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DEFENDING HOME AGAINST GIANTS: EXCLUSIVE DEALING AS A SURVIVAL STRATEGY FOR LOCAL FIRMS

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Defending Home against Giants: Exclusive Dealing as a Survival Strategy for Local Firms*

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Abstract

We consider exclusive contracts as a survival strategy for a local incumbent manufacturer facing a multinational manufacturer's entry. Although both manufacturers prefer to trade with an efficient local distributor, trading with inefficient competitive distributors is acceptable only to the entrant, owing to the entrant's efficiency. Hence, such competitive distributors can be an outside option for the entrant. As the entrant becomes efficient, the outside option works effectively, implying that the entry does not considerably benefit the efficient local distributor. Thus, the local manufacturer is more likely to sign an exclusive contract with the efficient distributor as the entrant becomes efficient.

JEL classification codes: F21, F23, L12, L42
Keywords: Multinational firms; Exclusive dealing; Vertical relation; Market protection

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1 Introduction

The influence of multinational firms' entry on local firms' survival strategies has attracted much attention in the business literature (Dawar and Frost, 1999; Bhattacharya and Michael, 2008; Kokko and Thang, 2014; Wu et al., 2019) because multinational firms are usually highly productive (Helpman, Melitz, and Yeaple, 2004; Yeaple, 2009). Dawar and Frost (1999) indicate that, as a proactive survival strategy for local firms, creating a strong distribution network is key to blocking the entry of giant firms such as multinational firms.[1] Among business activities that can strengthen the distribution network, signing an exclusive contract is a favored solution among local firms. For example, a Russian personal computer manufacturer, Vist, has entered into exclusive distribution agreements with several key retailers in local markets in response to the entry of multinational firms such as Compaq, IBM, and Hewlett-Packard (Dawar and Frost, 1999). Another example is the case of Eastman Kodak vs. Fuji, in which the former, a U.S. photographic film firm, complained that Fuji, its Japanese competitor, had established an exclusive relationship with several Japanese wholesalers (Nagaoka and Goto, 1997).

Although an exclusive contract is the primary candidate strategy for incumbents to protect local markets, the use of such a contract is usually difficult because trade with an efficient manufacturer, such as a multinational firm, usually benefits a local distributor. A well-known result in the literature on competition policy, introduced in the literature review, is that an exclusive contract to deter an efficient firm's entry is not always achievable. Therefore, it is valuable to analytically show the potential market environment when an exclusive contract is achievable.

Focusing on the features of giant firms, we construct a model of exclusive contracts in which a local incumbent manufacturer makes an exclusive offer to a local distributor to deter the entry of a multinational manufacturer that is more efficient than the local incumbent manufacturer. Although both manufacturers prefer to trade with the local distributor, there exist alternative but

[1] Examples are provided in Section 5.3.

inefficient competitive distributors, which are downstream competitive fringes. We consider the case in which, owing to its efficiency, only the multinational manufacturer can use the downstream competitive fringe as an outside option. Such outside options are notable features of multinational firms, which often have a network of switching options that is unavailable to local firms (Kogut and Kulatilaka, 1994; Tong and Reuer, 2007).[2]

By introducing non-linear wholesale pricing and a general demand function, we show that the existence of the downstream competitive fringe allows the local incumbent manufacturer to protect the local market from multinational entry via exclusive contracts if the multinational manufacturer is efficient and the manufacturers have strong bargaining power over the local distributor.

To understand this result, consider the impact of the downstream competitive fringe on industry profit allocation after entry. If the multinational manufacturer is marginally more efficient than the local incumbent manufacturer, the competitive fringe does not significantly affect the industry profit allocation after entry. That is, the model structure basically coincides with that in the absence of the competitive fringe. If the entry of the multinational manufacturer occurs in this case, the upstream competition allows the local distributor to earn higher profits, thereby preventing the local incumbent manufacturer from profitably compensating the local distributor through an exclusive contract. Therefore, exclusion cannot be an equilibrium outcome. Conversely, as the multinational manufacturer becomes increasingly efficient, the competitive fringe works effectively and empowers the multinational manufacturer to exploit higher profits when manufacturers have strong bargaining power. In this context, exploitation implies that entry does not significantly increase the local distributor's profit. Thus, exclusion can be an equilibrium outcome.

We also check the robustness of these results. First, exclusion outcomes are attainable even when the marginal cost of the multinational manufacturer is sufficiently low as long as the fixed cost of entry is adequately high. Second, in the appendix, we show that exclusion outcomes are

[2] See also Petersen, Welch, and Welch (2000) for a discussion on the switching options available to multinational firms.

attainable even in the case of downstream entry by inverting the vertical relationship; that is, abundant options of input suppliers may facilitate downstream exclusion through exclusive supply contracts. Thus, we can apply this study's exclusion mechanism to diverse vertical relationships in the real world.

The exclusion mechanism presented in this study provides important policy implications from several perspectives. First, the results provide important policy implications for the invitation of multinational firms. Since multinational entry usually has a positive impact on host countries, such as technology transfer and physical capital inflows, the host country government often removes official barriers, including taxes and legal systems, to promote multinational entry. Moreover, local firms seems to have difficulties in using exclusive contracts as a survival strategy because of the high efficiency of multinational firms. However, let us consider the distribution options that multinational firms possess. There is a possibility whereby not only the local manufacturer but also the local distributor has an incentive to sign exclusive contracts, which discourages multinational entry. Thus, the host country government should pay attention to the anticompetitive activities of local firms.

Second, this study's findings also provide an important implication for multinational firms' entry decisions; as an alternative distribution channel becomes efficient, an efficient firm can experience difficulty when entering a host market with exclusive business practices. The development of information and communication technology helps firms establish alternative distribution channels more easily (World Bank, 2009). Such development seemingly facilitates the entry of firms with high efficiency. However, the results herein imply that such development may help local manufacturers protect their local markets through exclusive contracts. From the viewpoint of a multinational firm's location strategy, the abundant trading-partner choices in preparation for entry into a new market may be harmful to the efficient entrant. Moreover, as global sourcing advances, the multinational entrant has rich options to procure inputs for the case of downstream entry, which may allow the local downstream incumbent to defend the local market through exclusive supply contracts.

Finally, the findings provide important policy implications for competition policy. The Chicago School argument, which states that exclusive contracts are not signed to exclude the efficient entrant, cannot be applied if we consider the possibility that the entrant has abundant trading options. Although we consider the case of multinational entry, we can apply the model in this study to the situation in which an entrant, a dominant firm in a certain domestic market, tries to enter the market in other regions to expand its business. Thus, we can apply the exclusion mechanism in this study to the competition policy for cases in which an efficient firm tries to enter a new market in other regions.

The remainder of this paper is organized as follows: Section 2 discusses the literature review. Section 3 constructs the model. Section 4 analyzes the existence of exclusion outcomes under two-part tariffs. Section 5 provides the extension analyses and discusses a survival strategy against multinational entry and the validity of our model. Section 6 offers concluding remarks. Appendix A presents the analysis of the case of downstream entry.

