Exclusive dealing: investment promotion may facilitate inefficient foreclosure[*]

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Chiara Fumagalli
Università Bocconi (Department of Economics), IGIER and CSEF.
E-mail: chiara.fumagalli@unibocconi.it

Massimo Motta
ICREA-Universitat Pompeu Fabra and BarcelonaGSE
E-mail: massimo.motta@upf.edu.

Thomas Rønde
Copenhagen Business School (Department of Innovation and Organizational Economics)
E-mail: thr.ino@cbs.dk

Abstract
This paper studies a model where exclusive dealing (ED) can both promote investment and foreclose a more efficient supplier. Since ED promotes the incumbent seller's investment, the seller and the buyer realize a greater surplus from bilateral trade under exclusivity. Hence, the parties may sign an ED contract that excludes a more efficient entrant in circumstances where ED would not arise absent investment. The paper therefore invites a more cautious attitude towards accepting possible investment promotion arguments as a defense for ED.

1. Introduction

Exclusive contracts require a buyer to purchase only from one seller, and their possible effects on competition have been at the center of attention of economists and lawyers for a long time. The decisions in cases involving exclusive dealing (ED hereafter) are often controversial as the promotion of relation-specific investment must be balanced against the threat of foreclosure of potential competitors; see, e.g., Schöller v. Commission [ECC T-9/95] and U.S. v. Dentsply [399 F.3d 181 (2001)].

The industrial organization literature has investigated these two opposite effects of ED contracts. On the one hand, it has identified conditions under which ED may serve anticompetitive purposes by deterring efficient entry (Aghion and Bolton, 1987; Rasmusen et al., 1991; Bernheim and Whinston, 1998; Segal and Whinston, 2000a; Fumagalli and Motta, 2006; Simpson and Wickelgren, 2007). On the other hand, the literature has explored under which conditions exclusive contracts may serve efficiency-enhancing ends by protecting relation-specific investments (Besanko and Perry, 1993; Segal and Whinston, 2000b; De Meza and Selvaggi, 2007; Groh and Spagnolo, 2004; Vasconcelos, 2008). These two branches of the literature, however, analyze the effects of ED in isolation. More precisely, the literature on investment promotion abstracts from the risk of foreclosure by assuming that an ED is renegotiated if a more efficient entrant appears, while the literature on foreclosure does not include the possibility of relation-specific investment.

The purpose of this paper is to contribute to fill this gap by offering a simple but unifying framework where exclusivity may give rise to both inefficient foreclosure and investment promotion. We show that the interaction between these two effects provides interesting insights into the welfare effects of ED and that investment promotion – usually interpreted as a pro-competitive effect of ED – may in fact facilitate inefficient foreclosure.

We present a simple model where, absent investment, ED does not arise in equilibrium. In the model, an incumbent seller offers a fee to a buyer in return for exclusivity, but it is common knowledge that a more efficient entrant will appear at a later stage. The buyer foresees that the incumbent seller will offer its product at marginal cost if competing with the entrant. Hence, if the buyer remains free, it will trade with entrant in equilibrium and receive a surplus no less than the maximal social welfare that the incumbent's product can create. It is thus never mutually beneficial for the buyer and the incumbent to eliminate competition by entering into exclusive dealing. In other words, the "Chicago critique" of exclusive dealing applies (Posner, 1976; Bork, 1978).

We then continue to show that ED may serve to foreclosure of a more efficient supplier once efficiency-enhancing investment by the incumbent is introduced. Compared to the benchmark of no investment possibility, the incumbent is able to offer a larger compensation for signing an ED contract to the buyer, because the investment increases the surplus from bilateral trade. In contrast, if no ED contract is in place, the buyer foresees the competition with the more efficient entrant and does not invest, which means that the buyer and the incumbent receive the same surplus as in the benchmark case. The possibility to invest makes it thus easier for the incumbent to elicit the buyer's acceptance of exclusive dealing, and we show that the buyer and the incumbent may enter into welfare-reducing ED, whereby a more efficient entrant is foreclosed. Notice that foreclosure can occur, because we – unlike the existing literature on the investment promotion effects of ED – assume that ED contracts are not renegotiated in face of entry by a more efficient entrant.

