products

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Abstract

In this paper we develop a simple model to analyze the effects of exclusive contracts in vertically integrated markets where both the upstream and the downstream market are characterized as oligopolies and manufacturers produce vertically differentiated products. We find that firms prefer to deal exclusively with retailers. If the extent of consumers' heterogeneity is small, manufacturers offer exclusive contracts unilaterally. On the other hand, if consumers' valuation differ significantly both manufacturers engage in exclusive contracting.

Key words: vertical differentiation, exclusive contracts, double marginalization

JEL codes: L14, K12, D43

1 Introduction

Contracts between a manufacturer and its retailers often contain provisions that prohibit one or both parties from trading with anyone else. Several articles have studied such contractual relationship, yet these works mostly focus on contracts that prevent the retailers from selling goods that compete with the manufacturer's product The literature offers three types of explanations.[1]

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[1] For detailed overview of the literature, see Whinston (2006)

Firstly, exclusive contracts can serve to prevent entry of potentially more efficient competitors (Rasmusen, Ramseyer and Wiley (1991), Segal and Whinston (2000a)). Secondly, exclusive contracts can be used to extract rents from a third party (Aghion and Bolton (1997)). By using contractually specified damages, an incumbent and its retailer can strategically force the entrant to lower the price he offers to the retailer, which will increase the incumbent and retailer's joint profits. And finally, exclusive contracts can be viewed as a method to motivate agents to make relationship-specific investments (Segal and Whinston (2000b), de Meza and Selvaggi (2004)).

Contracting in multiplayer models has been investigated in Hart and Tirole (1990), Besanko and Perry (1994), Stefanadis (1998) and Spector (2004). The main finding of these articles is that manufacturer profits are always higher with exclusive dealing. Furthermore, computational results suggest that profits increase, while consumer and aggregate welfare fall when manufacturers offer exclusive contracts. These results, however, do not offer any explanation for the case when not all but only a few manufacturers are engaged in exclusive dealing. To the best of our knowledge the economics of unilateral exclusive contracting has not yet been studied.

Little attention has been paid to the reason why manufacturers would deliberately commit themselves to sell their products exclusively through a specific retailer without any restriction needed from them. However, such contracts are commonly used practices in different industries. Well known examples are initiating from industries such as telecommunications or the food industry. At first glance it can be puzzling why a manufacturer would restrict its selling to the consumers as one would assume that the more retailers sell the product the better it is for the manufacturer. As we will show in this article there is no real paradox though.

In the present paper, we fill the gap in the theoretical literature by providing a simple model which can explain the unilateral exclusive dealing behavior. We consider an industry in which two manufacturers are selling products of different qualities through retailers to a population of consumers differing in their valuation for quality. The manufacturers first decide whether to deal exclusively with a specific retailer while retailers compete in prices. Our equilibrium analysis shows that either both manufacturers engage in exclusive contracting, or only the high quality firm offers exclusive contract to a retailer, or the low quality manufacturer sells exclusively depending on the extent of consumers' heterogeneity. As a result both manufacturers sell exclusively if the consumers' heterogeneity is significant. On the other hand, only one producer will deal exclusively if the consumers value the quality with an insignificant difference.

The intuition behind this result is as follows. Manufacturers selling without exclusivity cause a fierce price competition among retailers resulting in an incentive to underprice their rival and thereby increasing their market share with a smaller wholesale price. Although, if they use exclusive contracts, their retailers will sell the products with a monopoly margin, abating the negative effect of a price competition on their profits. However, this is not without consequence. The manufacturer who sells with exclusivity will lose its relative market share,

yet the profit increasing effect is stronger than the negative effect of the double marginalization.

2 The Model

Consider a market in which two manufacturers are selling products with different qualities through retailers to the consumers. Each product $i = A, B$ is characterized by its quality $s_i \geq 0$. Consumers are heterogeneous in their quality valuation and their preferences are described as follows: a consumer identified by θ derives the following utility from buying one unit of a product i:

$$U(\theta) = v + \theta s_i - p_i \tag{1}$$

where v is a positive constant, s_i is a quality parameter and p_i is the price of product i. The population of consumers is described by the parameter θ which is uniformly distributed between $\underline{\theta}$ and $\overline{\theta}$, with $\overline{\theta} > \underline{\theta} > 0$. We assume that v is large enough for all consumers to find a product that yields positive payoff in equilibrium.