2 Literature Review

Studies on exclusive contracts under international circumstances are limited. Lin and Saggi (2007) investigate the case in which foreign multinational firms make an exclusive supply offer with technology transfer to local suppliers when entering the local market. Raff and Schmitt (2006) explore the contractual choice of local firms and of foreign firms exporting to a local market between exclusive dealing and common agency in an international oligopoly. The main difference between these two studies and ours is that we investigate local firms' exclusive offer to construct a barrier to foreign multinational entry by incorporating rich switching options.

This study is also related to the substantial literature on the location decisions of multinational firms and on the boundaries of firms, which explores where multinational firms invest and have subsidiaries (Helpman, Melitz, and Yeaple, 2004; Antràs and Helpman, 2004; Yeaple, 2009; Chen and Moore, 2010). For example, Chen and Moore (2010) explore location decisions using French manufacturing firms' data and find that more productive firms are more likely to enter a foreign country. They also analyze the impact of host countries' attributes, such as entry cost, governance, corporate tax, and market potential, on the probability of each firm's entry into a foreign market. Our study is related to this literature because exclusive business practices can also be a host country attribute that influences the entry decisions of multinational firms. By interpreting this differently, our analysis predicts that, since more productive firms have more options in terms of locating their economic activities, multinational firms with several options regarding where to invest can avoid locations with high entry barriers.

Furthermore, this study is related to the literature on naked exclusion, in which the inefficient incumbent deters the entry of the efficient firm through exclusive contracts.[3] This literature traces its development to the Chicago School argument of the 1970s.[4] By focusing on the contracting party's individual rationality, the Chicago School theory reveals that exclusive contracts are never signed in a simple setting. In rebuttal to the Chicago School, post-Chicago economists find that exclusive contracts can be used to deter efficient entrants in some situations.[5] They show that the exclusion result is attainable in the cases where: the incumbent sets liquidated damages for the case of entry (Aghion and Bolton, 1987), the entrant is capacity-constrained (Yong, 1996), the entrant faces scale economies (Rasmusen, Ramseyer, and Wiley 1991; Segal and Whinston, 2000),[6] upstream firms compete à la Cournot (Farrell, 2005), downstream firms compete (Simpson and Wickelgren, 2007; Abito and Wright, 2008),[7] upstream firms can merge (Fumagalli, Motta,

[3] Several studies focus on the fact that active firms may compete for exclusivity and explore its welfare effect (Mathewson and Winter, 1987; O'Brien and Shaffer, 1997; Bernheim and Whinston, 1998). Recently, Calzolari and Denicolò (2013, 2015) and Calzolari, Denicolò, and Zanchettin (2020) have introduced asymmetric information.

[4] For an analysis of the impact of this argument on antitrust policies, see Motta (2004), Whinston (2006), and Fumagalli, Motta, and Calcagno (2018).

[5] There are series of empirical studies that discuss whether exclusive dealing creates a barrier to entry. See, for example, Nurski and Verboven (2016) and Fadairo, Yu, and Lanchimba (2017).

[6] For an extended analysis, see Choi and Stefanadis (2018).

[7] For extended models with downstream competition, see Wright (2008), Argenton (2010), Kitamura (2010),

and Persson, 2009), the incumbent makes relationship-specific investments (Fumagalli, Motta, and Rønde, 2012), and a dominant complementary input supplier exists (Kitamura, Matsushima, and Sato, 2018a).[8] In these studies, alternative distribution channels are out of scope; the contribution of this study to existing literature is to introduce an alternative exclusion mechanism such that naked exclusion is attainable if we consider the efficient entrant's outside option.

Among previous studies, this study is mostly related to Comanor and Rey (2000), who consider a market in which a single supplier, downstream incumbent with inefficient external suppliers, and downstream entrant exist. They assume that only the downstream incumbent has an outside option to buy inputs from the external supplier. When each downstream firm has the bargaining power to offer a wholesale price, the existence of an outside option diminishes the downstream incumbent's incentive to offer a higher wholesale price, which influences the efficient downstream entrant to refrain from offering a higher wholesale price. Therefore, the supplier cannot earn higher profits even when downstream entry occurs, which leads to exclusion outcomes. In contrast to their research, this study considers the entrant's outside option, the source of which is the entrant's efficiency. More importantly, although the entrant's efficiency does not play an essential role in inducing exclusion outcomes in their study, it does in this study; summarily, this study presents an alternative exclusion mechanism.

3 Model

This section describes the basic settings of the model. We first explain the players' characteristics and the timing of the game in Section 3.1. Section 3.2 introduces the design of the exclusive contracts. For convenience, we consider the relationship between manufacturers and distributors,

DeGraba (2013), and Gratz and Reisinger (2013). Moreover, Fumagalli and Motta (2006) show that participation fees to remain active in the downstream market play a crucial role in exclusion if buyers are undifferentiated Bertrand competitors. See also Wright (2009), who further investigates the settings of Fumagalli and Motta (2006) in the case of two-part tariffs.

[8] See also Kitamura, Matsushima, and Sato (2017), who show that anticompetitive exclusive dealing can occur if the downstream buyer bargains with suppliers sequentially.

although this model is suitable for a more general application; for example, it can be applied to the relationship between input suppliers and final goods producers.

3.1 Basic environment

The local upstream market consists of the incumbent manufacturer U_I and the entrant manufacturer U_E. Notably, U_I and U_E produce an identical product with marginal costs c_I and c_E ($c_I > c_E \geq 0$). The cost difference captures the higher efficiency of a giant firm, such as a multinational firm.

In the downstream market, there is a downstream incumbent distributor D_I who sells products supplied by manufacturers to the final consumers. We assume that D_I incurs a production cost wq when purchasing q units of the product under the linear wholesale price w. In addition to supplying the final product through D_I, each manufacturer can supply it to the final consumers by incurring an additional marginal cost $\Delta(> 0)$ through outside opportunities. We regard the opportunity as the manufacturers' outside options to use alternative distribution channels.

The demand system has the following properties. The demand function for the product is $Q(p)$, where p is the unit price of the product. We assume that $Q(p)$ is twice differentiable and $Q'(p) < 0$. For notational simplicity, we define $\Pi(p, z)$, $p^*(z)$, and $\Pi^*(z)$ as follows:

$$\Pi(p, z) \equiv (p - z)Q(p), \quad p^*(z) \equiv \operatorname*{argmax}_{p \geq z} \Pi(p, z), \quad \Pi^*(z) \equiv \Pi(p^*(z), z),$$

where $z \geq 0$. To obtain the interior solution, we assume that $c_I < P(0)$, where $P(Q)$ is the inverse demand function of $Q(p)$. We also assume that $\Pi(p, z)$ is strictly and globally concave in p, and it has a single peaked property; $2Q'(p) + (p - z)Q''(p) < 0$ for all $p \geq z$ and $Q(p) + (p - z)Q'(p) < 0$ for sufficiently large p. By definition, we have $\partial\Pi(p, z)/\partial p \gtreqless 0$ for $p \lesseqgtr p^*(z)$ and $\partial\Pi(p, z)/\partial z < 0$. In addition, the envelop theorem implies that $\partial\Pi^*(z)/\partial z = -Q(p^*(z)) < 0$.