Our analysis might affect the policy towards exclusive dealing by identifying a new reason why ED might lead to exclusion of efficient rivals. Indeed, an ED contract may foreclose a more efficient precisely *because* it fosters investment. The balancing of anti- and pro-competitive effects that many competition policy cases involving ED revolve around is thus likely to be even more complex than already acknowledged.

The paper closest to ours is probably Spier and Whinston (1995) that shows that the additional investment resulting from ED may be socially wasteful and serve only to extract rents from an entrant. We show here that the investment promotion effect of ED may also be welfare-detrimental, because it facilitates foreclosure of efficient entrants.

The paper proceeds as follows: section 2 presents the model and identifies under which conditions ED, by promoting investment, makes inefficient foreclosure more likely. Section 3 discusses key aspects of the analysis and concludes the paper.

2.   A simple model

We consider a model with three agents, a buyer (B), an incumbent supplier (I) and an alternative supplier (E). For simplicity, we assume that the buyer demands at most one unit of a good. The two suppliers, I and E, have marginal costs are normalized to zero, but, absent investment, B's valuation of E's product (v_E) is greater than that of I's product (v_I), $v_E > v_I$.

Date 0: B and I can sign an ED contract which prohibits B from trading with E. We assume that the initial contract is incomplete, and the only possible term in the contract, aside a lump-sum

payment, is the exclusivity provision. In other words, the only fact that can be described ex-ante and verified ex-post is that B does not conduct any trade with another seller.[1]

Date 1: the incumbent may undertake non-contractible investment which affects the value of ex-post trade. If I decides to increase B's valuation of its product by x, it entails a cost $C(x) = (\gamma x^2)/2$ where γ is a measure of the incumbent's investment cost.[2]

Date 2: trade takes place. With a probability $1/2$ it is the buyer who makes the price offer, and with probability $1/2$ it is the supplier(s) who makes it (them). If an ED contract has been signed at date 0, it is not renegotiated, and B can only trade with I.

2.1. When investment promotion facilitates foreclosure

In this section, we solve the game by backward induction and we start from the last stage where prices are decided for given contractual decision and investment decision.

The effect of ED for given investment

At date 2, the choices of exclusivity and investment level have been made. If the ED has been agreed upon, the buyer can trade only with the incumbent. If the incumbent makes the offer, which occurs with probability $1/2$, it charges the monopoly price $v_I + x$; when the buyer makes the offer it requires the good at the marginal cost equal to zero. Hence, under exclusivity B and I share evenly the value of trade $v_I + x$. Supplier E does not sell and its payoff is zero. The agents' payoffs under exclusivity are indicated in Table 1 below.

Table 1: a*gents' payoffs with and without exclusivity*

	Exclusive dealing	No exclusive dealing
Incumbent more efficient $v_I + x > v_E$	$\Pi_I^{ED}(x) = (v_I + x)/2 - (\gamma x^2)/2$ $\Pi_B^{ED}(x) = (v_I + x)/2$ $\Pi_E^{ED}(x) = 0$	$\Pi_I^{NoED}(x) = (v_I + x - v_E)/2 - (\gamma x^2)/2$ $\Pi_B^{NoED}(x) = (v_I + x + v_E)/2$ $\Pi_E^{NoED}(x) = 0$
Entrant more efficient $v_I + x \leq v_E$	$\Pi_I^{ED}(x) = (v_I + x)/2 - (\gamma x^2)/2$ $\Pi_B^{ED}(x) = (v_I + x)/2$ $\Pi_E^{ED}(x) = 0$	$\Pi_I^{NoED}(x) = -(\gamma x^2)/2$ $\Pi_B^{NoED}(x) = (v_I + x + v_E)/2$ $\Pi_E^{NoED}(x) = (v_E - v_I - x)/2$

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[1] This implies, in particular, that the investment level cannot be specified in the contract. If this were possible, exclusivity would not be necessary for promoting investment.

[2] We do not consider explicitly investment decisions by E. However the valuation of E's good can be thought of as determined by an entrant's exogenous investment.

