On the Choice of Target Firm in International Acquisition

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March, 2013

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A B S T R A C T

This paper discusses the choice of an MNC's entry strategy between greenfield investment and acquiring a local firm when there are two host firms with different levels of efficiency. We focus on the *process of selection* of target firm under acquisition by constructing sequential offer game, bidding game and repeated offer game. In the analysis the externality effect of Cournot competition is internalised. Contrary to the other works, the present paper shows that under acquisition the *inefficient firm* is acquired always. The possibility of greenfield investment however arises when the set up cost and the technology gap are low. In all the cases MNC's entry enhances host country welfare.

Key words: *Entry strategy; Multinational firm; Greenfield investment; Acquisition; Cross-border merger; Bidding game; Sequential offer game; Welfare.*

JEL Classifications: D43; F12; F23; L13.

1. Introduction

A multinational company (MNC) has to decide its entry strategy before it enters a foreign market. This ranges from direct export, licensing to equity investment. Entry by means of opening a subsidiary, that is, by setting up a new firm in a foreign country, is rhetorically called greenfield investment. There is already an extensive literature discussing entry strategies of an MNC.[1] In an environment of liberalization, it is, however, observed that greenfield investment has been a more popular choice than partially equity holding. But the last two decades have witnessed a growing importance of foreign direct investment (FDI) in the form of (cross-border) merger and acquisition (M&A). For instance, the UNCTAD (2000) study has recorded FDI in the form of M&A to be over 80%. In the study by Head and Ries (2008), for the period 1987-2001 FDI under M&A has two-third share. Hannart and Park (1993) and Calderon et al (2002) study also provides the similar support.

In this backdrop a number of papers are prepared highlighting the MNC's choice between acquisition and greenfield investment.[2] These works generally assume to have only one firm in the host country or more than one but identical host firms. But the problem becomes complicated in the presence of more than one host firm with differing efficiency level, because now the MNC's choice of strategy also hinges on the selection of the firm to be acquired. Clearly, firm asymmetry would play an important role in the entry decision, and welfare implication to the host country would also depend on the choice of entry strategy. Hence the purpose of the present paper is not only to discuss the choice between acquisition and greenfield investment but, more importantly, we focus on the process of selection of target firm under acquisition. We construct a three-firm model with two asymmetric host firms and one multinational (foreign) firm, and show that in acquisition equilibrium it is always the case that the inefficient or low productivity firm is acquired.

Two papers, close to our work, discussing the choice between greenfield investment and acquisition are by Gorg (2000) and Zhao (2011). Gorg, following the footstep of Buckley and

[1] See, for instance, Horstmann and Markusen (1987), Tang and Yu (1990), Buckley and Casson (1998), Mattoo et al. (2004).

[2] The choice broadly depends on the set up cost, market structure, acquisition costs, the extent of integration, technological efficiency levels of the host firms etc. A subset of the literature comprises of Buckley and Casson (1998), Bjorvatn (2004), Gorg (2000), Nocke and Yeaple (2007), Muller (2007), Kim (2009), Raff, Ryan and Stahler (2009), Zhao(2011), and Stepanok (2012).

Casson (1998), introduces an additional entry cost in the form of marketing and adaptation cost. Then based on simulation exercise for different values of marketing and adaptation cost he concludes that "the foreign entrant will in most cases be best off by acquiring an existing indigenous high technology firm". Zhao, on the other hand, decides selection of the target firm based on comparing the MNC's payoff under merger net of acquisition price, and he has assumed that the acquisition price is the payoff of the acquired firm under greenfield investment.[3] However, whether acquisition is at all profitable vis-à-vis greenfield investment is not fully examined. Hence welfare comparison in the paper under different modes of entry is questionable. In the presence of multiple target firms the main problem of the MNC is which firm to be acquired and at what price. The problem is somewhat complex when we take into consideration the host firms' strategic interactions. To elaborate more on this when there are there three firms in Cournot competition and two of them merge it is typically the outside firm which does not participate in the merger would gain due to the reduction in the number of competing firms in the market. None of the other models has, however, analysed explicitly the externality effect that benefits the outsider firm under M&A in a Cournot competition; hence these models have ignored the strategic aspect in the selection process. The purpose of our paper is to model the partner selection process explicitly in the presence of multiple target firms with externality.

To focus on the process of merger and to understand the strategic aspect, we construct a number of alternative games. While take-it-or-leave-it offer is analytically convenient and popular, in reality rarely the offer is once-for-all. Moreover, a host firm's payoff as an outsider is larger than its payoff under greenfield investment, hence each firm has incentives to see the other firm accepting the MNC's offer. We first discuss this issue by constructing two sequential offer games based on which host firm to be offerd first, given that two host firms have different efficiency levels. We study the subgame perfect Nash equilibrium (SPNE) of such sequential offer games. However, we restrict to one round of offer to each host firm.[4]

[3] In Zhao (2011), acquisition of the high productivity firm occurs when the ability of integration is sufficiently weak and the technological gap is relatively large. If the ability to integrate is strong and the gap of technology is sufficiently small, then the MNC acquires the low-productivity firm.

