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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 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, because of 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: L42, L12, F23, C72
Keywords: Exclusive dealing; Vertical relation; Antitrust policy; Multinational firms

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1 Introduction

The influence of multinational firms' entry on local firms' survival strategies has attracted considerable 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. For example, when India opened its automotive industry in the 1980s, Bajaj Auto, the largest Indian manufacturer of motor scooters, defended its market by building up its distribution network to fight Honda's entry (Dawar and Frost [1999]; Venugopal [2010]). 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]). As another example, by forming a sales network of more than one million consultants, Natura Cosméticos, a leading Brazilian cosmetics maker, defended its home market share against multinational rivals such as L'Oréal, P&G, and Avon (Sanotos and Williamson [2015]). From these observations, some multinational firms notice that their rivals are not other multinational firms but local firms (Sanotos and Williamson [2015]).

Among business activities that can strengthen the distribution network, signing an exclusive contract is a favored solution among local firms. For example, when Russia liberalized its economy, a Russian personal computer manufacturer, Vist, successfully defended its local markets by entering 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]). Moreover, such exclusive dealing can be an international issue. The US government and companies complained that exclusive distribution networks had been the entry barrier into Japanese industries, such as flat glass, paper and paper products, passenger cars, automobile parts, and films (Subramanian [1995]; US Department of Justice [2000]). As a specific example, in Eastman Kodak vs. Fuji, the former, a US photographic film firm, complained that Fuji, its Japanese competitor, had established an exclusive relationship with several Japanese wholesalers (Nagaoka and Goto [1997]). Similar conflicts are also observed in ice cream markets in Europe; for example, Mars, a US firm, complained that Unilever's subsidiaries in Ireland and Germany entered into exclusive agreements with local retailers, becoming a barrier to entry (Motta [2004]; Cooke [2010]; Fumagalli, Motta, and Calcagno [2018]).[1]

Although exclusive contracts benefit local firms, those can be harmful from the perspective of domestic welfare because of the efficiency loss. More importantly, it is not obvious whether such contracts are attainable 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, originating from the Chicago School argument in the 1970s, 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 inefficient competitive distributors, which are downstream competitive fringes. We consider the case in which, because of 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

[1] See also Raff and Schmitt [2006] for other international conflicts over exclusionary vertical relationships in other countries and industries. In addition to those publicly observable cases, there would be certain unobservable cases such that multinational firms actually consider entering a specific market but eventually relinquish the idea because of local firms' exclusive distribution networks, and subsequently those multinational firms instead choose another location. Thus, exclusive dealing may become a crucial barrier to the entry of giant firms.

and Kulatilaka [1994]; Tong and Reuer [2007]).[2]

By introducing nonlinear 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; the local incumbent manufacturer cannot offer an acceptable exclusive contract if the multinational manufacturer is not efficient.

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.

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. Because 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 systems, including taxes and legal barriers, to promote multinational entry. More-

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

over, local firms seem to have difficulty using exclusive contracts as a survival strategy because of the high efficiency of multinational firms. However, let us consider the distribution options available to multinational firms. It is possible that 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 highly efficient firms. However, the results herein imply that such development may help local manufacturers protect their local markets through exclusive contracts. From the perspective of a multinational firm's location strategy, 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.[3]

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

[3] In the Supplementary Appendix, we show that exclusion outcomes are attainable for the case of downstream entry by inverting the vertical relationship.

study to 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 presents the literature review. Section 3 constructs the model. Section 4 analyzes the existence of exclusion outcomes under two-part tariffs and the welfare effect of exclusive dealing. Section 5 offers concluding remarks.

