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Exclusive Dealing Contract and Inefficient Entry Threat

Noriyuki Yanagawa
University of Tokyo

Ryoko Oki
Graduate School of Economics, University of Tokyo

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Noriyuki Yanagawa* and Ryoko Oki†

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Abstract

This paper examines the effects of exclusive dealing contracts in a simple model with manufacturers-distributors relations. We consider entrants in both manufacturing and distribution sectors. It is well-known that a potential entry threat is welfare increasing under homogenous price competition, even though the potential entrant is less productive. This paper reexamines this intuition by employing the above model. We show that the entry threat of a less-productive manufacturer is welfare decreasing when there is an exclusive dealing contract between the incumbent manufacturer and distributor. This result is in contrast to the view of the contestable markets literature.

Key words: Exclusive Dealing, Entry Threat, Vertical Restraint, Antitrust,

JEL Classification: D86, K21, L11, L13, L14, L40

1 Introduction

The effects of exclusive dealing contracts have been a controversial subject among economists for more than 20 years. In recent times, several papers such as Fumagalli and Motta (2006) and Simpson and Wickelgren (2007) have made important contributions. They have focused on manufacturer-distributor structures and explored that the results are different from the

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

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

case of the manufacturer-final buyer structure. However, those papers consider the case of only one entrant. As Whinston (2004) states, the literature has been limited to "one buyer and several sellers, or between one seller and several buyers" (pp.175). To answer more realistic questions, "models with competing sellers and more than one buyer" and "[f]urther study of multiseller/multibuyer models" should be a high priority (pp.177). This paper focuses on the exclusive dealing contracts in a manufacturer-distributor structure and introduces potential entrants in both the manufacturing and distribution sectors. Using this setting, we challenge the question raised by Whinston.

We will show that weak entrants have a crucial role for understanding the effects of exclusive dealing contracts on social welfare. Those entrants may become the main reason for the exclusive dealing contract to decrease social welfare. In other words, we will present the possibility that an entry threat may become a harmful mechanism for social welfare. This result is in contrast to the view of the contestable markets literature (the seminal work is Baumol *et al.* (1982)).

More precisely, we consider a situation wherein there is one incumbent manufacturer and one incumbent distributor. A new distributor whose productivity is higher than that of the incumbent is going to enter the market. Hence, the incumbent distributor has an incentive to offer an exclusive dealing contract to the incumbent manufacturer and attempts to exclude the efficient entrant. Furthermore, we assume that a new manufacturer will enter the market. The productivity of the new manufacturer is private information and unknown to the other parties, who only know that the productivity of the new manufacturer is lower than that of the incumbent manufacturer. We will show that this inefficient entrant in the manufacturing sector decreases the total welfare.

It is well-known that a potential entry threat is welfare increasing (more rigorously, not welfare decreasing) under the price competition with a homogenous product, even though the potential entrant is weak (less productive). For example, the unit cost of an incumbent producer is 10. If there is no entrant, this incumbent can charge a monopoly price, say for example 20. On the other hand, if there is a potential entrant whose unit cost is 15, the incumbent cannot charge a monopoly price. It has to decrease the market price to 15 in order to compete with the entrant. Hence, the existence of this potential entrant is welfare increasing. This point is generalized by the contestable markets theory that claims that potential entrants improve welfare through potential competition, regardless of whether entrants are efficient or not.

In this paper, however, we will show that this result is not applicable when there is an exclusive dealing contract. An entrant can decrease social welfare when incumbents signed exclusive dealing contracts. In order to consider this point clearly, we focus on large and strong distributors who posses strong bargaining power over manufacturers. A famous example is Wal-Mart. Many papers pointed out the strong bargaining power of Wal-Mart (e.g., Moore (1993), Norek (1997)). As stressed by Comanor and Rey (2000), such large distributors are quite popular in the real world. Comanor and Rey presented the case of Belk and that of Toys 'R' Us (TRU). TRU is the largest toy retailer in the United States, and it had attempted to deter rival retailers, as we will examine below.[1] Antitrust authorities have become increasingly concerned about distributors' such strong bargaining power (for example, Competition Commission (2000), Federal Trade Commission (2001)). Inderst and Shaffer (2007) examined the relation between the bargaining power of distributors and the variety choice of manufacturers. Thus, it is natural and important to focus on the cases of such large and strong distributors.