To clarify the role of upstream firms' outside options, we assume that the marginal costs of U_I, U_E, and D_{CF} satisfy the following conditions:

Assumption 1.

$$c_E < P(0) - \Delta \leq c_I, \tag{1}$$

The first inequality of condition (1) implies that U_E can earn positive profits by using its outside options if it is an upstream monopolist. Conversely, the second inequality implies that U_I cannot earn positive profits using its outside options even when it is the upstream monopolist under exclusive dealing; that is, U_I needs to trade with D_I to earn positive profits. In summary, condition (1) implies that U_I's outside options are negligible before U_E appears.

Note that exclusion occurs even when the second inequality of condition (1) does not hold. This imposition in condition (1) simplifies the analysis, and it is the simplest way to explore how the efficiency of U_E affects the possibility of exclusion outcomes.

The model consists of four stages: In Stage 1, U_I makes an exclusive offer to D_I with fixed compensation $x \geq 0$.[9] We assume that U_E cannot make an exclusive offer because multinational firms usually spend some time to actually enter the markets after the news of their entry (Bao and Chen, 2018), which allows local firms to make exclusive offers before future entry occurs. In addition, following the standard literature on naked exclusion, we assume that the exclusive offer does not contain the wholesale price term.[10] After observing the exclusive offer, D_I decides whether to accept the offer. If D_I accepts the exclusive offer, it immediately receives x.

In Stage 2, after observing D_I's decision, U_E decides whether to enter the upstream market. We assume that the fixed cost of entry $F > 0$ is sufficiently low such that entry into the upstream market is profitable for U_E if D_I rejects the exclusive offer in Stage 1. In addition, to simplify the analysis, we assume the following condition so that entry never occurs when D_I accepts the exclusive offer in Stage 1:

Assumption 2.

$$c_E + \Delta \geq c_I \tag{2}$$

[9] In this study, we assume that U_E cannot make an exclusive offer. Kitamura, Matsushima, and Sato (2018b) consider the case in which manufacturers can make exclusive offers and show that exclusion-offer competition leads to exclusion outcomes. Our model setting eliminates the possibility that exclusion is attainable because of such an effect, which allows us to clarify the role of an alternative distribution channel.

[10] Several seminal studies such as Rasmusen, Ramseyer, and Wiley (1991) and Segal and Whinston (2000) indicate that price commitment is unlikely if a precise prescription of the nature of the final goods is not available in advance.

If condition (2) does not hold under the low fixed cost of entry, U_E may enter the upstream market to earn positive profits using its outside options even when D_I accepts the exclusive offer in Stage 1 (See Section 5 for details).

In Stage 3, existing firms negotiate and make contracts for two-part tariffs, which consist of a linear wholesale price w and an upfront fixed fee ψ; the two-part tariff between U_i and D_I when D_I accepts (rejects) the exclusive offer is (w_i^a, ψ_i^a) $((w_i^r, \psi_i^r))$, where $i \in \{I, E\}$. Following Fumagalli, Motta, and Rønde (2012) and Kitamura, Matsushima, and Sato (2018a), the industry profit is allocated by bargaining with random proposers, and the process in Stage 3 is as follows: In the negotiation between the distributor and the manufacturers, the players on one of the sides randomly become proposers; D_I has the proposer role with probability $\beta \in (0, 1)$ and the manufacturers become proposers with probability $1 - \beta$. We interpret β as the degree of the distributor's bargaining power over the manufacturers. In each event, U_E can always use its outside options. For simplicity, we assume that the proposers can choose how to offer two-part tariff contracts such that it maximizes their stage profits if possible; that is, they offer discriminatory two-part tariff contracts or offer such contracts sequentially.[11] We assume that if D_I is indifferent between the two-part tariffs of U_I and of U_E, the efficient manufacturer, U_E, supplies its product to D_I; that is, we impose the so-called tie-breaking rule.

Finally, in Stage 4, D_I orders products and sells them to consumers. Let π_{Ui}^a (π_{Ui}^r) be U_i's expected profit when D_I accepts (rejects) the exclusive offer, where $i \in \{I, E\}$. In addition, let π_{DI}^a (π_{DI}^r) be D_I's expected profit when it accepts (rejects) the exclusive offer.

3.2 Design of exclusive contracts

For an exclusion equilibrium to exist, the equilibrium transfer x^* must simultaneously satisfy the following two conditions:

First, the exclusive contract must satisfy D_I's participation constraint; that is, the amount of

[11] When a restriction is imposed on the proposers to offer the same two-part tariffs, exclusion is more likely to be attainable; however, the analysis becomes considerably complicated. The results are available upon request.

compensation x^* induces D_I to accept the exclusive offer:

$$\pi^a_{DI} + x^* \geq \pi^r_{DI} \text{ or } x^* \geq \pi^r_{DI} - \pi^a_{DI}. \tag{3}$$

Second, the exclusive contract must satisfy U_I's participation constraint; that is, U_I earns higher profits under exclusive dealing.

$$\pi^a_{UI} - x^* \geq \pi^r_{UI} \text{ or } x^* \leq \pi^a_{UI} - \pi^r_{UI}. \tag{4}$$

From the aforementioned conditions, it is evident that an exclusion equilibrium exists if and only if inequalities (3) and (4) hold simultaneously. This is equivalent to the following condition:

$$\pi^a_{UI} + \pi^a_{DI} \geq \pi^r_{UI} + \pi^r_{DI}. \tag{5}$$

Condition (5) implies that the inefficient incumbent manufacturer can use exclusive contracts to protect the local market if exclusive contracts increase the joint profits of U_I and D_I. Thus, in the remainder of this study, we mainly focus on the joint profits of the contracting party.

4 Analysis

In this section, the existence of exclusive outcomes is analyzed. First, in Section 4.1, we explore the case in which U_E is not so efficient such that its outside options are ineffective, that is, $p^*(c_I) - \Delta \leq c_E$. Second, we explore the case in which U_E is efficient such that its outside options are effective, that is, $c_E < p^*(c_I) - \Delta$, in Section 4.2.

4.1 When U_E is not so efficient

First, we consider the case in which U_E cannot use its outside options effectively when D_I sells U_I's product, that is, $p^*(c_I) - \Delta \leq c_E$. To derive the equilibrium outcomes, we solve the game using backward induction.

First, we consider the case in which D_I accepts the exclusive offer in Stage 1. In this case, U_E does not enter the upstream market in Stage 2, and U_I supplies products to D_I. In Stage 3, D_I

becomes the proposer and offers $(c_I, 0)$ to U_I with probability β, and U_I becomes the proposer and offers $(c_I, \Pi^*(c_I))$ to D_I with probability $1-\beta$. The resulting expected profits, excluding the fixed compensation x, are as follows:

$$\pi^a_{DI} = \beta\Pi^*(c_I), \quad \pi^a_{UI} = (1-\beta)\Pi^*(c_I), \quad \pi^a_{UE} = 0. \tag{6}$$

Second, we consider the case in which D_I rejects the exclusive offer in Stage 1. In this case, U_E enters the upstream market in Stage 2 and supplies the product to D_I. The industry profit allocation in Stage 3 is derived as follows: D_I becomes the proposer with probability β and offers $(c_I, 0)$ and $(c_E, 0)$ to U_I and U_E, respectively, to extract all the industry profits.[12] Conversely, U_I and U_E are the proposers with probability $1-\beta$, and then they offer $(c_I, 0)$ and $(c_E, \Pi^*(c_E) - \Pi^*(c_I))$ to D_I, respectively. Consequently, the resulting expected profits are:

$$\pi^r_{DI} = \beta\Pi^*(c_E) + (1-\beta)\Pi^*(c_I), \quad \pi^r_{UI} = 0, \quad \pi^r_{UE} = (1-\beta)(\Pi^*(c_E) - \Pi^*(c_I)). \tag{7}$$

