

Foreign market entry and merger policies with economies of scale*

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Abstract

This paper investigates the equilibrium entry mode of a foreign firm into a domestic market that can export, do a greenfield investment or acquire one or two domestic firms. We also scrutinize the optimal merger policy of the host country and whether it can induce the most preferred entry mode. We find that acquisitions are more likely with sufficiently large economies of scale, and this is also the endogenous outcome of optimal merger policies. Furthermore, the host government can induce the most preferred market structure if and only if the foreign firm always wants to acquire at least one domestic firm. Our findings suggest that a strict merger policy is more likely to be optimal as the greenfield investment cost rises. Finally, the national merger policy can be excessive as monopolization may raise aggregate world welfare if the benefits from economies of scale are substantial.

JEL-Classification: F12, F23, L41, L44.

Keywords: Foreign direct investment, market entry, oligopoly, merger policy, economies of scale.

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1 Introduction

This paper scrutinizes the optimal merger policy in an oligopoly model in which a foreign firm can choose between different modes of entry to a domestic market with two domestic firms to begin with. The innovation of the paper is that it endogenizes the degree of average cost savings across different entry modes. In particular, both the foreign entrant and the two potential domestic target firms operate under increasing returns to scale. The foreign firm can choose from four different entry modes, that is, exporting, greenfield investment, acquisition of one domestic firm, or acquisition of both domestic firms. Furthermore, the antitrust authority may apply three different merger policies, that is, a laissez-faire policy, potentially allowing full monopolization by sequential acquisitions, or a lenient merger policy allowing one merger only, or a strict merger policy prohibiting any merger. At the same time, a merger policy can only be restrictive: it cannot impose a certain entry mode, but will have to correctly anticipate and possibly induce what the next-best entry mode would be.

We find that economies of scale play pivotal roles in affecting firms' profits under different modes of entry, the acquisition prices and in the design of optimal merger policies. Not surprisingly, we find that the domestic government will never allow complete monopolization, mainly due to large anti-competitive effects. However, we also show that the host government will allow a single acquisition if economies of scale are sufficiently large. Our findings suggest that, if the greenfield entry costs are low, the foreign firm will always eventually monopolize the market under a laissez-faire policy (without any merger policy). While this is true, we show that different (credible) threats in the context of an acquisition imply different compensations, depending on trade costs, greenfield investment costs and economies of scale.

The case of high greenfield entry costs is rather complex. If economies of scale are small, the foreign firm's preferred entry mode is highly sensitive to the level of trade costs and switches back and forth from one mode of acquisition to another as trade costs rise. The host government can induce the most preferred market structure via a lenient or a strict merger policy if the foreign firm always wants to acquire at least one domestic firm. If not, the government fails to induce the most preferred entry mode, in particular if trade costs are sufficiently low and economies of scale are moderate. In this case, the host government prefers a single acquisition to exporting while the foreign firm prefers monopolization over exporting and exporting over a single acquisition. Our findings also suggest that a strict merger policy is more likely with larger greenfield investment costs and sufficiently small of economies of scale.

Why are these findings important? First, cross-border mergers and acquisitions (M&As) have been and are still a very important entry mode in export markets: since the mid-1980s, the industrial sectors have witnessed a significant increase in the number of cross-border M&As transactions, with over 126,000 deals announced, while the high-technology sector ranks second

with nearly 118,000 M&A deals, as reported by the Institute for Mergers, Acquisitions, and Alliances (IMAA) in 2020. Moreover, based on UNCTAD data spanning from 1990 to 2019, cross-border M&As were the most prominent in manufacturing industries, both in terms of the number and the value of deals, which include automobiles, pharmaceuticals and chemicals, electrical and electronic equipment, as well as food, beverages, and tobacco.¹ Furthermore, merger guidelines explicitly refer to potential cost savings due to mergers, and this is indeed our focus with economies of scale. For example, the merger control procedure of the European Union involves a thorough analysis of claimed efficiency gains for which cost reductions are essential.²

Our approach is also supported by some empirical evidence. Using the estimated scale elasticities across various manufacturing industries of Bartelme et al. (2021), our findings presented in Figure 1 show a positive correlation between economies of scale and the number of cross-border M&A deals.³ However, there is no evident relationship between economies of scale and the number of greenfield investments across these industries. These empirical findings suggest that industries with larger economies of scale are more likely to see cross-border M&A activities. This is exactly what we find as the merger policy will be lenient and allow a single acquisition if economies of scale are sufficiently large.