Manufacturer i produces at c_i marginal cost an s_i quality product and sells at price w_i to the retailers. Qualities are exogenous and without loss of generality we assume $s_B > s_A$. We normalize $c_B > c_A = 0$ and we assume the production's fixed costs to be equal to zero. For simplicity, retailers $j = 1, \ldots, n$ have no retailing costs above the cost of obtaining the products from manufacturers. For the sake of tractability we restrict our attention to the case of $n = 2$, however generalizing the model for n retailers is straightforward.

We solve the following sequential game for its subgame perfect Nash equilibrium. In the first stage, manufacturers simultaneously decide on whether to commit themselves to deal exclusively with a retailer and set their prices in the form of w_i. These decisions then become common knowledge. In the second stage, retailers simultaneously announce if they accept any of the offers and compete in Bertrand fashion. The game is solved by backward induction.

Hereafter we investigate the retailers' pricing decisions taking as given the decisions of manufacturers made in the first stage of the game. There are four subgames to consider corresponding to the following: no manufacturer offers exclusive contract; manufacturer B (the high quality manufacturer) is dealing exclusively with a retailer, while the other manufacturer sells its product without limitation; manufacturer A (the low quality manufacturer) is engaged unilaterally in exclusive contracting and both manufacturers sell exclusively through retailers.

Since $s_B > s_A$, all consumers prefer the high quality product to the low quality product when $p_A = p_B$. Thus, in order to exclude the case when manufacturer B benefits from the possibility of preempting the market with a limit price such as $p_B = p_A + \underline{\theta}(s_B - s_A)$ we make the following assumption

Assumption 1

$$\frac{c_B}{s_B - s_A} < 2\overline{\theta} - \underline{\theta} \quad if \quad \overline{\theta} \leq \frac{c_B}{s_B - s_A}$$

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$$2\underline{\theta} - \overline{\theta} < \frac{c_B}{s_B - s_A} \quad if \quad \overline{\theta} > \frac{c_B}{s_B - s_A}$$

(A1) implies that in equilibrium both manufacturers enjoy positive market shares and earn positive profits in each subgame.

Nash equilibrium in the subgames is obtained in two steps. First, we compute the candidate equilibrium. Second, we identify the parameters configuration for which candidates effectively yield the corresponding outcome.

No exclusive contracts. When there is no manufacturer who offers exclusive contract to any of the retailers both products are available for purchasing at every retailer. Demand addressed to product i is defined by the set of consumers who maximize their utility when buying product i rather then product $-i$. Given (p_A, p_B), where $p_i = \min\{p_{i1}, p_{i2}\}$, p_{ij} being the price of product i at the retailer j ($i = A, B$ and $j = 1, 2$), we denote by $\tilde{\theta}(p_A, p_B)$ the marginal consumer who is indifferent between consuming product A or product B. By definition he satisfies $\tilde{\theta}(p_A, p_B)s_A - p_A = \tilde{\theta}(p_A, p_B)s_B - p_B$. Accordingly, consumers with $\theta \leq \tilde{\theta}(p_A, p_B)$ strictly prefer product A over product B and therefore consumers in the interval $\theta \in [\underline{\theta}, \tilde{\theta}(p_A, p_B)]$ will purchase the product A at one of the retailers. Whereas those with $\theta \in (\tilde{\theta}(p_A, p_B), \overline{\theta}]$ will purchase product B from one of B's retailer. Demand for different products can be given by

$$D_A(p_A, p_B) = \frac{1}{\overline{\theta} - \underline{\theta}}\left(\frac{p_B - p_A}{s_B - s_A} - \underline{\theta}\right) \tag{2}$$

and

$$D_B(p_B, p_A) = \frac{1}{\overline{\theta} - \underline{\theta}}\left(\overline{\theta} - \frac{p_B - p_A}{s_B - s_A}\right) \tag{3}$$