2 Literature Review

This study is related to the literature on naked exclusion, in which an inefficient incumbent deters the entry of an efficient firm through exclusive contracts.[4] This literature traces its development to the Chicago School argument of the 1970s (see Posner [1976] and Bork [1978]. For surveys, see Motta [2004], Whinston [2006], and Fumagalli, Motta, and Calcagno [2018]). Focusing on the contracting party's incentives, the Chicago School theory reveals that exclusive contracts are never feasible in a three-player model with two suppliers and a buyer. In rebuttal to the Chicago School, post-Chicago economists find that exclusive contracts can deter efficient entrants in some situations.[5] The seminal work by Aghion and Bolton [1987] shows the anticompetitive effect of a private contract with liquidated damages between an incumbent seller and a buyer who anticipate a potential seller whose efficiency is private information (see also Spier and Whinston [1995] and Ziss [1996] for further discussions).[6]

The seminal works by Rasmusen, Ramseyer, and Wiley [1991] and Segal and Whinston [2000] add multiple buyers and entry costs to the simple three-player setting in the Chicago School theory.

[4] 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]).

[5] There are a 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] Although most studies on exclusive dealing assume perfect information, several studies consider the information asymmetry in this literature. Calzolari and Denicolò [2013, 2015] discuss three-player models with the private information of the buyer's valuation for the products of the two sellers. To investigate the effect of exclusive dealing, Calzolari, Denicolò, and Zanchettin [2020] unify the previous different analytical frameworks (Mathewson and Winter [1987]; Bernheim and Whinston [1998]; Calzolari and Denicolò [2013, 2015]).

The entrant can enter the market only if it acquires the demands from more than one buyer. Then, the incumbent can deter entry even when not all of the buyers, but rather only some of them, accept the exclusive dealing offers.[7] By extending the multiple-buyer framework, Simpson and Wickelgren [2007] and Abito and Wright [2008] introduce downstream market competition, assuming that buyers are competing firms.[8] Competition in both upstream and downstream markets lowers the profitabilities of the firms.[9] Exclusive dealing between upstream and downstream firms is a way to reduce competition in at least one of the markets.[10] On the contrary, entry in our model increases total industry profits, but can reduce the total profits of the contracting party.

The model in this study shares some parts of equilibrium properties with those in the studies that modify the competitiveness of the upstream market in a three-player model with two suppliers and one buyer.[11] Those studies show that anticompetitive exclusive dealing is attainable, and their key feature is that the buyer does not benefit enough from the mild upstream competition, allowing the incumbent supplier to offer an acceptable exclusive contract to the buyer.[12] The buyer's insuf-

[7] Miklós-Thal and Shaffer [2016], Choi and Stefanadis [2018], and Chen and Shaffer [2014, 2019], respectively, incorporate unobservable contracts (Hart and Tirole [1990]), sequential process innovation by the entrant, and market share contracts into the frameworks in Rasmusen, Ramseyer, and Wiley [1991] and Segal and Whinston [2000].

[8] In the literature on exclusion with downstream competition, 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.

[9] Ulsaker [2020] introduces an upstream exclusion model with the differences in input qualities. His model allows the possibility that entry increases industry profit, in contrast to the previous models with downstream competition.

[10] There are extended models with downstream competition: interbrand competition with homogeneous retailers (Wright [2008]), vertical differentiation (Argenton [2010]), multiple entrants (Kitamura [2010]), allowing imperfect exclusion (DeGraba [2013]), and allowing a higher degree of horizontal product differentiation (Gratz and Reisinger [2013]).

[11] Fumagalli, Motta, and Rønde [2012] extend the three-player model in a different direction by introducing the incumbent's relationship-specific investments.