While a large extensive literature examines the implications of economies of scale at the industry level on trade patterns and specialization, economies of scale and their impact on foreign market entry have received relatively little attention.⁴ Helpman (1984) and Helpman and Krugman (1985) use factor proportion models in which firms produce differentiated products under increasing returns to scale and choose between export and greenfield investment to serve a host country. In the presence of factor endowment differences, firms have an incentive to establish a production plant through greenfield investment in a host country where production inputs are abundant. Brainard (1993) develops a general equilibrium model in which firms can

¹ During the 1990s, the conclusion of the Uruguay Round and the formation of the European Union’s Single Market led to trade liberalization and deeper regional integration, resulting in a substantial increase in the number of firms engaged in international trade and FDI. UNCTAD data indicate that cross-border mergers and acquisitions (M&As) have been on the rise since the late 1980s, reaching a peak in the year 2000 when they accounted for 70 percent of the world’s total inward FDI.

² The European Union’s merger investigation affects mergers with an EU dimension that surpass certain thresholds. It has two phases, and if the European Commission remains to be concerned about the effects on competition after phase I, it will open a phase II investigation in which also efficiency gains will be scrutinized. For details see [Council Regulation \(EC\) No 139/2004 of 20 January 2004 on the control of concentrations between undertakings \(the EC Merger Regulation\)](#).

³ Bartelme et al. (2021) find that economies of scale are prevalent in most of these sectors. Industries engaged in the production of complex, high-tech products, such as automobiles, computers, and electronics, tend to exhibit more pronounced economies of scale. Conversely, industries manufacturing standard products where innovation plays a lesser role, such as food, beverages, and tobacco, tend to have lower economies of scale.

⁴ See Graham (1923), Chipman (1970), Ethier (1982), Krugman (1995), Grossman and Rossi-Hansberg (2010), Arkolakis, Costinot, and Rodríguez-Clare (2012), Costinot and Rodríguez-Clare (2014), Bartelme et al. (2021), and Kucheryavyy et al. (2023).

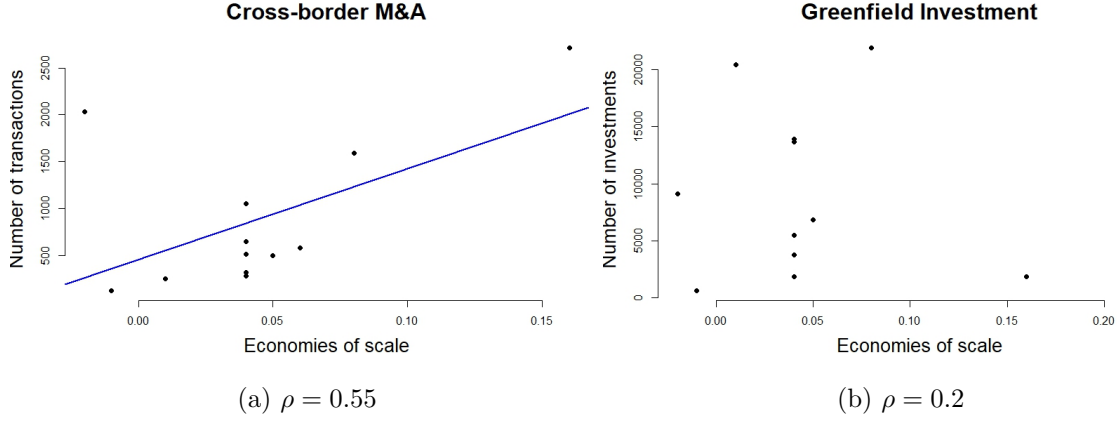


Figure 1: Correlation between M&A greenfield investments and economies of scale

Source: UNCTAD, Thomson Financial's Worldwide M&A database, and Bartelme et al. (2021); own calculations. ρ denotes the coefficient of correlation.