Let $D_{i1}(p_i, p_{-i})$ denote the demand function for product i faced by retailer 1 and $D_{i2}(p_i, p_{-i})$ the demand function for product i faced by retailer 2, respectively. Thus,

$$D_{ij}(p_i, p_{-i}) = \begin{cases} D_i(p_{ij}, p_{-i}) & if \quad p_{ij} < p_{i,-j} \\ D_i(p_{ij}, p_{-i})/2 & if \quad p_{ij} = p_{i,-j} \\ 0 & otherwise \end{cases} \tag{4}$$

and $D_i(p_i, p_{-i}) = \sum_{j=1,2} D_{ij}(p_i, p_{-i})$.

The retailers choose simultaneously p_{A1}, p_{B1}, p_{A2} and p_{B2} to maximize their profits. Since retailers compete in Bertrand fashion, every retailer set prices which are equal to their marginal costs and earn zero profits. Then the ith manufacturer problem is

$$\max_{w_i} \pi_i = D_i(w_i, w_{-i})(w_i - c_i) \tag{5}$$

This yields the manufacturers' wholesale prices. Hence

Lemma 2.1 *(Equilibrium prices and profits when no manufacturers deal exclusively with retailers).*
If no manufacturer sells exclusively through any retailer the equilibrium prices and profits are as follows

$$p_{A1}^{nn*} = p_{A2}^{nn*} = w_A^{nn*} = \frac{1}{3}[c_B + (s_B - s_A)(\bar{\theta} - 2\underline{\theta})] \qquad \pi_1^{nn*} = 0$$

$$p_{B1}^{nn*} = p_{B2}^{nn*} = w_B^{nn*} = \frac{1}{3}[2c_B + (s_B - s_A)(2\bar{\theta} - \underline{\theta})] \qquad \pi_2^{nn*} = 0$$

$$\pi_A^{nn*} = \frac{[c_B + (\bar{\theta} - 2\underline{\theta})(s_B - s_A)]^2}{9(\bar{\theta} - \underline{\theta})(s_B - s_A)} \qquad \pi_B^{nn*} = \frac{[c_B - (2\bar{\theta} - \underline{\theta})(s_B - s_A)]^2}{9(\bar{\theta} - \underline{\theta})(s_B - s_A)}$$

Lemma 2.1 indicates that for any given quality configuration the high quality manufacturer sets a higher wholesale price and earns a higher profit than the low quality firm. Moreover, in equilibrium manufacturer B always serves a larger market area. These results, in which manufacturer B has a quality advantage over manufacturer A are in line with the findings in literature.

The high quality firm sells exclusively. When only the high quality manufacturer engages in exclusive contracting then its product is available for purchasing at only one retailer shop, while the low quality product can be purchased at any retailer. Without loss of generality we assume that manufacturer B offers an exclusive contract to retailer 2. The demand functions for product A faced by retailer j can be given by (4). While the demand for product B faced by retailer 2 is equal to $D_B(p_B, p_A)$ given by (3), since retailer 2 is the only retailer who sells the product B. Therefore, retailers compete in Bertrand fashion at the market for product A and set $p_{A1} = p_{A2} = w_A$. Since retailer 2 is a monopoly at the retail market for the high quality product, the price set by retailer for this product satisfies

$$p_{B2}^* = \arg\max_{p_{B2}} \frac{1}{\bar{\theta} - \underline{\theta}} \left(\bar{\theta} - \frac{p_{B2} - w_A}{s_B - s_A} \right)(p_{B2} - w_B) \qquad (6)$$

This yields to $p_{B2}^* = \frac{1}{2}[w_A + w_B + \bar{\theta}(s_B - s_A)]$.

Moving backward and substituting the retailers' prices into the manufacturers' profit functions and solving the problems for w_A and w_B, we obtain the equilibrium outcome for the respective subgame. Lemma 2.2 summarizes this result.

