CIRJE-F-789

Exclusive Dealing Contracts by Distributors

Ryoko Oki
Graduate School of Economics, University of Tokyo

Noriyuki Yanagawa
University of Tokyo

March 2011

Exclusive Dealing Contracts by Distributors

Ryoko Oki* and Noriyuki Yanagawa†

January 14, 2011

Abstract

The existing literature about exclusive dealing contracts has focused on cases where an incumbent manufacturer offers exclusive contracts to deter an entry. In contrast, we consider the case where an incumbent distributor offers exclusive dealing contracts to deter an entry. Exclusive dealing contracts by a distributor are less effective. We will show that the outcome of such contracts is quite different from the outcomes in the traditional literature. If the number of manufacturers is sufficiently high, it is impossible to exclude an efficient entry. Furthermore, if we allow two-part tariff contracts, the entrant distributor can enter the market for any number of manufacturers.

Key words: Exclusive Dealing, Large Distributor, Entry Threat, Antitrust Policy

JEL Classification: D86, K21, L11, L13, L14, L42

*Graduate School of Economics, University of Tokyo. (e-mail: oki.ryoko@gmail.com)

†Faculty of Economics, University of Tokyo. (e-mail: yanagawa@e.u-tokyo.ac.jp)

1 Introduction

Whether exclusive dealing contracts prevent efficient entries is one of the main issues discussed in the economic literature on vertical restraints. Recently, Simpson and Wickelgren (2007) extended this issue to the case where a manufacturer offers exclusive dealing contracts to downstream distributors.[1] This strand of literature examines cases where one large incumbent manufacturer faces a potential efficient entrant. The results of these studies have a strong impact on the literature about exclusive dealing contracts. Simpson and Wickelgren (2007) have shown that in almost perfect competition at the distribution level, exclusive dealing contracts are signed by all distributors with up-front payment arbitrarily close to zero.[2]

In this paper, we consider the case where an incumbent distributor facing a rival's entry offers exclusive dealing contracts to manufacturers. We will show that the outcome of such exclusive dealing contracts is quite different from the outcomes in the traditional literature. We will show that as long as the number of manufacturers is sufficiently high, it is impossible to exclude an efficient entry. Furthermore, if we allow two-part tariff contracts, the entrant distributor can enter the market for any number of manufacturers.

Traditionally, the economic literature has focused on cases wherein vertical restraints are initiated by manufacturers or suppliers, that is, upstream firms. In many industries, however, we observe cases where downstream firms offer vertical restraints to manufacturers. As Miklos-Thal et al. (forthcoming) and Inderst and Wey (2007) point out, such cases occur especially in the grocery industry.[3] For example, large supermarket chains request slotting allowance payments to manufacturers. Miklos-Thal et al. (forthcoming) state, 'In France, manufacturers have long been complaining about the growing magnitude of slotting

[1] Though Fumagalli and Motta (2006) introduce a distributor into the entry deterrence model, Simpson and Wickelgren (2007) have proved more robust results without Fumagalli and Motta's ad-hoc assumption. See also Wright (2009) for a discussion on Fumagalli and Motta's result on two part tariffs.

[2] In Simpson and Wickelgren (2007), the exclusive dealing contract is breachable by paying expectation damages. At the equilibrium where all distributors sign contracts, an entrant can enter the market with one breaching distributor. However, at this equilibrium, the retail market price is as high as in the case of upstream monopoly.

[3] Inderst and Wey (2007) suggest that we can observe a similar situation in media industry as well.

allowances and hidden rebates and these practices have been at the center of the debate about the 2–5 reform of the *1996 Galland Act*'. Comanor and Rey (2000) present two antitrust cases of exclusive dealing contracts initiated by distributors. One is the Toys 'R' Us case and the other is the Belk case. Toys 'R' Us is the largest toy retailer in the United States and it faced intense competition with new warehouse clubs, for example Sam's club (a division of Wal-Mart), Costco, and so many others in the 1990's. Toys 'R' Us offered exclusive dealing contracts to major toy manufacturers, such as Mattel, in order to prevent their rivals' access to major toy products. Similarly, Belk, a department store chain with more than 400 retail outlets in the United States, also faced a competitive rival's entry: a discounter, Garment District. Belk offered exclusive dealing contracts to sportswear manufacturers and tried to prevent them from selling their products to Garment District.

A debate on vertical restraints initiated by distributors is growing even from a competition policy perspective. Regarding exclusive dealing contracts, the European Commission is working for a revision of the Vertical Restraints Block Exemption Regulation and the related guidelines on supply and distribution agreements concerning the increased buyer power of large retailers.[4] According to the revised regulation, 'the Commission proposes that for a vertical agreement to benefit from the block exemption, not only the supplier's market share (as is currently the case) but also the buyer's market share should not exceed 30%'.[5] The commission is concerned that with this regulation large distributors backed by their buying power could soften competition by restricting suppliers' deals. At the time of announcing the new rule, the European Commission states, 'We have found that big distributors can also use their buyer power to impose anti-competitive contractual clauses on suppliers, to the detriment of competition and consumers'. [6]

As far as we know, there are not many articles considering vertical restraints initiated by distributors. Regarding the slotting allowance, Marx and Shaffer (2007) and Miklos-Thal et al. (forthcoming) examine the case where distributors request slotting allowance for manufacturers. In this paper, we focus on another vertical restraint, exclusive deal-

[4] The new rule became effective in June 2010 with a one-year transitional phase.

[5] The European Commission press release, July 28, 2009.

[6] The European Commission press release, April 20, 2010. This comment was made by Joaquin Almunia, vice president of the European Commission responsible for competition policy.

ing contracts. We consider a case where distributors offer exclusive dealing contracts to manufacturers.

