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**Economic integration and the profitability
of cross-border mergers and acquisitions**

by

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Economic integration and the profitability of cross-border mergers and acquisitions

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Abstract

The 1990s was a decade of increased economic integration. The decade also witnessed a sharp increase in cross-border mergers and acquisitions (M&As). From a theoretical perspective, the increase in M&As in more integrated economies is rather puzzling. It is a well-established result that due to the “business stealing effect”, mergers in integrated markets are not likely to take place. A reasonable conjecture would therefore be that closer integration of markets would reduce the profitability of mergers. The present paper demonstrates that economic integration may trigger cross-border acquisitions by reducing the business stealing effect and by reducing the acquisition price of the target firm. The paper thus provides explanations to the rather puzzling observation of increased cross-border mergers in more integrated economies.

JEL classification: F15, F21, F23, L12, L13

Keywords: Economic integration; Mergers and acquisitions; Trade; Foreign direct investment;

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1 Introduction

Cross-border mergers and acquisitions (M&As) increased sharply during the 1990s. UNCTAD reports that the value of cross-border M&As rose from less than \$100 billion in the late 1980s to \$720 billion in 1999. Within Europe alone, the value of cross-border acquisitions reached \$498 billion in 1999, a 75% increase from the year before.¹ Indeed, most of the growth in international production during the 1990s has been driven by cross-border M&As, in 1999 accounting for more than 80% of foreign direct investment flows.

Together with this dramatic increase in international acquisitions, the 1990s saw a liberalization of international trade and closer regional integration. Examples of trade liberalization include the conclusion of the Uruguay round and the establishment of the single market in the European Community. Moreover, UNCTAD (2000: 146) report that in the period 1991-1999 close to one thousand regulatory changes facilitating foreign direct investment flows were made in over 100 countries.

Many observers refer to economic integration as an important reason for the expansion of international M&As. For instance, on page 20 in the overview of the UNCTAD 2000 report, it is stated that: "Trade liberalization and regional integration efforts have added an impetus to cross-border M&As by setting the scene for more intense competition . . ." There may of course be a number of other reasons for the rise in cross-border acquisitions, such as privatization and deregulation. The focus of the present study, however, is on the link between economic integration and international mergers.

From a theoretical perspective, the link between economic integration and profitability of cross-border M&As is far from trivial. It is well known from the literature that in a fully integrated market it is generally more profitable to be outside a merger than to participate in it, see Stigler (1950). Moreover, Salant et al. (1983) show that in a Cournot model with symmetric firms, a merger involving less than 80 percent of the industry will not be profitable. The reason is that the outside firms will expand their production and thereby "steal business" from the merging parties. A reasonable conjecture would therefore be that economic integration would reduce the profitability of cross-

¹In the following, the terms M&A, merger, acquisition, and takeover will be used interchangeably. The great majority of transactions classified as cross-border M&As are in fact acquisitions, see UNCTAD (2000, Chapter IV).

border mergers.²

While the theoretical literature on mergers typically deals with the single market case, the present article explicitly focuses on cross-border acquisitions. In a highly simplified and stylized model, I study how economic integration in the form of lower trade costs and lower greenfield investment costs affect the profitability of international takeovers. Economic integration affects the profitability of cross-border acquisitions in three ways. First, economic integration may increase the competitive pressure in the market, thereby reducing the reservation price and hence the acquisition price of the target firm. I shall refer to this as the “acquisition price effect”. Second, economic integration in the form of reduced trade costs may reduce the business stealing effect by changing the entry mode of the outside firm from greenfield investment to the less aggressive strategy of exports. Third, economic integration reduces the importance of a cross-border merger as entry mode into a foreign market by making the alternative entry modes of greenfield investment and exports less costly. This is the “market access” effect.

The first and the second effect are arguments in favor of economic integration increasing the profitability of cross-border acquisitions, while the third effect pulls in the opposite direction. Hence, the net effect of economic integration on the profitability of cross-border acquisitions is not evident. The main point of the analysis, however, is to demonstrate that economic integration may lead to increased cross-border M&As, thereby shedding light on the puzzle motivating this study.