[12] Based on the Chicago School three-player model, Kitamura, Matsushima, and Sato [2018a] introduce a complementary input supplier and show that exclusion is attainable when the complementary input supplier has market power. In addition, Kitamura, Matsushima, and Sato [2018b] consider the case in which symmetric manufacturers can make exclusive offers based on the three-player model and show that exclusive-offer competition leads to exclusion outcomes.

ficient benefit from entry is similar to ours,[13] although the source of such an insufficient benefit in those studies (milder upstream competition) differs from ours (the entrant's rent extraction in negotiation). Yong [1996] incorporates a capacity constraint of the upstream entrant, mitigating upstream competition. Farrell [2005] considers upstream quantity competition, which is milder than Bertrand competition. Fumagalli, Motta, and Persson [2009] allow a horizontal merger between the incumbent supplier and a potential supplier under inspection by the antitrust authority after signing an exclusive dealing between the incumbent and the buyer. The merger escapes upstream competition. Kitamura, Matsushima, and Sato [2017] assume Nash bargaining between the buyer and the entrant supplier with potential subsequent bargaining between the buyer and the incumbent supplier. The bargaining process mitigates upstream competition. Alternative distribution channels are beyond the scope of these studies; the contribution of this study to the 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 most closely related to Comanor and Rey [2000], who consider a market with a single supplier, a downstream incumbent with inefficient external suppliers, and a downstream entrant.[14] They assume that only the downstream *incumbent* has an outside option to buy inputs from the external supplier, although an efficient upstream *entrant* can use inefficient downstream distributors in our model. When each downstream firm has full bargaining power to offer a wholesale price, the existence of inefficient external suppliers lowers the downstream incumbent's wholesale price offer, which induces the efficient downstream entrant to offer a lower wholesale price. Therefore, the supplier cannot earn higher profits even when downstream entry occurs, which leads to exclusion outcomes. The key feature of their study is that, because of

[13] Liu and Meng [2021] introduce the fixed cost of the incumbent to stay in the market. If the entrant enters, the fixed cost forces the incumbent to exit the market, lowering the buyer's benefit from the new entry.

[14] Kitamura, Matsushima, and Sato [2021] consider a three-player model with a single supplier, a downstream incumbent, and a downstream entrant. The key feature of their model is that the entrant is efficient in terms of the necessary amount of input produced by the supplier. The lower input demand by the entrant can be a source of the exclusion outcome if the supplier employs nondiscriminatory linear wholesale pricing.

the existence of the external supplier, downstream entry generates competition throughout the vertical structure, which induces final consumers to extract the benefit from the entry.[15] In contrast to their research, this study considers the entrant's outside option, the source of which is the entrant's efficiency. Furthermore, the entry in our model increases total industry profit. More importantly, although the entrant's efficiency is irrelevant in inducing exclusion outcomes in Comanor and Rey [2000], it is critical in our study; by facilitating rent extraction from the downstream firm, an efficiency improvement of the upstream entrant is more likely to induce exclusion, which is the novel feature of our result.[16] In sum, this study presents an alternative exclusion mechanism with the modifications of Comanor and Rey [2000].

This study is also related to the literature on exclusive contracts in an international context. There are few studies in this field. 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 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 offers to construct a barrier to foreign multinational entry by incorporating rich switching options.

Finally, this study is 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 deci-

[15] Using a two-period model, Fumagalli and Motta [2020] point out that to avoid the coexistence of upstream and downstream competition, the possibility of an efficient upstream firm's entry in the future may facilitate the current exclusion of an efficient downstream entrant by a vertically integrated incumbent.

[16] In the extended model in Comanor and Rey [2000], the entrant's efficiency improvement makes exclusion less achievable, which contrasts our novel feature. Note that an efficiency improvement by inefficient external suppliers makes exclusion more achievable in Comanor and Rey [2000]. This property aligns with that in our model in which an efficiency improvement of competitive fringe distributors makes exclusion more achievable.

sions 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 because 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.

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, 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 ($c_I > c_E \geq 0$), respectively. 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. To simplify the analysis, we assume that D_I's resale cost is zero; 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 through competitive fringe distributors that are less efficient than D_I. Each of the fringe distributors incurs the per unit resale cost $\Delta(>0)$; it incurs a production cost $(w+\Delta)q$ when purchasing q units of the product under the linear wholesale price w.

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 is single-peaked; $2Q'(p) + (p-z)Q''(p) < 0$ 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 envelope theorem implies that $\partial\Pi^*(z)/\partial z = -Q(p^*(z)) < 0$.