Finally, we consider the game in Stage 1. By substituting equations (6) and (7) into both sides of condition (5), we check the difference between the two sides as follows:

$$\pi^a_{UI} + \pi^a_{DI} - (\pi^r_{UI} + \pi^r_{DI}) = -\beta(\Pi^*(c_E) - \Pi^*(c_I)) < 0,$$

for all $\beta \in (0, 1)$, which implies that condition (5) never holds. Thus, we have the following proposition:

Proposition 1. *Suppose that $p^*(c_I) - \Delta \leq c_E$; U_E's outside options are not effective. In this case, U_I cannot protect the local upstream market from the entry of U_E through exclusive contracts for any $\beta \in (0, 1)$.*

The intuition behind Proposition 1 is as follows: When D_I rejects the exclusive offer in Stage 1, U_E enters the upstream market in Stage 2. The entry of U_E allows D_I to earn considerably higher

[12] Although we consider the case in which D_I offers discriminatory two-part tariff contracts to U_I and U_E simultaneously to extract all industry profits $\Pi^*(c_E)$, D_I can achieve the same profit allocation by using sequential offers; that is, D_I first offers $(c_E, 0)$ to U_E and thereafter offers $(c_I, 0)$ to U_I if U_E rejects the first offer, which prevents U_E from earning positive profits from outside options by using alternative distribution channels.

profits. U_I cannot profitably compensate D_I for such high profits through an exclusive contract. Thus, U_I cannot protect the local upstream market from the entry of U_E using exclusive contracts.

4.2 When U_E is efficient

We consider the case in which U_E can use its outside options effectively when D_I sells U_I's product, that is, $c_I - \Delta \leq c_E < p^*(c_I) - \Delta$.

First, we consider the case in which D_I accepts the exclusive offer in Stage 1. The subsequent outcomes in the remaining stages are the same as those in Section 4.1.

Second, we consider the case in which D_I rejects the exclusive offer in Stage 1. In this case, U_E enters the upstream market in Stage 2 and supplies the product to D_I. In Stage 3, D_I becomes the proposer with probability β and offers $(c_I, 0)$ and $(c_E, 0)$ to U_I and U_E, respectively, and U_E accepts and becomes the manufacturer trading with D_I. Conversely, U_I and U_E become the proposers with probability $1-\beta$, and then U_I and U_E offer $(c_I, 0)$ and $(c_E, \Pi^*(c_E) - \Pi(c_E + \Delta, c_I))$ to D_I, respectively. The latter contract term differs from that in Section 4.1 because U_E can use its outside options as a competitive threat to the pair of U_I and D_I in the case whereby D_I rejects U_E's offer and accepts U_I's offer. Notably, $\Pi^*(c_E) - \Pi(c_E + \Delta, c_I)$ in this section is strictly larger than $\Pi^*(c_E) - \Pi^*(c_I)$ in Section 4.1. Such a competitive threat by U_E gives it an advantage over D_I in the proposal stage. The resulting expected profits are summarized as follows.

$$\begin{aligned} &\pi^r_{DI} = \beta\Pi^*(c_E) + (1-\beta)\Pi(c_E + \Delta, c_I), \quad \pi^r_{UI} = 0, \\ &\pi^r_{UE} = (1-\beta)(\Pi^*(c_E) - \Pi(c_E + \Delta, c_I)). \end{aligned} \tag{8}$$

We consider the game in Stage 1. By substituting equations (6) and (8) into condition (5), we find that condition (5) holds if and only if:

$$\begin{aligned} &c_I - \Delta \leq c_E < p^*(c_I) - \Delta \ \text{ and} \\ &\beta \leq \hat{\beta}(c_E, c_I, \Delta) \equiv \frac{\Pi^*(c_I) - \Pi(c_E + \Delta, c_I)}{\Pi^*(c_E) - \Pi(c_E + \Delta, c_I)}. \end{aligned}$$

Note that we have $\hat{\beta}(c_E, c_I, \Delta) \in (0, 1)$, $\hat{\beta}(c_E, c_I, \Delta) \to 0$ as $c_E \to p^*(c_I) - \Delta$, and $\hat{\beta}(c_E, c_I, \Delta) \to \Pi^*(c_I)/\Pi^*(c_E) < 1$ as $c_E \to c_I - \Delta$. The following proposition summarizes the results:

Proposition 2. *Suppose that $c_I - \Delta \le c_E < p^*(c_I) - \Delta$; U_E's outside options are effective. U_I can protect the local upstream market from the entry of U_E through exclusive contracts if D_I has a weak bargaining power (i.e., $\beta \le \hat{\beta}(c_E, c_I, \Delta)$).*

The results in Propositions 1 and 2 imply that in the presence of an outside option, the giant manufacturer cannot enter the market because of the incumbent's exclusive contracts if the giant manufacturer has high efficiency. The change in U_E's efficiency has two opposite effects on the possibility of exclusion outcomes. First, as U_E becomes efficient, the industry profit in the case of entry increases, which allows D_I to earn higher profits when D_I becomes the proposer; thus, exclusion becomes more difficult. Second, as U_E becomes efficient, it can earn higher profits because its outside options work more effectively for bargaining over D_I when the manufacturers become proposers; therefore, D_I cannot earn higher profits even in the case of entry. Since β represents the probability that D_I becomes the proposer, the second effect is dominant for lower β; thus, exclusion is attainable. In this case, we obtain the seemingly counterintuitive results that the inefficient incumbent manufacturer can protect the local market from the entrant manufacturer through exclusive contracts when the entrant manufacturer is sufficiently efficient rather than when it is rather inefficient.

We believe that the exclusion mechanism presented herein captures the negotiation on profit allocation that multinational firms often conduct when they have rich distribution options. Thus, the results here imply that we cannot ignore such distribution options if we consider local firms' survival strategies in response to the entry of giant multinational firms.

We also explore the relationship between the existence of an exclusion equilibrium in Proposition 2 and D_{CF}'s efficiency under the general demand function with standard properties. By differentiating $\hat{\beta}(c_E, c_I, \Delta)$ with respect to Δ, we obtain

$$\frac{\partial \hat{\beta}(c_E, c_I, \Delta)}{\partial \Delta} = -\frac{\Pi^*(c_E) - \Pi^*(c_I)}{\{\Pi^*(c_E) - \Pi(c_E + \Delta, c_I)\}^2} \frac{\partial \Pi(c_E + \Delta, c_I)}{\partial \Delta} < 0,$$

for all $\Delta \in (c_I - c_E, p^*(c_I) - c_E)$. Thus, we have the following proposition.[13]

Proposition 3. *Suppose that conditions (1) and (2) hold. U_I can protect the local upstream market from the entry of U_E through exclusive contacts as the outside options become efficient; that is, $\partial\hat{\beta}(c_E, c_I, \Delta)/\partial\Delta < 0$ always holds.*

Proposition 3 shows that entry is less likely as the outside option becomes efficient for $c_I - \Delta < c_E < p^*(c_I) - \Delta$. An increase in the efficiency of alternative distribution channels benefits U_E after entry, and U_E has a strong incentive for entry. However, from the viewpoint of D_I, the entry of U_E in such a situation is harmful because D_I earns lower profits when U_E's entry occurs. Thus, D_I is more likely to have an incentive to choose exclusive dealing with U_I.