Although cross-border acquisitions is an empirically important phenomenon, it has received relatively little attention in the literature on trade and investment and likewise in the literature on mergers. Exceptions include Barros and Cabral (1994) and Horn and Levinsohn (2001), both of which analyse the welfare effects of mergers and derive policy implications. More recently, the positive issue of equilibrium market structure in an international context has been analysed by Horn and Persson (2001), Norbäck and Persson (2001), Görg (2000), and Lommerud, Straume, and Sjørgard (2003).

The present paper is closely related to Horn and Persson (2001), which focuses on the question whether mergers are international or national. In their paper, the main advantage of a cross-border merger is that it provides access to a foreign market. The main advantage with a national merger

²For recent contributions to merger formation in a closed economy, see Gowrisankaran (1999), Tombak (2002), and Inderst and Wey (2002).

is that it reduces the competitive pressure in the domestic market. Using cooperative game theory, the main result of their paper is that an increase in trade costs may increase the profitability of domestic mergers relative to cross-border mergers. The intuition is basically that when trade costs are high, a domestic merger results in very limited international competition, which is a more profitable venture than a cross border merger resulting in tough duopoly competition in both markets. When trade costs are low, national mergers do not reduce the competitive pressure to any significant extent. The market access argument then dominates, resulting in cross-border mergers. Note that in this explanation, there is more than one merger taking place and there are no outside firms to the mergers.

Horn and Persson explain how a reduction in international trade costs can trigger cross-border acquisitions. This is the main ambition of the present paper, too. However, the modelling approach and the mechanisms differ. The present paper employs a traditional non-cooperative merger model in an open economy setting. This has the advantage of simplicity as well as the fact that it builds on, and thereby hopefully sheds light on, well-established theory. Moreover, I consider both greenfield investment and exports as modes of accessing foreign markets, whereas Horn and Persson consider only exports.³

The paper is organized as follows. Section 2 presents the model. The analysis is presented in Section 3, starting with a benchmark case of symmetric firms, and then moving on to an extension with asymmetries in firms' characteristics. Section 3 concludes.

2 The model

Consider a market where demand for the homogeneous good q is given by

$$q = 1 - p, \tag{1}$$

where p is the price. The market is supplied by local and foreign firms. With s^i denoting marginal costs for firm i , operating profits for this firm are

³Norbäck and Persson (2001), which considers the case of privatization, also allows for both exports and greenfield investment as alternative entry modes to acquisition. However, since the reservation price of the privatized firm is zero, they do not consider the possibility of acquisitions not taking place. Finally, Görg (2000) analyses the choice between acquisition and greenfield, and therefore abstracts from exports as possible entry mode. By considering only a two-firm case, he also does not address the issue of an acquisition being unprofitable.

given by

$$\pi^i = (p - s^i) q^i, \quad (2)$$

Assuming Cournot competition between firms, equilibrium operating profits can be found as

$$\pi^i = \frac{(1 - ns^i + \sum s^k)^2}{(n+1)^2}, \quad k \neq i, \quad (3)$$

where n is the number of firms competing in this market. To study the issue at hand, it suffices to consider the situation where, prior to a merger, there are three firms in the economy, call them a, b and c .⁴ Let c be the target firm, while firms a and b sometimes will be referred to as the active firms. Since our focus is on cross-border mergers, let c be located in a foreign country relative to a and b , call it country C . Note that in the closed economy context studied by Salant et al (1983), a merger between a pair of firms in the symmetric triopoly case would not be profitable. In line with the literature, I ignore the trivial case of the three firms merging to form a monopoly. We can think of such monopolization as being prohibited by competition policy.

A foreign firm has three modes of servicing market C . First, it may acquire the firm already located there. This is the acquisition strategy A . Second, it may enter by investing in a new production plant at a fixed cost f . This is the greenfield strategy G . Third, it may choose exports at a per unit trade cost t , which I shall call strategy X . Finally, the firm may choose not to serve the market at all, which I call strategy 0 .

The sequence of moves is as follows. At stage one, the firms simultaneously decide whether or not to invest, and in case of investment, whether to choose strategy A or G . At stage two, there is production and sales, with Cournot-competition between the firms.