To clarify the role of manufacturers' outside options, we assume that the marginal costs of firms 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 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 always negligible.

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 $x \geq 0$. 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.[17] In addition, following the standard literature on naked exclusion, we assume that the exclusive offer does not contain the trading term.[18] 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.

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

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.[19]

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 distributors and the manufacturers, the players on one of the sides randomly

[17] If we consider the case in which every manufacturer can make exclusive offers, exclusive-offer competition leads to exclusion outcomes as in Kitamura, Matsushima, and Sato [2018b]. Our model setting eliminates the possibility that such an effect makes exclusion attainable, which allows us to clarify the role of an alternative distribution channel.

[18] 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.

[19] In the Supplementary Appendix, we explore the case in which condition (2) does not hold. We show that exclusion is attainable even when U_E's marginal cost is sufficiently low if the fixed cost of entry is adequately high.

become proposers; the distributors become proposers with probability $\beta \in (0, 1)$, and the manufacturers become proposers with probability $1 - \beta$. We interpret β as the degree of the distributors' bargaining power over the manufacturers. In each event, only U_E can always use its outside option to trade with a competitive fringe distributor (CF) under the term $(w^r_{E|CF}, \psi^r_{E|CF}) = (c_E, 0)$.[20] For simplicity, we assume that the proposers can choose how to offer two-part tariff contracts such that the contracts maximize their stage profits if possible; that is, they offer discriminatory two-part tariff contracts or offer such contracts sequentially.[21] We assume that if D_I is indifferent between the two-part tariffs of U_I and 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^a_{Ui} (π^r_{Ui}) be U_i's expected profit when D_I accepts (rejects) the exclusive offer, where $i \in \{I, E\}$. In addition, let π^a_{DI} (π^r_{DI}) 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 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

[20] Note that in each event, the pair of U_E and a competitive fringe distributor cannot earn positive profits because they cannot win the competition with the pair of U_I and D_I under condition (2). Hence, regardless of the proposer role, $\psi^r_{E|CF} = 0$ holds, although the competition among competitive fringe distributors usually benefits manufacturers.

[21] 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.

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 focus mainly on the joint profits of the contracting party.

Moreover, if U_I and D sign exclusive contracts to satisfy condition (5), the global total surplus decreases; the exclusive contracts we consider here are harmful. We provide a precise discussion of the welfare analysis in Section 4.4.

4 Analysis

In this section, the existence of exclusive outcomes is analyzed. First, in Section 4.1, we explore the case in which the pair of U_E and a competitive fringe distributor cannot be a competitive threat to the pair of U_I and D_I in the off-path event whereby D_I rejects U_E's offer and accepts U_I's offer in Stage 3; concretely, $p^*(c_I) - \Delta \leq c_E$. This means that the pair of U_I and D_I can set the monopoly price $p^*(c_I)$ even when the pair of U_E and a competitive fringe distributor exist as a competitor in the downstream market. Second, we explore the case in which the pair of U_E and the competitive fringe distributor can be a competitive threat to the pair of U_I and D_I in the off-path event mentioned above; concretely, $c_I - \Delta \leq c_E < p^*(c_I) - \Delta$, in Section 4.2. Third, we introduce comparative statics in Section 4.3. Finally, we explore the welfare effect of exclusive dealing in Section 4.4.

4.1 When U_E is not so efficient

We consider the case in which the pair of U_E and a competitive fringe distributor cannot be a competitive threat to the pair of U_I and D_I in the off-path event whereby D_I rejects U_E's offer and accepts U_I's offer in Stage 3; concretely, $p^*(c_I) - \Delta \leq c_E$. 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.[22] 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:

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

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 in the equilibrium, although it can trade with a competitive fringe distributor under the term $(c_E, 0)$ off the equilibrium path. 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.[23] Conversely, U_I and U_E are the proposers with probability $1-\beta$, and then they offer $(c_I, 0)$

[22] Because U_I cannot earn positive profits by selling its products through competitive fringe distributors under condition (1), the existence of competitive fringe distributors is negligible under exclusive dealing regardless of the proposer role.