In the literature on exclusive dealing contracts, Rasmusen et al. (1991) and Segal and Whinston (2000) have shown that exclusive dealing contracts may deter efficient entries. They have shown that buyers may not reject the exclusive dealing offer from an incumbent manufacturer when an entrant has to pay a sufficient amount of entry cost. The reason is that the sales amount to a rejected buyer (or free buyer) is insufficient and the entrant cannot cover the fixed entry cost. Hence, there is a possibility that all buyers accept the exclusive dealing contract.

Simpson and Wickelgren (2007) and Abito and Wright (2008) incorporate product differentiation of downstream firms. They have proved that there is an equilibrium where all distributors sign the exclusive dealing contract with compensation close to zero as downstream competition is almost perfect.[7] Second, since the compensation required by the distributors to sign the exclusive contracts is zero, the number of distributors does not affect the possibility of exclusion; the incumbent can induce all distributors to sign the exclusive dealing contract, no matter how many distributors exist.

This paper shows that even if an incumbent distributor tries to deter an efficient entrant distributor by offering exclusive dealing contracts to manufacturers, it is difficult to deter the entry. In this sense, the effectiveness of an exclusive dealing contract offered by a distributor is quite different from that offered by a manufacturer. Exclusive dealing contracts by a distributor are less effective. Crucial to our argument is that a manufacturer who has refused an exclusive dealing contract (called a "free manufacturer") has a strong bargaining position with regard to an entrant distributor. Since only a free manufacturer

[7] As Fumagalli and Motta (2006) and Simpson and Wickelgren (2007) show, there exists multiplicity of the equilibria in the homogenous Bertrand competition. The source of multiplicity is the indeterminacy of the deviation profit of distributors. If one distributor rejects the exclusive contract, the incumbent manufacturer can offer the signed distributors any wholesale price. However low the incumbent's offers are, it does not affect their profit; one free distributor can obtain the entire final consumer demand by purchasing from the entrant at a price slightly lower than the incumbent's production cost. Fumagalli and Motta (2006) exclude multiplicity by assuming additional fixed cost (only) for distributors. It leads to unique entry equilibria in contrast to the result of Simpson and Wickelgren (2007).

can supply a product to the entrant distributor, the free manufacturer can absorb the high profit of an entrant distributor. Hence, the necessary compensation level for signing the exclusive contract becomes very high, and it is impossible to convince all manufacturers to sign an exclusive dealing contract. On the other hand, in the traditional literature, an incumbent manufacturer offers an exclusive dealing contract to distributors in order to deter an efficient entrant manufacturer. Even in this case, only the distributor who refused the exclusive dealing contract can trade with the entrant. In this situation, however, the free distributor has to compete with those who signed at the retail market. Thus, the free distributor cannot get any extra benefit, and it is easy for an incumbent manufacturer to convince all distributors to sign an exclusive dealing contract.

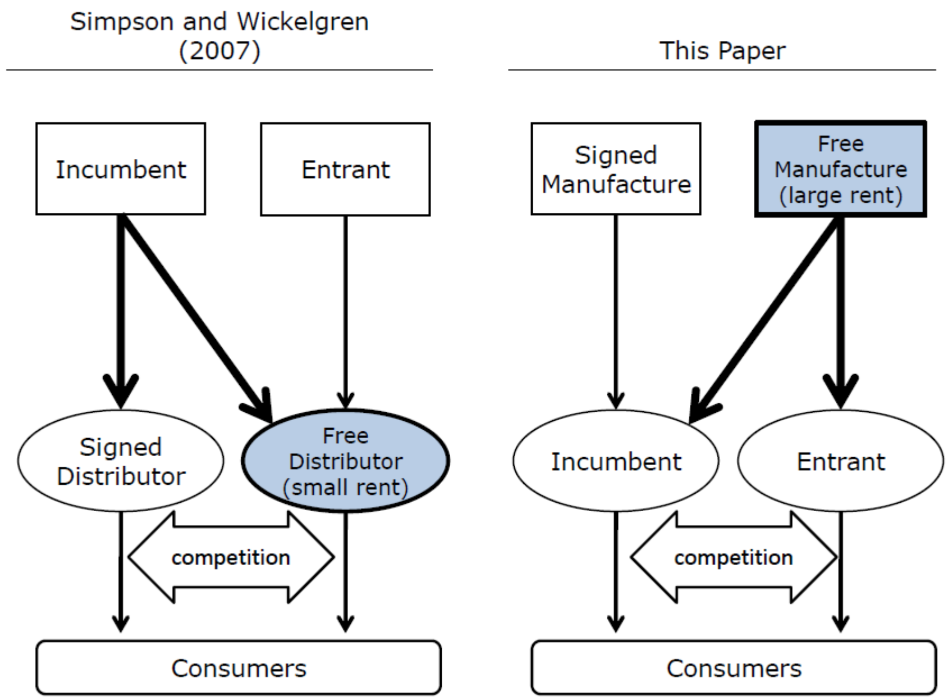
In our basic model, we examine a sequential Bertrand competition model. We also extend our basic setting and manufacturers are allowed to offer two-part tariff contracts. In the traditional literature, two-part tariffs enhance the exclusion of an entrant manufacturer. Our argument obtains quite the opposite result. If manufacturers are allowed to offer two-part tariff contracts, the incumbent distributor cannot deter entry even if the number of manufacturers is small.

This paper is organized as follows. In Section 2, we present our basic model. In Section 3, we examine the model allowing two-part tariff contracts by manufacturers. Section 4 concludes this paper and presents some policy implications.