How can we obtain such a counter-intuitive result? The exclusive dealing contract offered by the incumbent distributor is a key element. As explored by Aghion and Bolton (1987), an exclusive dealing contract functions not only as an entry-deterrence device but also as a rent-extraction device by setting an appropriate level of liquidation damage. Hence, if the new distributor is expected to be more efficient than the incumbent distributor, the incumbent may not deter the entry via the exclusive dealing contract. Rather, it sets the liquidation damage level such that the incumbent manufacturer has an incentive to breach the exclusive contract and pay the liquidation damage. Hence, without an entrant in the manufacturing sector, an efficient transaction (incumbent manufacturer trades with the entrant distributor) is realized even under the exclusive dealing contract, and the incumbent distributor obtains the liquidation damage. With the possibility of entry into the manufacturing sector, however, this mechanism does not function properly. If the exact cost of the new manufacturer is unknown to the other parties, the incumbent distributor cannot set an appropriate level of liquidation damage to extract all rents realized by the efficient players since it must be dependent upon the

[1] As we will see later, however, most of the previous models in the exclusive dealing contract literature assumed strong manufacturers.

cost level of the entrant. Thus, there is a possibility that the inefficient entrant in the manufacturing sector replaces the efficient incumbent and trades with the new efficient distributor. This trade decreases the total welfare.

Economists have extensively examined whether exclusive dealing contracts actually deter efficient entrants and decrease social welfare.[2] In the 1970s, the so-called Chicago school argued that any vertical contracts could not deter efficient entry. The pioneering works are Posner (1976) and Bork (1978). They argued that in order to induce signing an exclusive dealing contract, a high cost (inefficient) incumbent must compensate the potential loss arising from the contract. Hence, by considering the compensation, it is not profitable for the inefficient incumbent to offer the exclusive dealing contract.

In contrast, Aghion and Bolton (1987) have shown that an exclusive contract with liquidation damage, that is "the penalty to be paid when a party breaches the contract and deals with an efficient new comer" can deter efficient entry. Such a contract enables an inefficient incumbent to survive in the market by precluding entry because the liquidation damage imposes an entry cost on a potential entrant. Moreover, even in the event of a new entry, the incumbent can still extract some of the surplus that the efficient entrant brings to the market by gaining the entry fee. In this case, the externality of contracts makes an exclusive dealing contract profitable for the inefficient incumbent.[3]

In recent times, Fumagalli and Motta (2006) treated the cases where buyers are not final consumers. They have assumed that buyers are distributors, as in our model. Fumagalli and Motta (2006) extended the models of Rasmusen *et al.* (1991) and Segal and Whinston (2000). They have clearly shown the conditions wherein sufficient competition among buyers in the downstream markets prevents the incumbent from using exclusive dealing contracts. This factor has an implication that the intensity of competition in the downstream markets might be crucial for judging the effects of an exclusive dealing contract.

Simpson and Wickelgren (2007) also treat the case where buyers are not final consumers, but their main focus is on the possibility of a breach of contract. They examined the roles of exclusive dealing contract when buyers

[2] Rey and Tirole (2007) provide a concise survey on papers on this topic.

[3] In contrast, Innes and Sexton (1994) have shown that by adding exclusive dealing contracts between entrants and buyers to the Aghion and Bolton model, efficient entrants are never deterred.

can breach the exclusive dealing contract and pay expectation damages. They also employ the settings of Rasmusen *et al.* (1991) and Segal and Whinston (2000), but the results are in contrast to those of Fumagalli and Motta (2006). Simpson and Wickelgren have shown that exclusive dealing contracts can inefficiently deter entry if buyers are downstream competitors.[4]

The situation considered in this paper is similar to that of Fumagalli and Motta (2006) and Simpson and Wickelgren (2007). We assume that buyers are distributors and consider manufacturer-distributors relations. However, there are several crucial differences. First, we consider an entrant even in the distribution sector in addition to the manufacturing sector. Second, since we consider the large distributor case, the incumbent distributor offers an exclusive dealing contract to the incumbent manufacturer. Third, the penalty for breaching the exclusive dealing contract is assumed to be a liquidation damage as in Aghion and Bolton (1987). Finally, the entrant manufacturer is weak and less productive than the incumbent manufacturer.

The paper is organized as follows: Section 2 explains the basic model and analyzes a case without any exclusive dealing contracts as a benchmark. Section 3 provides the optimal contracts with an inefficient entrant manufacturer. Section 4 deals with the optimal contracts without no entrant manufacturer and considers the implications for the contestable markets theory. Finally, Section 5 provides some concluding remarks.

2 Model

2.1 Basic Structure

We consider a model with a simple vertical structure. Players are manufacturers (sellers), distributors (buyers), and consumers. Manufacturers produce a homogenous good. The constant marginal cost for an incumbent manufacturer (IM) is denoted by c_I. IM faces an entrant manufacturer (EM). EM's constant marginal cost, c_E, is her private information, and the other players only know that c_E is uniformly distributed in $[\underline{c_E}, \overline{c_E}]$. Hereafter, we will focus on an inefficient upstream entrant case by assuming that EM's cost,

[4] When distributors are homogenous and compete a la Bertrand, no entry deterrence occurs in their model. However, Simpson and Wickelgren (2007) treat this situation as an extreme case of monopolistic competition that induces entry deterrence with an exclusive dealing contract between incumbents and distributors.

c_E , is uniformly distributed in $[c_I, \overline{c_E}]$, and let us define $C \equiv \overline{c_E} - c_I$.[5] At the distribution level, there is a single incumbent distributor (ID) with unit distribution cost d_I and an entrant distributor (ED) with unit distribution cost $d_E (< d_I)$, that is, ED is more efficient than ID.[6] There is no entry cost, and fixed costs are zero for all players. ID has an incentive to exclude ED by using exclusive dealing contracts as will be explained below. The cost conditions of these four players are summarized in Figure 1.