realize increasing returns and lower marginal production costs for all its production facilities by costly R&D activities. Firms have an incentive to operate multiple plants in their local market and foreign markets if the plant-specific fixed cost is relatively low and trade costs are relatively large. While those papers provide important insights on firm decisions to become a multinational firm under increasing returns, cross-border M&As are not taken into account as one of possible entry modes.

The more closely related papers to the present paper are Bjorvatn (2004) and Raff et al. (2009). Bjorvatn (2004) uses a model with constant returns to scale, one domestic firm in the host country, two foreign firms and three possible entry modes: a (single) acquisition, greenfield investment, and exports. He finds that economic integration, that is, either lower trade costs or lower greenfield investment costs, can trigger cross-border acquisitions. This is similar to our results since cross-border mergers arise with a lenient merger policy if trade and greenfield investment costs and economies of scale are sufficiently small. In contrast to Bjorvatn (2004), Raff et al. (2009) include two domestic firms in the host country and one foreign firm as we do. They also allow for a joint venture formation, and both acquisitions and joint ventures allow firms to achieve efficiency gains in the form of lower marginal production costs through joint investments. While we do not consider joint ventures, we allow endogenous cost structures with economies of scale, and thus production costs change not only with acquisition(s), but also with all possible entry modes, and also for the non-acquired firm. Thus, we take into account that size does not only matter for the foreign firm, but also for the domestic firms, and the change in the production costs also affects the acquisition prices the foreign firm has to pay to make the domestic firm agree to a merger. Furthermore, we also conduct a welfare analysis and develop the optimal domestic merger policy to potentially induce the most preferred market structure depending on the level of trade and greenfield investment costs and the degree of economies of scale.

Other papers that examine the effects of economies of scale include Mermelstein et al. (2020) who develop a dynamic industry model in which the presence of economies of scale allows firms to lower their average and marginal costs through capital accumulation. Firms can accumulate capital either through investment or mergers with other firms. They show that the steady state distribution is a near-monopoly or a monopoly under an all-mergers-allowed policy. Mermelstein et al. (2020) also examine optimal static merger policies, following Williamson (1968) and Farrell and Shapiro (1990), in which mergers are either approved or blocked based on their impact on welfare, which can be either consumer surplus or aggregate surplus. Since mergers reduce consumer surplus in general, all merger are prohibited under a static consumer-surplus-based policy. However, many mergers lead to an increase in aggregate surplus, and thus the steady state distribution is a near-monopoly or a monopoly under the aggregate-surplus-based static policy. While capital accumulation is not our focus, economies of scale give rise to an endogenous cost reduction effect in our paper. We show that national merger policies can be excessive as they allow maximally for a single acquisition even if aggregate surplus can be maximized by monopolization if economies of scale are sufficiently large.

Furthermore, Arzandeh and Gunay (2023) develop a symmetric model of an oligopolistic industry with increasing returns due to R&D activities. Internationally merged firms, facing no tariffs, invest more in R&D compared to domestic firms. Arzandeh and Gunay (2023) consider a welfare-increasing merger policy, and if R&D is highly effective, this policy leads to a monopoly. Conversely, as R&D efficiency decreases, the welfare-increasing merger policy leads to less concentrated market structures. Similar to Mermelstein et al. (2020) and Arzandeh and Gunay (2023), we consider welfare-improving merger policies. The host country's antitrust authority evaluates proposed acquisitions based on the domestic welfare and compares them to alternative entry modes like greenfield investment or exports which the foreign firm might choose if the acquisition were blocked. However, unlike Mermelstein et al. (2020) and Arzandeh and Gunay (2023), we take into account the compensation the target firm will receive during the acquisition process when evaluating proposed acquisitions. In Arzandeh and Gunay (2023), the optimal merger policy heavily depends on the efficiency of R&D. In our model, the stringency of the optimal merger policy depends on the level of trade and greenfield investment costs and more importantly on the degree of economies of scale experienced by *all* firms. In line with their findings where R&D efficiency is not significantly effective, we find that a laissez-faire policy is never optimal. We go one step further and show that the optimal merger policy is lenient with substantial economies of scale, and that a strict merger policy is optimal only if the economies of scale are not sufficiently large.