The results herein provide important implications for the relationship between the likelihood of multinational entry and the progress of information and communication technology and globalization. The advancement of informatization and globalization seemingly enhances multinational entry because such development facilitates not only finding new trading partners easily but also reducing transaction costs; in other words, the entrant manufacturer can use alternative distribution channels more effectively for negotiations on industry profit allocation after entry. Therefore, the advancement of informatization and globalization may help local manufacturers protect the local market from multinational entry.

5 Discussion

This section briefly introduces the extension analyses and discussions on a market protection strategy against multinational entry and our model's validity. Section 5.1 extends the analysis to the case in which U_E is highly efficient. Section 5.2 briefly discusses a reversal setting in which entry can occur in the downstream market. Section 5.3 discusses the validity of our model by capturing the features of multinational entry.

[13] The partial differential $\partial\hat{\beta}(c_E, c_I, \Delta)/\partial c_i$ $(i = I, E)$ does not have clear-cut properties.

5.1 When U_E is highly efficient

This subsection explores the case in which condition (2) does not hold. In this subsection, we assume that the fixed cost of entry satisfies the following conditions:

$$\underline{F} < F < \overline{F}, \tag{9}$$

where

$$\underline{F} \equiv \begin{cases} \Pi(c_I, c_E + \Delta) & \text{if } c_E + \Delta \leq c_I < p^*(c_E + \Delta), \\ \Pi^*(c_E + \Delta) & \text{if } c_E + \Delta < p^*(c_E + \Delta) \leq c_I, \end{cases}$$
$$\overline{F} \equiv \begin{cases} (1-\beta)\Pi^*(c_E) + \beta\Pi(c_I, c_E + \Delta) & \text{if } c_E + \Delta \leq c_I < p^*(c_E + \Delta) \\ (1-\beta)\Pi^*(c_E) + \beta\Pi^*(c_E + \Delta) & \text{if } c_E + \Delta < p^*(c_E + \Delta) \leq c_I. \end{cases}$$

If the first inequality in condition (9) holds, entry into the local upstream market by using its outside options is not profitable for U_E when D_I accepts the exclusive offer in Stage 1. That is, the exclusive offer is effective in completely excluding U_E. However, if the second inequality in condition (9) holds, entry into the upstream market is profitable for U_E when D_I rejects the exclusive offer in Stage 1.[14]

Note that when D_I accepts the exclusive offer in Stage 1, the equilibrium outcomes coincide with equations (6) as long as condition (1) holds. Therefore, as presented in the previous section, the rest of this section only focuses on the equilibrium outcomes after D_I rejects the exclusive offer in Stage 1.

When D_I rejects the exclusive offer in Stage 1, U_E trades with D_I. To derive equilibrium outcomes, we consider two possible cases: (i) $c_E + \Delta \leq c_I < p^*(c_E + \Delta)$ and (ii) $c_E + \Delta < p^*(c_E + \Delta) \leq c_I$.

We first consider the case of $c_E+\Delta \leq c_I < p^*(c_E+\Delta)$. D_I becomes the proposer with probability β and offers $(c_I, 0)$ and $(c_E, \Pi^*(c_E) - \Pi(c_I, c_E + \Delta))$ to U_I and U_E, respectively. The fixed payment in the latter term reflects the fact that U_E can earn $\Pi(c_I, c_E + \Delta)$ by using its outside options for the case in which it rejects D_I's offer. Consequently, U_I earns nothing, U_E earns $\Pi(c_I, c_E + \Delta)$, and

[14] When condition (2) and $c_E < p^*(c_I) - \Delta$ hold, $\underline{F} = 0$ and $\overline{F} = (1-\beta)(\Pi^*(c_E) - \Pi^*(c_E + \Delta, c_I))$.

D_I earns $\Pi^*(c_E) - \Pi(c_I, c_E + \Delta)$. In addition, U_I and U_E become the proposers with probability $1 - \beta$ and offer $(c_I, 0)$ and $(c_E, \Pi^*(c_E))$ to D_I, respectively. D_I obtains nothing by accepting U_I's offer because U_E defeats the pair of D_I and U_I in the downstream competition by using its outside options owing to the cost advantage of U_E. Hence, U_E earns $\Pi^*(c_E)$, while U_I and D_I earn nothing.

Next, we consider the case of $c_E + \Delta < p^*(c_E + \Delta) \leq c_I$. D_I is the proposer with probability β and offers $(c_I, 0)$ and $(c_E, \Pi^*(c_E) - \Pi^*(c_E + \Delta))$ to U_I and U_E, respectively. The fixed payment in the latter term reflects the fact that U_E can earn $\Pi^*(c_E + \Delta)$ by using its outside options for the case in which it rejects D_I's offer. Therefore, when D_I becomes the proposer, U_I earns nothing, U_E earns $\Pi^*(c_E+\Delta)$, and D_I earns $\Pi^*(c_E)-\Pi^*(c_E+\Delta)$. Furthermore, U_I and U_E become the proposers with probability $1 - \beta$ and offer $(c_I, 0)$ and $(c_E, \Pi^*(c_E))$, respectively. Consequently, in this event, U_E earns $\Pi^*(c_E)$, while U_I and D_I earn nothing. The resulting expected profits are summarized as follows:

$$
\begin{aligned}
\pi^r_{DI} &= \begin{cases} \beta(\Pi^*(c_E) - \Pi(c_I, c_E + \Delta)) & \text{if } c_E + \Delta \leq c_I < p^*(c_E + \Delta), \\ \beta(\Pi^*(c_E) - \Pi^*(c_E + \Delta)) & \text{if } c_E + \Delta < p^*(c_E + \Delta) \leq c_I, \end{cases} \\
\pi^r_{UI} &= 0, \\
\pi^r_{UE} &= \begin{cases} (1-\beta)\Pi^*(c_E) + \beta\Pi(c_I, c_E + \Delta) & \text{if } c_E + \Delta \leq c_I < p^*(c_E + \Delta) \\ (1-\beta)\Pi^*(c_E) + \beta\Pi^*(c_E + \Delta) & \text{if } c_E + \Delta < p^*(c_E + \Delta) \leq c_I. \end{cases}
\end{aligned} \tag{10}
$$

Finally, using the subgame outcomes derived above, we consider the game in Stage 1. By substituting equations (6) and (10), we find that condition (5) holds if and only if both $\beta \leq \hat{\beta}(c_E, c_I, \Delta)$ hold, where

$$
\hat{\beta}(c_E, c_I, \Delta) \equiv \begin{cases} \min\left\{1, \dfrac{\Pi^*(c_I)}{\Pi^*(c_E) - \Pi(c_I, c_E + \Delta)}\right\} & \text{if } c_E + \Delta \leq c_I < p^*(c_E + \Delta), \\[2ex] \min\left\{1, \dfrac{\Pi^*(c_I)}{\Pi^*(c_E) - \Pi^*(c_E + \Delta)}\right\} & \text{if } c_E + \Delta < p^*(c_E + \Delta) \leq c_I. \end{cases}
$$