Since there is no entry cost and no uncertainty about the entries, the difference between the incumbents and the entrants denotes the possibility of signing an exclusive dealing contract. Only the incumbents have an opportunity to write exclusive dealing contracts.

With regard to the consumers' side, we assume a simple structure. All consumers have the same preference, and the reservation price for the product is v. Each consumer buys at most only one unit of the product, and we set the number of consumers as 1 for simplicity. In order to avoid unnecessary complications, we assume that v is sufficiently high, and all possible transactions are profitable for consumers, that is, $v > d_I + \overline{c_E}$. We assume that all players are risk neutral. Under these assumptions, the transaction between IM and ED is efficient and socially optimal.

The timing of the game is as follows: at t = 0, the incumbent distributor offers the incumbent manufacturer a exclusive dealing contract. Then, at t = 1, EM and ED enter the markets. We assume that EM's cost, c_E, is unobservable throughout these two periods. Therefore, contracts at t = 0 cannot be contingent upon c_E. Finally, after the confirmation of consumer's purchase, productions and trades take place.

2.2 No Exclusive Dealing Contract (a benchmark)

In this subsection, we focus on the case wherein there is no exclusive dealing contract at t = 1 as a benchmark case. The time line of decisions at t = 1 is as follows. First, each distributor chooses a manufacturer and simultaneously

[5]We assume an inefficient upstream entrant for simplicity. Even if we assume that EM can be more efficient than IM with some probabilities, the qualitative results of this paper are not affected.

[6]In this sense, we can see that our model is an extension of Comanor and Rey's (2000) model with efficient downstream entrants and weak upstream entrants. Comanor and Rey (2000), however, exclude the possibility of trade between entrants, i.e., between EM and ED, by assumption.

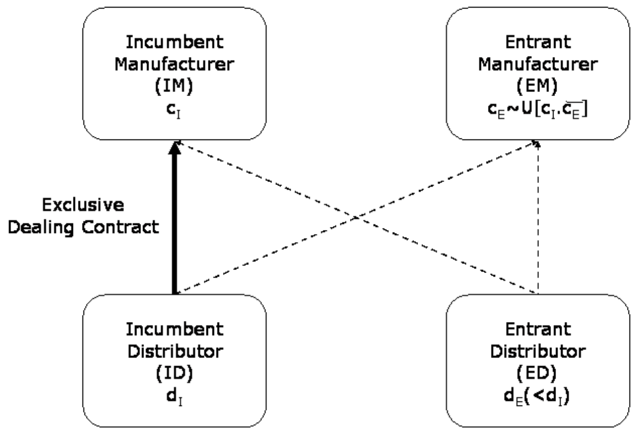

Figure 1:

offers a take-it-or-leave-it offer since we assume that distributors have strong bargaining power over manufacturers, as explained in the introduction. We denote w_j^i as a wholesale price offered by distributor i ($i = ID$ or ED) to a manufacturer j ($j = IM$ or EM). Second, each manufacturer determines whether to accept each offer. Since we do not assume any capacity constraint for the production, manufacturers may accept two offers. We assume a distributor cannot cancel an offer if it is accepted by a manufacturer. If an offer is rejected, the distributor has a chance to offer a wholesale price to the other manufacturer. [7] However, one might imagine the situation wherein a second-round offer from a distributor is impossible due to time constraints or other reasons. Hence, we will examine such cases in Appendix. Third, ID and ED simultaneously offer their retail price to consumers given the decisions of manufacturers. P^i is the retail price offered by distributor i. Finally, consumers choose a distributor and determine whether to buy the product.

Next, we examine the equilibrium outcome of this game. It is the opti-

[7]It is assumed that a distributor does not make offers to the two manufacturers simultaneously since the distributor has to sell two units of the product if the two offers are accepted.

mal strategy for each manufacturer to accept an offer as long as the offered wholesale price is not lower than her unit cost, since offers from distributors are of take-it-or-leave type and no capacity constraints exist. Given this optimal strategy of manufacturers, the optimal strategy of each distributor is to offer a wholesale price to IM equivalent to IM's marginal cost. Then, $w_{IM}^{ID} = w_{IM}^{ED} = c_I$. Moreover, no distributor makes an offer to EM, because it is commonly known that $c_E \in [c_I, \overline{c_E}]$.

Hence, when no exclusive dealing contracts are signed, the minimum total costs for ID (ED), denoted by TC^I (TC^E), can be written as

$$\begin{aligned} TC^I &= c_I + d_I \\ TC^E &= c_I + d_E. \end{aligned}$$

Given these cost conditions, ID and ED decide P^i ($i = I$ or E) simultaneously and compete a la Bertrand. Thus, the equilibrium market price P^* becomes

$$P^* = \max(TC^I, TC^E) = TC^I = c_I + d_I$$

Then, ED wins the Bertrand competition and obtains a profit $d_I - d_E$.