Negotiations determine the outcome of the acquisition game. But for negotiations to take place, the willingness to pay for firm c must exceed c 's reservation price. Firm j 's willingness to pay for c is given by $\omega^j = (\hat{\pi}^{j+c} - \pi^j)$ in case the best alternative to an acquisition is exports, and $\omega^j = (\hat{\pi}^{j+c} - \pi^j - f)$ in case the best alternative is greenfield investment. Here, $\hat{\pi}^{j+c}$ denotes the post-merger operating profits of the merged entity

⁴We know from Salant et al (1983) that adding more firms would reduce the profitability of a merger to the merging parties. The qualitative results derived in the three-firm model would however not be affected by adding more firms.

and π^j is j 's operating profits if it chooses not to acquire c . The reservation price of c is given by π^c , i.e. the profits that c would realize in the absence of a merger. An acquisition requires $\omega^j \geq \pi^c$ for at least one of the two active firms.

Even if $\omega^j \geq \pi^c$ for both active firms, this does not mean that they are both interested in acquiring c . We need to consider their outside options. Let $\hat{\pi}^j$ denote the post-merger operating profits of the outside firm. As long as $\hat{\pi}^{j+c} - \pi^c < \hat{\pi}^j$, in case the best outside option is trade, and $\hat{\pi}^{j+c} - \pi^c < \hat{\pi}^j - f$, in case it is greenfield investment, it is more profitable to be the outside firm than inside the merger. When this holds, there will be no bidding contest between the two active firms.⁵ The equilibrium acquisition price, ρ^c , is defined as the result of a Nash bargaining solution between the acquiring firm and the target firm. More specifically, $\rho^c = \gamma\omega^j + (1 - \gamma)\pi^c$, where γ represents the relative bargaining strength of the target firm relative to the acquiring firm.

Only if $\hat{\pi}^{j+c} - \pi^c > \hat{\pi}^j$, or $\hat{\pi}^{j+c} - \pi^c > \hat{\pi}^j - f$ in the greenfield case, both a and b wish to acquire c given the reservation price π^c . A bidding contest will then raise the acquisition price to a level where the two active firms are indifferent between being inside or outside the merger. Hence, in this case $\rho^c = \hat{\pi}^{j+c} - \hat{\pi}^j$.

3 Analysis

3.1 The benchmark case

In the benchmark case the firms have identical marginal production costs, which I normalize to zero. Moreover, the two active firms face exactly the same fixed greenfield investment costs and trade costs.⁶ Figure 1 illustrates the equilibrium market outcomes in the benchmark scenario. Calculations underlying the figure are presented in the Appendix. The horizontal axis measures per unit trade costs, t , and is bounded above by $t = 0.5$, at which point profits for two foreign exporters are zero. The vertical axis measures

⁵Inderst and Wey (2002) discuss how the free rider problem in mergers affects the probability of a merger taking place. Fridolfsson and Stennek (2000) analyse how the free rider problem may delay mergers.

⁶Asymmetries in marginal production costs and initial location, and thereby tradecosts, are briefly analysed in Section 3.2.

the size of the fixed greenfield investment costs, f . The length of this axis is defined by the condition that a greenfield investment should be profitable when there is only one firm operating in the foreign market.

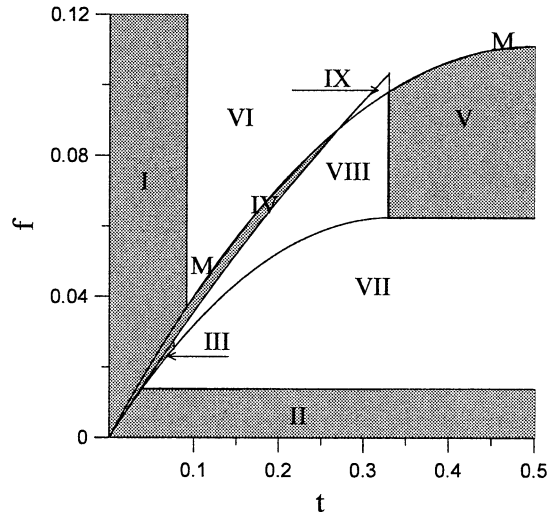


Figure 1: The benchmark case

Each equilibrium market structure in Figure 1 is assigned a roman number. Table 1 below specifies the different equilibrium market structures.