[4] In a sense the sequential offer games provide a mental or behind-the-scene calculation for the best take-it-or-leave-it offer.

Next we construct bidding game. There are examples in real life where partner selection occurs by means of auction. In our model each host firm will bid in a sealed envelope for merger with the MNC and the highest bidder will win. Finally we consider the scenario where there is always the possibility that if the present offer of the MNC is rejected by both host firms, there will be a new offer by the MNC. Since no offer is the last offer in absolute sense, therefore the present repeated offer game appears to be more practical. This game fully captures the positive externality effect of merger for the outside firm. While MNC's payoff differs from game to game, but, we show, target under acquisition remains invariant, that is, acquiring the low-productive firm is always optimal under acquisition. This clearly contrasts with the results of the other papers discussed in the literature.

The set up of the paper is the following. Section 2 describes the model. Then in section 3 we study the optimal entry decision and partner choice under merger and acquisition. Section 4 provides a welfare discussion and section 5 concludes the paper.

2. Model

We consider the following framework. Initially two domestic firms, firm 1 and firm 2, are competing in the home market, and a foreign firm, call MNC, is going to enter the domestic market either setting up a 100% owned subsidiary (i.e., green field investment) or by acquiring one of the two domestic firms. In any case, the operating firms will compete in quantities in a Cournot fashion.

The marginal costs of the MNC, firm 1 and firm 2 are, respectively, c_f, c_1 and c_2. We assume that the MNC and firm 1 are equally efficient but firm 2 is less efficient compared to them; therefore, $c_f = c_1 < c_2$.[5] However, if the MNC enters with opening a subsidiary, it will have to incur a set up cost, $F > 0$. In case of acquisition the integrated firm will use their least cost technology (thus in our paper full integration with the local firm is assumed). Our problem is to see whether the MNC will merge with the efficient firm or inefficient firm,

[5] In Zhao, the high cost firm, the low cost firm and the MNC are each at a same distance in terms of their unit cost of production, so $c_2 - c_1 = c_1 - c_f$, but Gorg assumes the MNC's unit cost to be very close to that of the low cost local firm, that is, $c_2 - c_1 > c_1 - c_f \cong 0$.

whenever such a merger is profitable, compared to the case of subsidiary. The market demand for the homogeneous good is assumed to be linear and in inverse form given by

$$P = \max\{0, a - Q\};\ a > c_2 \qquad (1)$$

where $Q = \sum_i q_i$ is industry output, q_i is supply of output by firm i, and P is the market price for the product. We first consider the benchmark case of foreign subsidiary (S regime), and then consider the possibility of merger with the efficient firm (M1 regime) and with the inefficient firm (M2 regime). Finally we discuss the question of optimal partner choice in a merger. In our analysis we focus on the process of selection of the target firm.

2.1 Subsidiary or Greenfield investment (S)

Under subsidiary of the foreign firm when all firms operate at positive output levels, they produce:

$$q_f^S = q_1^S = \frac{a - 2c_1 + c_2}{4} \quad \text{and} \quad q_2^S = \frac{a - 3c_2 + 2c_1}{4}$$

The corresponding payoffs are:

$$\pi_f^S = \frac{(a - 2c_1 + c_2)^2}{16} - F;\ \pi_1^S = \frac{(a - 2c_1 + c_2)^2}{16} \quad \text{and} \quad \pi_2^S = \frac{(a - 3c_2 + 2c_1)^2}{16} \qquad (2)$$

The assumption that all firms operate at a positive output level under subsidiary requires to specify the following two assumptions:

(A1) $\quad c_2 \in I \equiv (c_1,\ \frac{a + 2c_1}{3} \equiv \bar{c})$

(A2) $\quad F \le \frac{(a - c_1)^2}{16}$

Under (A1), $q_2^S > 0$, and under (A2) $\pi_f^S > 0\ \forall c_2 \in I$. Given (A1) and (A2), all firms operate at positive output levels under S.

2.2 Merger between the MNC and the efficient firm (M1)

If merger occurs with firm 1, then the payoffs of the merged firm and the outsider (firm 2) are:

$$\Pi_{1f}^{M1} \equiv \pi_1^{M1} + \pi_f^{M1} = \frac{(a-2c_1+c_2)^2}{9} \text{ and } \pi_2^{M1} = \frac{(a-2c_2+c_1)^2}{9} \qquad (3)$$

It can be easily checked that $\pi_2^{M1} > \pi_2^S$, that is, firm 2 as outsider gains under merger between the MNC and firm 1 due to externality effect of merger. Then merger with the efficient firm will be profitable if and only if,

$$\Pi_{1f}^{M1} > \pi_1^S + \pi_f^S \qquad (4)$$

$$\Leftrightarrow F > \frac{(a-2c_1+c_2)^2}{72} \equiv R_1(c_2)$$

Further, (A2) is to be satisfied. Hence for profitability of merger M1, the relevant condition is:

$$\text{(C1)} \quad \frac{(a-c_1)^2}{16} \geq F > R_1(c_2)$$

Now, $R_1(c_2)$ is increasing in c_2, with $R_1(.) = \frac{(a-c_1)^2}{72}$ at $c_2 = c_1$, and $R_1(.) = \frac{16}{9}.\frac{(a-c_1)^2}{72}$ at $c_2 = \bar{c}$. Further, $R_1(.) = \frac{(a-c_1)^2}{72}$. Hence we get the following lemma.