This outcome is quite consistent with the standard Bertrand competition outcome. The production cost is minimized by the competition and only the efficient distributor obtains a positive profit.[8] Since a new manufacturer is less efficient than the incumbent manufacturer, the unknown cost, c_E, does not affect the market equilibrium outcome. In the next section, we will examine how this outcome will be affected by the exclusive dealing contracts.

3 Effects of the Exclusive Dealing Contract

Now, we introduce a simple exclusive dealing contract. ID offers IM an exclusive dealing contract that stipulates no transaction with the new distributor,

[8] More precisely, there might exist an incentive problem of ID. Since ID expects that she cannot win the retail price competition, ID has no incentive to offer to IM. If so, the pricing of ED may become more higher. Such complicated probrem can be avoided, as implicitly assumed in the literature, by assuming that a wholesale contract is just a "reservation contract", i.e., if a distributor cannot confirm the consumers' purchases, she does not have to buy the product, or ID has a chance to (re)offer to manufacturers even afther the retail pricing of ED.

ED, and the penalty level, h_0, in the case of a breach. Here, h_0 denotes the liquidation damage that IM has to pay for ID as a penalty when IM breaches this contract to trade with ED. As mentioned above, the new manufacturer's exact cost, c_E, is unknown to both contracting parties. They only know of the existence of an entrant, EM, and the distribution of c_E is uniform in $[c_I, \overline{c_E}]$. Hence, the exclusive dealing contract cannot be contingent upon the realized c_E.

Before deriving the optimal contract, i.e., the optimal level of liquidation damage, h_0^*, we examine the competitive equilibrium, given h_0. When a given exclusive dealing contract is signed, the entrant distributor bears an additional cost, h_0, if it buys from the incumbent manufacturer.

Based on these cost conditions, the competition outcome becomes different from the no-contract case. Each distributor's minimized total cost can be written as

$$TC^I = c_I + d_I \tag{1}$$

$$TC^E = \begin{cases} c_I + h_0 + d_E & \text{if} \quad w_{EM}^{ED} < c_E \quad (w_{EM}^{ED} : \textit{rejected}) \\ w_{EM}^{ED} + d_E & \text{if} \quad w_{EM}^{ED} \geq c_E \quad (w_{EM}^{ED} : \textit{accepted}) \end{cases} \tag{2}$$

If $w_{EM}^{ED} < c_E$, EM rejects ED's offer, and ED makes an offer to IM after the rejection. Thus, $TC^E = c_I + h_0 + d_E$. We should note that if ED contracts with IM, ID does not compete with ED even when $TC^I < TC^E$. The reason is as follows. Based on the price competition, ID can obtain $c_I + h_0 + d_E - (c_I + d_I) > 0$, when $TC^I < TC^E$. However, we can see that this profit is lower than h_0.

$$c_I + h_0 + d_E - (c_I + d_I) = h_0 + (d_E - d_I) < h_0.$$

Hence, it is better for the incumbent distributor to avoid the price competition and receive the penalty from the incumbent manufacturer. In this situation, there are multiple Nash equilibria. All combinations such as P^I, which is higher than TC^E, and P^E, which is slightly lower than P^I (or v if P^I is higher than v), are Nash equilibria. Here, we simply assume that a Nash equilibrium that maximizes the profit of ED is chosen.[9] In other words,

[9]If P^I is lower than v, the profit of ED becomes more lower and the possibility that ED trades with EM should be raised. That is, the possibility of inefficient outcome should become higher than we are considering in this setting.

ID will set its price higher than v and ED will set its price as $P^E = v$. Under this equilibrium, ED obtains $v - (c_I + h_0 + d_E)$ and ID obtains h_0.[10] In this situation, we can easily observe that the total welfare is maximized since IM trades with ED; thus, the maximum total welfare $v-$ $(c_I + d_E)$ is realized.

On the other hand, if $w_{EM}^{ED} \geq c_E$, EM accepts ED's offer this time, TC^E becomes $w_{EM}^{ED} + d_E$ and TC^I becomes $c_I + d_I$. Hence, if $TC^I \geq TC^E$, ED earns a positive profit $c_I + d_I - (w_{EM}^{ED} + d_E)$. However, if $TC^I < TC^E$, ED loses the retail price competition and obtains nothing.