Table 1. Equilibrium entry strategies

<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>	<i>VI</i>	<i>VII</i>	<i>VIII</i>	<i>IX</i>
<i>XX</i>	<i>GG</i>	<i>GX</i>	<i>XX</i>	<i>G0</i>	<i>XX</i>	<i>GG</i>	<i>GX</i>	<i>GX</i>
-	-	-	-	-	<i>AX</i>	<i>AG</i>	<i>AG</i>	<i>AX</i>

The second row of the table shows equilibrium entry strategies by the two foreign firms when we do not allow for acquisition. For instance, *GG* means that both foreign firms in the absence of merger would choose greenfield investment. *XG* means that one firm chooses exports, the other greenfield. Since the two firms are entirely symmetric, we do not know which of the firms chooses exports, and which greenfield investment. And since they are symmetric, it does not matter. The third row of Table 1 shows the equilibrium entry mode allowing for acquisition. For instance, *AX* means that one

of the foreign firms acquires c , while the outside firm chooses exports. The symbol “–” means that an acquisition is not profitable and therefore will not take place.

In order to analyse the mechanisms involved, it is instructive to start by investigating the equilibrium entry modes in the absence of merger. The model without mergers is standard, and the results are as one should expect. Basically, when trade costs are low relative to greenfield costs (areas I , IV , VI), the foreign firms choose exports, and when trade costs are high (areas II , VII), they choose greenfield. In the central areas III , $VIII$, IX and V , there is room for only one greenfield investor; in III , $VIII$ and IX the optimal response of the rival is to choose exports, and in V to stay out of the market. The MM -curve shows combinations of investment costs and trade costs above which an entrant, in case he meets a single competitor in the foreign market, chooses exports and below which he chooses greenfield. This information is relevant if the rival chooses to stay out of the market or acquires firm c .

We now have the information we need on the no-merger market structure to analyse the main issue, namely the profitability of merger. The point I want to make is that economic integration, in the form of lower trade costs and/or lower greenfield investment costs, may lead to an increase in cross-border M&A. In Figure 1, this means that economic integration brings the economy from one of the shaded regions $III - V$, where no acquisition takes place, to one of the unshaded regions $VI - IX$, where an acquisition indeed is profitable.

The main reason why acquiring c is not profitable in regions $III - V$ is that the competitive pressure is not very tough in the absence of a merger, and so the reservation price of the target firm is relatively high. In V the no-merger market structure is characterized by duopoly competition between c and a greenfield investor. Since an acquisition in this case would not change the equilibrium market structure, the willingness to pay for c exactly equals c 's reservation price. This can be seen in Figure 2, which shows the reservation price of c , π^c , illustrated with a bold line, and the willingness to pay of firm j , ω^j , illustrated with a fine line, as a function of trade costs.⁷ In region V , i.e. for $t > \frac{1}{3}$, the two lines coincide.

In region IV an acquisition is not profitable for two reasons. First, although the no-merger market structure is characterized by triopoly, the com-

⁷In Figure 2, the level of greenfield costs is fixed at $f = 0.07$.

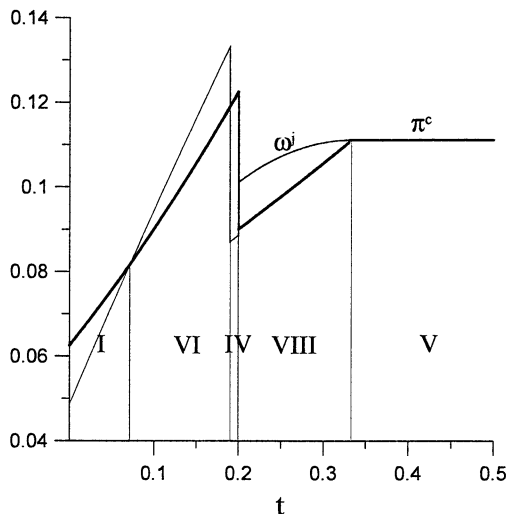


Figure 2: Reservation prices

petitive pressure in the market is not very tough. The reason is that both foreign firms are exporters and face relatively high trade costs. This means that the reservation price of c is high. It also means that for an active firm considering acquiring c , its best alternative, which in this case is exports, is also relatively profitable since the other active firm also chooses exports. Second, since we are to the right of the MM -curve, an acquisition would “create room” for greenfield investment by the outside firm, the result being that the outside firm realizes an equal post-merger market share to that of the merged entity. Thus, the business stealing effect is significant. In Figure 2 we see that moving from region $VIII$ to region IV results in a sharp rise in c ’s reservation price and a drop in j ’s willingness to pay, resulting in $\omega^j < \pi^c$ and hence no acquisition.