Lemma 1: Given any F, $\frac{(a-c_1)^2}{72} < F < \frac{16}{9}\frac{(a-c_1)^2}{72}$, $\exists c_2^*(\text{F}) < \bar{\text{c}}$ such that, $\forall \text{c}_2 \in (c_1, c_2^*(F))$ condition (C1) is satisfied.

Thus, if $F \leq \frac{(a-c_1)^2}{72}$, merger under regime M1 is never profitable; if $\frac{(a-c_1)^2}{16} \geq F \geq \frac{16}{9}.\frac{(a-c_1)^2}{72}$, merger between the MNC and the efficient firm is always

profitable; and if $\frac{(a-c_1)^2}{72} < F < \frac{16}{9}.\frac{(a-c_1)^2}{72}$, such a merger is profitable if and only if $c_2 \in (c_1, c_2^*(F))$. Define

$$\Delta_1 = \{(c_2, F) \mid c_2 \in I \text{ and Condition (C1) holds}\} \quad (5)$$

In Figure 1, Δ_1 is given by the area ABCD. Then for all $(c_2, F) \in \Delta_1$, merger between the MNC and the efficient firm is profitable.

[FIGURE 1 HERE]

2.3 Merger between the MNC and the inefficient firm (M2)

If merger between the MNC and the inefficient firm occurs, then the payoffs of the merged firm and the outsider (firm 1) are:

$$\Pi_{2f}^{M2} \equiv \pi_2^{M2} + \pi_f^{M2} = \frac{(a-c_1)^2}{9} \text{ and } \pi_1^{M2} = \frac{(a-c_1)^2}{9} \quad (6)$$

The efficient firm as an outsider will gain, due to externality, if merger occurs between the MNC and firm 2.

Then, merger with the inefficient firm will be profitable if and only if,

$$\Pi_{2f}^{M2} > \pi_2^S + \pi_f^S \quad (7)$$

$$\Leftrightarrow F > \frac{(a-2c_1+c_2)^2}{16} + \frac{(a-3c_2+c_1)^2}{72} - \frac{(a-c_1)^2}{9} \equiv R_2(c_2)$$

Hence, given (A2), the relevant condition for the profitable merger with firm 2 is:

$$\text{(C2)} \quad \frac{(a-c_1)^2}{16} \geq F > R_2(c_2)$$

Now, $R_2(c_2)$ is U-shaped with $R_2(.) = \frac{(a-c_1)^2}{72}$ at $c_2 = c_1$, and $R_2(.) = 0$ at $c_2 = \bar{c}$.

Lemma 2: Given any F, $0 < F \leq \frac{(a-c_1)^2}{72}$, $\exists c_2^{**}(\mathrm{F}) < \bar{\mathrm{c}}$ such that $\forall \mathrm{c}_2 \in (c_2^{**}(F), \bar{c})$ Condition (C2) is satisfied.

Thus, (i) if $F \geq \frac{(a-c_1)^2}{72}$, merger under regime M2 is always profitable; and (ii) if $0 < F < \frac{(a-c_1)^2}{72}$, then such a merger is profitable if and only if $\mathrm{c}_2 \in (c_2^{**}(F), \bar{c})$. Define,

$$\Delta = \{(c_2, F) \mid \mathrm{c}_2 \in I \text{ and Condition (C2) holds}\} \qquad (8)$$

In Figure 1, Δ represents the area ABEGDA, and for any $(c_2, F) \in \Delta$, merger with the inefficient firm is preferred to subsidiary. Clearly $\Delta_3 \equiv$ area DGH represents the situation where subsidiary is the better option than acquisition. Define $\Delta_2 = \Delta - \Delta_1$. Then for any $(c_2, F) \in \Delta_2$, merger between the MNC and firm 2, and not between the MNC and firm 1 is profitable.

Comparing the results underlying Lemma 1 and 2, we have the following observations.

(1) If the set up cost is too large (i.e., $\frac{(a-c_1)^2}{16} \geq F \geq \frac{16}{9}.\frac{(a-c_1)^2}{72}$), merger with both the efficient and inefficient firm is always profitable.

(2) If the set up cost is low (i.e., $0 < F \leq \frac{(a-c_1)^2}{72}$), merger with the efficient firm is never profitable, but merger with the inefficient firm is profitable only if the inferior technology is relatively inefficient. If, however, the inferior technology is close to the efficient technology, no merger is profitable and in this case, subsidiary will be the outcome.

(3) If $\frac{(a-c_1)^2}{72} < F < \frac{16}{9}.\frac{(a-c_1)^2}{72}$, merger with the inefficient firm is always profitable, but merger with the efficient firm is profitable only if the inferior technology is close to the efficient technology.

In Figure 1, the area CEGD contains all combinations of (c_2, F) for which merger between the MNC and the inefficient firm is profitable but not between the MNC and the

efficient firm. Therefore, ABCD ($=\Delta_1 \cap \Delta$) is the area where both mergers are profitable. So the area DGH contains all combinations for which no merger is profitable.