[23] 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 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 using competitive fringe distributors under the term $(c_E, 0)$. This is because the per production cost of U_E's product in such a case is strictly higher than that of U_I's product using D_I (i.e., $c_E + \Delta > c_I$).

and $(c_E, \Pi^*(c_E) - \Pi^*(c_I))$ to D_I, respectively.[24] Consequently, the resulting expected profits are:

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

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 is not so efficient. 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 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 the pair of U_E and a competitive fringe distributor can be a competitive threat to the pair of U_I and D_I in the off-path event whereby D_I rejects U_E's offer and accepts U_I's offer in Stage 3; $c_I - \Delta \leq c_E < p^*(c_I) - \Delta$.

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; then, the resulting expected profits are presented in equation (6).

[24] U_E's offer is derived as follows. If D_I rejects U_E's offer, U_E trades with a competitive fringe distributor under the term $(c_E, 0)$ off the equilibrium path. Under this term, the per unit production cost of the chosen competitive fringe distributor selling U_E's product becomes $c_E + \Delta$, which is not lower than $p^*(c_I)$; namely, by trading with U_I, D_I sets $p^*(c_I)$, earning $\Pi^*(c_I)$ off the equilibrium path. Thus, U_E needs to compensate D_I for this profit in the equilibrium.

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 using its outside option to trade with a competitive fringe distributor under the term $(c_E, 0)$. 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.[25] 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. U_E's outside option gives it an advantage over D_I in the proposal stage. The resulting expected profits are summarized as follows:

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

Finally, 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:

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

Note that we have $\hat{\beta}(c_E, c_I, \Delta) \in (0, 1)$. The following proposition summarizes the results:

Proposition 2. *Suppose that $c_I - \Delta \le c_E < p^*(c_I) - \Delta$; U_E is efficient. U_I can protect the local upstream market from the entry of U_E through exclusive contracts if D_I has 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

[25] U_E's offer is derived as follows. If D_I rejects U_E's offer, U_E trades with a competitive fringe distributor under the term $(c_E, 0)$ off the equilibrium path. Under this term, the chosen competitive fringe distributor sells U_E's product at $p = c_E + \Delta$, which is lower than $p^*(c_I)$. By trading with U_I, D_I matches this price, earning $\Pi(c_E + \Delta, c_I)$ off the equilibrium path. Thus, U_E needs to compensate D_I for this profit in the equilibrium.

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. Because 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 result 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.

Remark (The inverted vertical relationship) Inverting the vertical relationship, we obtain companion results of Propositions 1 and 2 for downstream entry (available in the Supplementary Appendix). The results under downstream entry imply that abundant options of input suppliers may facilitate downstream exclusion through exclusive supply contracts. Moreover, under the inverted relationship, we can apply our exclusion mechanism to situations where a multinational downstream entrant needs a local firm, such as a local manufacturer or logistics company, to procure a complementary input.

4.3 Comparative statics

From now on, we explore the relationship between the existence of an exclusion equilibrium in Proposition 2 and the efficiencies of U_E and competitive fringe distributors, c_E and Δ. Although we cannot obtain a clear-cut property of the partial differential $\partial\hat{\beta}(c_E, c_I, \Delta)/\partial c_E$, we obtain the following result as a corollary of Proposition 2:

Corollary 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 $c_E \to c_I - \Delta$; that is, $\hat{\beta}(c_E, c_I, \Delta)$ is higher for lower c_E within $c_I - \Delta \leq c_E < p^*(c_I) - \Delta$.*

Next, for $\partial\hat{\beta}(c_E, c_I, \Delta)/\partial\Delta$, 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.