Then, ED's payoff is as follows.

$$\pi^{ED} = \begin{cases} v - (c_I + h_0 + d_E) & \text{if} \quad w_{EM}^{ED} < c_E \\ c_I + d_I - (w_{EM}^{ED} + d_E) & \text{if} \quad w_{EM}^{ED} \geq c_E, \ c_I + d_I - (w_{EM}^{ED} + d_E) \geq 0 \\ 0 & \text{if} \quad w_{EM}^{ED} \geq c_E, \ c_I + d_I - (w_{EM}^{ED} + d_E) < 0 \end{cases} \tag{3}$$

Since ED knows that TC^I is $c_I + d_I$, it is not optimal for ED to set w_{EM}^{ED} that makes $c_I + d_I - (w_{EM}^{ED} + d_E) < 0$. Hence, hereafter, we characterize only the cases where $c_I + d_I - d_E \geq w_{EM}^{ED}$. Because c_E is a random variable for ED, ED's expected payoff becomes as follows.

$$E[\pi^{ED}] = \frac{w_{EM}^{ED} - c_I}{C}(d_I - d_E - w_{EM}^{ED} + c_I) + (1 - \frac{w_{EM}^{ED} - c_I}{C})[v - (c_I + h_0 + d_E)] \tag{4}$$

Next, we derive the optimal w_{EM}^{ED}, denoted by w_E^*. ED sets w_E^* to maximize the above expected payoff. We should be careful, however, that it is always possible for ED to offer IM and not to offer w_{EM}^{ED}. By offering to IM, ED can obtain $v - (c_I + h_0 + d_E)$ as explained above. Hence, ED's maximized profit must be higher than $v - (c_I + h_0 + d_E)$. Based on this point, we obtain the following lemma.

Lemma 1 *: If $v \leq c_I + d_I + h_0$, ED offers $w_E^* = \frac{3c_I + d_I - v + h_0}{2}$ to EM. If $v > c_I + d_I + h_0$, ED does not offer to EM and offers $w_{IM}^{ED} = c_I + h_0$ to IM.*

Proof. Since $c_E \in [c_I, \overline{c_E}]$, w_{EM}^{ED} should be higher than c_I. This implies that the maximum value of $d_I - d_E - w_{EM}^{ED} + c_I$ is $d_I - d_E$. Hence, if $v - (c_I + h_0 + d_E) - (d_I - d_E) = v - (c_I + d_I + h_0) > 0$, ED has no incentive to offer

[10] In general, there is a possibility that $v - (c_I + h_0 + d_E)$ may become negative if h_0 is very high. However, setting such high h_0 is not optimal for the ID. Thus, we only characterize the cases where $v - (c_I + h_0 + d_E)$ is positive.

to EM. On the other hand, if $v \leq c_I + d_I + h_0$, w_{EM}^{ED} is chosen to maximize (4). From the first order condition, we obtain

$$w_E^* = \frac{3c_I + d_I - v + h_0}{2}. \tag{5}$$

Next, we confirm that this w_E^* satisfies $c_I + d_I - d_E \geq w_{EM}^{ED}$. $c_I + d_I - d_E - w_E^* = \{v - (c_I + h_0 + d_E) + d_I - d_E\}/2 > 0$. ■

Given this strategy of ED, ID determines the level of liquidation damage, h_0. When ED trades with IM, ID can obtain h_0. On the other hand, ID receives 0 when ED trades with EM, since ED always chooses the level of w_{EM}^{ED} to win the retail price competition. Thus, the expected profit of ID becomes as follows.

$$E[\pi^{ID}] = \begin{cases} (1 - \frac{w_E^* - c_I}{C})h_0 = \{1 - \frac{1}{C}(\frac{3c_I + d_I - v + h_0}{2} - c_I)\}h_0 & \text{if } \ v \leq c_I + d_I + h_0 \\ h_0 & \text{if } \ v \geq c_I + d_I + h_0 \end{cases} \tag{6}$$

From the expected profit function, we obtain the following lemma.

Lemma 2 *: If $v \leq c_I + d_I + 2C$, the optimal liquidation damage, h_0^*, becomes as follows.*

$$h_0^* = \frac{2C + v - c_I - d_I}{2} \tag{7}$$

Then,

$$w_E^* = \frac{3c_I + d_I - v + h_0}{2} = \frac{5c_I + d_I - v + 2C}{4}. \tag{8}$$

If $v \geq c_I + d_I + 2C$, $\quad h_0^* = v - c_I - d_I$.

Proof. By maximizing $\{1 - \frac{1}{C}(\frac{3c_I + d_I - v + h_0}{2} - c_I)\}h_0$, we obtain $h_0^* = \frac{2C + v - c_I - d_I}{2}$. If this h_0^* satisfies $v \leq c_I + d_I + h_0^*$, h_0^* denotes h_0 that maximizes $E[\pi^{ID}]$. Since $v \leq c_I + d_I + h_0^* \iff v \leq c_I + d_I + \frac{2C + v - c_I - d_I}{2}$, if $v \leq c_I + d_I + 2C$, $h_0^* = \frac{2C + v - c_I - d_I}{2}$ and $w_E^* = \frac{5c_I + d_I - v + 2C}{4}$. On the other hand, if $v > c_I + d_I + h_0^*$, $E[\pi^{ID}]$ is obviously maximized at $h_0 = v - c_I - d_I$. ■

From the Lemma, we obtain the following proposition.