3. Optimal Partner Choice

In this section we discuss the choice of target firm partner under acquisition equilibrium. In the following subsections we construct sequential offer games, bidding game and repeated offer game, respectively.

3.1 Sequential Offer Game

Consider the situation where the MNC gives offers sequentially to the firms, but assume that the MNC can commit not to give any further offer once one round offers are complete. In Game 1, the MNC's first offer goes to firm 1 and if it is rejected the second offer goes to the second firm. In Game 2, the first offer goes to firm 2 and the second offer to firm 1 if the first offer is rejected. Whenever a firm gets an offer, it decides whether to accept (A) or reject (R) the offer (i.e., $d_i = \{A, R\}$). Such an offer is accepted if the firm under the offer gets at least as good as its next best alternative payoff. If both offers are rejected, greenfield investment occurs. Finally, we see which game yields the highest possible payoff to the MNC. Figure 2 portrays Game 1 and Game 2.

[FIGURE 2 HERE]

To solve the games the following conditions are useful (along with (C1) and (C2)).

(C3) $\quad \Pi_{2f}^{M2} - \pi_2^S \geq \Pi_{1f}^{M1} - \pi_1^{M2}$

(C4) $\quad \Pi_{2f}^{M2} - \pi_2^{M1} \geq \Pi_{1f}^{M1} - \pi_1^S$

Note that (C3) holds for all $c_2 \in (c_1, \bar{c})$. But $\exists \tilde{c} \in (c_1, \bar{c})$ such that condition (C4) holds if and only if $c_2 \in (\tilde{c}, \bar{c})$.

Let x_i^* be the MNC's optimal offer to firm i, and d_i^* is the optimal decision of firm i in response to the MNC's offer. When the MNC likes to give a rejection offer to firm i, we assume, for convenience, $x_i^* = -\infty$. We summarize the results of Game 1 and Game 2 in the following two lemmas, and the proofs are relegated to the *appendix.*

Lemma 3: *The subgame perfect equilibrium outcome of Game 1 is:*

(i) $[(x_1^* = -\infty, x_2^* = \pi_2^S), (d_1^* = R), (d_2^* = A)]$ *if condition (C2) holds; and*

(ii) $[(x_1^* = -\infty, x_2^* = -\infty), (d_1^* = R), (d_2^* = R)]$ *otherwise.*

Lemma 3 states that when (C2) holds (i.e., when both mergers are profitable), firm 1 will reject the MNC's first offer but firm 2 will accept the second offer. The MNC will target the high cost firm. When (C2) does not hold, no merger is profitable; this means the MNC will offer an unacceptable offer. Therefore, when (C2) holds, the MNC gets a payoff $(\Pi_{2f}^{M2} - \pi_2^S)$, otherwise its payoff will be π_f^S .

Lemma 4: *The subgame perfect equilibrium outcome of Game 2 is:*

(i) $[(x_2^* = \pi_2^{M1}, x_1^* = \pi_1^S), (d_2^* = A), (d_1^* = A)]$ *if (C1) holds and* $c_2 \in (\tilde{c}, \bar{c})$ *(i.e. (C4) holds),*

(ii) $[(x_2^* = -\infty, x_1^* = \pi_1^S), (d_2^* = R), (d_1^* = A)]$ *if (C1) holds and* $c_2 \in (c_1, \tilde{c})$ *(i.e. (C4) does not hold),*

(iii) $[(x_2^* = \pi_2^S, x_1^* = -\infty), (d_2^* = A), (d_1^* = R)]$ *if (C1) does not hold but (C2) holds, and*

(iv) $[(x_2^* = -\infty, x_1^* = -\infty), (d_2^* = R), (d_1^* = R)]$ *if neither (C1) nor (C2) holds.*

The corresponding payoffs of the MNC are respectively: (i) $(\Pi_{2f}^{M2} - \pi_2^{M1})$, (ii) $(\Pi_{1f}^{M1} - \pi_1^S)$, (iii) $(\Pi_{2f}^{M2} - \pi_2^S)$, and (iv) π_f^S. Note that this game gives the possibility that acquisition of the efficient firm can occur. This happens when both (C1) and (C4) hold.

Now to examine whether the MNC will choose Game 1 or Game 2 to maximize its payoff, note that we have always

$$\Pi_{2f}^{M2} - \pi_2^S > \Pi_{1f}^{M1} - \pi_1^S \quad \forall c_2 \in (c_1, \bar{c}) \tag{9}$$

Then to compare the payoffs of the MNC in Game 1 and Game 2, we note the following:

(i) If only (C2) holds but (C1) does not hold, both games yield a payoff of $\Pi_{2f}^{M2} - \pi_2^S$.

(ii) If both (C1) and (C2) hold, Game 1 generates a payoff of $\Pi_{2f}^{M2} - \pi_2^S$, whereas Game 2 yields a payoff: $\Pi_{2f}^{M2} - \pi_2^{M1}$ if $c_2 \in (\tilde{c}, \bar{c})$, and $\Pi_{1f}^{M1} - \pi_1^S$ if $c_2 \in (c_1, \tilde{c})$. Clearly in this case Game 1 generates a larger payoff (in view of (C3) and (C4)).