2 The Model: Sequential Bertrand Competition

We present a simple manufacturer-distributor model. There are N ($N \geq 2$) identical manufacturers (M) whose constant marginal cost is c and they produce homogenous goods. There is no fixed cost for the production. Downstream of the market, there is one incumbent distributor (I) who faces a potential entrant distributor (E). The marginal distribution cost of the incumbent distributor is d_I and that of the entrant distributor is d_E. We assume that $d_I > d_E$, and thus the entrant is more efficient as compared to the incumbent. For simplicity, we assume that E pays no entry cost.[8] We assume that two distributors compete

[8] We examine the cases where the entry cost is positive, in Section 3.



a la Bertrand facing a demand function given by $X = X(p)$. As a standard assumption, $\partial X(p)/\partial p < 0$, where p is the retail price. First, we have the demand function with retail price offers of both distributors denoted by p_i for $i = I, E$ as below:

$$X(p) = \begin{cases} X(p_i) & \text{if} \quad p_i < p_j \\ X(p_i)/2 & \text{if} \quad p_i = p_j \\ 0 & \text{if} \quad p_i > p_j \end{cases}. \tag{1}$$

Then, we define the profit function for each distributor denoted by $\pi(p, C)$,

$$\pi_i(p, C) = (p - C)X(p), \ i = I, E, \tag{2}$$

with marginal cost of a distributor denoted by C. Obviously, C consists of marginal production cost and marginal distribution cost. When a distributor can monopolize the final consumer market, it obtains the profit $\pi^m(C)$ by offering the retail price $p^m(C)$ as below:

$$\begin{aligned} \pi^m(C) &= \max_p\,(p-C)X(p), \quad (3) \\ p^m(C) &= \arg\max_p\,(p-C)X(p). \quad (4) \end{aligned}$$

We assume that the profit function satisfies a condition so that $p^m(C)$ is uniquely determined.

Now we have the payoff of distributor $i = I, E$ with respect to its retail price strategy denoted by p_i, given its competitor's strategy (denoted by p_j) and its marginal cost (denoted by C_i). Let $\Pi_i(p_i, p_j; C_i)$ denote distributor i's profit, which is specified as follows:

$$\Pi_i(p_i, p_j; C_i) = \begin{cases} (p_i - C_i)X(p_i) & \text{if} \quad p_i < p_j \\ (p_i - C_i)X(p_i)/2 & \text{if} \quad p_i = p_j \\ 0 & \text{if} \quad p_i > p_j \end{cases}. \quad (5)$$

Then, the reaction function of each distributor in the retail price competition stage is the same as a standard Bertrand competition. It is given as follows:

$$p_i(p_j; C_i) = \begin{cases} p^m(C_i) & \text{if} \quad p_j > p^m(C_i) \\ p_j - \varepsilon & \text{if} \quad p^m(C_i) \geq p_j > C_i \\ C_i & \text{if} \quad C_i \geq p_j \end{cases} \quad \text{for } i = I, E. \quad (6)$$

To reduce the notation, we assume that ε is a small parameter with $\lim \varepsilon \to 0$. Then we have an equilibrium strategy for each player.

$$p_i^*(C_i, C_j) = \begin{cases} p^m(C_i) & \text{if} \quad C_j > p^m(C_i) \\ C_j & \text{if} \quad p^m(C_i) \geq C_j > C_i \\ C_i & \text{if} \quad C_i \geq C_j \end{cases} \quad \text{for } i = I, E. \quad (7)$$

Finally we have player i's equilibrium profit, which is given as follows:

$$\Pi_i^*(C_i, C_j) = \begin{cases} \pi^m(C_i) & \text{if} \quad C_j > p^m(C_i) \\ (C_j - C_i)X(C_j) & \text{if} \quad p^m(C_i) \geq C_j > C_i \\ 0 & \text{if} \quad C_i \geq C_j \end{cases} \quad \text{for } i = I, E. \quad (8)$$

For simplicity, we assume that $p^m(c+d_E) > c+d_I$, that is, the efficiency gap between the incumbent and entrant distributor is not large enough for the entrant to offer a monopoly price when no exclusive dealing contract is effective.

The game runs as follows. At t=0, the incumbent offers manufacturers the exclusive contracts, and the manufacturers decide whether to accept them or not.[9] $S(\leq N)$ denotes the number of signed manufacturers. An exclusive dealing contract stipulates a signer to supply goods only to the incumbent. In return, a compensation x is paid for the signer in order to induce manufacturers to sign the contract. The amount of x is also stipulated in the contract. As assumed in the related literature, any commitments on wholesale prices or distribution margins are not included in the contract. As a standard assumption, if manufacturers are indifferent whether to sign or reject the contract, they sign it. We further assume that contracts cannot be breached. Our analysis is focused on simultaneous and nondiscriminatory offers of exclusive dealing contracts. At t=1, the efficient entrant distributor, having observed S, decides either to enter the market or not to. The entrant enters the market when it can obtain non negative profit.

At t=2, we have three stages. First, each manufacturer offers wholesale prices to active distributors. Let w_s,and w_f^I denote the wholesale price offered by a signed manufacturer to the incumbent, by a free manufacturer to the incumbent, and let w_f^E denote the free manufacturer's price to the entrant. Second, distributors decide to accept the wholesale price offers. Finally, distributors engage in retail price competition a la Bertrand. Here we adopt the tie-break rule as in the literature. The most efficient firm wins the price competition if the offers are the same. We look for a subgame perfect Nash equilibrium of this game and examine the effect of efficient entry downstream.[10]

First, we consider the possible continuation games after S is determined as $S = 0, ..., N-1, N$, and obtain the following lemma.

Lemma 1 *(i) If $S = N$, (i-1)–(i-4) are the equilibrium outcomes.*

(i-1) The entrant distributor does not enter the market.

[9] We call a manufacturer who signs the exclusive dealing contract as a signed manufacturer, on the other hand, a manufacturer who does not sign the exclusive dealing contract as a free manufacturer.

[10] Here, we consider the weak concept of subgame perfection. As long as there is no strictly positive deviation incentive, that is the quilibrium behavior.

(i-2) All manufacturers offer $w_s = c$.

(i-3) The incumbent distributor accepts the offer $w_s = c$.

(i-4) The retail price becomes $p^m(c + d_I)$. The incumbent obtains the monopoly profit $\pi^m(c + d_I)$. All manufacturers obtains zero.

(ii) If $S = N - 1$, (ii-1)–(ii-4) are the equilibrium outcomes.

(ii-1) The entrant distributor enters the market.