Proposition 1 *:As long as $v \leq c_I + d_I + 2C$, the exclusive dealing contract offered by an incumbent distributor generates inefficiency since the efficient distributor, ED, trades with the inefficient manufacturer, EM, and supplies the product. The probability of realizing the inefficiency is $\frac{1}{2} - \frac{v-c_I-d_I}{4C}$. If $v > c_I + d_I + 2C$, the exclusive dealing contract does not generate inefficiency.*

Proof. As long as $v \leq c_I + d_I + 2C$, $h_0^* = \frac{2C+v-c_I-d_I}{2}$, as explained in Lemma 2. If $h_0^* = \frac{2C+v-c_I-d_I}{2}$, then, $v \leq c_I + d_I + h_0$ and $w_E^* = \frac{5c_I+d_I-v+2C}{4}$ from Lemma 1. Thus, with probability $\frac{w_E^*-c_I}{C} = \frac{1}{2} - \frac{v-c_I-d_I}{4C}$, the offer by ED is accepted by EM, and the inefficient transaction between ED and EM is realized. ■

The intuition of this proposition is natural. By the exclusive dealing contract, the offer to IM is not so attractive for ED. Thus, unless h_0 is sufficiently low, ED has an incenitive to trade with the inefficient entrant EM. On the other hand, such h_0 level is too low for ID as long as $v \leq c_I + d_I + 2C$, and thus ID chooses the optimal level of h_0 which may generate the inefficient transaction.

If the actual c_E is less than or equal to w_E^*, EM accepts the offer and the combination of EM-ED wins the retail market competition. On the other hand, if c_E is larger than w_E^*, EM rejects the offer, and ED has to trade with IM by paying the liquidation damage. Figure 2 depicts the equilibrium manufacturer-distributor structure depending on the EM's actual cost.

Here, we have assumed that ED has a chance to contract and trade with IM even after the rejection of EM. In some cases, however, the second round offer may be impossible. In Appendix, we will examine such cases and get similar result. Even if the second round offer is prohibited, there is a possibility that the exclusive dealing contract offered by an incumbent distributor generates inefficiency.

We should note that under the equilibrium exclusive dealing contract, the entrant distributor is not excluded at all. ED always supplies the product to consumers. However, if the level of c_E is low, however, the inefficient manufacturer, EM, can survive and supply the product. This result is quite in contrast with the results in the traditional literature. In the literature, an efficient entrant is excluded by the exclusive dealing contract. This paper has derived a different possibility by considering multiple entrants. This factor has an important implication for the competition policy. We will examine this point more carefully in Section 5.

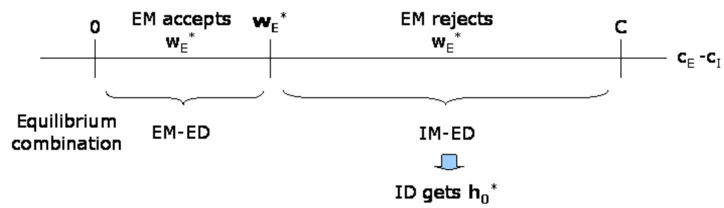

Figure 2:

Next, we examine the possibility of renegotiation. The argument of Aghion and Bolton (1987) is criticized that by considering renegotiation, inefficient outcomes do not emerge (Masten and Snyder (1989) and Spier and Whinston (1995)).[11] We now examine whether our argument is affected by allowing the possibility of renegotiation.

In our setting, the renegotiation possibility implies renegotiation regarding the liquidation damage level, h_0. Under the settings of Aghion and Bolton, if the level of liquidation value can be renegotiated after the realization of a random variable, the inefficiency should disappear. One huge difference between our settings and those of Aghion an Bolton (1987) is that c_E is private information and not a random variable. Hence, it is difficult to perceive a renegotiation possibility similar to that of Aghion and Bolton.

However, the decision of EM may convey some information regarding the cost condition of EM. If EM accepts the offer from ED, it is revealed that EM's cost is lower than the offered price, w_{EM}^{ED}. Even if ID (and IM) received this information, it is difficult to readjust the contracted liquidation damage level since EM has already accepted the offer from ED at that time. ED

[11] Simpson and Wickelgren (2007) also pointed out this argument.

cannot change its partner to IM, and thus, the reduction of h_0 does not change the outcome in our model.

This outcome is not affected even if we consider the possibility that ED pays a penalty for a breach of the contract to EM and make a contract with IM. For the breach of the contract, ED has to pay at least w_E^*. In this case, ED's total cost with IM becomes $c_I + h_0 + d_E + w_E^*$, and it is larger than $d_E + w_E^*$ even if the reduced liquidation damage level, h_0, is zero. Hence, even after allowing for renegotiation, the results of this paper are not affected.

4 The Optimal Contracts with No Entrant Manufacturer

In this section, we examine the optimal exclusive contract when no entrant manufacturer exists. We will show that there is no inefficiency in this case even if an exclusive dealing contract is signed by the incumbents.