Hence under sequential (one round) offer game, the MNC will select Game 1, and $\forall (c_2, F) \in \Delta$ merger will occur with the inefficient firm 2. But if $(c_2, F) \in \Delta_3$, there will be no acquisition and the outcome will be subsidiary of the foreign firm. Hence we have the following result.

Proposition 1: *Under sequential offer game, the MNC will select the merger Game 1 and* $\forall (c_2, F) \in \Delta$ *acquisition of the inefficient firm will occur. If, however,* $(c_2, F) \in \Delta_3$, *the outcome will be greenfield investment.*

The implication of the above results is that under a take-it-or-leave-it offer game (that is, if the offer is once for all), the MNC will offer π_2^S targeting the high cost firm, and only firm 2 will accept the offer.

3.2 Bidding Game

Sometimes we observe that the acquisition problem is resolved by means of a bidding game where the potential target firms submit their bids in a sealed envelop for being merged with the MNC and the highest bidder wins the race. In the context of our problem, the maximum that firm i can offer to the MNC in a bidding game is $(\Pi_{if}^{Mi} - \pi_i^{Mj})$. But since we have

$$\Pi_{2f}^{M2} - \pi_2^{M1} > \Pi_{1f}^{M1} - \pi_1^{M2} \quad \forall c_2 \in (c_1, \bar{c}) \tag{10}$$

therefore, whenever both mergers M1 and M2 are profitable (i.e., $(c_2, F) \in \Delta_1 \cap \Delta$), firm 2 will win the bid by offering a little more than that of firm 1; hence merger with the inefficient firm will occur in equilibrium. Note that the bidding game in our model generates a lower payoff for the MNC compared to the above sequential offer games (or take-it-or-leave-it offer game) because, $\Pi_{2f}^{M2} - \pi_2^S > \Pi_{1f}^{M1} - \pi_1^{M2}$.

3.3 Repeated Offer Game

Consider the possibility of having a new offer by the MNC if the earlier offer is rejected. If the host firms perceive this, then given the externality in Cournot framework, each firm will have an incentive to reject the MNC's offer unless it gets a payoff not less than outsider payoff. In such a situation firm 1 would accept an offer if it is not less than π_1^{M2} and firm 2 would accept a payoff not less than π_2^{M1}. Realizing this when both mergers are profitable, the MNC will offer a payoff of π_2^{M1}, and such an offer will immediately be accepted by firm 2 (firm 1 will not accept because $\pi_1^{M2} > \pi_2^{M1}$). Consider the following strategies of the players. The MNC will offer π_2^{M1} every time, and firm i will accept any payoff if it is not less than π_i^{Mj} $(i, j = 1,2; i \neq j)$; otherwise it will reject. Note that these strategies are optimal, given the strategies of the other players. Therefore the MNC will offer π_2^{M1} at the beginning, and the offer will immediately be accepted by firm 2 only. The MNC's net payoff under this situation is $(\Pi_{2f}^{M2} - \pi_2^{M1})$. On the other hand, if $(c_2, F) \in \Delta_2$, so that merger only with firm 2 is possible, the MNC will offer a payoff of π_2^S, and again only firm 2 will accept the offer (firm 1 will not accept because $\pi_1^S > \pi_2^S$); in this case the MNC's net payoff is $(\Pi_{2f}^{M2} - \pi_2^S)$.

Proposition 2: *Consider repeated offer game. Given externalities, the MNC's optimal offer of merger is* π_2^{M1} *if* $(c_2, F) \in \Delta_1 \cap \Delta$, *and* π_2^S *if* $(c_2, F) \in \Delta_2$. *In either case, firm 2 will accept the MNC's offer immediately and merger between the MNC and the inefficient firm will occur in equilibrium. There will be no merger if* $(c_2, F) \in \Delta_3$.

While the MNC gets under repeated offer game a (weakly) lower payoff compared to sequential or take it or leave it offer game, but whenever merger occurs, it occurs with the low productivity firm.

4. Welfare Discussion

Given an initial asymmetric duopoly of domestic firms, as an MNC enters the domestic market by setting up a new firm it has to incur a set up cost. When such entry occurs,

domestic firms suffer due to increased competition, although consumers have a lot to gain in this situation because of a larger industry output.

When the foreign firm enters by acquiring a local partner, it can save the set up cost. Now if integration occurs with firm 1, there will be no efficiency gain further as both of them have the same efficiency level of technologies. This also means that consumers have nothing to gain compared to no foreign firm entry situation. Then such a merger could be profitable only if the set up cost is large enough and the local partner is paid from the saving of the set up cost under merger.