Our paper is also related to the literature that focuses on the relationship between trade and merger policies such as Horn and Levinsohn (2001), Horn and Persson (2001), Saggi and

Yildiz (2006) and Ulus and Yildiz (2012).⁵ Horn and Levinsohn (2001) investigate how the optimal industry concentration changes with trade liberalization. Unlike our paper, the implicit assumption is that competition policies can induce the optimal concentration. However, in our model we allow the domestic country to block or approve merger proposals, and we show that merger policies cannot always induce the domestic country's preferred market structure. While we employ a non-cooperative sequential entry game, Horn and Persson (2001) use cooperative game theory to endogenize the formation of a merger when the only alternative mode of entry is exporting with exogenously given cost savings.⁶ In our paper, we assume that the foreign entrant can make a merger proposal, and we also include the option of a greenfield investment and economies of scale to endogenize potential cost savings.

Finally, our paper is also linked to the literature that examines under-enforcement and over-enforcement of national merger policies.⁷ Barros and Cabral (1994) extends Farrell and Shapiro (1990) to examine possible scenarios of under-enforcement and over-enforcement of merger policies in an open economy setting. Similarly, Head and Ries (1997) also scrutinize over-enforcement of merger policies where countries may end up blocking mergers that raise world welfare. Tay and Willmann (2005) also find that the absence of a global authority can lead to a too strict merger policy because national authorities can block every merger that would be harmful to their domestic welfare. Our results extend support to this literature if economies of scale are sufficiently large: national merger policy can be excessive as monopolization may lead to a larger aggregate world welfare if the benefits from economies of scale (that arise under monopoly) are substantial. This finding may suggest that a supra-national merger policy may lead to a highly concentrated market structure with a significant cost reduction effect.

The remainder of the paper is organized as follows. Section 2 presents the model, and section 3 scrutinizes the entry modes if no merger policies are in place. Section 4 develops the preferred entry modes of the domestic country and its implications for merger policies. Section 5 offers some concluding remarks.

2 Model

We consider a (domestic) market in which linear-quadratic preferences imply an inverse demand function $p(Q) = \alpha - Q$, where $Q = \sum_i q_i$ denotes total consumption of the industry's product in the host country, and q_i is the output produced by firm i . To keep the model tractable, we assume that firms produce output q_i with a total cost $TC(q_i) = cq_i - \gamma q_i^2$, where $\gamma \geq 0$ represents the degree of economies of scale. This means that we are considering the case

⁵ Unlike our paper, Saggi and Yildiz (2006) focus on the linkage between optimal trade policy and merger incentives under constant returns to scale.

⁶ Ulus and Yildiz (2012) employ the same merger formation model under Bertrand competition.

⁷ See the survey by Breinlich et al. (2017) for details.

in which firms produce a country-specific product whose production cost does not depend on sales in any other market.⁸ To ensure that firms have non-negative marginal costs of production, we impose restrictions on the size of cost c and the degree of economies of scale γ such that $MC(q_i) = \partial TC(q_i)/\partial q_i = c - 2\gamma q_i \geq 0$ should hold.⁹