When no ED has been signed, the agents' payoffs depend on which good exhibits higher valuation after the investment. Let us start from the case where ex-post E is still more efficient than the incumbent. With probability 1/2 the buyer makes the offer, requires E's good for free and appropriates the value of trade v_E. With probability 1/2 suppliers compete. The pricing game is a standard asymmetric Bertrand game: the more efficient supplier E wins the buyer offering a price $p_E = v_E - (v_I + x)$. The argument is similar when it is I that is more efficient ex-post, but it is the incumbent that appropriates the ex-post efficiency gap. Table 1 below also reports the agents' payoffs absent exclusivity.

Table 1 highlights that, for given investment x, signing ED benefits the incumbent and harms both the buyer and the entrant. Note, however, an important distinction. When the incumbent is ex-post more efficient, ED redistributes welfare in favor of I but leaves total welfare unchanged, as trade none the less occurs with the more efficient supplier. Since E's payoff is zero irrespective of exclusivity, the incumbent's gain coincides with the buyer's loss:

$$\Delta\Pi_I(x) = v_E/2 = -\Delta\Pi_B(x), \tag{1}$$

where $\Delta\Pi_j(x) \equiv \Pi_j^{ED}(x) - \Pi_j^{NoED}(x), j = B, E, I.$

Instead, when the entrant is more efficient ex-post, by forcing trade with the incumbent ED forecloses the more efficient supplier and it not only redistributes total welfare but it also reduces it. In this case the loss caused to the buyer is larger than the incumbent's gain:

$$\Delta\Pi_I(x) = (v_I + x)/2 < v_E/2 = -\Delta\Pi_B(x). \tag{2}$$

It follows immediately that, absent the possibility to invest (i.e. $x = 0$), the Chicago School critique of ED holds, and B and I would never agree on exclusivity.

The effect of ED on investment incentives

At date 1, I chooses its investment level. If ED does not affect the investment choice, equations (1) and (2) show that exclusivity is not (strictly) profitable for the B-I coalition since $\Delta\Pi_I(x) \leq -\Delta\Pi_B(x)$. In order for ED to arise in equilibrium, it must stimulate investment, and we now investigate under which conditions this is the case.

Lemma 1: *there exists a threshold level of the investment cost* $\bar{\gamma} \equiv \dfrac{1}{4(v_E - v_I)}$ *such that:*

(i)   *if the investment cost is sufficiently large ($\gamma > \bar{\gamma}$), then exclusive dealing promotes investment: $x^{*ED} = \frac{1}{2\gamma}$ and $x^{*NoED} = 0$;*

(ii)   *if the investment cost is low enough ($\gamma \leq \bar{\gamma}$), then exclusive dealing is irrelevant for investment: $x^{*ED} = x^{*NoED} = \frac{1}{2\gamma}$.*

Proof: see Appendix.

To see the intuition, start from the situation where the investment cost is large enough ($\gamma > \bar{\gamma}$). Absent ED, I does not invest. It anticipates that, in order to compete successfully with E, it should invest so much as to become ex-post more efficient; but this is too costly. The marginal return on investment is therefore zero in the relevant range, and $x^{*NoED} = 0$. Instead, under exclusivity, I anticipates that it will appropriate the value of trade with B if it makes the offer. Using the payoff in table 1, the first-order condition of I is:

$$\frac{\partial \Pi_I}{\partial x} = \frac{1}{2} - \gamma x = 0, \tag{3}$$

which yields $x^{*ED} = 1/(2\gamma)$. Under exclusivity, the marginal benefit of the investment is thus larger and investment incentives are stronger.

Consider now the case where the investment cost is sufficiently low ($\gamma \leq \bar{\gamma}$). Absent ED, it is profitable for I to invest so much as to become ex-post more efficient than E. In such a case, post-investment competition results in the incumbent extracting its efficiency advantage when it makes the offer. The first-order condition is again given by (3), and $x^{*NoED} = 1/(2\gamma)$. Under exclusivity, instead, post-investment competition is removed, and I will obtain the value of trade, $v_I + x$, when it makes the offer. I earns a larger payoff under ED, but exclusivity does not affect the investment benefit at the margin. The first-order condition is given (3) also in this case, and $x^{*ED} = 1/(2\gamma)$. In other words, the 'Irrelevance Result' of Segal and Whinston (2000b) holds here.

The contractual choice and welfare effects

At date 0, B and I negotiate exclusivity. The policy question underlying this analysis is whether ED should be allowed or be prohibited. We therefore compare the welfare with and without ED in circumstances where B and I have an incentive to agree on exclusivity.