On the other hand, if merger occurs with the inefficient partner, the integrated firm uses the efficient technology, which means that such a merger not only saves the set up cost but also generates a surplus due to use of efficient technology. Therefore, total surplus created under merger with firm 2 is larger than that of merger with firm 1. That's why merger with the inefficient firm always dominates the other merger; hence merger occurs with the inefficient firm in equilibrium. Under such merger consumers also strictly gain due to efficiency effect. Further, the other local firm gains as outsider. So entry of the foreign firm in the form of merger with the inefficient firm is overall welfare improving. If the set up cost is low and the inefficiency level is small, clearly in such a situation merger cannot be profitable at all, and then entry will occur by means of forming a subsidiary. While in this case the local industry profit will be lower compared to no entry situation, consumers' welfare gain will overcompensate the loss. Therefore, foreign firm entry either in the form of merger or in the form of subsidiary will be welfare enhancing for the domestic country.

5. Conclusion

We have examined the issue of foreign market entry when a multinational firm faces the choice between acquisition of a target firm among the multiple heterogeneous targets, and greenfield investment. Throughout the paper we have focused our attention on the process of selection of the target firm and provided an analysis based on three different game, viz., sequential offer game, bidding game and repeated offer game. We find that in case of acquisition the multinational always prefers to acquire the inefficient target. When the multinational firm chooses to set up a subsidiary, it does so because the reservation payoff of

the inefficient firm is not favourable for acquisition as compared to the low level of fixed set up cost. The divergence of technological efficiency also plays a crucial role in the choice between greenfield investment and acquisition.

Appendix

Proof of Lemma 3

In Game 1, the first acquisition offer of the MNC goes to firm 1, which is either accepted (A) or rejected (R). If accepted, acquisition of firm 1 takes place. If rejected, the MNC's second acquisition offer goes to firm 2. If the offer is accepted, acquisition of firm 2 occurs; otherwise, greenfield investment occurs. The game is solved by backward induction. Denote by x_i the offer of the MNC to firm i, and x_i^* is the optimal offer.

Consider the subgame that starts with the MNC's offer x_2 to firm 2. Since firm 2 will accept any offer $x_2 \geq \pi_2^S$, the optimal offer in this subgame would be $x_2 = \pi_2^S$ provided that

$$\Pi_{2f}^{M2} - \pi_2^S \geq \pi_f^S \quad \Leftrightarrow \Pi_{2f}^{M2} \geq \pi_2^S + \pi_f^S$$

And given (A2), the above condition is reduced to (see (7))

$$\text{(C2)} \quad \frac{(a-c_1)^2}{16} \geq F \geq R_2(c_2)$$

Therefore, when (C2) holds, the optimal offer in this subgame is $x_2^* = \pi_2^S$, which is accepted by firm 2. In this case, the MNC gets a payoff of $(\Pi_{2f}^{M2} - \pi_2^S)$, firm 1 gets π_1^{M2} and firm 2 gets π_2^S.

If (C2) does not hold, the MNC will give a rejection offer $x_2 < \pi_2^S$. For convenience we take $x_2^* = -\infty$ in this case.

Now move to the beginning of the game where the MNC makes the offer to firm 1. If (C2) holds, then the optimal offer would be $x_1 = \pi_1^{M2}$ provided

$$\Pi_{1f}^{M1} - \pi_1^{M2} \geq \Pi_{2f}^{M2} - \pi_2^S$$

But this condition never holds (in view of (C3)). Therefore the optimal beginning offer to firm 1 will be the `rejection' offer $x_1^* = -\infty$

Thus in the subgame perfect equilibrium, the MNC first gives a `rejection' offer $x_1^* = -\infty$ to firm 1, and offers $x_2^* = \pi_2^S$ iff (C2) holds; otherwise, `rejection offer' $x_2^* = -\infty$ is optimal, in which case subsidiary is the outcome. This gives the SPNE of the game as stated in Lemma 3.

Proof of Lemma 4

In Game 2, the MNC gives the first acquisition offer to firm 2, and if it is rejected then the MNC's second offer goes to firm 1. In the subgame that starts with the MNC's second offer, the optimal offer would be $x_1 = \pi_1^S$ if and only if

$$\Pi_{1f}^{M1} - \pi_1^S \geq \pi_f^S \quad \Leftrightarrow \Pi_{1f}^{M1} \geq \pi_1^S + \pi_f^S$$

Given (A2), this condition is reduced to (see (4))

$$\text{(C1)} \quad \frac{(a-c_1)^2}{16} \geq F \geq R_1(c_2)$$

Therefore, if (C1) holds, the optimal offer is $x_1^* = \pi_1^S$ which is accepted. This yields a payoff of $(\Pi_{1f}^{M1} - \pi_1^S)$ to the MNC, π_1^S to firm 1 and π_2^{M1} to firm 2. If (C1) does not hold, the MNC will give a rejection offer, $x_1 < \pi_1^S$, i.e., $x_1^* = -\infty$.

When (C1) holds, in the subgame beginning with the MNC's first offer to firm 2, the optimal offer would be $x_2 = \pi_2^{M1}$ if and only if

$$\text{(C4)} \qquad \Pi_{2f}^{M2} - \pi_2^{M1} \geq \Pi_{1f}^{M1} - \pi_1^S$$

But (C4) holds iff $c_2 \in (\tilde{c}, \bar{c})$; $c_1 < \tilde{c} < \bar{c}$. Therefore if both (C1) and (C4) hold (i.e., (c_2, F) satisfies (C1) and $c_2 > \tilde{c}$), the optimal offer is $x_2^* = \pi_2^{M1}$, which is accepted. If (C1) holds but (C4) does not, then $x_2^* = -\infty$ and the offer is rejected by firm 2, but the second offer $x_1^* = \pi_1^S$ is accepted by firm 1.