Lemma 2.2 *(Equilibrium prices and profits when only a specific retailer sells exclusively the high quality product).*
Suppose the high quality manufacturer unilaterally offers an exclusive contract to a retailer. The equilibrium prices and profits are as follows

$$p_{A1}^{ne*} = p_{A2}^{ne*} = w_A^{ne*} = \frac{1}{3}[c_B + (s_B - s_A)(3\bar{\theta} - 4\underline{\theta})]$$

$$p_{B2}^{ne*} = \frac{1}{2}[c_B + (s_B - s_A)(3\bar{\theta} - 2\underline{\theta})] \qquad w_B^{ne*} = \frac{1}{3}[2c_B + (s_B - s_A)(3\bar{\theta} - 2\underline{\theta})]$$

$$\pi_A^{ne*} = \frac{[c_B + (s_B - s_A)(3\bar{\theta} - 4\underline{\theta})]^2}{18(\bar{\theta} - \underline{\theta})(s_B - s_A)} \qquad \pi_B^{ne*} = \frac{[c_B - (s_B - s_A)(3\bar{\theta} - 2\underline{\theta})]^2}{18(\bar{\theta} - \underline{\theta})(s_B - s_A)}$$

$$\pi_2^{ne*} = \frac{[c_B - (s_B - s_A)(3\bar{\theta} - 2\underline{\theta})]^2}{36(\bar{\theta} - \underline{\theta})(s_B - s_A)} \qquad \pi_1^{ne*} = 0$$

By granting a downstream firm with exclusivity, the high quality manufacturer causes a double marginalization problem, which has a negative effect on the quantity sold from its product. The high quality manufacturer's market share is $\frac{(s_B - s_A)(3\bar{\theta} - 2\underline{\theta}) - c_B}{6(s_B - s_A)(\bar{\theta} - \underline{\theta})}$ compared to the case when it is not involved in exclusive contracting, $\frac{(s_B - s_A)(2\bar{\theta} - \underline{\theta}) - c_B}{3(s_B - s_A)(\bar{\theta} - \underline{\theta})}$. However, in equilibrium, manufacturer B's wholesale price, profit and market size is still higher than those of manufacturer A.

The low quality firm sells exclusively. Now suppose that the low quality manufacturer sells exclusively through a retailer. Without loss of generality we assume that the retailer who carry the low quality manufacturer's product is the retailer 1. Again, since retailer 1 is a unique retailer regarding the low quality product, it sets its monopoly price for this product while at the high quality product's market, retailers compete as Bertrand competitors and set their prices equal to the wholesale prices. The analysis goes the same way as in the previous case, when the high quality manufacturer solely engages in exclusive contracting. Formally, we obtain the following equilibrium outcome.

Lemma 2.3 *(Equilibrium prices and profits when a retailer sells exclusively the low quality product).*
Suppose the low quality manufacturer offers an exclusive contract to a retailer. The equilibrium prices and profits are as follows

$$p_{A1}^{en*} = \frac{1}{2}[c_B + (s_b - s_A)(2\bar{\theta} - 3\underline{\theta})] \quad w_A^{en*} = \frac{1}{3}[c_B + (s_B - s_A)(2\bar{\theta} - 3\underline{\theta})]$$

$$p_{B1}^{en*} = p_{B2}^{en*} = w_B^{en*}\frac{1}{3}[2c_B + (s_B - s_A)(4\bar{\theta} - 3\underline{\theta})]$$

$$\pi_A^{en*} = \frac{[c_B + (s_B - s_A)(2\bar{\theta} - 3\underline{\theta})]^2}{18(\bar{\theta} - \underline{\theta})(s_B - s_A)} \qquad \pi_B^{en*} = \frac{[c_B - (s_B - s_A)(4\bar{\theta} - 3\underline{\theta})]^2}{18(\bar{\theta} - \underline{\theta})(s_B - s_A)}$$

$$\pi_1^{en*} = \frac{[c_B + (s_B - s_A)(2\bar{\theta} - 3\underline{\theta})]^2}{36(\bar{\theta} - \underline{\theta})(s_B - s_A)} \qquad \pi_2^{en*} = 0$$

Both manufacturers sell exclusively. When both manufacturers offer exclusive contracts to retailers, the market prices equal the wholesale prices plus the retailers' monopoly margins.[2] Solving the problem backward and taking the wholesale prices as given, retailers set $p_{A1} = \frac{1}{3}[2w_A + w_B + (s_B - s_A)(\bar{\theta} - 2\underline{\theta})]$ and $p_{B2} = \frac{1}{3}[w_A + 2w_B + (s_B - s_A)(2\bar{\theta} - \underline{\theta})]$, respectively. Substituting these into the manufacturers' profit functions and maximizing them with respect of w_A and w_B yield the following lemma.

