Investment liberalization and cross-border acquisitions: the effect of partial foreign ownership

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Abstract

This paper investigates the optimal strategy for a multinational to conduct FDI. We find that the incentives to use acquisition rather than greenfield investment change significantly if the multinational is allowed to have already an ownership interest in the target local firm before the market is fully liberalized. Interestingly, when investment costs are sufficiently high, the multinational prefers not entering the market at all with partial ownership in place, whereas a cross-border takeover would be the optimal entry mode otherwise. For intermediate levels of entry costs, holding a stake in the local producer reverses positively the profitability of a full acquisition compared to greenfield investment.


Keywords: partial ownership, FDI, mergers and acquisitions, development.

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1. Introduction

The past decades have witnessed an unprecedented surge in cross-border investment activity. Foreign direct investment (FDI) has grown much faster than world production or trade. From 1980 to 2004 FDI increased 11 times while world trade and GDP increased four and five times, respectively. The rapid expansion of FDI at the global level is attributable to a number of factors. One of the most important is the change in the policy stance towards incoming capitals. Historically free capital movements, and FDI in particular, have raised concerns for possible adverse economic and political consequences. The alleged negative economic effects include balance of payments deficits, diminished competition in the product market, crowding-out of domestic firms and lower employment. Political concerns relate instead to the possible loss of sovereignty by national authorities under excessive influence of multinational corporations. For these reasons national governments have often imposed restrictions on inward FDI. In particular, severe restrictive measures have been put in place through explicit regulatory provisions limiting the right of establishment for foreign firms, both in the form of greenfield investment and acquisitions of local producers. Examples of such provisions are compulsory joint venture requirements for foreign investors, ceilings to the share of foreign-owned equity and obligatory screening and authorization.

Notwithstanding any remaining concerns about the adverse effects of FDI, the general trend has been towards liberalization, especially in the past two decades. According to UNCTAD (2000), in the 1991-1999 period around one thousand regulatory changes facilitating FDI flows were made in over 100 countries. Furthermore, a survey dealing with more than 100 national FDI regulatory frameworks reveals that most laws concerning FDI do not explic-
itly make a distinction between greenfield investment and mergers and acquisitions. Thus, when industries are removed from closed lists, both forms of FDI are typically permitted; and when restrictions on foreign ownership are removed, majority acquisitions of domestic firms are also allowed (UNCTAD, 2000).

Clearly, attitudes and policies favoring inward investment, and consequently the timing and scope of liberalization have not been homogeneous at the global level. Developed countries have been the first to dismantle discriminatory barriers against foreign investment, whereas transition and developing economies have until recently been wary of inward FDI. For instance, with the notable exception of Hungary, countries in Central and Eastern Europe strongly limited the inflows of foreign capitals until the mid 1990s. Hence, foreign firms were in general excluded from the process of privatization of formerly state-owned enterprises. Restrictions to the level of foreign ownership have been used by many developing countries to protect infant domestic industry; those limitations, along with other regulatory barriers, are now being progressively lifted in order to attract inward investment in the context of global trade and investment liberalization. Emerging economies like India, China and Malaysia have recently raised the permitted level of foreign ownership in several service sectors, like retail and wholesale trade, storage and warehousing, multimodal transportation services, in some cases up to 100% (UNCTAD, 2006). In Korea, as documented in UNCTAD (2000), in the wake of the 1997 financial crisis, "restrictions on foreign equity ownership were abandoned in most industries, and even hostile takeovers by foreign investors have become possible".

The sharp increase in cross-border investment activity has motivated many theoretical analyses on the optimal business strategy to conduct FDI. Building on the general internationalization theory proposed by Buckley and Casson (1998), Görg (2000) investigates the
effects of market structure on the choice between greenfield investment and acquisition. He shows that in general, depending on the magnitude of the cost associated to each strategy and on the post-entry competitive stance of the market, acquisition of an existing local firm may be the optimal mode to enter a foreign market. In fact, greenfield investment is preferred only if adaptation costs are prohibitive. Müller (2007) investigates the same issue in a model for horizontally differentiated products à la Hotelling, highlighting the role of pre-entry competition on the investment decision. He finds that the optimal entry mode is affected by the competition intensity in the market in a non-monotonic fashion. Greenfield investment is most profitable with low or very high competition, while for intermediate regimes acquisition becomes the optimal strategy. The consequences of economic integration on the optimal entry strategy are analyzed by Bjorvatn (2004) in a simple Cournot oligopoly with symmetric firms. Comparing the costs related to each strategy, and taking into account the simultaneous choice of other potential entrants, he finds conditions under which a cross-border acquisition becomes profitable for a foreign producer, notwithstanding the business stealing effect induced by the consolidation. In fact, his contribution is closely related to another strand of the literature focusing on the profitability of international versus national acquisitions in the context of progressing market integration. This field of analysis builds upon the model proposed by Salant, Switzer and Reynolds (1983), which predicts that, in a Cournot model, opening up of the markets, by increasing the number of competitors, makes a consolidation less profitable for the insiders.