Finally, if (C1) does not hold (this means, $x_1^* = -\infty$, in which case the outcome is subsidiary), then in the beginning the MNC would offer $x_2 = \pi_2^S$ if and only if $\Pi_{2f}^{M2} - \pi_2^S \geq \pi_f^S$. This leads to condition (C2).

Hence if (C1) does not hold but (C2) holds, then the optimal first offer will be $x_2^* = \pi_2^S$ which is accepted by firm 2 and acquisition of firm 2 takes place. But if neither (C1) nor (C2) holds,

the MNC's first offer will also be $x_2^* = -\infty$. That is, in this case the MNC gives both rejection offers and the outcome is subsidiary. This leads to the results of Lemma 4.

References

Bjorvatn, K., 2004, "Economic Integration and the Profitability of Cross-Border Mergers and Acquisitions", *European Economic Review* 48, 1211-1226.

Buckley, P. J. and M. C. Casson, 1998, "Analyzing Foreign Market Entry Strategies: Extending the Internalization Approach", *Journal of International Business Studies* 29, 539-561.

Calderon, C. and N. Loayza and L. Serven, 2002, "Greenfield FDI vs. Mergers and Acquisitions: Dos the Distinction Matter?", *Working Paper*, Santiago Central Bank of Chile.

Gorg, H., 2000, "Analysing Foreign Market Entry: The Choice between Greenfield Investment and Acquisitions", *Journal of Business Studies*, 27, 165-181.

Head, K and J. Ries, 2008, "FDI as an Outcome of the Market for Corporate Control: Theory and Evidence", *Journal of International Economics*, 74, 2020.

Hennart, J.-F. and Y. R. Park, 1993, "Greenfield vs. Acquisition: The Strategy of Japanese Investors in the United States", *Working Paper*, Tilburg University.

Horstmann, I. J. ans J. R. Markusen, 1987, "Licensing versus Direct Investment: A Model of Internalisation by the Multinational Enterprise", *Canadian Journal of Economics*, 20, 464-481.

Kim, Y.-H., 2009, "Cross-border M&A vs. Greenfield FDI: Economic Integration and Its Welfare Impact", *Journal of Policy Modeling*, 31, 87-101.

Mattoo, A., M. Olarreaga and K. Saggi, 2004, "Mode of Foreign Entry, Technology Transfer, and FDI Policy", *Journal of Development Economics*, 75, 95-111.

Müller, T., 2007, "Analyzing Modes of Foreign Entry: Greenfield Investment versus Acquisition", *Review of International Economics* 15, 93-111.

Nocke, V. and S. Yeaple, 2007, "Cross-border Mergers and Acquistions vs. Greenfield

Foreign Direct Investment: The Role of Firm Heterogeneity", *Journal of International Economics*, 72, 336-365.

Raff, H., M. Ryan, and F. Stähler, 2009, "The Choice of Market Entry Mode: Greenfield Investment, M&A and Joint Venture", *International Review of Economics and Finance* 18, 3-10.

Stepanok, I. 2012, "Cross-border Mergers and Greenfield Foreign Direct Investment", *Kiel Working Paper No. 1805*, Kiel Institute for the World Economy, Germany.

UNCTAD., 2000, "Cross-border Mergers and Acquisitions and Development", *World Investment Report 2000*, New York and Geneva.

Tang, M.-G. and C.-M. J. Yu, 1990, "Foreign Market Entry: Product Related Strategies", *Management Science*, 36, 476-89.

Zhao, K. (2011), "Entry Mode Choice and Target Firm Selection: Private and Collective Incentive Analysis", *mimeo*, GAINS-TEPP, Universit´e du Maine.