Note that $\hat{\beta}(c_E, c_I, \Delta) > 0$ holds for all $c_E + \Delta \leq c_I$, which implies that exclusion can always be observed even when U_E is sufficiently efficient and the fixed entry cost F is not overly small such that condition (9) holds. The following proposition summarizes these results:

Proposition 4. *Suppose that condition (2) does not hold; When the fixed cost of entry satisfies condition (9), U_I can protect the local upstream market from the entry of U_E through exclusive contracts if and only if D_I has weak bargaining power (i.e., $\beta \leq \hat{\beta}(c_E, c_I, \Delta)$).*

The results in Proposition 4 imply that U_I can protect the local upstream market from the entry of U_E using exclusive contracts even when U_E is highly efficient if the fixed cost of entry is sufficiently high, which confirms the robustness of the exclusion mechanism presented in this study. Moreover, because $\Pi(c_I, c_E + \Delta)$ and $\Pi^*(c_E + \Delta)$ strictly decrease in Δ, $\hat{\beta}(c_E, c_I, \Delta)$ strictly decreases in Δ for all $\hat{\beta}(c_E, c_I, \Delta) < 1$. Thus, as described in the previous section, as the alternative distribution channel becomes efficient, U_E is more likely to have difficulties entering the upstream market.

5.2 Downstream exclusion

We briefly introduce the results in the case of exclusive supply contracts by inverting the vertical relationship in Section 4. We provide a precise analysis in Appendix A. In this extension analysis, we consider the following case. The upstream market comprises an upstream input supplier, U_I; conversely, the downstream market consists of an incumbent manufacturer D_I and an entrant manufacturer D_E. In addition to procuring the input from U_I, each manufacturer can procure it from alternative supply chains by incurring an additional marginal cost. We regard the opportunity as an outside option for manufacturers. As in Section 4, we consider the case in which, owing to its efficiency, only D_E can use the outside option for simplicity.

In this setting, we introduce two measures of D_E' s efficiency. First, we consider the case in which manufacturers differ in exogenous marginal costs by inverting the cost structure in Section 4. Second, we consider the case in which manufacturers differ in the transformational technology of input supplied by suppliers.

In both settings, we show that D_I can protect the local downstream market from the entry of D_E if D_E is sufficiently efficient and downstream manufacturers have strong bargaining powers.

As demonstrated in Section 4, D_I cannot protect the local downstream market when the alternative supply chain is too inefficient or D_E is marginally more efficient than D_I.[15] Thus, the exclusion mechanism in this study remains valid in various settings.

5.3 Survival strategies for multinational entry in emerging markets

We briefly introduce several cases whereby multinational firms struggle in emerging markets and explain why the model setting adopted in this study is suitable for the case of multinational entry.

Multinational entry struggling in emerging markets In addition to the case of Vist, as described in the Introduction, we briefly introduce three cases in which multinational firms are struggling in emerging markets, and some of them decide to withdraw from the market. First, the Honda Motor Company, a Japanese manufacturer of automobiles, motorcycles, and so on, entered the motor scooter market in India in the mid-1980s. Notwithstanding its superior technology, Honda failed to compete with Bajaj Auto, the largest manufacturer of motor scooters in India, and abandoned the Indian market in 1998 (Dawar and Frost, 1999; Venugopal, 2010). Second, when PepsiCo entered the bakery market in Mexico in 1991, Grupo Bimbo, the largest bakery product manufacturer in Mexico, strengthened its distribution network and maintained its leading market position (Dawar and Frost, 1999). Third, Natura Cosméticos, a leading Brazilian cosmetics maker, also defended its home market share in Brazil against multinational rivals such as L'Oréal, P&G, and Avon (Sanotos and Williamson, 2015).[16]

A common factor in these three examples is that local firms have strong distribution networks (plus a widespread local supply chain in Natura's case), which works as a key element in their defense strategies against multinational rivals.[17] If local firms have had strong ties with local man-

[15] Kitamura, Matsushima, and Sato (2020) consider the second case in the absence of alternative supply chains and show that exclusion can be an equilibrium outcome under linear wholesale pricing.

[16] Some survival strategies of local firms can protect a certain area of the local country from multinational entry or lead to compartmentalization in a local market.

[17] In the business literature, studies typically are interested in why local firms win the competition against foreign

ufacturers or distributors as a result of the first-mover advantage, it could work as a sort of barrier to entry when multinational firms choose which location to invest in. Notably, some multinational firms in emerging markets notice that their rivals are not other multinational firms, but local firms (Sanotos and Williamson, 2015). More importantly, we expect that there would be certain unobservable cases such that multinational firms actually consider entering a specific market but eventually relinquish the idea due to local firms' strong distribution network, and subsequently, those multinational firms rather choose another location from their candidates. Thus, constructing strong distribution channels in the local market, including exclusive dealing, may become a crucial barrier to the entry of giant firms.[18]

Linkage between the model and multinational entry We believe that signing exclusive contracts against multinational entry is one of the most suitable situations that this study focuses on because of the following reasons: First, multinational firms usually have high productivity (Helpman, Melitz, and Yeaple, 2004); second, multinational firms usually have a network of switching options that is unavailable to locally operating domestic firms (Kogut and Kulatilaka, 1994; Tong and Reuer, 2007); third, multinational entry usually takes some time for full establishment after the initial news of the entry, and domestic firms thereby have an opportunity to respond to the threat of future entry (Bao and Chen, 2018); and fourth, the recent development of information and communication technology allows multinational firms to find trading partners more easily because such technology reduces communication, search, and variable trade costs (World Bank, 2009). These

giants (Dawar and Frost, 1999; Bhattacharya and Michael, 2008). One of the crucial factors in multinational firms' survival in emerging markets is the integration of economic activities with local commercial networks. Sanotos and Williamson (2015), for example, discuss the importance of the "home team" advantage of local firms through local integration; partnership with local manufacturers or distributors are vital to the success of local firms in the local market. In particular, a tie with distributors gives local firms a channel for interactions with customers. See also Johanson and Vahlne (2009) and Monaghan, Gunnigle, and Lavelle (2014) for further examples. They discuss the importance of "insidership" in the business network for successful foreign market entry.

[18] Heide, Dutta, and Bergen (1998) empirically report that the use of exclusive contracts against new entry is less likely to be observed. However, the existence of such contracts can reduce the possibility of new entry (Whinston, 2006, p.192), which is similar to our argument.

four features play essential roles in the exclusion mechanism presented in this study. Therefore, we predict that exclusive contracts can be effectively used as a survival strategy against foreign firms' entry.

Notably, we can apply the exclusion mechanism presented in this study to not only the entry of multinational firms but also that of giant domestic firms. For example, we can apply our concept to a situation in which a locally dominant firm tries to enter the market in other regions to expand its business, because the development of information and communication technology also helps local firms find several trading partner candidates in other regions. Thus, this study is also suitable for exclusive dealing when an efficient giant firm tries to enter a new market in other countries or regions.