Lemma 2.4 *(Equilibrium prices and profits when retailers sell exclusively the manufacturers' products).*
Suppose the manufacturers offer exclusive contract to retailers. The equilibrium prices and profits are as follows

$$p_{A1}^{ee*} = \frac{4}{9}[c_B + (s_B - s_A)(4\bar{\theta} - 5\underline{\theta})] \quad w_A^{ee*} = \frac{1}{3}[c_B + (s_B - s_A)(4\bar{\theta} - 5\underline{\theta})]$$

$$p_{B2}^{ee*} = \frac{1}{9}[5c_B + 4(s_B - s_A)(5\bar{\theta} - 4\underline{\theta})] \quad w_B^{ee*} = \frac{1}{3}[2c_B + (s_B - s_A)(5\bar{\theta} - 4\underline{\theta})]$$

$$\pi_A^{ee*} = \frac{[c_B + (s_B - s_A)(4\bar{\theta} - 5\underline{\theta})]^2}{27(\bar{\theta} - \underline{\theta})(s_B - s_A)} \qquad \pi_B^{ee*} = \frac{[c_B - (s_B - s_A)(5\bar{\theta} - 4\underline{\theta})]^2}{27(\bar{\theta} - \underline{\theta})(s_B - s_A)}$$

$$\pi_1^{ee*} = \frac{[c_B + (s_B - s_A)(4\bar{\theta} - 5\underline{\theta})]^2}{81(\bar{\theta} - \underline{\theta})(s_B - s_A)} \qquad \pi_2^{ee*} = \frac{[c_B - (s_B - s_A)(5\bar{\theta} - 4\underline{\theta})]^2}{81(\bar{\theta} - \underline{\theta})(s_B - s_A)}$$

Having derived the profit functions for the pricing stage, we move one step backward to study the contracting decisions.

3 Equilibrium Contracting Choices

In the contracting stage manufacturers simultaneously decide whether to offer an exclusive contract to a retailer and to sell exclusively through it. By applying this strategy the manufacturer weakens the competition for its product on the market for final consumers which has a profit enhancing effect. On the other hand it causes a double marginalization problem. The payoffs corresponding to different strategies are represented by Table 1.

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[2]Here we suppose that the manufacturers offer exclusive contracts to different retailers. The case when both manufacturers grant the same retailer with exclusivity doesn't yield to different result from the manufacturers point of view, however the latter case results in the foreclosure of a retailer. This can be an interesting issue for the regulators, though the fact of foreclosure doesn't have any significant effect on welfare in our model. Without loss of generality we assume that manufacturer A offers an exclusive contract to the retailer 1, and manufacturer B to the retailer 2.

Table 1: The payoff matrix

		M_B	
		non-exclusively (N)	exclusively (E)
	non-exclusively (N)	$(\pi_A^{nn*},\ \pi_B^{nn*})$	$(\pi_A^{ne*},\ \pi_B^{ne*})$
M_A	exclusively (E)	$(\pi_A^{en*},\ \pi_B^{en*})$	$(\pi_A^{ee*},\ \pi_B^{ee*})$

Depending on the population's characteristic the game has several equilibria. Our main findings are stated in the next proposition.