(ii-2) The manufacturers' offers are as follows: $w_s = c$, $w_f^I \geq c$, $w_f^E = c + (d_I - d_E)$.

(ii-3) The incumbent distributor accepts the offer $w_s = c$ and the entrant distributor accepts the offer $w_f^E = c + (d_I - d_E)$.

(ii-4) The retail price becomes $P = c+d_I$. The distributors and the signed manufacturers obtain zero. The free manufacturer obtains $R_f^* = (d_I - d_E)X(c + d_I)$.

(iii)If $S \leq N - 2$, (iii-1)–(iii-4) are the equilibrium outcomes.

(iii-1) The entrant distributor enters the market.

(iii-2) The manufacturers' offers are as follows: $w_s = c$, $w_f^I \geq c$, $w_f^E = c$.

(iii-3) The incumbent distributor accepts the offer $w_s = c$ and the entrant distributor accepts the offer $w_f^E = c$.

(iii-4) The retail price becomes $P = c + d_I$. The incumbent distributors and the manufacturers obtain zero. The entrant distributor obtains $(d_I - d_E)X(c + d_I)$.

Proof. Consider three cases separately, (i) $S = N$, (ii) $S = N - 1$, and (iii) $S \leq N - 2$.

(i) Since all manufacturers have signed the exclusive dealing contracts, they compete with prices for the incumbent distributor's purchase. Thus each manufacturer offers $w_s = c$ at the equilibrium. The entrant distributor obviously cannot enter the market. Since all wholesale prices are the same, the incumbent distributor accepts the wholesale price $w_s = c$, and obtains the monopoly profit $\pi^m(c + d_I)$ by pricing $p^m(c + d_I)$.

(ii) If $S = N - 1$, only one manufacturer is free and can offer the wholesale price to the entrant distributor. Other $N - 1$ signed manufacturers have to sell to the incumbent distributor. Assume that an entrant distributor enters the market. Because the entrant distributor's cost is lower than the incumbent's, the optimal pricing (w_f^E, w_f^I) for the free manufacturer is derived by solving the following problem,

$$\max_{w_f^E, w_f^I} \quad (w_f^E - c)X(\min(w_s, w_f^I) + d_I),$$
$$s.t. \quad w_f^E + d_E \leq \min(w_s, w_f^I) + d_I.$$

In order that the entrant may win the retail price competition, the total marginal cost for the entrant, $w_f^E + d_E$, cannot exceed the total marginal cost for the incumbent, $\min(w_s, w_f^I) + d_I$. Since the incumbent can choose the wholesale price offer from signed manufacturers (w_s) or the free manufacturer (w_f^I), the total marginal cost for the incumbent is $\min(w_s, w_f^I) + d_I$. Obviously, the free manufacturer has no incentive to offer $w_f^I < w_s$. Hence, the best responses become $w_f^E = w_s + d_I - d_E - \varepsilon$ where ε is small parameter with $\lim \varepsilon \to 0$, and $w_f^I \geq w_s$. On the other hand, the optimal behaviors of signed manufacturers are rather simple. If there are two or more than two signed manufacturers, by simple price competition among them, w_s becomes c. Even if there is only one signed manufacturer ($N - 1 = 1$), the best response is $w_s = c$ because the incumbent distributor is less cost efficient than the entrant distributor. As a result, the equilibrium wholesale prices become $w_f^E = c + d_I - d_E - \varepsilon$ where ε is a small parameter with $\lim \varepsilon \to 0$, $w_f^I \geq c$, and $w_s = c$. Under those wholesale prices, the entrant distributor wins the retail price competition by pricing $c + d_I$, however with zero profit. Only the free manufacturer can obtain a positive profit, $(w_f^E - c)X(\min(w_s, w_f^I) + d_I) = (d_I - d_E)X(c + d_I)$. Since the profit of the entrant is slightly positive ε, the entrant enters the market if $S = N - 1$.

(iii) If $S = N - 2$, two or more manufacturers are free. Assume that the entrant distributor enters the market. The free manufacturers compete with their wholesale prices to the entrant. Thus, $w_f^E = c$. On the other hand, the optimal offer of each signed manufacturer is $w_s = c$. As in the case of (ii), w_f^I should not be lower than c. Thus, $w_f^I \geq c$ is the optimal strategy for the free manufacturers as long as $w_f^E = c$. Hence, by retail price competition, the entrant distributor obtains $(d_I - d_E)X(c + d_I)$ by pricing $c + d_I - \varepsilon$ where ε is small with $\lim \varepsilon \to 0$, and the incumbent distributor gets zero profit. As in the case of (ii), the entrant chooses to enter the market. ■

Now, we consider the manufacturers' decision at t=0. Each manufacturer has an equal chance to become the free manufacturer. Therefore, in order to induce all manufacturers to sign the contract, the incumbent is required to compensate each manufacturer at least $(d_I - d_E)X(c + d_I)$. To cover the total amount of compensation, $Nx^* = N(d_I - d_E)X(c + d_I)$, the incumbent's monopoly profit $\pi^m(c + d_I)$ must be equal to or higher than Nx^*. Hence, we obtain the following proposition:

Proposition 1 *The incumbent distributor cannot deter an efficient entrant if the number of upstream firms is larger than* $N^* = \pi^m(c + d_I)/(d_I - d_E)X(c + d_I)$.

Proof. Since all manufacturers have an incentive to be a free manufacturer and obtains $R_f = (d_I - d_E)X(c + d_I)$, the incumbent distributor has to pay at least R_f to each manufacturer in order to realize $S = N$. Only when $S = N$, the incumbent can obtain $\pi^m(c + d_I)$ but receives zero profit otherwise. Thus, as long as $\pi^m(c + d_I) \geq N(d_I - d_E)X(c + d_I)$, the incumbent can profitably offer the exclusive dealing contract to all N manufacturers and the entrant distributor cannot enter the market. Then, we define $N^* = \pi^m(c + d_I)/(d_I - d_E)X(c + d_I)$, and if $N^* \geq N$, then the incumbent can make all manufacturers sign the exclusive dealing contracts.