6 Conclusion

This study considers a survival strategy for defending a home market facing multinational entry. Notwithstanding their high efficiency, multinational firms sometimes struggle to enter emerging markets because a local dominant manufacturer develops strong connections with local distributors to safeguard against multinational entry. To consider such situations, we discuss the effectiveness of signing exclusive contracts, one of the primary solutions to protect the local market. In our model, a local manufacturer makes an exclusive offer to a local dominant distributor against a multinational firm's entry. Our model's key feature is that because of its efficiency, only the multinational entrant can use alternative distribution channels as one of the rich switching options; in other words, the entrant in this study is stronger than those in previous studies on naked exclusion. Seemingly, it is difficult to close exclusive contracts with the local distributor when existing firms anticipate the entry of a strong multinational firm. However, multinational entry may not necessarily benefit the local distributor when multinational entrants have rich outside options. Thus, there is room for exclusive dealing between local manufacturers and distributors.

Note that this study's exclusion mechanism works effectively if the entrant manufacturer is more efficient than the local incumbent manufacturer, which is different from the exclusion mechanism in previous studies on naked exclusion. This implies that our model provides a new rationale for exclusion, caused by an entrant's high efficiency, which is one of the important features of multinational firms. Although the results obtained here are seemingly counterintuitive, we can explain them based on common commercial practice, which we frequently observe in commerce and business settings; a giant firm takes an aggressive attitude toward negotiation with a local distributor based on its rich outside options.

The findings of this study have important implications. From the perspective of entry strategies, we predict that a strong entrant may not necessarily succeed in entering a new market with a less efficient incumbent. Although the development of information and communication technology helps multinational firms find trading partners for entry, it allows the local firm to protect the local market from entry through exclusive contracts. In addition, from the viewpoint of competition policy, the Chicago School argument may be inapplicable when the entrant has rich switching options; naked exclusion is achievable if the entrant has high efficiency, rich switching options, and strong bargaining power. When antitrust agencies consider the situation in which naked exclusion occurs, they cannot neglect the possibility that the entrant has an option to use alternative but inefficient distribution channels.

Notwithstanding these contributions, several issues require further research. First, the present study's analysis assumes that industry profit is allocated by bargaining with random proposers, to clarify the exclusion mechanism in this study easily. We predict that the exclusion result may also remain valid under more general bargaining structures. Second, we assume that manufacturers produce homogeneous products. For a small degree of product differentiation, the exclusion result remains valid. We hope that this study will help researchers address these issues.

A Downstream Exclusion

This appendix introduces the case of exclusive supply contracts by inverting the vertical relation in Section 4. In this appendix, the upstream market is composed of a supplier U_I, while the downstream market, by contrast, is composed of a downstream incumbent D_I and a downstream entrant D_E.

In the remainder of this appendix, we introduce two efficiency measures for downstream firms to clarify the robustness of the exclusion mechanism reported in this study. We first consider the case in which downstream firms differ in exogenous marginal costs in A.1. Thereafter, we consider the case in which downstream firms differ in the transformational technology of input supplied by suppliers in A.2.

A.1 When downstream firms differ in marginal costs

U_I produces an input at a marginal cost of $0 \leq c < P(0)$. To simplify the analysis, we assume that $c = 0$. In this subsection, we assume that D_I and D_E sell the products supplied by the suppliers. In terms of exogenous marginal costs, D_E is more efficient than D_I, with a marginal cost of $0 \leq d_E < d_I$. In addition to procuring the input from U_I, each manufacturer can procure identical inputs by incurring an additional marginal cost $c_0 \in (0, P(0))$. We regard this opportunity as an outside option for manufacturers to use alternative supply chains.

As in Section 4, we assume that only D_E can earn positive profits by using the outside options if it is able to monopolize the downstream market and that D_E does not enter the downstream market if U_I accepts the exclusive offer.

Assumption A.1. *d_E satisfies the following properties:*

$$d_E < P(0) - c_0 \leq d_I. \tag{11}$$

$$d_E + c_0 \geq d_I \tag{12}$$

As in Section 4, the model contains four stages: In Stage 1, D_I makes an exclusive supply offer to U_I with fixed compensation $x \geq 0$. Thereafter, U_I decides whether to accept the offer. If U_I accepts the exclusive supply offer, it immediately receives x. In Stage 2, after observing U_I's decision, D_E decides whether to enter the downstream market. We assume that the fixed cost of entry is sufficiently low such that D_E can earn positive profits.[19] In Stage 3, existing firms negotiate and make contracts for two-part tariffs. As in Section 4, the industry profit is allocated by bargaining with random proposers. In Stage 4, the manufacturer(s) orders inputs and sells the final goods to consumers. U_I's profit when it accepts (rejects) the exclusive offer is denoted by π^a_{UI} (π^r_{UI}). Conversely, D_i's profit when U_I accepts (rejects) the exclusive offer is denoted by π^a_{Di} (π^r_{Di}), where $i \in \{I, E\}$.

Henceforth, we explore the existence of exclusion outcomes. The equilibrium outcomes in the subgame following U_I's decision in Stage 1 are derived as follows: When the exclusive supply offer is accepted in Stage 1, D_I offers $(0, 0)$ to U_I with probability β, and U_I offers $(0, \Pi^*(d_I))$ to D_I with probability $1 - \beta$. The resulting expected profits, excluding the fixed compensation x, are given as follows:

$$\pi^a_{UI} = (1 - \beta)\Pi^*(d_I), \quad \pi^a_{DI} = \beta\Pi^*(d_I), \quad \pi^a_{DE} = 0. \tag{13}$$

By contrast, when the exclusive supply offer is rejected in Stage 1, D_E sells U_I's inputs on the equilibrium path. There are two possible equilibrium outcomes: We first consider the case in which D_E is not too efficient ($d_I < p^*(d_I) \leq d_E + c_0$). When U_I becomes the proposer with probability $1 - \beta$, it offers two-part tariff contracts sequentially to extract all industry profits; it first offers $(0, \Pi^*(d_E))$ to D_E and then it offers $(0, \Pi^*(d_I))$ to D_I if D_E rejects the first offer. At equilibrium, D_E accepts the first offer.[20] By contrast, when manufacturers become proposers with probability β, D_I

[19] Similar to the discussion in Section 5.1, we have exclusion results even when condition (12) does not hold. The results are available upon request.

[20] In contrast to the upstream exclusion in Section 4, U_I cannot extract all industry profits $\Pi^*(d_E)$ by offering discriminatory two-part tariff contracts to D_I and D_E simultaneously. If U_I is restricted to offering discriminatory two-part tariff contracts simultaneously, exclusion is more likely to be attainable because U_I earns a lower profit when it rejects the exclusive offer. Moreover, the analysis becomes considerably complicated with such offers. The results

and D_E offer $(0, \Pi^*(d_I))$ to U_I and U_I accepts D_E's offer.