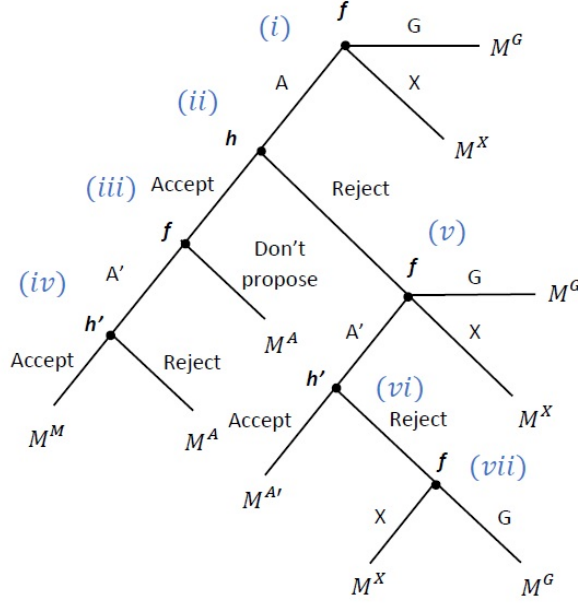


Figure 2: Entry Game

Figure 2 illustrates the game without any merger policy with the following stages: First, the foreign firm f decides on its mode of entry. If it opts for acquiring a domestic firm, it makes a take-it-or-leave-it offer to the first domestic target firm h , which depends on the target firm's anticipated profit if the offer is rejected. If the target firm h accepts the offer, the foreign firm becomes the new owner of the acquired target firm and – if the foreign firm intends to monopolize the host country's market – it makes an acquisition offer to the second domestic target firm h' . If the first domestic target firm h rejects the acquisition offer, the foreign firm may choose one of the following modes of entry: acquisition of the second domestic target firm h' , greenfield investment, or exporting. As a result, the foreign firm's entry strategy determines the market structure in the host country. Subsequently, once the foreign firm has entered the host country, all independent firms compete non-cooperatively in a Cournot fashion.

We let q_i^Z and π_i^Z denote the output and profit of firm i in the host country's market when the foreign firm chooses a mode Z ($Z = X, G, A, A', M$) for entering the host country. These entry

⁸ Otherwise we would have to make assumptions on the sales of domestic firms and the foreign firm in other countries and make an assumption whether any acquisition will take over the domestic activities of the domestic firms only or its international activities as well. Instead, we keep the model symmetric which allows us to focus on the domestic market only.

⁹ By definition of economies of scale, $MC(q_i) < AC(q_i)$, where AC denotes the average cost such that $AC(q_i) > 0$ if $MC(q_i) > 0$.

modes are characterized as follows. First, the foreign firm may choose to export its products to the host country, incurring a trade cost t per unit of exports. We denote this strategy as X , and it results in the market structure M^X in the host country. Profit maximization by all three firms in the triopoly leads to the following output and profit levels of the foreign and the domestic firm, respectively:

$$q_f^X = \frac{1}{2} \frac{(\alpha - c)(1 - 2\gamma) - t(3 - 2\gamma)}{(2 - \gamma)(1 - 2\gamma)}, \quad q_j^X = \frac{1}{2} \frac{(\alpha - c)(1 - 2\gamma) + t}{(2 - \gamma)(1 - 2\gamma)}, \quad j = h, h',$$

$$\pi_f^X = \frac{1}{4} \frac{(1 - \gamma)((\alpha - c)(2\gamma - 1) - t(2\gamma - 3))^2}{(2 - \gamma)^2(1 - 2\gamma)^2}, \quad \pi_j^X = \frac{1}{4} \frac{(1 - \gamma)((\alpha - c)(1 - 2\gamma) + t)^2}{(2 - \gamma)^2(1 - 2\gamma)^2}, \quad j = h, h'.$$