Proposition 3.1 *The following holds for the manufacturers' equilibrium contracting choice.*

(i) *If $\overline{\theta} \leq \frac{c_B}{s_B - s_A}\left(\frac{1+\sqrt{6}}{5}\right)$ then the Nash equilibrium is (N,E) for any value of $\underline{\theta}, \overline{\theta}$ which satisfies (A1).*

(ii) *If $\frac{c_B}{s_B - s_A}\left(\frac{1+\sqrt{6}}{5}\right) \leq \overline{\theta} < \frac{c_B}{s_B - s_A}$ then the Nash equilibrium is (N,E) for $\underline{\theta} \geq \overline{\theta}\left(\frac{4+\sqrt{6}}{2}\right) - \frac{c_B}{s_B - s_A}\left(\frac{2+\sqrt{6}}{2}\right)$ and (E,E) for any other $\underline{\theta}$ which satisfies (A1).*

(iii) *If $\frac{c_b}{s_B - s_A} \leq \overline{\theta}$ the Nash equilibrium is (E,E) for $\underline{\theta} \leq \overline{\theta}\left(\frac{4-\sqrt{6}}{5}\right) + \frac{c_B}{s_B - s_A}\left(\frac{1+\sqrt{6}}{5}\right)$ and (E,N) for $\underline{\theta}$ higher than this threshold but smaller than the limit defined in (A1).*

These outcomes are depicted in figure 1. The equilibria with the high quality firm's exclusivity is given by the dark-shaded triangle, while the ones of low quality firm are given by the light-shaded triangle. Note that in equilibrium at least one manufacturer offers an exclusive contract to a retailer. Furthermore, observe that both manufacturers engage in exclusive contracting as the consumer with the lowest valuation for quality differs significantly in his valuation from the consumer who values the quality the most. Proposition 3.1 indicates that the low quality firm offers exclusivity unilaterally yet the difference in consumers' valuation is not significant, yet the consumer with the highest valuation has a strong preference for the quality.

To understand the economic logic behind Proposition 3.1 more deeply, consider the case when the high quality manufacturer offers exclusivity to a retailer unilaterally. By exclusivity the manufacturer grants its retailer with monopoly power on its product market. As far as the players' actions are strategic complements, this yields the low quality manufacturer to price its product on the wholesale market on a higher level, resulting in higher consumer prices on the market for the final products. While the market is always fully covered this results in higher profit to the manufacturers. The relative market share loss caused by double marginalization is offset by the higher consumer prices. When
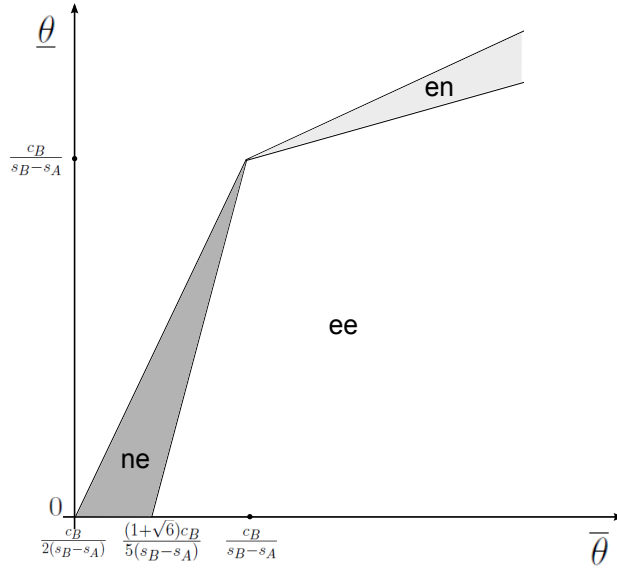
Figure 1: Equilibrium outcomes as a function of consumers' heterogeneity.

consumers' taste are less concentrated, manufacturers can temper the price competition by offering exclusive contracts to the retailers which produce higher profits to them. The way exclusivity is applied in the light-shaded triangle seems somewhat counterintuitive at first. Recall here the low quality firm offers exclusivity while the high quality one does not. However, consider the following. Whereas the difference in valuations is not that significant, it is not in the interest of the high quality firm to offer exclusivity. On the other hand, as consumers value both products highly, the low quality firm may offer an exclusive contract. The underlying logic is that since there is room for further possible price increases, it will instigate a price increase for the high quality product because of strategic complementarity.

4   Welfare analysis

Given this set of results, it is not *a priori* clear which type of behavior is the most efficient from a social welfare point of view. Indeed an exclusive contract can lead to higher profits but lower consumer surplus. In order to compare different situations let us define social welfare as the sum of consumer's surplus and producer's surplus defined as the sum of joint profits of manufacturers and their retailers $(\pi_i + \pi_j)$.