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 contracts as the alternative distribution channels become efficient; that is, $\partial\hat{\beta}(c_E, c_I, \Delta)/\partial\Delta < 0$ always holds.*

Corollary 1 and Proposition 3 show that entry is less likely as the efficiencies of U_E and the competitive fringe distributors improve for $c_I - \Delta < c_E < p^*(c_I) - \Delta$. An increase in the efficiencies benefits U_E after entry because U_E's outside options work more effectively, and U_E has a strong incentive for entry. However, from the perspective of D_I, the entry of U_E in such a situation is harmful because D_I earns lower profits when U_E enters. 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.

4.4 Welfare

We examine the effect of exclusive contracts satisfying condition (5) on global welfare. For simplicity, we assume that the fixed cost of entry is negligible.

We first consider the consumer surplus, which is defined as

$$CS(p^*(z)) \equiv \int_0^{Q(p^*(z))} P(s)ds - p^*(z)Q(p^*(z)).$$

Consumer surplus under exclusive dealing (entry) is $CS^a \equiv CS(p^*(c_I))$ ($CS^r \equiv CS(p^*(c_E))$). Using the first-order condition of D's profit maximization problem, the implicit function theorem implies that

$$p^{*\prime}(z) = \frac{Q'(p^*(z))}{2Q''(p^*(z)) + (p^*(z) - z)Q''(p^*(z))} > 0,$$

where the inequality follows the second-order condition. Thus, exclusive dealing increases the equilibrium price; $p^*(c_I) > p^*(c_E)$. Because $CS(p^*(z))$ is decreasing in $p^*(z)$, we have $CS^a < CS^r$; exclusive dealing is harmful for consumers.

We next consider the global producer surplus, $PS^\omega \equiv \pi^\omega_{DI} + \pi^\omega_{UI} + \pi^\omega_{UE}$, where $\omega \in \{a, r\}$. From equations (6) and (8), we have $PS^a = \Pi^*(c_I) < \Pi^*(c_E) = PS^r$; exclusive dealing reduces global producer surplus.

Finally, we consider global total surplus, $TS^\omega \equiv CS^\omega + PS^\omega$. From the discussion presented above, exclusive dealing reduces global total surplus; i.e., $TS^a < TS^r$.

Proposition 4. *Exclusive dealing to deter the entry of U_E is not desirable from the perspective of global welfare.*

Note that global total surplus here coincides with domestic total surplus when U_E is a domestic supplier. We can also consider domestic total surplus when U_E is a foreign supplier, TS^ω_d. The difference from global total surplus arises in domestic producer surplus, $PS_d^\omega \equiv \pi_{DI}^\omega + \pi_{UI}^\omega$. If condition (5) holds, we have $PS_d^a \geq PS_d^r$, which implies that exclusive dealing does not reduce domestic producer surplus. Thus, there exists a possibility that exclusive dealing is desirable from the perspective of domestic total surplus. The result depends highly on the level of β. When $\beta = \hat{\beta}(c_E, c_I, \Delta)$, we have $PS_d^a = PS_d^r$, which leads to $TS_d^a < TS_d^r$; exclusive dealing reduces domestic total surplus. Conversely, as $\beta \to 0$ and $c_E \to c_I - \Delta$, we have $PS_d^r \to 0$; the entry of U_E does not benefit D_I because U_E extracts a large part of industry profits. In this case, exclusive dealing can increase domestic total surplus. We can derive such a result under a linear demand system.[26] These results provide important insight for competition policy. Prohibiting exclusive dealing for entry deterrence purposes may not always be desirable for the case of multinational entry. Even when a foreign multinational entrant is considerably efficient, the antitrust authority may allow exclusive dealing to protect domestic total surplus.

5 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 situation in which signing exclusive contracts is achievable, 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

[26] The results are available upon request.

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. Besides, we show that such exclusion harms global total surplus.

Note that this study's exclusion mechanism works well 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 perspective 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.

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.

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.