As expected, trade costs reduce the volume of export of the foreign firm while raising the output of domestic firms: $\partial q_f^X / \partial t < 0 < \partial q_j^X / \partial t$. We make the following assumption as to rule out prohibitive trade costs:

$$t \leq t^p \equiv \frac{(\alpha - c)(1 - 2\gamma)}{3 - 2\gamma}.$$

We observe that t^p decreases with γ : domestic firms do not face a trade cost and thus domestic firms become relatively more efficient with an increasing γ , reducing exports. As a second mode of entry, the foreign firm may establish a new production plant in the host country, incurring a greenfield investment cost g . This is the greenfield strategy G , leading to the market structure M^G in the host country. Under M^G , the foreign firm serves the host country's market without trade costs and thus the host country's market becomes a symmetric triopoly, with two domestic firms facing more intense competition with the foreign firm compared to exporting. Profit maximization by all firms leads to the following output and profit levels of the foreign and the domestic firm, respectively:

$$q_i^G = \frac{1}{2} \frac{(\alpha - c)}{(2 - \gamma)}, \quad i = f, h, h'$$

$$\pi_f^G = \frac{1}{4} \frac{(1 - \gamma)(\alpha - c)^2}{(2 - \gamma)^2} - g, \quad \pi_j^G = \frac{1}{4} \frac{(1 - \gamma)(\alpha - c)^2}{(2 - \gamma)^2}, \quad j = h, h'.$$

In order to rule out prohibitive greenfield investment costs, we assume that

$$g \leq g^p \equiv \frac{1}{4} \frac{(1 - \gamma)(\alpha - c)^2}{(2 - \gamma)^2}$$

holds. Furthermore, the foreign firm may acquire a domestic target firm by offering an acquisition price determined by the target firm's best alternative E to acquisition. Given that the foreign firm pays an acquisition price to a target firm, we can express the net profit from acquiring a domestic firm (e.g., firm h) as $\pi_f^A - \pi_h^E - \varepsilon$ where π_f^A represents the post-acquisition profits of the foreign firm, and π_h^E denotes the profit that the domestic target firm h would make if the foreign firm enters the market through the E mode of entry in case the acquisition

offer is rejected. Since the foreign firm's best alternative to an acquisition is the E mode, it serves as a credible threat to the target firm h and determines the reservation price of the target firm. The foreign firm has all the bargaining power in acquisition negotiations and makes an acquisition offer by paying an acquisition price equal to the target firm's reservation price and a negligible additional compensation $\varepsilon > 0$ to ensure that the acquisition offer will be accepted. Without loss of generality, we will ignore ε and thus $\pi_f^A - \pi_h^E$ will represent the net profit resulting from the acquisition of domestic firm h .

In particular, if the foreign acquires the second target firm h' for an acquisition price a' , we denote this strategy by A' , resulting in market structure $M^{A'}$ in the host country. The acquisition price is determined either by exporting or greenfield entry as the second-best (credible) entry option, depending on the level of trade and greenfield investment costs and economies of scale. We then have a duopoly in the host country's market where the foreign firm saves on trade cost and competes with domestic firm h . Profit maximization by both firms leads to the following output and profit levels:

$$q_f^{A'} = q_h^{A'} = \frac{(\alpha - c)}{(3 - 2\gamma)}$$

$$\pi_h^{A'} = \frac{(1 - \gamma)(\alpha - c)^2}{(3 - 2\gamma)^2} \quad \text{and} \quad \pi_f^{A'} = \frac{(1 - \gamma)(\alpha - c)^2}{(3 - 2\gamma)^2} - \pi_{h'}^E, \quad E = X, G.$$

If the foreign firm acquires the first target firm h for an acquisition price a , we denote this strategy by A , resulting in market structure M^A in the host country. Note carefully that – if the foreign firm acquires the first domestic firm h only – the target firm's alternative can also be determined by the second domestic firm being acquired in addition to exporting and greenfield entry. In this case, the foreign firm's profit after the acquisition is given by

$$\pi_f^A = \frac{(1 - \gamma)(\alpha - c)^2}{(3 - 2\gamma)^2} - \pi_h^E, \quad E = A', X, G.$$