Social welfare is given by

$$
\begin{aligned}
W &= \int_{\underline{\theta}}^{\frac{p_B^* - p_A^*}{s_B - s_A}} (v + \theta s_A - p_A^*)\mathrm{d}\theta + \int_{\frac{p_B^* - p_A^*}{s_B - s_A}}^{\overline{\theta}} (v + \theta s_B - p_B^*)\mathrm{d}\theta \\
&+ \sum_{i=A,B} \pi_i + \sum_{j=1,2} \pi_j
\end{aligned}
$$

where p_i^* $(i = A, B)$ stands for the equilibrium prices. Plugging into this the equilibrium prices for the different subgames, we get the social welfare for the different contracting settings. For the sake of tractability let us define ΔW^{lk} as the difference between the welfare where no exclusive contracts can be offered and the welfare where at least one firm offers exclusivity (here l stands for the contract offered by manufacturer A and k for B's contract type).

It is easy to see that consumer surplus decreases with the number of exclusive contracts being offered in equilibrium. When an additional exclusive contract is offered, firms experience less fierce competition and thus consumer prices go up. Yet, the profits of the firms increase as well, hence the welfare effect of exclusive contracts is unclear.

To show this more precisely we consider the following numerical examples when $v = 0$, $s_A = 0$, $s_B = 1$, $c_B = \frac{1}{2}$. If, for example $\overline{\theta} = \frac{2}{5}$ in the equilibrium only the high quality firm offers exclusivity to a retailer. In this case $\Delta W^{ne} < 0$, that is, exclusivity is social efficient if $\frac{1}{20}(6 - \sqrt{6}) \leq \underline{\theta} < \frac{3}{10}$. On the other hand, if we assume that $\overline{\theta} = 1$ then two possible outcomes can emerge in equilibrium. If $\frac{1}{10}(9 - \sqrt{6}) \leq \underline{\theta} < \frac{3}{4}$ in the equilibrium the low quality firm engages in exclusivity with a retailer and when $\underline{\theta} < \frac{1}{10}(9 - \sqrt{6})$ both firms sell exclusively. In both cases the respective outcome is socially efficient. Note, that in this case prohibiting exclusive contracting by the regulator decreases welfare. Our result can be summarized as follows:

Proposition 4.1 *Exclusive contracts decrease consumer surplus. The welfare effect – if we consider welfare as aggregate welfare – is ambiguous.*

5   Conclusion

This paper focuses on the economics of exclusive contracts in multiplayer markets. We analyze the problem of contracting by assuming vertically differentiated products and consumer heterogeneity for quality. We give a simple explanation for the phenomenon of unilateral exclusive contracting by arguing that it is profitable for a manufacturer to sell its product exclusively through a retailer rather than to make the product available for purchasing at any retailer shop if the extent of consumers' heterogeneity is small.

In this paper, we assumed that manufacturers make public offers and the outcome of their contracting stage is common knowledge. Admittedly, this is a simplification. The reason for this is that little is known theoretically about

how to handle contracting with several parties when contracts can have more general forms. However, often the offers of manufacturers can be observed by the competing firms which can validate our assumption. Another limitation of the model is our assumption that the competing retailers are symmetric firms. Further work is desirable to test whether our conclusions extend to the case of asymmetric retailers and other forms of contracting.

The theory advanced in this paper also shows that welfare effects are not as straightforward as they were suggested by Besanko and Perry (1994). Moreover, our result contrasts the findings of Anderson and Bao (2010) which states that decentralized supply chains, when all retailers carry the products of both manufacturers, are more profitable than integrated supply chains, when manufacturers offer exclusive contracts. From the analysis in this paper, in some cases there seems little reason for antitrust authorities to worry when exclusive contracts are being offered. Thus an *a priori* ban on exclusive contracting – the prevailing legal attitude in EU – can have a negative effect on social welfare. On that basis a rule-of-reason legal attitude would be more appropriate than the current legislation when exclusive contracts are being offered by vertically differentiated manufacturers.

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