The change in the regulatory stance towards FDI is explicitly taken into account by Norbäck and Persson (2006). They analyze the welfare effects of discriminatory investment liberalization, which allows for greenfield entry but not for cross-border mergers and acquisi-
tions. The focus of their analysis, however, is not on the optimal entry mode, which in fact is determined by the restriction(s) still in place. In this paper, we argue that government regulations may affect the choice on the optimal entry mode even after they have been completely lifted, by shaping market outcomes before entry takes place. To demonstrate that point, we use a simple model for a multinational seeking to invest in a formerly protected market in order to service local demand. Once the market in open to foreign investment, the multinational is free to choose the organizational form of its operation: acquisition of an existing local producer or greenfield investment. We capture the idea that regulatory barriers are not neutral by allowing the multinational to have a minority joint venture agreement with the local firm before the market is opened up completely. This is consistent with the effect that the restrictive measures against inward investment pursue. Other specifications of the model make it particularly apt to a developing country framework. First, we suppose that the multinational has a technology advantage over the local producer. Second, by assuming a monopolistic market structure we implicitly rule out competition policy concerns by a national antitrust authority.

The rest of the paper is organized as follows. In the section 2, we lay out the model framework. Section 3 discusses the issue of market entry when partial foreign ownership is in place, comparing it with the benchmark case of a traditional Cournot setup. Section 4 concludes.
2. The model

In a partial equilibrium framework, we consider a market $H$, where the inverse demand function for a homogeneous product is given by $P = 1 - Q$. Total quantity $Q$ is initially supplied only by a local producer, firm $h$. The local monopolist employs a production technology with a positive and constant marginal cost ($c > 0$). There is another producer in the economy, a foreign firm labelled $e$, which we refer to also as the multinational. It is assumed that the multinational is more efficient than the local incumbent, and faces a null marginal cost. Therefore, $c$ can be considered as the efficiency gap between the two firms, and also a measure of the technological backwardness of the host country. Fixed costs of production are always equal to zero.

We suppose that the market is initially protected by regulatory restrictions to the level of foreign ownership. Due to those restrictions, the multinational seeking entry has only been allowed to form a joint venture agreement with the local producer. In particular, the foreign entrant holds a minority stake $v$ in the local incumbent. Given its nature of silent financial interest, the stake does not involve any synergies or marginal cost savings. Following investment liberalization, the multinational has to decide between two different entry options into the country in order to serve local demand. First, it may set up its own production facilities (strategy G). Greenfield investment entails sinking fixed entry outlays of $f$. Alternatively, it may decide to acquire the local firm (label it strategy A). In this case, we assume that production takes place with the technology endowment of the local incumbent, hence no adaptation or restructuring cost is borne by the entrant. In this context, we analyze the profitability for the foreign firm to enter the market under the different available
strategies; we compare the results with the counterfactual situation when partial ownership is absent (the benchmark case). The sequence of moves is as follows. At stage one, firm \( e \) decides on the entry modality; after entry has taken place, there is Cournot competition in the market.

To clarify notation, operating profits in the benchmark case and with partial ownership are \( \pi^i_j \) and \( \hat{\pi}^i_j \) respectively, with \( i \in \{ h, e \} \), and \( j \in \{ G, A \} \), the strategy set for the multinational. Clearly, it holds that \( \pi^e_A = \hat{\pi}^e_A \). By the same token, \( \pi^i_o \) depicts operating profits in the pre-entry scenario, when the multinational realizes \( \pi^e_o = 0 \).

### 3. Entry

At the first stage of the game the multinational has to choose the modality of investing into the market, among greenfield (G) and acquisition of the local producer (A). In this latter case, a desired level of ownership of 100\% is assumed. Furthermore, we suppose that the more efficient production technology cannot be immediately transferred to the integrated firm; thus, production takes place with the low technology employed by the local firm.

After the acquisition, the integrated firm realizes monopoly profits given by \( \pi^e_A = \frac{(1-c)^2}{4} \). An acquisition price for the target firm has to be paid, however. In order to endogenize negotiations, the incentives to acquire the home firm should be explicitly modelled. The takeover can be represented as a bidding game, in which the entrant and the local firm submit their prices; hence, the acquisition takes place only if the willingness to pay of the multinational (call it \( P_{\text{max}} \)) is higher than the reservation price of the target (\( P_{\text{min}} \)). This latter corresponds to the profits that the local incumbent would have earned in the absence of
a takeover. By the same token, $P_{\text{max}}$ is equal to the additional profits to the buyer resulting from the consolidation. The focus of our analysis is only on the incentive to enter the market by a cross-border acquisition, therefore we will not ask which price will be actually paid for the target firm: any price between the target’s reservation value and the acquirer’s valuation is indeed sustainable. The actual transaction price is determined by the relative bargaining power of the two firms, which is not specified in this model. If $P_{\text{max}} > P_{\text{min}}$, however, a monetary transfer can be arranged between the two parties such that both of them benefit from the consolidation. With this in mind, we analyze the profitability of entry under the two strategies available, first in the benchmark case and then in the scenario with partial ownership of domestic assets by the multinational.