At this point, it should be clear that the aggregate output of firms is lower while the sales price is higher under M^A or $M^{A'}$ relative to M^X and M^G . More importantly, the output of the foreign firm under duopoly (after the acquisition) is lower relative to the combined output of the acquired domestic firm (say firm h) and foreign firm under exporting and greenfield investment while the non-acquired domestic firm (firm h') free rides and enjoys larger sales at a higher price:

$$q_f^A - (q_f^Z + q_h^Z) < 0 \quad \text{and} \quad q_{h'}^A - q_{h'}^Z > 0, \quad \forall \gamma \geq 0 \quad \text{where} \quad Z = X, G.$$

Finally, the foreign firm has the option to monopolize the host country's market by acquiring both domestic firms. This strategy is denoted as M and leads to the market structure M^M in the host country. Note that the acquisition price of the second domestic firm h' is always the

duopoly profit h' it would obtain under M^A , $\pi_{h'}^A$. This is different for the acquisition price of the first domestic firm h that will depend on the level of trade or greenfield investment costs and the degree of economies of scale. Output and profit under monopoly are given by

$$q_f^M = \frac{(\alpha - c)}{2(1 - \gamma)} \quad \text{and} \quad \pi_f^M = \frac{(\alpha - c)^2}{4(1 - \gamma)} - \pi_h^E - \pi_{h'}^A, \quad E = A', X, G.$$

In order to find the subgame-perfect Nash equilibrium (SPNE), we solve the game using backward induction. Therefore, we begin with subgame (vii) where the foreign firm faces a choice between exporting and greenfield investment, given the rejection of acquisition offers by both domestic target firms. This choice of entry mode subsequently determines the market structure in the host country and serves as a credible threat towards the target firm h' . The comparison of foreign firm's profit under M^X and M^G implies a critical threshold of trade cost $t(X - G)$ below which the foreign firm prefers exporting to greenfield investment, as illustrated by Figure 3:

$$\begin{aligned} \pi_f^X - \pi_f^G &\geq 0 \quad \text{iff} \quad t \leq t(X - G) \quad \text{where} \\ t(X - G) &= \frac{(1 - 2\gamma) \left((\alpha - c)(1 - \gamma) - \sqrt{(1 - \gamma) \left((1 - \gamma)(\alpha - c)^2 - 4g(\gamma - 2)^2 \right)} \right)}{(1 - \gamma)(3 - 2\gamma)} \\ \text{and} \quad \frac{\partial t(X - G)}{\partial g} &> 0 \quad \text{and} \quad \frac{\partial t(X - G)}{\partial \gamma} < 0. \end{aligned}$$

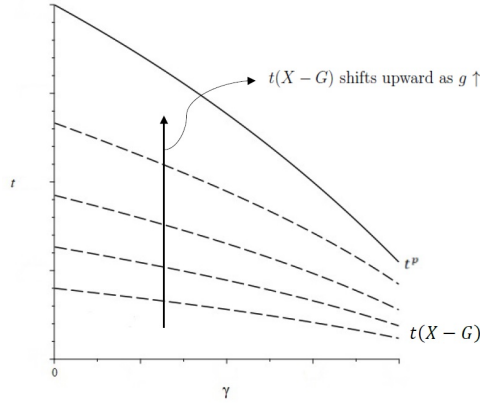


Figure 3: Critical threshold trade cost $t(X - G)$

$\partial t(X - G)/\partial g > 0$ is the well-known proximity-concentration trade-off: as the greenfield investment cost rises, the foreign firm's profit under greenfield investment falls and thus the threshold trade cost $t(X - G)$ at which the foreign firm is indifferent between exporting and greenfield investment rises. We also find that $t(X - G)$ declines with the economies of scale: $\partial t(X - G)/\partial \gamma < 0$ because they increase the foreign firm's profit more under greenfield investment than under exporting due to trade costs. As a result, the threshold trade cost has to be lower for the export profit to be equal to the profit under greenfield investment.