Finally, in III the no-merger entry mode is characterized by greenfield by one firm and exports by the other, and since entry costs are very low in both cases, firms prefer not to enter through acquisition.

Starting in region V consider a reduction in f and/or t that takes us to one of the regions $VI - IX$ in Figure 1. This changes the no-merger market structure from duopoly to triopoly, thus leading to an intensification of competition. The intensified competition reduces the profitability of the target

firm, thereby reducing its reservation price and therefore also the acquisition price. The reduction in acquisition price turns the profitability of acquisition from negative to positive, as illustrated in the move from V to $VIII$ in Figure 2. The same mechanism applies for a reduction in f starting in III or IV taking us to VII or $VIII$, respectively. The no-merger competitive pressure intensifies as the entry mode changes from GX to GG in the former case and from XX to GX in the latter. This pushes down the acquisition price and makes a merger profitable. Finally, consider a reduction in t that takes us from IV to VI . Note that this change involves crossing the MM -line, implying that the post-merger entry mode of the outside firm changes from greenfield investment to the softer export strategy. This makes acquisition profitable by reducing the business stealing effect.

While economic integration may indeed lead to cross-border acquisitions, Figure 1 also shows that this is not necessarily the case. Economic integration that takes us to regions I or II , characterized by low entry costs, turns the profitability of mergers from positive to negative. The reason is that the “market access” argument in favor of a cross-border acquisition loses its strength, as the alternative entry modes become increasingly inexpensive. Of course, with zero entry costs we are effectively in a perfectly integrated market, and we know from the literature that in this case a merger between two firms is not profitable, see Salant et al (1983).

Similarly, a reduction in trade costs that takes the economy into region IV makes the merger unprofitable by changing the no-merger entry mode from GX to XX , thereby reducing the competitive pressure and increasing the reservation price of c as well as the no-merger payoff for the active firms. Similarly, a reduction in f that takes us to from VI to IV involves crossing the MM -line from left to right. This makes a merger unprofitable by increasing the business stealing effect. Finally, a reduction in fixed greenfield costs that takes us from VI to V turns the profitability of a merger from positive to negative by changing the no-merger market structure from triopoly to duopoly, and thereby increasing the acquisition price.

Given that a merger is profitable, is it more profitable to be inside or outside the merger? In the benchmark case it can be shown that the profits of the inside firm dominate those of the outside firm only for very high trade costs and greenfield investment costs, i.e. in the upper right corner of Figure 1. More specifically, a bidding contest will only arise in region VI for $t > \frac{3}{14}$ and in region IX . In all other regions, it is more profitable to be the outside

firm.⁸

3.2 Extensions: Asymmetries between the active firms

So far in the analysis, we have assumed that the two active firms are entirely similar. In what now follows, we allow for asymmetries between the active firms along two dimensions. First, in terms of cost efficiency. Second, in terms of their initial location. There are of course a number of ways in which the three firms could differ, even restricting our attention to efficiency and location. Rather than carrying out a full analysis of how asymmetries in these two dimensions would affect the model, I use a couple examples that capture some important effects.

Consider first the case where there is one technological leader, firm a , the other two firms having identical, but inferior technology to that of a . Maintaining the assumption of zero marginal costs for a , let $\kappa > 0$ represent the common marginal production costs of b and c , which can also be interpreted as the technology gap between the more and less advanced firms. If firm a can apply its superior technology to c in case of acquisition, this modification of the model clearly increases the profitability of a merger between a and c . It does so by adding an efficiency gain to the merger. In fact, as shown in the Appendix, if the technology gap is larger than a certain critical level, there is an incentive for a to acquire c even for zero trade costs and zero greenfield costs. If, on the other hand, technology cannot be transferred between firms, it can be shown that the less advanced foreign firm, namely b , is the more likely buyer of c . Intuitively, firm a wishes to serve the market using its best technology and would therefore be less inclined to choose acquisition as entry mode.