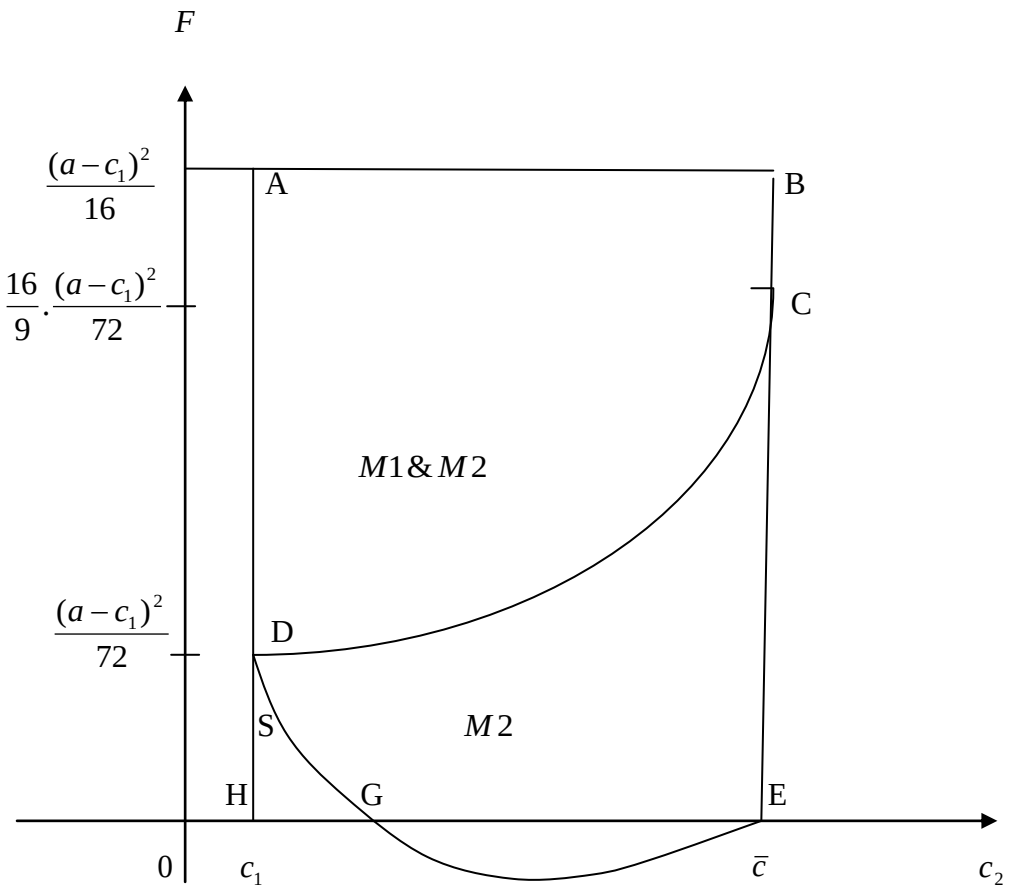

Figure 1: Different regimes of acquisition and subsidiary.

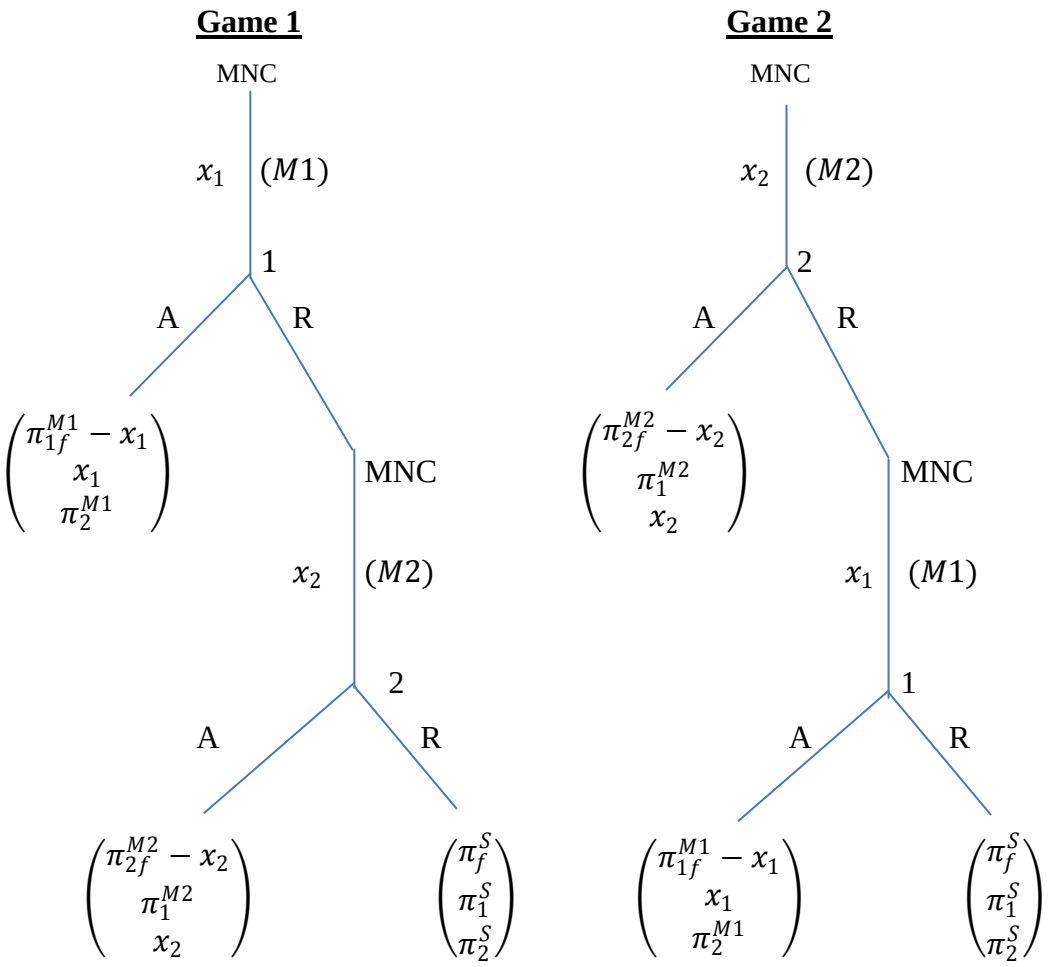

Figure 2: Sequential offer merger game