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A Supplementary Appendix for "Defending Home against Giants: Exclusive Dealing as a Survival Strategy for Local Firms"

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Abstract

This appendix provides an extension analysis of Kitamura, Matsushima, and Sato (2021a). Appendix A extends the analysis to the case in which U_E is highly efficient. Section B briefly discusses a reversal setting in which entry can occur in the downstream market.

JEL classification codes: L42, L12, F23, C72
Keywords: Exclusive dealing; Vertical relation; Antitrust policy; Multinational firms

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A When U_E is highly efficient

This subsection explores the case in which condition (2) in Kitamura, Matsushima, and Sato (2021a) does not hold. In this subsection, we assume that the fixed cost of entry satisfies the following conditions:

$$\underline{F} < F < \overline{F}, \tag{1}$$

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 (1) 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 (1) holds, entry into the upstream market is profitable for U_E when D_I rejects the exclusive offer in Stage 1.[1]

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 in Kitamura, Matsushima, and Sato (2021a). Therefore, as presented in Kitamura, Matsushima, and Sato (2021a), 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

[1] When condition (2) in Kitamura, Matsushima, and Sato (2021a) and $c_E < p^*(c_I) - \Delta$ hold, $\underline{F} = 0$ and $\overline{F} = (1-\beta)(\Pi^*(c_E) - \Pi^*(c_E + \Delta, c_I))$.

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 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 $\Pi^*(c_E)$, whereas 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 $\Pi^*(c_E)$, whereas U_I and D_I earn nothing. The resulting expected profits are summarized as follows:

$$
\begin{aligned}
\pi^r_{DI} &= \begin{cases} \beta(\Pi^*(c_E) - \Pi(c_I, c_E + \Delta)) & \text{if } c_E + \Delta \leq c_I < p^*(c_E + \Delta), \\ \beta(\Pi^*(c_E) - \Pi^*(c_E + \Delta)) & \text{if } c_E + \Delta < p^*(c_E + \Delta) \leq c_I, \end{cases} \\
\pi^r_{UI} &= 0, \\
\pi^r_{UE} &= \begin{cases} (1-\beta)\Pi^*(c_E) + \beta\Pi(c_I, c_E + \Delta) & \text{if } c_E + \Delta \leq c_I < p^*(c_E + \Delta) \\ (1-\beta)\Pi^*(c_E) + \beta\Pi^*(c_E + \Delta) & \text{if } c_E + \Delta < p^*(c_E + \Delta) \leq c_I. \end{cases}
\end{aligned} \tag{2}
$$

Finally, using the subgame outcomes derived above, we consider the game in Stage 1. By substituting equations (6) in Kitamura, Matsushima, and Sato (2021a) and (2), we find that condition (5) in Kitamura, Matsushima, and Sato (2021a) 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 (1) holds. The following proposition summarizes these results:

Proposition A.1. *Suppose that condition (2) in Kitamura, Matsushima, and Sato (2021a) does not hold; When the fixed cost of entry satisfies condition (1), 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 A.1 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.

B Downstream exclusion

This appendix introduces the case of exclusive supply contracts by inverting the vertical relation in Kitamura, Matsushima, and Sato (2021a). 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 Kitamura, Matsushima, and Sato (2021a), 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 Kitamura, Matsushima, and Sato (2021a). Second, we consider the case in which manufacturers differ in the transformational technology of input supplied by suppliers, following Kitamura, Matsushima, and Sato (2021b).[2]

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 Kitamura, Matsushima and Sato (2021a), 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. Thus, the exclusion mechanism in this study remains valid in various settings.

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 B.1. Thereafter, we consider the case in which downstream firms differ in the transformational technology of input supplied by suppliers in B.2.

B.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 Kitamura, Matsushima, and Sato (2021a), 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.

[2] Kitamura, Matsushima, and Sato (2021b) consider the second case in the absence of alternative supply chains and show that exclusion can be an equilibrium outcome under linear wholesale pricing.