However, if $\pi^m(c + d_I) < N(d_I - d_E)X(c + d_I)$, it is not profitable for the incumbent to offer exclusive dealing contracts with the necessary compensation. In other words, the incumbent cannot deter the entrant distributor if $\pi^m(c + d_I) < N(d_I - d_E)X(c + d_I)$. ■

This proposition implies that the effectiveness of the exclusive dealing contract by the incumbent distributor is limited. If the number of manufacturers is sufficiently large, entry deterrence by an exclusive dealing contract is not successful, and an entrant distributor with a more efficient technology can enter the market. The crucial point for this result is the positive gain of the free manufacturer, $R_f = (d_I - d_E)X(c + d_I) > 0$. By rejecting the exclusive dealing offer, a manufacturer becomes a monopoly supplier to the entrant distributor and obtains the positive gain, R_f. This means that, in order to convince a manufacturer, the incumbent distributor has to compensate the positive gain R_f. On the other hand, the incumbent can realize the monopoly gain only when all manufacturers sign the contract. Hence, it becomes impossible to block entry if there are too many manufacturers since the incumbent cannot pay such large compensations. It implies that as long as the upstream market is sufficiently competitive, in the sense the number of manufacturers is large, no inefficiency occurs.

This result is different from the case where an incumbent manufacturer offers an exclusive dealing contract to distributors. As explained in the introduction, exclusive dealing offers from an incumbent manufacturer to distributors are examined in the traditional literature (Simpson and Wickelgren, 2007; Abito and Wright, 2008; Fumagalli and Motta, 2006; and Wright, 2009). According to the traditional literature, an exclusion by the incumbent manufacturer can be successful. In those situations, even if a distributor rejects an exclusive dealing offer from the incumbent manufacturer, it cannot obtain any profit because of the competition effect among distributors. Hence, the competition at the downstream market generates inefficient entry deterrence. However, when an incumbent distributor tries to deter an entrant distributor, a manufacturer can obtain positive gain by rejecting the exclusive dealing contract. This difference becomes more drastic if manufacturers use two-part tariff contracts. We will examine this point in the next section.

As explored by Simpson and Wickelgren (2007), if there is no product differentiation and all distributors sell homogenous goods, there are multiple types of equilibria when an incumbent distributor offers exclusive dealing contracts. The main reason is that the wholesale price offer from an incumbent manufacturer to a signed distributor can be indeterminate. In the case of an exclusive dealing offer from an incumbent distributor, there are no multiple types of equilibria under homogenous goods competition. With many manufacturers there exist no equilibria in which entry is excluded. Even in our setting, the wholesale price offer from a free manufacturer to the incumbent is indeterminate and can be $w_f^I \geq c$. However, this indeterminacy does not affect the positive gain of the free manufacturer $R_f = (d_I - d_E)X(c + d_I)$. Hence, the outcome is uniquely determined and the entrant can enter the market if the number of manufacturers is larger than N^*.

3 Wholesale Contract in Two-part Tariffs

In this section, we extend our analysis to the case where a two-part tariff type wholesale contract is available at the first stage, t=2. The wholesale contract consists of a unit wholesale price and a fixed fee, denoted by w and f , respectively.[11] At t=2, we still have three stages. First, each manufacturer offers wholesale contracts to active distributors. A manufacturer offers two-part tariffs to each distributor which consisting of a non-negative per-unit wholesale price w and a possibly negative fixed fee f, written in the form (w, f). Let w_j^i and f_j^i denote, respectively the per-unit wholesale price and fixed fee offered by manufacturer j to distributor i, where $j = s, f$ and $i = I, E$. Second, each distributor decides whether to accept the offer. We assume that a distributor can accept only one wholesale contract.[12] Finally, distributors engage in retail price competition a la Bertrand. All remaining settings are the same as in the previous section. We look for a subgame perfect Nash equilibrium and examine the effect of efficient entry downstream. Consider possible continuation games after S is determined as $S = 0, ..., N-1, N$.

Lemma 2 *(i) If $S = N$, (i-1)–(i-4) are the equilibrium outcomes.*

(i-1) The entrant distributor does not enter the market.

(i-2) All manufacturers offer $(c, 0)$ to the incumbent distributor.

(i-3) The incumbent distributor accepts the offer $(c, 0)$.

(i-4) The retail price becomes $p^m(c+d_I)$. The incumbent obtains monopoly profit $\pi^m(c+d_I)$. All manufacturers obtain zero profit.

(ii) If $S = N-1$, (ii-1)–(ii-4) are the equilibrium outcomes.

(ii-1) The entrant distributor enters the market.

(ii-2) $N-1$ signed manufacturers offer $(c, 0)$ to the incumbent distributor. The one free manufacturer offers $(w_f^I, 0)$ to the incumbent distributor and $(c, \pi^m(c+d_E))$ to the entrant distributor, where $w_f^I \geq p^m(c+d_E) - d_I$.

(ii-3) The incumbent distributor chooses the offer, $(w_f^I, 0)$, and the entrant distributor accepts the offer $(c, \pi^m(c+d_E))$ from the free manufacturer. The incumbent distributor's cost becomes $C_I = w_f^I + d_I \geq p^m(c+d_E)$ and the entrant distributor's cost becomes $c + d_E$.

[11] If f is positive, a distributor pays the manufacturer a fee. If f is negative, a distributor receives as a compensation or subsidy from the manufacturer.

[12] As Wright (2009) notes, this prohibits a distributor from receiving additional compensation and buying the product at a lower wholesale price. According to Wright (2009), if we allow a conditional contract such that the fixed fee payment realizes only when the distributor actually purchase from the manufacturer, this problem can be solved.

(ii-4) The retail price becomes $p^m(c+d_E)$ and the entrant distributor wins the competition. Both incumbent distributor and the entrant distributor obtain zero. The free manufacturer obtains positive profit $\pi^m(c+d_E)$.