Consider next the issue of location. Assume that initially, i.e. prior to any investment decision, b and c are located in the same market with a being the only foreign firm. In this case, market entry is of course an issue only for firm a .⁹ As in the benchmark case, the firms are assumed to have identical marginal production costs. This modification of the analysis allows us to deal with the interesting issue of the nationality of the acquiring firm. I shall refer to this case as the “nationality” scenario. When should we expect to

⁸See the Appendix for proof.

⁹The general insights derived from this analysis would apply also in a situation where b faced *lower* trade costs than a , and not necessarily *zero* trade costs as in the present scenario.

see cross-border mergers and when are mergers between two firms located in the same market more profitable? Figure 3 illustrates the outcome of this scenario, and Table 2 specifies the equilibrium entry modes of firm a .

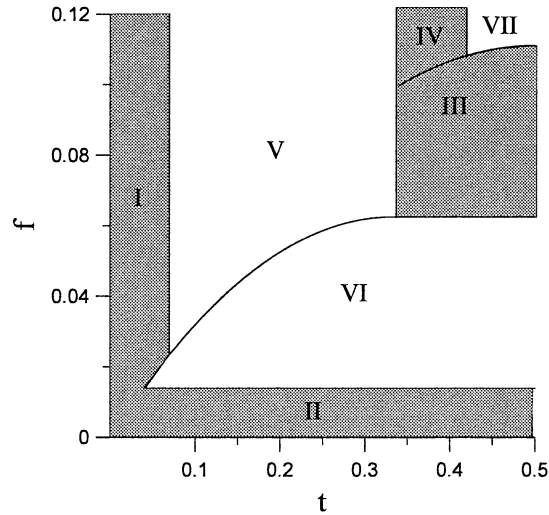


Figure 3: The nationality case

Table 2. The nationality case.

<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>	<i>VI</i>	<i>VII</i>
<i>X</i>	<i>G</i>	0	0	<i>X</i>	<i>G</i>	0
—	—	—	—	A_a	A_a	A_bX

The no-merger equilibrium market structure is relatively straightforward. Again, low trade costs relative to greenfield costs lead to exports (areas *I* and *V*), whereas high trade costs relative to greenfield costs lead to investment (areas *II* and *VI*). When the cost of both kinds of entry are high, firm a stays out (areas *III*, *IV* and *VII*).

As in the benchmark scenario, Figure 3 clearly shows that economic integration may trigger cross-border acquisitions. Starting in region *III*, a reduction in trade costs and/or greenfield costs that takes us to region *V* or *VI* changes the profitability of a merger from negative to positive. A reduction in trade costs that moves the economy from region *IV* to *V* has

a similar effect. The intuition is basically as in the benchmark case: Lower entry costs intensifies the no-merger market competition and thereby reduces the reservation price of the target firm. In Table 2, the acquisition of c by a is referred to as A_a .

For sufficiently high entry costs, namely in regions *III*, *IV* and *VII*, the reservation price of the target firm is too high to make acquisition a profitable venture for the foreign firm. In regions characterized by high entry costs, the question is therefore whether the local firm b will choose acquisition or not. The answer is that when entry costs are sufficiently high, more precisely in region *VII*, a national merger will take place. The gain to the local firm, firm b , from this merger is that it replaces a local competitor with a foreign based exporter, a fact which softens the competitive pressure on b . In Table 2, the acquisition of c by b , which opens up for profitable exports by a , is given by A_bX .

4 Concluding remarks

The results presented here demonstrate that the link between economic integration and cross-border mergers is complex. One possibility is that economic integration may trigger cross-border mergers, contrary to what one perhaps would think from reading the theoretical literature on mergers in closed economies. The reason is that economic integration may intensify the pre-merger competition in the market, thereby reducing the reservation price of the target firm. In addition, economic integration in the form of lower trade costs may reduce the post-merger business stealing effect as the outside firm chooses exports rather than greenfield investment.