Before deriving the optimal contract, we should examine the no-contract payoffs of each player. Without any exclusive dealing contracts, there is a unique subgame perfect equilibrium. IM accepts wholesale price offers from both ID and ED, and the equilibrium wholesale prices are $w_{IM}^{ID} = w_{IM}^{ED} = c_I$. Then, ID and ED compete a la Bertrand with $TC^I = c_I + d_I$ and $TC^E = c_I + d_E$. Thus, the market price becomes $P^* = TC^I = c_I + d_I$, and only ED obtains a positive profit $d_I - d_E$. Hence, both incumbents cannot obtain any positive profit. In this model, we have assumed that distributors can offer take-it-or-leave-it offers, and thus, distributors have strong bargaining power and IM obtains zero profit even though IM is in a monopoly position.

Next, we derive the optimal exclusive dealing contract as we did in Section 3. Suppose the liquidation damage level, h_0, was contracted between the incumbents at t = 0. This implies that ED has to pay h_0 additionally to buy from IM. Hence, the equilibrium wholesale price offering strategies are $w_I^I = c_I$ and $w_I^E = c_I + h_0$, and the total cost of the distributors becomes

$$\begin{aligned} TC^I &= c_I + d_I \\ TC^E &= c_I + h_0 + d_E. \end{aligned}$$

Even if $d_I - d_E < h_0$, i.e. $TC^I < TC^E$. ID will not compete with ED, because if it competes, the market price becomes $P^* = TC^E = c_I + h_0$, and ID's profit becomes $\pi^{ID} = h_0 - d_I + d_E < h_0$. Hence, ID avoids the price competition and gets the liquidation damage h_0 by offering $P^I > v$.[12]

If $d_I - d_E \geq h_0$, $P^* = TC^I = c_I + d_I$, ED wins the competition, and ID obtains $\pi^{ID} = h_0$. Hence, ID can obtain h_0 anyway, the profit maximization problem for the incumbent distributor at t = 1 becomes to maximize the amount of h_0.

$$\begin{aligned} & \underset{h_0}{Max} \quad h_0 \\ s.t.\ 0 \quad \leq & \quad h_0 \leq v - c_I - d_E \end{aligned}$$

Obviously, $h_0^* = v - c_I$, and the equilibrium consumer price offer becomes $P^* = v$. Clearly, ID obtains all surplus by liquidation damages. Each player's payoff is as follows:

$$\begin{aligned} \pi^{ID} &= v - c_I - d_E \\ \pi^{ED} &= 0 \\ \pi^{IM} &= 0. \end{aligned}$$

Since the optimal combination IM-ED is realized, there is no welfare loss.

It is evident from this result that without entrants at the manufacturing level, there is no social inefficiency. The efficient new distributor can enter the market. The rent extraction device, h_0, makes ID absorb all the surplus that the efficient ED would obtain. When we compare this result with the potential inefficient manufacturer entrant case shown above, the potential entrants enable such exclusive dealing contracts to induce inefficient entry.

Proposition 2 : *When no potential entrant exists in the upstream side of the market, the optimal exclusive dealing contract does not deter an efficient entry, and there is no welfare loss.*

[12] As noted in the previous section, all combinations such that P^I which is higher than TC^E, and P^E, which is slightly lower than P^I (or v if P^I is higher than v), are Nash equilibria. Here, we simply assume that a Nash equilibrium that maximizes the profit of ED is chosen.

Proof. See above. ■

From this proposition, we understand that the entrant manufacturer is crucial for the result in the previous section, that is, the optimal exclusive dealing contract generates inefficiency. The intuitive reason is that without the entrant, the incumbent distributor can set the level of liquidation damage appropriately and can absorb the rent completely. Hence, even with the exclusive dealing contract, it does not decrease the total welfare in this simple setting. In other words, the existence of the entrant in the manufacturing sector and the asymmetric information about the cost level of the entrant are crucial for the inefficiency. This result is important in considering entry threats. Our result implies that an entry threat does not increase the welfare automatically even though the competition is homogenous and there is no entry cost. This point is quite in contrast with the results of the contestable markets theory. We can state that the relation between the entry threats and exclusive dealing contracts are more complex than expected.

5 Conclusion

In this paper, we have focused on the exclusive dealing contracts in the manufacturer-distributor structure aligned with two recent papers, namely, Fumagalli and Motta (2006) and Simpson and Wickelgren (2007). We introduced potential entrants in both the manufacturer and distributor sides and shown that exclusive dealing contracts may decrease the social welfare in this new environment. Fumagalli and Motta (2006) and Simpson and Wickelgren (2007) have shown that, in the case of homogenous Bertrand competition, efficient entry always occurs with any exclusive dealing contract and no inefficiency occurs in the manufacturer-distributor structure. On the other hand this paper has shown that even if the distributors compete with homogenous price competition, the inefficient result comes out. Hence, our result shows that homogenous Bertrand competition in the distributor side is not sufficient condition for realizing the social efficiency.