3.1. The benchmark case

In case the foreign firm enters the market setting up its own venture, duopoly profits for the incumbent and for the multinational are, respectively:

$$
\pi^h_G = \frac{1}{9} (1 - 2c)^2 \tag{3.1}
$$

$$
\pi^e_G = \frac{1}{9} (1 + c)^2 - f \tag{3.2}
$$

In the case of cross-border acquisition, the profitability condition previously defined gives $\Pi_A^e \equiv P_{\text{max}} - P_{\text{min}}$. Following the reasoning above, the increase in profits to the multinational with respect to greenfield entry after the consolidation amounts to $P_{\text{max}} = \pi_A^e - \pi_G^e$; similarly,
the reservation price for the local firm is given by $P_{\text{min}} = \pi^h_G$. Hence, the profitability of entry by a takeover can be expressed as:

$$\Pi_A^e = \frac{1}{4} (1 - c)^2 - \frac{1}{9} (1 + c)^2 - \frac{1}{9} (1 - 2c)^2 + f$$ (3.3)

We start by looking at the viability of the different entry modes; in that, entry costs play obviously a crucial role. In particular, from equation 3.2 it follows that greenfield investment is profitable if and only if fixed cost of setting up a new venture are lower than operating profits for that strategy, or $f < f_p \equiv \frac{1}{9} (1 + c)^2$.

The profitability of entry through an acquisition can be determined imposing strict positivity of the stability condition defined in equation 3.3. The result is summarized in the following lemma:

**Lemma 1.** If the marginal cost asymmetry is sufficiently low ($c < 1/11$) an acquisition is always viable. If the cost asymmetry is high ($c > 1/11$), there is a positive level of entry costs $f_o$ above which acquisition is profitable.

**Proof.** See the appendix.

Clearly, the technological gap between the local firm and the entrant plays a pivotal role in determining when an acquisition is profitable. As the integrated firm can only make use of the less efficient local technology, a high marginal cost asymmetry reduces the willingness to pay of the entrant ($\frac{\partial P_{\text{max}}}{\partial c} < 0$): monopoly profits after the acquisition decrease in $c$, while greenfield investment, given the level of entry costs, leads to relatively high operating profits. At the same time, a high technological asymmetry decreases the reservation price of the incumbent ($\frac{\partial P_{\text{min}}}{\partial c} < 0$), making acquisition cheaper. As the latter effect is dominated,
it holds that $\frac{\partial \Pi_e}{\partial c} < 0$. Therefore, an increase in the production cost asymmetry affects negatively the profitability of acquisition. The result in Lemma 1 states that there is a cutoff level of marginal cost asymmetry, $c = 1/11$, at which the multinational is just indifferent between staying out and acquiring the local incumbent. When the marginal cost asymmetry is below the threshold, acquisition is always profitable: monopoly profits using the local technology are relatively high, while, from the point of view of the entrant, gross profits achievable with greenfield investment are dampened by the small technological gap. As the technology difference increases, acquisition becomes less and less attractive. For $c > 1/11$, acquisition is still profitable only if fixed costs of setting up a new venture are too high ($f > f_o$), therefore making greenfield investment too costly.

Interestingly, when greenfield investment is not viable, that is to say when entry costs associated with this strategy are prohibitively high ($f > f_p$), acquisition is not profitable either. Thus, in that case, the foreign firm prefers to stay outside the market. Similar to the findings in Müller (2007), this apparently counterintuitive result is easily understood recalling how the profitability of acquisition is defined. In fact, the availability of alternative entry strategies is crucial to determine the reservation price of the incumbent. When greenfield investment leads to null profits, the entrant cannot commit to use it as an entry strategy; therefore, it would have to pay an acquisition price for the local producer equal to the monopoly profit. Hence, as for the foreign firm an acquisition has no advantage over no entry, the incentives to enter the market are null. Note that if the takeover would generate synergies leading to marginal cost savings, all other things being equal, entry by acquisition would be more profitable than not servicing the market at all.

Having defined the profitability of entry through greenfield investment and acquisition,
it remains to specify under which circumstances one of the strategies is optimally chosen by
the multinational. The isoprofit function defining the indifference condition between the two
entry modes can be expressed as:

\[ \pi_G^c - \Pi_A^c = 0 \quad \implies \quad f = f_c = \frac{1}{24} (1 + c)(1 + 5c) \quad (3.4) \]

As Figure A1 shows, the optimal entry strategy is defined by the level of fixed costs. For
\( f < f_o \) greenfield investment leads to high duopoly profits, making at the same time the other
entry mode too expensive for the multinational. Therefore, acquiring the local incumbent is
not an entry option. For \( f_o < f < f_c \), although viable, acquisition is still less attractive than
greenfield. Only when investment costs turn sufficiently high \( (f_c < f < f_p) \), and profits from
greenfield investment are thus accordingly lower, acquisition is the preferred entry modality.
Finally, when fixed costs are prohibitive, \( f \geq f_p \), the multinational stay out of the market,
as both investment strategies lead to null profits.