The benchmark version of the model deals with the standard case of symmetric firms. An extension to the model deals with asymmetries between firms. It shows that a technologically advantaged firm has a stronger incentive to acquire a foreign firm than its less advanced rival, as long as technology can freely be applied to the target firm. If, on the other hand, technology cannot be transferred to the foreign affiliate, the less advantaged firm has the stronger incentive to use a cross-border acquisition as entry mode. Finally, I demonstrate that when there is an asymmetry in the location of the two active firms, entry costs is an argument in favor of cross-border acquisitions rather than national mergers. However, if entry costs are sufficiently high, the price of the target firm may be too high for the foreign firm to find an

acquisition profitable. In this case, a merger between the local firms is more likely.

Appendix

A.1. Operating profits

Let π_{YZ}^j represent firm j 's operating profits if j chooses strategy Y and its rival chooses strategy Z in the no-merger case. Similarly, let π_{ZY}^c represent firm c 's operating profits if the foreign firms choose strategy Z and Y . In the case of merger, let $\hat{\pi}_Y^{j+c}$ represent the post-merger profit of the merged entity when the outside firm chooses strategy Y , and let $\hat{\pi}_Y^k$ be the post-merger profits of the outside firm when it chooses Y as a response to an acquisition by firm j .

$$\begin{aligned}
 \pi_0^j &= 0 \\
 \pi_{G0}^j &= \pi_{G0}^c = \hat{\pi}_G^{j+c} = \hat{\pi}_G^k = \frac{1}{9} \\
 \pi_{GX}^j &= \pi_{GX}^c = \frac{(1+t)^2}{16} \\
 \pi_{GG}^j &= \pi_{GG}^c = \frac{1}{16} \\
 \pi_{X0}^j &= \hat{\pi}_X^k = \frac{(1-2t)^2}{9} \\
 \pi_{XX}^j &= \frac{(1-2t)^2}{16} \\
 \pi_{XG}^j &= \frac{(1-3t)^2}{16} \\
 \hat{\pi}_0^{j+c} &= \pi_{00}^c = \frac{1}{4} \\
 \hat{\pi}_X^{j+c} &= \pi_{X0}^c = \frac{(1+t)^2}{9} \\
 \pi_{XX}^c &= \frac{(1+2t)^2}{16}
 \end{aligned}$$

A.2. Critical entry costs in the benchmark scenario

A.2.1 Derivation of Figure 1 and Table 1

The lengths of the axes are defined by $\pi_{XX}^j = 0 \Rightarrow t = \frac{1}{2}, \pi_{G0}^j - f = 0 \Rightarrow f = \frac{1}{9}$

The equations below define the critical entry costs where equilibrium entry modes change in the non-merger case. For instance, (V, VII) shows the critical level of greenfield costs for which a firm is indifferent between staying out of the market, given by profits π_0^j , and investing greenfield in the market side by side with another greenfield investor, given by $\pi_{GG}^j - f$.

$$\begin{aligned}
 (V, VII) : \pi_0^j &= \pi_{GG}^j - f \Rightarrow f = \frac{1}{16} \\
 (V, VIII) : \pi_0^j &= \pi_{XG}^j \Rightarrow t = \frac{1}{3} \\
 (VII, VIII) : \pi_{GG}^j - f &= \pi_{XG}^j \Rightarrow f = \frac{3}{8}t - \frac{9}{16}t^2
 \end{aligned}$$

$$(IV, III \& VIII), (VI, IX) : \pi_{GX}^j - f = \pi_{XX}^j \Rightarrow f = \frac{3}{8}t - \frac{3}{16}t^2$$

$$(\text{The MM-curve}) : \pi_{X0}^j = \pi_{G0}^j - f \Rightarrow f = \frac{4}{9}t - \frac{4}{9}t^2$$

The shaded areas in Figure 1 represent combinations of entry costs for which the condition $\omega^j \leq \pi^c$ holds for different market structures.