Next, we consider the case in which D_E is efficient ($d_I \leq d_E + c_0 < p^*(d_I)$). When U_I becomes the proposer with probability $1-\beta$, it offers two-part tariff contracts sequentially; it first offers $(0, \Pi^*(d_E))$ to D_E and then offers $(0, \Pi(d_E+c_0, d_I))$ to D_I if D_E rejects the first offer. At equilibrium, D_E accepts the first offer. Conversely, when manufacturers become proposers with probability β, D_I and D_E offer $(0, \Pi(d_E + c_0, d_I))$ to U_I, and U_I accepts D_E's offer. Consequently, the resulting expected profits are as follows:

$$
\begin{aligned}
\pi^r_{UI} =& \begin{cases} \beta\Pi^*(U_I) + (1-\beta)\Pi^*(d_E) & \text{if } d_I < p^*(d_I) \leq d_E + c_0, \\ \beta\Pi(d_E + c_0, d_I) + (1-\beta)\Pi^*(d_E) & \text{if } d_I \leq d_E + c_0 < p^*(d_I), \end{cases} \\
\pi^r_{DI} =& 0, \\
\pi^r_{DE} =& \begin{cases} \beta(\Pi^*(d_E) - \Pi^*(d_I)) & \text{if } d_I < p^*(d_I) \leq d_E + c_0, \\ \beta(\Pi^*(d_E) - \Pi(d_E + c_0, d_I)) & \text{if } d_I \leq d_E + c_0 < p^*(d_I). \end{cases}
\end{aligned} \tag{14}
$$

Using the subgame outcomes derived above, we now consider the game in Stage 1. Note that, as presented in Section 4, there is an exclusion equilibrium if and only if condition (5) holds. By substituting equations (13) and (14), we find that condition (5) holds if and only if $d_I \leq d_E + c_0 < p^*(d_I)$ and $\beta \geq \overline{\beta}(d_E, d_I, c_0)$ hold simultaneously, where

$$
\overline{\beta}(d_E, d_I, c_0) \equiv \frac{\Pi^*(d_E) - \Pi^*(d_I)}{\Pi^*(d_E) - \Pi(d_E + c_0, d_I)}.
$$

Note that we have $\overline{\beta}(d_E, d_I, c_0) \in (0, 1)$. The following proposition summarizes the result.

Proposition A.1. *Suppose that conditions (11) and (12) hold. D_I can protect the local downstream market from the entry of D_E through exclusive supply contracts if D_E is sufficiently efficient ($d_I - c_0 \leq d_E < p^*(d_I) - c_0$) and U_I has weak bargaining power ($\beta \geq \overline{\beta}(d_E, d_I, c_0)$).*

A.2 When downstream firms differ in transformational technology

In contrast to the previous subsection, we consider a case in which manufacturers differ in terms of transformational technology. In addition, we assume that $c \geq 0$ in this appendix. Here, D_I

are available upon request.

produces a unit of final goods using a unit of input. The transformational technology of D_I is given by:

$$Q_I = q_I,$$

where Q_I (q_I) is the amount of output (input) for D_I. The per unit production cost of D_I, given the linear wholesale price w, c_I, is denoted by:

$$c_I = w.$$

Conversely, D_E produces a unit of final goods using k units of input, where k is a positive constant. The transformational technology is denoted by:

$$Q_E = q_E$$

where Q_E (q_E) is the amount of output (input) for D_E. Thereafter, the per unit production cost of D_E, given linear wholesale price w, c_E, is denoted by:

$$c_E = kw.$$

By assuming $0 < k < 1$, D_E is more efficient than D_I in terms of the per unit production cost.

As provided in the previous analyses, we assume that only D_E can earn positive profits using outside options if it is able to monopolize the downstream market and that D_E does not enter the downstream market if U_I accepts the exclusive offer.

Assumption A.2. *k satisfies the following properties:*

$$kc_0 < P(0) \leq c_0. \tag{15}$$

$$kc_0 \geq c. \tag{16}$$

We also assume that, as stated in Section A.1, the model contains four stages and that the fixed cost of entry is sufficiently low such that D_E can earn positive profits if the exclusive offer is rejected in Stage 1.[21]

[21] Similar to the discussion in Section 5.1, we have exclusion results even when condition (16) does not hold. The results for the case of low k and high c are available upon request.

Hereinafter, we explore the existence of exclusive outcomes. The equilibrium outcomes in the subgame following U_I's decision in Stage 1 are derived as follows: When the exclusive supply offer is accepted in Stage 1, D_I offers $(c, 0)$ to U_I with probability β, and U_I offers $(c, \Pi^*(c))$ to D_I with probability $1-\beta$. The resulting expected profits, excluding the fixed compensation x, are:

$$\pi^a_{UI} = (1-\beta)\Pi^*(c), \;\; \pi^a_{DI} = \beta\Pi^*(c), \;\; \pi^a_{DE} = 0. \tag{17}$$

By contrast, when the exclusive supply offer is rejected in Stage 1, D_E sells U_I's inputs on the equilibrium path. There are two possible equilibrium outcomes: We first consider the case in which D_E is not too efficient ($c < p^*(c) \leq kc_0$). When U_I becomes the proposer with probability $1-\beta$, it offers two-part tariff contracts sequentially to extract all industry profits; it first offers $(0, \Pi^*(kc))$ to D_E and then offers $(0, \Pi^*(c))$ to D_I if D_E rejects the first offer. At equilibrium, D_E accepts the first offer. Contrariwise, when manufacturers become proposers with probability β, D_I and D_E offer $(c, \Pi^*(c))$ to U_I and U_I accepts D_E's offer with probability β.

Next, we consider the case in which D_E is efficient ($c \leq kc_0 < p^*(c)$). When U_I becomes the proposer with probability $1-\beta$, it offers two-part tariff contracts sequentially. It first offers $(0, \Pi^*(kc))$ to D_E and thereafter offers $(0, \Pi(kc_0, c))$ to D_I if D_E rejects the first offer. At equilibrium, D_E accepts the first offer. Conversely, when manufacturers become proposers with probability β, D_I and D_E offer $(c, \Pi(kc_0, c))$ to U_I, and U_I accepts D_E's offer. Consequently, the resulting expected profits are:

$$\begin{aligned}
\pi^r_{UI} &= \begin{cases} \beta\Pi^*(c) + (1-\beta)\Pi^*(kc) & \text{if } c < p^*(c) \leq kc_0, \\ \beta\Pi(kc_0, c) + (1-\beta)\Pi^*(kc) & \text{if } c \leq kc_0 < p^*(c), \end{cases} \\
\pi^r_{DI} &= 0, \\
\pi^r_{DE} &= \begin{cases} \beta(\Pi^*(kc) - \Pi^*(c)) & \text{if } c < p^*(c) \leq kc_0, \\ \beta(\Pi^*(kc) - \Pi(kc_0, c)) & \text{if } c \leq kc_0 < p^*(c). \end{cases}
\end{aligned} \tag{18}$$

Using the subgame outcomes derived above, we now consider the game presented in Stage 1. By substituting equations (17) and (18), we find that condition (5) holds if and only if $c \leq kc_0 < p^*(c)$ and $\beta \geq \tilde{\beta}(k, c, c_0)$ hold simultaneously, where

$$\tilde{\beta}(k, c, c_0) \equiv \frac{\Pi^*(kc) - \Pi^*(c)}{\Pi^*(kc) - \Pi(kc_0, c)}.$$

Note that we have $\tilde{\beta}(k, c, c_0) \in (0, 1)$. The following proposition summarizes the result.

Proposition A.2. *Suppose that conditions (15) and (16) hold. D_I can protect the local downstream market from the entry of D_E through exclusive supply contracts if D_E is sufficiently efficient ($c \leq kc_0 < p^*(c)$) and D_I has a strong bargaining power ($\beta \geq \tilde{\beta}(k, c, c_0)$).*

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