(iii) If $S \leq N-2$, (iii-1)–(iii-4) are the equilibrium outcomes.

(iii-1) The entrant distributor enters the market.

(iii-2) $N-2$ (or less) signed manufacturers offer $(c,0)$ to the incumbent distributor, and the free manufacturers offer $(c,0)$ to both the incumbent distributor and entrant distributor.

(iii-3) Both of the distributors accept the offer $(c,0)$. The choice of manufacturer for the purchase does not affect the result.

(iii-4) The retail price becomes $c+d_I$ and the entrant distributor wins the competition. The entrant distributor obtains $(d_I-d_E)X(c+d_I)$. The incumbent distributor and all manufacturers obtain zero profit.

Proof. See Appendix. ■

The crucial point of this Lemma 2 is that the free manufacturer can obtain the monopoly profit $\pi^m(c+d_E)$ if $S=N-1$. The free manufacturer employs a "divide-and-conquer" type strategy. By offering a very high wholesale price and a (small) negative fixed fee to the incumbent distributor, the free manufacturer can avoid a retail price competition and obtain the monopoly profit by offering the fixed fee, $\pi^m(c+d_E)$, to the entrant distributor. Similar strategy is also employed in Wright (2009), wherein an incumbent manufacturer offers exclusive dealing contracts to deter an entrant manufacturer.[13] In Wright (2009), however, this strategy reduces the profit of a free distributor and enhances the entry deterrence. Why do this paper and Wright(2009) derive such opposite results? The reason is simple. In Wright(2009), the "divide-and-conquer" strategy employed by the entrant manufacturer raises its profit and reduces the profit of the free distributor. Hence, it reduces the incentive to become a free distributor. On the other hand, in this paper, the "divide-and-conquer" strategy employed by the free manufacturer raises its profit, and it raises the incentive to become a free manufacturer.

[13] Wright (2009) is a comment on Fumagalli and Motta (2006) regarding two-part tariff wholesale pricing with some correction of the proofs.

Next, we consider the equilibrium of the entire game with this lemma. The incumbent distributor obtains $\pi^m(c+d_I)$ if $S = N$. On the other hand, if the entrant enters the market, the incumbent obtains zero if $S < N$. It follows that it is necessary that all manufacturers sign the exclusive dealing contracts to exclude the entrant. Hence, we obtain the following proposition.

Proposition 2 *If manufacturers can offer two-part tariff contracts, the incumbent distributor cannot deter the entry of any number of manufacturers.*

Proof. *The incumbent distributor should offer compensation x of at least $\pi^m(c + d_E)$. If $S = N$, the incumbent's profit is $\pi^m(c + d_I)$ and it is strictly less than $\pi^m(c + d_E)$. Thus, the incumbent cannot induce all the manufacturers to sign the exclusive contracts.* ■

This result is opposite to the existing literature, where the incumbent manufacturer tries to deter the rival's entry by an exclusive dealing contract. Wright (2009) shows that by correcting Fumagalli and Motta (2006), a two-part tariff enables the incumbent manufacturer to deter the efficient entry. Abito and Wright (2008) also show that a unique exclusion equilibrium exists when the manufacturer offers a two-part tariff even if distributors are not differentiated, as in our model.[14] In our model, however, there exists a unique entry equilibrium when an incumbent distributor tries to deter the rival's entry.

The difference stems from the fact that the free manufacturer has a monopoly position trading with the entrant distributor who has more efficient technology. The free manufacturer can use the two-part tariff contract which is powerful tool to absorb the rent the entrant will obtain at the retail market. On the other hand, in the existing literature model where the incumbent manufacturer intends to capture all distributors in order to deter the rival's entry, the two-part tariff scheme gives manufacturers larger bargaining power. Therefore, the deviation from signing the exclusive dealing contract is less profitable for each distributor. This makes exclusion more feasible.

Lastly, we should examine the case where the entrant pays a positive fixed entry cost $F > 0$. Even if the entrant has to pay the entry cost, our result does not change as long as

[14] The main difference between Wright (2009) and Abito and Wright(2008) is in fixed operation costs for distributors. Wright (2009) assumes that distributors should cover fixed costs to be active, otherwise they will remain inactive. Abito and Wright (2008) do not assume such operation costs.

the free manufacturer can offer the two-part tariff contract at the time of the entry decision. By offering $(c, \pi^m(c+d_E)-F)$ to the entrant distributor, the free manufacturer can absorb all the rent. Hence, in this case, as long as $\pi^m(c+d_I) < \pi^m(c+d_E) - F$, the incumbent distributor cannot deter the entry for any number of manufacturers.

4 Conclusion

In this paper, we consider a model where an incumbent distributor facing an efficient entry threat tries to deter the entry by offering exclusive dealing contracts with all manufacturers. We have shown that an incumbent distributor can deter an efficient rival's entry as long as the number of manufacturers is sufficiently small, when the manufacturers are using linear wholesale price contracts. Otherwise, entry occurs. The incumbent distributor should offer positive compensation to each manufacturer to induce it sign the contract even if no product differentiation exists. In order to offer all manufacturers the required compensation, the number of manufacturers should be lower than a certain level. This contrasts with Simpson and Wickelgren (2007) and other existing literature on the incumbent manufacturer's exclusion of efficient entry by exclusive dealing contracts. In these papers, as product differentiation diminishes, the compensation approaches zero. Thus, no matter how many distributors exist, exclusion occurs with fully signed exclusive dealing contracts in almost homogenous product market.

This is clearly shown in the analysis of two-part tariff wholesale contracts. With a two-part tariff, manufacturers have strong bargaining power against distributors. In particular, if only one manufacturer rejects the exclusive dealing contract, it can behave as a monopolist. Thus, the incumbent cannot afford the necessary compensation for even one manufacturer to sign the exclusive dealing contract.