### 3.2. Partial foreign ownership

Now we turn to the alternative scenario in which the multinational and the local firm are
linked by a joint venture agreement. The underlying hypothesis is that, constrained by regu-
laratory restrictions in the past, the entrant holds a minority interest, \( v \), in the local incumbent.
The influence of partial ownership on the entry decision once investment has been fully lib-
eralized is twofold. First, the pre-entry situation is altered: by staying outside the market
the multinational earns strictly positive profits, equal to the fraction \( v \) of operating profits
received from the local monopolist. Secondly, partial ownership modifies the competitive
interaction once the foreign firm has entered the market via greenfield; as a consequence, it affects directly the profitability of a full acquisition. In fact, when both firms are active in the market, joint asset ownership decreases the incentives for the entrant to compete vigorously with the local producer. The multinational recognizes the effects that its decisions have on the rival’s profitability, and behaves accordingly; in other words, it aims to maximize profits from its own operations plus the share of the profits earned at firm $h$. On the other hand, the local incumbent maximizes as usual only its own operating profits $e$. Equilibrium duopoly profits for the local firm and the multinational are, respectively:

$$
\hat{\pi}_G^h = \frac{(1 - 2c)^2}{(3 - v)^2} \\
$$

$$
\hat{\pi}_G^e = \frac{[1 + c (1 - v)] [1 + c - v (1 - c)]}{(3 - v)^2} - f.
$$

Comparing equations 3.1 and 3.5 it is easy to see that $\pi_G^h < \hat{\pi}_G^h$; the inequality is reversed for operating profits of the multinational $\pi_G^e > \hat{\pi}_G^e$ (equations 3.2 and 3.6). In fact, profits of the target firm increase in the size of the stake owned by the foreign producer, $\frac{\partial \pi_G^h}{\partial v} > 0$, while the opposite holds for operating profits of the entrant, $\frac{\partial \pi_G^e}{\partial v} < 0$. As pointed out by Farrell and Shapiro (1990), there are two reasons why profits of the buyer decrease with the fraction of ownership $v$. First, given the output of the incumbent, as the foreign firm reduces its production, the profits it earns on its own operations must fall. The reason is that the entrant is increasingly willing to sacrifice profits at its own facility in order to augment profits of the target, the larger is $v$. Second, as the output of the entrant moves further from the Cournot level, the local firm expands production, which lowers $\hat{\pi}_G^e$ even more.
fact, partial ownership affects directly only the behavior of the foreign firm, whose reaction function rotates inwards as \( v \) increases, whereas the reaction function of the local producer is unaffected (see Figure A2). Overall, industry output decreases, and market price rises \(^4\). Although operating profits to the multinational are lower than in the traditional Cournot equilibrium, its total earnings need not fall with partial ownership. The following proposition establishes cost conditions under which overall profits to the multinational increase when partial ownership is in place compared to the benchmark case.

**Proposition 1.** There exists a critical \( c^* \) so that for \( c < c^* \), duopoly profits to the entrant are higher with partial ownership than in the benchmark case, whatever the value of the non-prohibitive investment costs in place. The opposite occurs when \( c > c^* \).

**Proof.** Consider duopoly profits from greenfield investment. It holds that \( \hat{\pi}^c_G + v\hat{\pi}^h_G = \pi^c_G \)

iff \( c = c^* \equiv \frac{6 - v}{21 - 5v} \). Evaluated at \( c = c^* \), \( \partial\left(\hat{\pi}^c_G + v\hat{\pi}^h_G - \pi^c_G\right) / \partial c = -\frac{1}{3} (3 - v)^{-1} v < 0. \)

First of all, as expected, investment costs \( f \) do not play any role in determining the relative profitability of duopoly with partial ownership and in the benchmark case, as they are the same under both scenarios. On the other hand, the technological gap between the firms is crucial. For a given fraction of foreign ownership \( v \), the marginal cost asymmetry influences the intensity of competition in the market, and thus the relative size of operating profits \( \hat{\pi}^h_G \) and \( \hat{\pi}^c_G \). This is relevant because the multinational now gets also a fraction of the incumbent’s profits. The result states that at a certain cutoff value \( c^* \) overall profits to entrant are the same under both scenarios.

What happens when \( c \) changes? At the margin, an increase of the production cost asymmetry affects negatively profits to the incumbent \( (\frac{\partial \hat{\pi}^h_G}{\partial c} < 0) \), whereas it has a positive effect
on operating profits to the multinational. Moreover, the magnitude of the positive effect is higher with partial ownership, \( \frac{\partial \pi^*_x}{\partial c} > \frac{\partial \pi^*_x}{\partial c} (> 0) \). When the local firm is not highly inefficient \((c < c^*)_\) its output expansion following partial ownership is large; hence, its profits are relatively high. In this case, from the point of view of the entrant, what it gets from the local firm more than compensates the reduction in its own operating profits; its overall profitability is thus higher with partial ownership than in the benchmark case. By the same reasoning, when the technological asymmetry is large \((c > c^*)_\), the decrease in operating profits that the entrant suffers as a consequence of partial ownership relative to the benchmark case is not compensated by the fraction of profits it gets from the (less efficient) local producer. Thus, duopoly competition is more profitable in the benchmark case.