$$I : \hat{\pi}_X^{j+c} - \pi_{XX}^j - \pi_{XX}^c < 0 \Rightarrow t < \frac{1}{14}$$

$$II : \hat{\pi}_G^{j+c} - (\pi_{GG}^j - f) - \pi_{GG}^c < 0 \Rightarrow f < \frac{1}{72}$$

$$III : \hat{\pi}_G^{j+c} - \pi_{XG}^j - \pi_{GX}^c < 0 \Rightarrow t < \frac{1}{15}$$

$$IV : \hat{\pi}_G^{j+c} - \pi_{XX}^j - \pi_{XX}^c < 0$$

$$V : \hat{\pi}_G^{j+c} - \pi_0^j - \pi_{G0}^c = 0$$

A.2.2 On the profits of outside and inside firms

A bidding contest will only arise if $\hat{\pi}^{j+c} - \pi^c > \hat{\pi}^j$, or, in the case where greenfield investment is the choice of the outside firm, $\hat{\pi}^{j+c} - \pi^c > \hat{\pi}^j - f$. The critical entry costs for which this condition holds in the various areas characterized by acquisition are given by:

$$VI : \hat{\pi}_X^{j+c} - \pi_{XX}^c > \hat{\pi}_X^k \Rightarrow t > \frac{3}{14} \text{ which is true for part of VI.}$$

$$VII : \hat{\pi}_G^{j+c} - \pi_{GG}^c > \hat{\pi}_G^k \Rightarrow f < \frac{1}{16} \text{ which never holds for area VII.}$$

$$VIII : \hat{\pi}_G^{j+c} - \pi_{GX}^c > \hat{\pi}_G^k \Rightarrow f > \frac{1}{16}(1+t)^2 \text{ which never holds for area VIII.}$$

$$IX : \hat{\pi}_X^{j+c} - \pi_{GX}^c > \hat{\pi}_X^k \Rightarrow t > 0.127 \text{ which is true for the entire area IX.}$$

Hence, a bidding contest will arise only for $t > \frac{3}{14}$ in area VI and in area IX.

A.2.3 On asymmetries in marginal production costs

Let the marginal production cost of firms b and c be given by κ , and that of firm a by zero. If technology can freely be transferred to the acquired firm, the condition $\omega^a > \pi^c$ for $t = 0$ or $f = 0$ is given by $\frac{(1+\kappa)^2}{9} - \frac{(1+2\kappa)^2}{16} > \frac{(1-2\kappa)^2}{16} \Rightarrow \kappa > 0.07$. Hence, for $\kappa > 0.07$, firm a will acquire c even for zero trade costs or zero greenfield costs.

If the technology cannot be transferred to the acquired firm, $\omega^a > \pi^c$ in regions I and II requires

$$I : \frac{(1-\kappa+t)^2}{9} - \frac{(1-2t+2\kappa)^2}{16} > \frac{(1-2\kappa+2t)^2}{16} \Rightarrow t > \frac{1}{14} + \kappa$$

$$II : \frac{(1-\kappa)^2}{9} - \frac{(1+2\kappa)^2}{16} + f > \frac{(1-2\kappa)^2}{16} \Rightarrow f > \frac{1}{72} + \frac{2}{9}\kappa + \frac{7}{18}\kappa^2$$

and similarly for b , the condition $\omega^b > \pi^c$ can be expressed as

$$I : \frac{(1-2\kappa+t)^2}{9} - \frac{(1-2t-2\kappa)^2}{16} > \frac{(1+2t-2\kappa)^2}{16} \Rightarrow t > \frac{1}{14} - \frac{1}{7}\kappa$$

$$II : \frac{(1-\kappa)^2}{9} - \frac{(1+2\kappa)^2}{16} + f > \frac{(1-2\kappa)^2}{16} \Rightarrow f > \frac{1}{72} - \frac{1}{18}\kappa + \frac{1}{18}\kappa^2$$

Non-negative output requires $\kappa < \frac{1}{2}$, so in a fully integrated economy, i.e. zero entry costs, there will be no merger. However, the above expressions show that b is willing to acquire c for lower levels of f and t than is the case for firm a . In this sense, b is more inclined than a to take over firm c .

A.3. Critical entry costs in the nationality scenario

(III, VI) = (V, VII) in benchmark scenario

(III, V) = (V, VIII) in benchmark scenario

(V, VI) = (VII, VIII) in benchmark scenario

(III, VII) = MM-curve in benchmark scenario

I : as in I in benchmark scenario

II : as in II in benchmark scenario

III : as in V in benchmark scenario

IV : $\hat{\pi}_X^b - \pi_{G0}^b < \pi_{G0}^c \Rightarrow t < 0.41$

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