Considering the implications of antitrust issues, we do not conclude that exclusion is less likely when an efficient entry occurs at the distribution level in comparison to the manufacture level. Otherwise, we argue that allocation of bargaining power between manufacturers and distributors is crucial for exclusion to occur at the equilibrium. Thus, the antitrust authority should examine which sector initiates the exclusive dealing contracts and which sector has bargaining power, when it estimates the anti-competitive effect of such contracts.

A Appendix

This appendix proves Lemma 2. We examine three cases, (i), (ii), (iii), separately.

(i) $S = N$. The situation is almost same as the case where manufacturers use linear wholesale pricing. Even if a signed manufacturer can use the two-part tariff, it cannot offer a positive fixed fee since there is a price competition among signed manufacturers. Hence, all signed manufacturers offer $(c, 0)$ and the entrant cannot enter the market. Since the incumbent obtains the product at the cost c, the profit of the incumbent becomes $\pi^m(c+d_I)$ with the retail price $p^m(c + d_I)$.

(ii) $S = N - 1$. First, we check the deviation incentives of distributors. If the entrant distributor rejects the offer from the free manufacturer, it cannot trade with any manufacturer and cannot get any positive profit. Hence, the entrant distributor has no incentive to reject the offer from the free manufacturer. If the incumbent rejects the offer from the free manufacturer and accepts the offer from the signed manufacturers, $(c, 0)$, the cost for the incumbent becomes $C_I = c + d_I$. In the meantime, the marginal cost for the entrant distributor is $C_E = c + d_E$. By the retail price competition, the incumbent loses the competition and obtains nothing. In addition, each signed manufacturer obtains zero in this case. On the other hand, if the incumbent accept the free manufacturer's offer, it obtains zero as well. Thus, the incumbent has no incentive to deviate.

Second, we check the deviation incentive of signed manufacturers. If a signed manufacturer offers $w > c$, the incumbent cannot win the retail price competition by accepting the offer. It means that the incumbent accepts the offer only when the fixed fee is sufficiently negative. However, the deviated manufacturer cannot sell its product and cannot get any positive revenue by this wholesale contract. Thus, offering $w > c$ is not profitable for a signed manufacturer. Next, we consider the case where $w < c$ and $f > 0$. The incumbent distributor accepts the offer only when $w < c - (d_I - d_E)$ and it can obtain non-negative profit. That is, $(c + d_E - w - d_I)X(c + d_E) - f$ should be non-negative, i.e., f must be equal or smaller than $(c + d_E - w - d_I)X(c + d_E)$. However, the deviated (signed) manufacturer's profit becomes $(w - c)X(c + d_E) + f \leq (w - c)X(c + d_E) + (c + d_E - w - d_I)X(c + d_E) = (d_E - d_I)X(c + d_E) < 0$. Hence, signed manufacturers have no incentive to deviate from the equilibrium behavior.

Third, we check the deviation incentive of the free manufacturer. Under the equilibrium strategy, the free manufacturer can obtain $\pi^m(c+d_E)$. Obviously, $c+d_E$ is the minimum cost under the efficient production-distribution plan and $\pi^m(c+d_E)$ is the attainable maximum profit under the plan. This means that it is impossible for the free manufacturer to obtain higher profit than $\pi^m(c + d_E)$. Thus, the free manufacturer has no incentive to deviate.

(iii) $S = N - 2$. First, it is obvious that distributors do not have incentive to deviate from the equilibrium behavior since all offers from manufacturers are the same. Second, we check the deviation incentive of manufacturers. Suppose that a signed manufacturer offers $(w, f) \neq (c, 0)$. If $w > c$, the incumbent does not accept the offer since it cannot win the retail price competition. Therefore, we only consider the case where $w < c$ and $f > 0$. The incumbent distributor accepts the offer only when $w < c - (d_I - d_E)$ and it can obtain a non-negative profit. That is, $(c + d_E - w - d_I)X(c + d_E) - f$ should be non-negative, i.e., f must be equal or smaller than $(c + d_E - w - d_I)X(c + d_E)$. However, the deviated (signed) manufacturer's profit becomes $(w - c)X(c + d_E) + f \leq (w - c)X(c + d_E) + (c + d_E - w - d_I)X(c + d_E) = (d_E - d_I)X(c + d_E) < 0$. Hence, signed manufacturers have no incentive to deviate from the equilibrium behavior.

Third, let us examine the deviation incentive of a free manufacturer (called "deviator") who offers (w^I, f^I) to the incumbent and (w^E, f^E) to the entrant. Suppose that the deviator offers $(w^I, f^I) = (c, 0)$ and $(w^E, f^E) \neq (c, 0)$. If $w^E + d_E \leq c + d_I$, the entrant distributor wins the retail competition and earns $(c+d_I-w^E-d_E)X(c+d_I)-f_E$ by accepting (w^E, f^E). On the other hand, by accepting $(c, 0)$ (which is offered by other free manufacturers), the entrant obtains $(d_I - d_E)X(c + d_I)$. Thus, to induce the entrant to accept (w^E, f^E), $(c + d_I - w^E - d_E)X(p) - f^E \geq (d_I - d_E)X(c + d_I)$, i.e., $(c - w^E)X(c + d_I) \geq f_E$ must be satisfied. This means, however, the deviator's profit becomes $(w^E - c)X(c + d_I) + f_E \leq (w^E - c)X(c + d_I) + (c - w^E)X(c + d_I) = 0$. It means the deviation is not profitable. Moreover, the entrant never accepts the offer (w^E, f^E) if $w^E + d_E > c + d_I$, because the deviator-entrant combination cannot win the retail competition and the deviator has no mean to compensate $(d_I - d_E)X(c + d_I)$ to the entrant.