**Lemma 2.** It holds that \( \frac{dc^*}{dv} > 0 \). Hence, the larger is \( v \), the larger are duopoly profits with partial ownership relative to the benchmark case, for any given \( c \).

**Proof.** It can be immediately verified that \( dc^*/dv = 9 (21 - 5v)^{-2} \).

Hence, not surprisingly, an increase in the fraction of partial ownership makes duopoly in this regime more attractive compared to the benchmark case. Besides exerting a second order effect on profits, the size of \( v \) affects directly the fraction of earnings that the multinational gets from local producer.

In defining overall profitability of the two entry modes with partial ownership one has to consider the fraction of profits transferred from the local producer to the multinational, both before and after entry. It follows that, when entry takes place through greenfield investment,
net gains to the multinational are:

\[ \hat{\Pi}^e_G = \hat{\pi}_G^e + \nu (\hat{\pi}_G^h - \pi_o^h) \]  

(3.7)

where \( \pi_o^h \) are monopoly profits to the local incumbent in the pre-entry scenario. As in the benchmark case, the viability of greenfield investment is found by imposing strict positivity of the condition above. A first important result can be stated as follows:

**Proposition 2.** There exist a level of entry costs \( \hat{f}_p \), such that for \( \hat{f}_p < f < f_p \) acquisition is the optimal entry strategy in the benchmark case but is not profitable with partial ownership.

**Proof.** See the appendix.

The result in Proposition 2 has three parts. First, it states that the prohibitive levels of entry costs are lower than the corresponding values in the benchmark case \( \hat{f}_p < f_p \); therefore, partial ownership decreases the scope for entry through greenfield investment. This is a direct consequence of the cannibalization effect that duopoly competition imposes on profits accruing to the entrant. In order to understand the mechanism at work, consider equation 3.7. It is immediately clear that, for greenfield investment to be viable \( \hat{\Pi}_G^e > 0 \), total gross profits to the entrant need to cover both the fixed cost \( f \) and the "opportunity cost" of entering the market, given by the foregone fraction of monopoly profits \( \nu \pi_o^h \). Intuitively, staying outside the market is now very attractive compared to the benchmark case; hence, there are still incentives to invest greenfield only if fixed entry costs are relatively low. Therefore, it has to be \( \hat{f}_p < f_p \).

Furthermore, from the discussion in the previous section, we know that when investment costs are prohibitively high acquisition is not an option for market entry. The reason is
that, as the entrant cannot commit to greenfield investment, the reservation price of the incumbent is equal to its monopoly profits. Hence, net gains from entering the market through an acquisition are null. It then follows immediately that in the cost range \([\hat{f}_p, f_p]\) the foreign firm will stay outside the market.

Finally, it remains to clarify what happens within this cost range in the benchmark case. Equation 3.4 defines the critical level of fixed costs \(f_c\) for which the entrant is indifferent between greenfield and acquisition. It is easy to verify that \(f_c < \hat{f}_p\) (see algebra in the Appendix). From the comments to the equilibrium strategy in the benchmark case, we know that for entry costs above \(f_c\) greenfield investment is a dominated strategy. Therefore, summing up, for \(f \in [\hat{f}_p, f_p]\) the multinational prefers entry through acquisition in the benchmark case, whereas it stays out of the market in the case of partial ownership. In this regime, in fact, it benefits from the joint venture agreement, achieving a level of profitability high enough to make entry not profitable.

The profitability for the entrant to fully acquire the local incumbent is determined defining the range of prices that make the transaction mutually viable. Taking into account the other entry option available, the valuation on the part of the acquirer is given by net gains from the takeover, or \(\hat{P}_{\text{max}} = \pi_A^e - \nu \pi_o^h - \hat{\Pi}^e_G\). On the other hand, the reservation price of the incumbent reflects what it would have earned without the acquisition, or \(\hat{P}_{\text{min}} = (1 - \nu) \pi_A^h\). The viability condition for an acquisition is \(\hat{\Pi}_A^e = \hat{P}_{\text{max}} - \hat{P}_{\text{min}}\).

It can be easily verified that, like in the benchmark case, when greenfield investment is a viable option, profitability of a full acquisition - and the associated threshold level of entry costs - depend on the technological gap between the local firm and the entrant. Clearly, the cost asymmetry influences monopoly profits, as well as profits from duopoly
in case of greenfield investment; hence, as discussed above, both the willingness to pay of the multinational and the reservation price of the incumbent are affected. It is interesting to analyze in depth the changes that partial ownership brings about compared to the benchmark case. We sketch the most relevant results here, leaving the complete algebraic derivation for the Appendix.