In order to make clear the reason of the inefficiency, we compared the results with or without inefficient entrants. We have shown that with inefficient entrants in upstream, exclusive dealing contracts with liquidation damages can facilitate inefficient entries in the upstream side. Although efficient entrants in downstream are not deterred, such an exclusive dealing contract is welfare reducing.

Our result has important implications for competition policies. Generally, a competition policy focuses on whether entry is deterred by any contracts between incumbents. Our result, however, shows that even if no entry is deterred, inefficiency might be generated. It is a natural situation wherein entrants are less productive than the incumbent, and they enter the market with efficient new distributors. The result of this paper suggests that the competition policy should be careful with regard to not only whether entrants are deterred but also whether inefficient transactions are promoted by exclusive dealing contracts. This point is not derived by the traditional one-entrant setting. Analysis of multiple entrants at both sides of the market structure enable us to reach this new policy implication.

This paper has focused on the situation wherein distributors have strong bargaining power. As the presence of Wal-Mart shows that this situation is important for considering actual phenomena, and based on this setting, our model has become very simple and tractable. Hence, it would serve as an important work in future to reconsider traditional results by assuming that downstream firms have strong bargaining power. Moreover, we can imagine that distributors are platforms that exert bargaining power on upstream manufacturers and also the final consumer. To analyze platforms with exclusive dealing contracts, two-sided market problems are important[13]. Although this paper avoided such complicated problems and focused mainly on the effects of exclusive dealing contracts, this is an important issue for future research.

A Appendix

In this appendix, we examine the case in which the second round offer is prohibited, that is, ED cannot offer to IM if the offer to EM is rejected. We will show that even in this case, there is a possibility that social inefficiency is generated. First, we derive the profit function of EM, given the offered price, w^E, and the liquidation damage level, h_0. EM accepts the wholesale price offer, if $w^E \geq c_E$, but EM rejects it and obtains no profit, if $w^E < c_E$. Since a second round offer is impossible, ED also obtains no profit. As explained in Section 3, the market price is $d_I + c_I$ in this case. Hence, the expected

[13]With regard to the two-sided market problems, see, for example, Rochet and Tirole (2006).

profit for ED is as follows.

$$E\left[\pi^{ED}\right] = \frac{w^E - c_I}{C}(d_I + c_I - d_E - w^E). \tag{9}$$

From the first-order condition, we obtain

$$w^{E*} = \frac{d_I - d_E}{2} + c_I. \tag{10}$$

Hence, the probability that EM accepts the offer, ρ, and the expected profit for ED, $E\left[\pi^{ED}\right]$, becomes as follows.

$$\rho = \frac{w^E - c_I}{C} = \frac{d_I - d_E}{2C},\ E\left[\pi^{ED}\right] = \frac{(d_I - d_E)^2}{4C}. \tag{11}$$

ED does not make an offer to EM, and it offers to IM if the above expected profit is lower than $v - (c_I + h_0 + d_I)$, that is the gain obtained by offering to IM. Therefore, if $v - (c_I + h_0 + d_I) \geq \frac{(d_I - d_E)^2}{4C}$, ED offers to IM and gets $v - (c_I + h_0 + d_I)$. On the other hand, if $v - (c_I + h_0 + d_I) < \frac{(d_I - d_E)^2}{4C}$, ED offers to EM and obtains the expected profit $\frac{(d_I - d_E)^2}{4C}$.

ID determines h_0^* expecting the ED's behavior. If the offer from ED is rejected by EM, ED cannot supply the product, then ID obtains the monopoly profit $v - c_I - d_I$. On the other hand, if the offer is accepted by EM, IM cannot win the retail price competition and obtains zero profit. Thus, the expected profit of ID, π^{ID}, is given by

$$E[\pi^{ID}] = \begin{cases} (1 - \frac{d_I - d_E}{2C})(v - c_I - d_I) & \text{if} \quad v - c_I - d_I - \frac{(d_I - d_E)^2}{4C} < h_0 \\ h_0 & \text{if} \quad v - c_I - d_I - \frac{(d_I - d_E)^2}{4C} \geq h_0. \end{cases} \tag{12}$$

From this profit function, if $(1 - \frac{d_I - d_E}{2C})(v - c_I - d_I) - (v - c_I - d_I - \frac{(d_I - d_E)^2}{4C}) > 0 \Leftrightarrow d_I - d_E > 4C + 2(v - d_I - c_I)$, ID sets $h_0^* > v - c_I - d_I - \frac{(d_I - d_E)^2}{4C}$ to induce the offer from ED to EM and the inefficient transaction between ED and EM. We should note that in this high h_0 case, the transaction is always inefficient, and there is a possibility that the efficient distributor, ED, is excluded by the exclusive dealing contract. More rigorously, when $c_I \leq c_E \leq \frac{d_I - d_E}{2} + c_I$, the EM-ED transaction is realized, and when $\frac{d_I - d_E}{2} + c_I \leq c_E \leq \overline{c_E}$, the ID-IM transaction is realized in the market.

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