Next let us suppose that the deviator offers $(w^I, f^I) \neq (c, 0)$ and $(w^E, f^E) = (c, 0)$. If $w^I + d_I \leq c + d_E$ and the incumbent accepts the offer (w^I, f^I), the incumbent distributor wins the retail competition and earns $(c + d_E - w^I - d_I)X(c + d_E) - f_I$. On the other hand, if the incumbent accept $(c, 0)$ offered from the other free manufacturers, the incumbent cannot win the competition and gets zero. Thus, to induce the incumbent to accept (w^I, f^I), $(c + d_E - w^I - d_I)X(c + d_E) - f_I \geq 0$ is required. However, the deviator's profit becomes $(w^I - c)X(c + d_E) + f_I \leq (w^I - c)X(c + d_E) + (c + d_E - w^I - d_I)X(c + d_E) < 0$. Thus, the deviation is not profitable. Moreover, if $w^I + d_I > c + d_E$, the incumbent cannot get a positive benefit and cannot accept the offer.

Then, we consider the case where $(w^I, f^I) \neq (c, 0)$ and $(w^E, f^E) \neq (c, 0)$, and both distributors accept the offers. If $w^E + d_E \leq w^I + d_I$, the deviator's profit becomes as follows:

$$\pi_f^d = f^I + (w^E - c)X(p^*) + f^E,$$

where p^* denotes the retail market price and $p^* = \min(w^I + d_I, p^m(w^E + d_E))$. The profit of the entrant becomes:

$$\pi_E^d = (p^* - w^E - d_E)X(p^*) - f^E$$

If the entrant rejects the offer (w^E, f^E) and accepts $(c, 0)$ offered by the other free manufacturer, it obtains

$$\pi_E = (\tilde{p} - c - d_E)X(\tilde{p}),$$

where $\tilde{p} = \min(w^I + d_I, p^m(c + d_E))$. Hence, $\pi_E^d \geq \pi_E \Leftrightarrow f^E \leq (p^* - w^E - d_E)X(p^*) - (\tilde{p} - c - d_E)X(\tilde{p})$ must be satisfied when the entrant accepts (w^E, f^E). In this case, the deviator's profit becomes $(w^E - c)X(p^*) + f^E + f^I$. We can show that $(w^E - c)X(p^*) + f^E \leq (w^E - c)X(p^*) + (p^* - w^E - d_E)X(p) - (\tilde{p} - c - d_E)X(\tilde{p}) = (p^* - c - d_E)X(p^*) - (\tilde{p} - c - d_E)X(\tilde{p})$. Obviously $\tilde{p} = \arg\max\ (p - c - d_E)X(p)$ under the constraint that $p \leq w_I + d_I$. It follows $(p^* - c - d_E)X(p^*) - (\tilde{p} - c - d_E)X(\tilde{p}) \leq 0$, and thus, $(w^E - c)X(p) + f^E \leq 0$. On the other hand, f^I must be negative, since the incumbent distributor cannot win the retail price competition by accepting the offer from the deviator. Hence, $\pi_f^d = f^I + (w^E - c)X(p^*) + f^E$ cannot be positive.

Even if $w^E + d_E > w^I + d_I$, the situation is almost same. In this case, the deviator's profit becomes $\pi_f^d = f^I + (w^I - c)X(p^{**}) + f^E$ where $p^{**} = \min(w^E + d_E, p^m(w^I + d_I))$ and f^E cannot be positive to compensate the entrant. On the other hand, by accepting the offer from the deviator, the incumbent obtains $(p^{**} - w^I - d_I)X(p^{**}) - f^E$. By rejecting this offer and contracting with the other free manufacturer, it obtains $(\bar{p} - c - d_I)X(\bar{p})$, where $\bar{p} = \min(w^E + d_E, p^m(c + d_E))$. Hence, when the incumbent accepts the deviator's offer, the following condition should be satisfied: $(p^{**} - w^I - d_I)X(p^{**}) - f^E \geq (\bar{p} - c - d_I)X(\bar{p}) \Leftrightarrow f^E \leq (p^{**} - w^I - d_I)X(p^{**}) - (\bar{p} - c - d_I)X(\bar{p})$. In this case, the deviator's profit becomes $(w^I - c)X(p^{**}) + f^I + f^E$. We can show that $(w^I - c)X(p^{**}) + f^I \leq (w^I - c)X(p^{**}) + (p^{**} - w^I - d_I)X(p^{**}) - (\bar{p} - c - d_I)X(\bar{p}) = (p^{**} - c - d_I)X(p^{**}) - (\bar{p} - c - d_I)X(\bar{p}) \leq 0$. Thus, the deviator obtains non-positive profit. Thus, it has no incentive to deviate.

In summary, there is no deviation incentive when $S \leq N - 2$. Note that even if $S = 0$ (there is no signed manufacturer), all free manufacturers can trade with the incumbent distributor and offer $(c, 0)$ to both the incumbent distributor and the entrant distributor. Thus, analysis above can be applied to this extreme case.

References

[1] Abito, J. M. and J. Wright (2008) "Exclusive dealing with imperfect downstream competition." *International Journal of Industrial Organization*, 26: 227−246.

[2] Comanor, W. S., and P. Rey (2000) "Vertical Restraints and the Market Power of Large Distributors." *Review of Industrial Organization*, 17: 135−153.

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

[4] Inderst, R. and C. Wey (2007) "Buyer power and supplier incentives",European Economic Review, 51, pp. 647–667.

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

[6] Miklos-Thal, J., P. Rey, and T. Verge (forthcoming) "Buyer Power and Intraband Coordination" *Journal of the European Economic Association*.

[7] Rasmusen, E. B., M. J. Ramseyer and J. S. Jr. Wiley (1991) "Naked Exclusion." *American Economic Review*, 81: 1137−1145.

[8] Segal, I. R., and M. D. Whinston (2000) "Naked Exclusion: Comment." *American Economic Review*, 90: 296−309.

[9] Simpson, J. and A. L. Wickelgren (2007) "Naked Exclusion, Efficient Breach and Downstream Competition." *American Economic Review*, 97: 1305−1314.

[10] Wright, J. (2009) " Exclusive dealing and entry, when buyers compete: comment", *American Economic Review*, 99: 1070−1081.