First of all, it can be seen that the profitability condition \( \hat{\Pi}_A \) is strictly positive when \( c < \frac{1-v}{11-5v} \), irrespective of the level of entry costs. This cutoff value of the marginal cost is lower than the corresponding threshold in the benchmark case, \( c = \frac{1}{11} \) (see Lemma 1). Hence, the incumbent needs to be relatively more efficient for acquisition to be profitable. Why is that? Consider the willingness to pay of the entrant. Total profits to the multinational in case of greenfield entry now include a fraction of the incumbent’s profits; from Proposition 1 we know that in the cost range under analysis duopoly competition with partial ownership leads to higher profits than in the benchmark case. Therefore, given monopoly profits after acquisition, the valuation of the entrant is lower with partial ownership (\( \hat{P}_{\text{max}} < P_{\text{max}} \)).

Turning to the incumbent, although partial ownership increases its total operating profits, after distribution among the shareholders it gets less than in the benchmark case. Hence, its reservation price is lower (\( \hat{P}_{\text{min}} < P_{\text{min}} \)). It can be easily shown that the first effect dominates, and the profitability of acquisition with partial ownership turns lower, or \( \hat{\Pi}_A < \Pi_A \). As \( \frac{\partial \hat{\Pi}_A}{\partial c}, \frac{\partial \Pi_A}{\partial c} < 0 \) the marginal cost level that makes the entrant indifferent between acquisition and staying out must be lower as well. Intuitively, even with low marginal cost asymmetry (i.e. when \( c = \frac{1}{11} \)), monopoly profits being the same, greenfield investment with partial ownership is relatively more attractive than in the benchmark case; from the point of view of the entrant, in fact, the erosion in own profitability due to partial ownership is compensated
by the fraction of profits it gets from the (relatively efficient) local incumbent. As marginal
cost goes down, total profits to the entrant decrease less, as earnings received from the
incumbent increase; thus, its willingness to pay increases less than in the benchmark case. We
know that this effect is strong enough to counteract the positive evolution of the reservation
price. Consequently, acquisition turns viable only when the production cost discrepancy is
very low.

Following the result in Lemma 1, we expect entry costs to play a fundamental role in
determining the profitability of acquisition as the efficiency gap widens. Thus, when the
technological gap between the two firms is not too low \( c > \frac{1 - v}{11 - 5v} \), one has to consider the
level of fixed investment costs \( f \). It is possible to recover a critical value, defined \( \hat{f}_o \), above
which acquisition becomes a viable entry option. High investment costs make greenfield
entry not attractive, thus increasing the willingness to pay of the entrant in the takeover
negotiations. So far the result is not qualitatively different from the findings obtained for the
benchmark case, where the cutoff level of fixed entry costs was \( f_o \) (see Lemma 1). In fact,
the difference \( f_o - \hat{f}_o \) reflects the discrepancy between the indifference conditions (staying
out of the market versus entering through acquisition) in the benchmark case and with
partial ownership, respectively. It can be expressed as the difference between the valuations
of the entrant, gross of entry costs, and the reservation prices of the incumbent in the two
scenarios, or \( \left( \hat{P}_{\max} - P_{\max} \right) - \left( \hat{P}_{\min} - P_{\min} \right) \). We already know that while the reservation
price is always lower with partial ownership, \( \hat{P}_{\min} < P_{\min} \), the relative size of the willingness
to pay depends on the level of marginal cost asymmetry (see Proposition 1).

To check the relative magnitude of the fixed cost thresholds, it is easy to verify that
\( f_o - \hat{f}_o = 0 \) when \( c = \frac{3 - 2v}{15 - 7v} \). What happens when \( c \) changes? As we know, duopoly profits
from greenfield increase in $c$, but the positive effect is dampened in the case of partial ownership, when the entrant is penalized by the fraction of earning it gets from the less efficient incumbent. Therefore, gross of entry costs, greenfield investment with partial ownership becomes relatively less profitable when $c > \frac{3-2v}{15-7v}$. In order to restore the equilibrium along the indifference curve, $\hat{f}_o$ has to decrease with respect to $f_o$. Hence, when $c > \frac{3-2v}{15-7v}$, $f_o - \hat{f}_o > 0$.

It follows that for $\hat{f}_o < f < f_o$ acquisition is profitable with partial ownership but not in the benchmark case. The opposite is true for $c < \frac{3-2v}{15-7v}$. Using the reasoning above, as $c$ decreases, the negative effect on gross greenfield profits is stronger in the benchmark case. Greenfield investment turns relatively less profitable than in the case with partial ownership. Therefore $f_o$ has to decrease with respect to $\hat{f}_o$ to reestablish the indifference condition. Finally, for $f_o < f < \hat{f}_o$ partial ownership reverses negatively the profitability of an acquisition.

The result is illustrated graphically in Figure A3. From the discussion above the following proposition can be claimed:

**Proposition 3.** In general partial foreign ownership reduces the scope for profitable acquisitions, except for sufficiently high marginal cost asymmetry ($c > \frac{3-2v}{15-7v}$) when $f \in [\hat{f}_o, f_o]$.