Proposition 1 derives the equilibrium contractual choice and the welfare effects of ED.

Proposition 1: *there exist two threshold levels of the investment cost, $\gamma^S \equiv \frac{3}{4(v_E - v_I)}$ and $\gamma^W \equiv \frac{3}{8(v_E - v_I)}$, with $\gamma^S > \gamma^W > \bar{\gamma}$, such that:*

(i) *the ED contract signed for $\gamma^S > \gamma > \bar{\gamma}$, and B and I are indifferent between signing the ED contract or not for $\bar{\gamma} \geq \gamma$.*

(ii) *the ED contract is signed and is welfare detrimental for $\gamma^S > \gamma > \gamma^W$.*

Proof: see Appendix.

First, if $\bar{\gamma} \geq \gamma$, the investment cost is so low that I is more efficient than E absent ED. Lemma 1 shows that there is no investment promotion effect, and it follows from (1) that it is a matter of indifference both to the B-I coalition and to society at large whether an ED contract is signed.

Instead, ED stimulates investment by protecting I's return on its investment for $\gamma > \bar{\gamma}$. The additional investment increases both the incumbent and the buyer's payoff under exclusivity (the former, by revealed preferences; the latter because higher investment increases the value of internal trade and the buyer appropriates part of this value), thereby mitigating the buyer's loss due to exclusivity and expanding the incumbent's gain. Proposition 1 shows that this makes if privately profitable for B and I to agree on ED if the investment cost is sufficiently low, $\gamma^S > \gamma > \bar{\gamma}$. In this case, the introduction of exclusivity harms E by foreclosing its activity. Signing the contract will be welfare detrimental if B and I's joint gain from exclusivity is less than E's loss, which happens for intermediate investment cost, $\gamma^S > \gamma > \gamma^W$. Here, the investment promotion effect is sufficiently strong to make B and I willing to sign the contract; however, it is too weak to be beneficial for society because (i) either the incumbent remains less efficient than the rival; (ii) or the incumbent becomes more efficient than E, but achieving such an improvement is too costly for society.

Finally, the minimum payment to B for signing an ED contract is:

$$P_{Min} \equiv \Pi_B^{NoED}(x^{*NoED}) - \Pi_B^{ED}(x^{*ED}). \tag{4}$$

The fee P_{Min} is strictly positive for $\bar{\gamma} \geq \gamma$ where the incumbent is ex-post more efficient and where ED shifts rents from B to I without affecting total welfare. However, it is easy to show that $P_{Min} \leq 0$ for $\gamma^S > \gamma > \bar{\gamma}$ if and only if $v_E \leq x^{*ED}$. Hence, if the investment promotion effect is sufficiently strong relative to the efficiency of the foreclosed entrant, B and I can agree on ED without an upfront payment.

3. Discussion

This paper studies a model where exclusive dealing can both promote investment and foreclose a more efficient supplier. Since exclusive dealing promotes the seller's investment, the seller and the buyer realize a greater surplus from bilateral trade under exclusivity. Hence, there exist conditions under which the incumbent is able to compensate the buyer for the rents lost from not trading with the more efficient entrant, and the buyer and the incumbent enter into welfare-detrimental exclusive dealing.

A key assumption of the analysis is that an exclusive dealing contract is not renegotiated in the face of entry by a more efficient supplier. Obviously, this is an extreme assumption, and firms do sometimes renegotiate the contracts that they sign. On the other hand, the alternative assumption made in the literature of costless renegotiation is also strong, and it is likely to depend on industry characteristics whether one or the other assumption is more appropriate.

For example, there is only one buyer in the model, but the buyer's demand can readily be interpreted as the sum of the demand from many, smaller buyers. If the demand side is fragmented as in Schöller v. Commission [ECC T-9/95], renegotiation is difficult, because the entrant needs to convince a large number of buyers to renegotiate their contract in order to capture a significant market share.[3] This problem is particularly severe if the buyers are locked into long and overlapping contracts. There are then a limited number of free buyers at any given point in time, and then entrant cannot avoid renegotiation by waiting until the contracts expire; see Carlsberg v. The Danish Competition Council [3/1120-0204-0170/FI/AWF]. Renegotiation may also be difficult if the buyer customizes its production process to the input from the incumbent in order to benefit from the incumbent's relation-specific investment, thereby increasing the cost of switching to an entrant; see Milliou (2008) for examples of such technological lock-in.