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

(3) $$d_E < P(0) - c_0 \leq d_I.$$

(4) $$d_E + c_0 \geq d_I$$

As in Kitamura, Matsushima, and Sato (2021a), 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.[3] In Stage 3, existing firms negotiate and make contracts for two-part tariffs. As in Kitamura, Matsushima, and Sato (2021a), 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:

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

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

[3] Similar to the discussion in Appendix A, we have exclusion results even when condition (4) does not hold. The results are available upon request.

$1-\beta$, 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.[4] By contrast, when manufacturers become proposers with probability β, D_I 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 ($d_I \le d_E + c_0 < p^*(d_I)$). 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:

$$
\begin{aligned}
\pi^r_{UI} &= \begin{cases} \beta\Pi^*(U_I) + (1-\beta)\Pi^*(d_E) & \text{if } d_I < p^*(d_I) \le d_E + c_0, \\ \beta\Pi(d_E + c_0, d_I) + (1-\beta)\Pi^*(d_E) & \text{if } d_I \le d_E + c_0 < p^*(d_I), \end{cases} \\
\pi^r_{DI} &= 0, \\
\pi^r_{DE} &= \begin{cases} \beta(\Pi^*(d_E) - \Pi^*(d_I)) & \text{if } d_I < p^*(d_I) \le d_E + c_0, \\ \beta(\Pi^*(d_E) - \Pi(d_E + c_0, d_I)) & \text{if } d_I \le d_E + c_0 < p^*(d_I). \end{cases}
\end{aligned}
\tag{6}
$$

Using the subgame outcomes derived above, we now consider the game in Stage 1. Note that, as presented in Kitamura, Matsushima, and Sato (2021a), there is an exclusion equilibrium if and only if condition (5) in Kitamura, Matsushima, and Sato (2021a) holds. By substituting equations (5) and (6), we find that condition (5) holds if and only if $d_I \le d_E + c_0 < p^*(d_I)$ and $\beta \ge \overline{\beta}(d_E, d_I, c_0)$ 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.

[4] In contrast to the upstream exclusion in Kitamura, Matsushima, and Sato (2021a), 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 are available upon request.

Proposition B.1. *Suppose that conditions (3) and (4) 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 ($\beta \geq \overline{\beta}(d_E, d_I, c_0)$).*

B.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 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 B.2. *k satisfies the following properties:*

$$kc_0 < P(0) \leq c_0. \tag{7}$$

$$kc_0 \geq c. \tag{8}$$

We also assume that, as stated in Section B.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.[5]

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:

$$\pi^a_{UI} = (1 - \beta)\Pi^*(c), \;\; \pi^a_{DI} = \beta\Pi^*(c), \;\; \pi^a_{DE} = 0. \tag{9}$$

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,

[5] Similar to the discussion in Appendix A, we have exclusion results even when condition (8) does not hold. The results for the case of low k and high c are available upon request.

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:

$$\pi^r_{UI} = \begin{cases} \beta\Pi^*(c) + (1-\beta)\Pi^*(kc) & \text{if } c < p^*(c) \leq kc_0, \\ \beta\Pi(kc_0, c) + (1-\beta)\Pi^*(kc) & \text{if } c \leq kc_0 < p^*(c), \end{cases}$$
$$\pi^r_{DI} = 0, \tag{10}$$
$$\pi^r_{DE} = \begin{cases} \beta(\Pi^*(kc) - \Pi^*(c)) & \text{if } c < p^*(c) \leq kc_0, \\ \beta(\Pi^*(kc) - \Pi(kc_0, c)) & \text{if } c \leq kc_0 < p^*(c). \end{cases}$$

Using the subgame outcomes derived above, we now consider the game presented in Stage 1. By substituting equations (9) and (10), we find that condition (5) in Kitamura, Matsushima, and Sato (2021a) 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 B.2. *Suppose that conditions (7) and (8) 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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