So far we have defined the viability conditions for the two alternative entry modes. It remains to clarify how partial ownership changes the incentives to enter the market through a full acquisition rather than by greenfield investment. The main result can be summarized as follows:

**Proposition 4.** When both entry strategies are viable, there exists a level of entry cost $\hat{f}_c$ such that:

- for $f < \hat{f}_c$, greenfield investment is the optimal entry mode;
• for $f > f_c$, acquisition is the optimal entry mode;

• for $\hat{f}_c < f < f_c$, acquisition is optimal with partial ownership, whereas greenfield investment is optimal in the benchmark case.

Proof. See the appendix. ■

Clearly, the choice of a full acquisition over greenfield entry is driven by the magnitude of investment costs. Through the effects on the profitability of greenfield investment discussed above, partial ownership shifts the critical levels of entry costs that make the entrant indifferent between acquisition and the other strategy. Not surprisingly, when entry costs are sufficiently low greenfield investment is the optimal entry mode, both in the benchmark case and with partial ownership. On the other hand, when investment costs are high, but still non prohibitive, acquisition dominates greenfield, again in both scenarios. For intermediate levels of market openness, as it is reflected in the level of investment costs, however, a joint venture with the local incumbent reverses positively the incentives to the entrant for a full takeover. In fact, acquisition becomes the optimal entry strategy, whereas it is strictly dominated by greenfield investment in the benchmark case. The reason is again to be found in the profit erosion to the multinational following duopoly competition with partial ownership; greenfield investment becomes relatively less attractive in this case, and therefore the incentives for a full acquisition are correspondingly higher.

4. Concluding remarks

We have analyzed the optimal strategy for a multinational to conduct FDI in a formerly protected market. We find that the incentives to use greenfield investment versus acquisition
once the market is fully liberalized change significantly if we allow the multinational to have already an ownership interest in the target local firm, compared to the benchmark case when such partial ownership is absent.

We find that the technological gap between firms plays a fundamental role in determining the viability of an acquisition, both when a joint venture is in place and in the alternative scenario. Hence, when marginal costs are very similar, a full takeover is the most profitable entry mode. Furthermore, our findings suggest that the effect of partial ownership on the choice of the optimal entry strategy is not clear-cut: it depends on the level of fixed entry costs. When investment costs are sufficiently high, the multinational prefers a cross-border takeover over greenfield entry in the benchmark case, whereas not entering the market at all is the optimal strategy with partial ownership in place. For intermediate levels of entry costs, holding a stake in the local producer reverses positively the profitability of a full acquisition compared to the alternative entry strategy available. Thus, the multinational prefers an acquisition over greenfield investment when it already has a joint venture arrangement with the local incumbent, while it would set up its own operations in the alternative scenario.

Although very simple, the model may help understand why in conducting FDI multinationals choose acquisitions rather than greenfield investment in some markets. In particular, it shows how, in the context of full investment liberalization, still ongoing in many transition and developing economies, entry choices by foreign investors may be driven by the way regulatory restrictions to inward FDI have shaped market outcomes in the past.

Certainly there are a number of policy issues concerning investment liberalization which are not explored in the present paper. In particular, investigating the welfare effects of the different entry modes may give a rationale to why national governments are increasingly
engaging in promotion of greenfield FDI (UNCTAD, 2007). Such extensions are left for further research.

A. Appendix

Proof of Lemma 1.

From equation 3.3 in the text it is clear that profits resulting from the acquisition, when the best alternative is greenfield investment, are positive, $\Pi_A^e > 0$, when $f > \frac{1}{9} (1 - 2c)^2 + \frac{1}{9} (1 + c)^2 - \frac{1}{4} (1 - c)^2$, which can be simplified in $f > f_o \equiv \frac{1}{36} (1 + c)(11c - 1)$. This expression is strictly positive only if $c > \frac{1}{11}$. It also holds $f_p - f_o = \frac{1}{36} (1 + c)(5 - 7c) > 0$.

Proof of Proposition 2.

Consider the profitability condition for greenfield investment, $\hat{\Pi}_G^e > 0$. Substituting for the relevant equilibrium profits and rearranging, after simply algebraic manipulations it can be expressed as $f = \hat{f}_p \equiv \left(\frac{4-v}{4}\right)^2 > 0$, where $\hat{f}_p$ denotes the level of fixed entry cost above which greenfield investment is no longer viable. The inequality $\hat{f}_p < f_p$ can be immediately verified, using equation 3.2 in the text, and noticing that: $\hat{\pi}_G^e - \pi_A^e = \frac{(1-2c)}{9} \frac{v}{(3-v)^2} (5cv - v - 3c - 3) < 0$, and $\hat{\pi}_A^h - \hat{\pi}_o^h = \frac{1+c-v+cv}{4(3-v)^2} (5 - 7c + cv - v) < 0$.