If renegotiation entails significant cost, our analysis invites a more cautious attitude towards accepting possible investment promotion arguments as a defense for ED, as investment promotion may facilitate inefficient foreclosure.

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[3] See Dewatripont and Maskin (1995) for an argument along these lines in the context of financial contracting.

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Appendix

Proof of Lemma 1

If there is no ED, the profit function of I is given by:

$$\Pi_I(x) = \begin{cases} -(\gamma x^2)/2 & \text{if } v_I + x \leq v_E \\ (v_I + x - v_E)/2 - (\gamma x^2)/2 & \text{otherwise} \end{cases}.$$

If $\frac{1}{2(v_E - v_I)} \leq \gamma$, the continuous function $\Pi_I(x)$ is decreasing for all positive x, and the solution is

$x^{*NoED} = 0$. If $\frac{1}{2(v_E - v_I)} > \gamma$, $\Pi_I(x)$ has two local maxima, $x = 0$ and $x = \frac{1}{2\gamma}$. Comparing these two

candidate solutions shows that $x^{*NoED} = \frac{1}{2\gamma}$ for $\gamma \leq \bar{\gamma}$ and $x^{*NoED} = 0$ otherwise. Notice that $v_I +$

$x^{*NoED} > v_E$ for $\gamma \leq \bar{\gamma}$. As argued in the text, the investment under ED is $x^{*ED} = \frac{1}{2\gamma}$. The proof

follows then from comparing x^{*ED} and x^{*NoED}.

Proof of Proposition 1

The B-I coalition has an incentive to enter into exclusive dealing if and only if:

$$\Pi_B^{ED}(x^{*ED}) + \Pi_I^{ED}(x^{*ED}) \geq \Pi_B^{NoED}(x^{*NoED}) + \Pi_I^{NoED}(x^{*NoED}). \tag{A1}$$

Consider part (i) of the proposition. First, if $\gamma \leq \bar{\gamma}$, it follows from Lemma 1 that $x^* = x^{*ED} = x^{*NoED}$.

Furthermore, in the proof of Lemma 1 it is shown that $v_I + x^* > v_E$. From Table 1, it is then

immediate that (A1) holds with equality, which implies that B and I are indifferent about signing an

exclusive dealing contract. Second, if $\gamma > \bar{\gamma}$, then $x^{*ED} = \frac{1}{2\gamma} > x^{*NoED} = 0$, and equation (A1)

simplifies to:

$$v_I + x^{*ED} - \frac{\gamma (x^{*ED})^2}{2} \geq \frac{v_I + v_E}{2}, \tag{A1'}$$

which is satisfied for $\gamma \leq \frac{3}{4(v_E - v_I)} \equiv \gamma^S$. This proves part (i) of the proposition.

Consider now part (ii). The firms enter into welfare-detrimental ED if (A1) is fulfilled, and the

following condition holds:

$$\Pi_B^{NoED}(x^{*NoED}) + \Pi_E^{NoED}(x^{*NoED}) + \Pi_I^{NoED}(x^{*NoED}) > \Pi_B^{ED}(x^{*ED}) + \Pi_E^{ED}(x^{*ED}) + \Pi_I^{ED}(x^{*ED}). \tag{A2}$$

First, if $\gamma \leq \bar{\gamma}$, then $x^* = x^{*ED} = x^{*NoED}$ and $v_I + x^* > v_E$. Therefore, $\Pi_E^{NoED}(x^{*NoED}) = \Pi_E^{ED}(x^{*ED}) = 0$,

and (A1) and (A2) cannot hold simultaneously. Second, if $\gamma > \bar{\gamma}$, equation (A2) simplifies to:

$$v_E > v_I + x^{*ED} - \frac{\gamma (x^{*ED})^2}{2}, \tag{A2'}$$

which is satisfied for $\gamma \leq \frac{3}{8(v_E - v_I)} \equiv \gamma^W$. Since $v_E > \frac{v_I + v_E}{2}$, (A1') and (A2') can hold simultaneously, and welfare-detrimental ED arises in equilibrium for $\gamma \in (\gamma^W, \gamma^S)$.