To compare with the critical level of investment costs which drives the choice between greenfield and acquisition in the benchmark case (see equation 3.4 in the text), note first that this can be expressed as $f_c = \pi_G^e + \frac{1}{2} \left(\pi_A^h - \pi_A^e\right)$. Recalling that $\pi_A^e = \hat{\pi}_o^h$, the difference $\hat{f}_p - f_c$ can be rearranged as $(\hat{\pi}_G^e - \pi_G^e) + \frac{1}{2} (\pi_A^e - \pi_A^h) - v (\pi_A^e - \hat{\pi}_G^e)$. The condition for strict positivity can be written as $v < \frac{\hat{\pi}_G^e - \pi_G^e}{\pi_A^e - \hat{\pi}_G^e} + \frac{1}{2} \frac{\pi_A^e - \pi_A^h}{\pi_A^e - \hat{\pi}_G^e}$, which holds for sufficiently small levels of $v$, as it is assumed in the model.
Proof of Proposition 3.

The profitability of a full acquisition can be expressed as: 
\[ \hat{\Pi}_A = \frac{(1-c)^2}{4} - \frac{(1+c(1-v))(1+c-v(1-c))}{(3-v)^2} + f - \frac{(1-2c)^2}{(3-v)^2}. \]
Simplifying and rearranging, the profitability condition \( \hat{\Pi}_A > 0 \) can be written as \( f > \hat{f}_o \equiv \frac{1+c-v+c(1-c)}{4(3-v)^2} (11c + v - 1 - 5cv). \) It is easy to check that \( \hat{f}_o > 0 \) iff \( c > \frac{1-v}{11-5v} \). From 3.3 and Lemma 1 it can be verified that \( \hat{f}_o = f_o \) iff \( c = \frac{3-2v}{15-7v} \). Evaluated at \( c = \frac{3-2v}{15-7v} \), 
\[
\frac{\partial (\hat{f}_o - f_o)}{\partial c} = -\frac{1}{3} (3 - v)^{-1} v < 0. \]
Moreover, it holds that: \[ \frac{3-2v}{15-7v} - \frac{1-v}{11-5v} > 0. \]

Proof of Proposition 4.

The isoprofit curve for acquisition and greenfield investment, \( \hat{\Pi}_A - \hat{\Pi}_G = 0 \), can be simplified and rearranged into:
\[ f = f_c \equiv \frac{(1+c(1-v))(1+c-v(1-c))}{(3-v)^2} + \frac{1}{2} (1 + v) \left[ \frac{(1-2c)^2}{(3-v)^2} - \frac{(1-c)^2}{4} \right] = \frac{1+c-v(1-c)}{8(3-v)} (1 + 5c + cv - v). \]
Recalling from equation 3.4 in the text the corresponding critical level of entry costs for the benchmark case, and subtracting it from \( \hat{f}_c \), one gets \( \hat{f}_c - f_c = \frac{v(3v-6c-6cv+23c^2+3c^2v-5)}{24(3-v)} \), which is negative as the expression in the parentheses.
Figure A1. Optimal entry mode in the benchmark case

Figure A2. Reaction functions

Figure A3. Profitability of acquisition
References


Notes

1 A first contribution in this field was made by Ross (1988); subsequently, general models have been proposed by Long and Vousden (1995), Benchekroun and Chaudhuri (2006), Horn and Persson (2001).

2 Farrell and Shapiro (1990) point out that if shareholders have divergent interests, the foreign stake might in turn be taken into account in the maximisation problem of the target firm. However, this would not be the case when the foreign stake is fairly small, like it is assumed in the present model.

3 This effect is similar to the finding in Salant et al. (1983) that a merger without economies of scale in a Cournot oligopoly may turn unprofitable for the integrated entity, following the restriction in its own production.

4 As stressed by Reynolds and Snapp (1986), the contraction in industry output due to partial ownership might be substantial. In our model, for an ownership interest of 5 percent total production decreases by 1 percent compared to the standard Cournot setup; when $v$ rises to 20 and 30 percent, the gap is about 7 and 11 percentage points, respectively.

5 We know that $f_p$ is retrieved by the equality $\pi_G^c = 0$. Similarly, $\hat{f}_p$ is given by equating to zero the profitability condition in 3.7, $\hat{\Pi}_G^c = \hat{\pi}_G^c + v \left( \hat{s}_G^h - \pi_o^h \right)$. We already know that $\hat{\pi}_G^c < \pi_G^c$; hence, as $\left( \hat{s}_G^h - \pi_o^h \right) < 0$, it is immediate to see that it has to be $\hat{f}_p < f_p$.

6 This is true below $c^\ast$. It is easily checked that $c^\ast > \frac{1-v}{1-5v}$.

7 Like in the benchmark case, now it holds that $\frac{\partial \hat{P}_{\text{max}}}{\partial c} = \frac{\partial \hat{P}_{\text{min}}}{\partial c} < 0$, with $\left| \frac{\partial \hat{P}_{\text{max}}}{\partial c} \right| > \left| \frac{\partial \hat{P}_{\text{min}}}{\partial c} \right|$. 

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