In subgame (vi), the second domestic target firm h' decides on accepting or rejecting an acquisition offer of the foreign firm, and this takes us to subgame (v) where the foreign firm either makes an acquisition offer to the second domestic target firm h' , exports, or makes a greenfield investment given that its acquisition offer to the first domestic target firm h had already been rejected. Consider first the case where $t < t(X - G)$ such that the foreign firm chooses exporting if h' rejects the acquisition offer. Then, the foreign firm compares the exporting profit with the net acquisition profit with a credible exporting threat. It prefers the acquisition if

$$(\pi_f^{A'} - \pi_{h'}^X) - \pi_f^X \geq 0 \text{ iff } t \geq t(A'(X) - X)$$

$$\text{where } t(A'(X) - X) = \frac{(1 - 2\gamma)(\alpha - c)((1 - \gamma)^2 - \gamma(2 - \gamma))}{(3 - 2\gamma)((2 - \gamma)^2 + (1 - \gamma)^2)}.$$

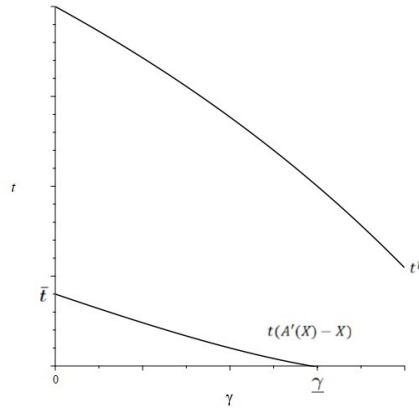


Figure 4: Critical threshold trade cost $t(A'(X) - X)$

First, as illustrated by Figure 4, we show that the merger is not profitable unless it achieves a considerable market concentration, a result well-known from the merger literature,¹⁰ and/or saves on trade cost and/or benefits from economies of scale. Furthermore, we find that

$$t(A'(X) - X) = \bar{t} = \frac{\alpha - c}{15} \text{ if } \gamma = 0$$

and

$$t(A'(X) - X) = 0 \text{ if } \gamma = \underline{\gamma} = 1 - \frac{\sqrt{2}}{2} \approx 0.292893.$$

Without economies of scale, the cross-border acquisition has to save on sufficiently large trade costs larger than $\bar{t}$. Without trade cost saving ($t = 0$), the degree of economies of scale should be sufficiently larger than $\underline{\gamma}$ for making the acquisition more attractive than exporting. We also show that $\partial t(A'(X) - X)/\partial \gamma < 0$. Larger economies of scale benefit the foreign firm more under an acquisition compared to exporting since an acquisition does not face any trade costs while producing a larger output for the domestic market. As a result the threshold trade

¹⁰ See Salant et al. (1983) and Perry and Porter (1985) for details.

cost has to decline for the exporting profit to be equal to the acquisition profit.

What happens if $t > t(X - G)$ and the foreign firm prefers greenfield investment over exporting? Similarly, an acquisition is preferred if the foreign firm's profit under greenfield investment is smaller than the net acquisition profit with a credible threat of greenfield investment, that is,

$$(\pi_f^{A'} - \pi_{h'}^G) - \pi_f^G \geq 0 \quad \text{iff} \quad \gamma \geq \gamma(A'(G) - G)$$

where $\frac{\partial \gamma(A'(G) - G)}{\partial g} < 0$.

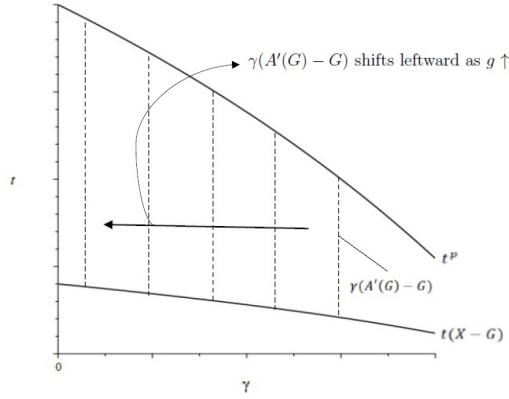


Figure 5: Critical threshold degree of economies of scale $\gamma(A'(G) - G)$

These results are illustrated by Figure 5 which shows that an acquisition is attractive relative to greenfield investment only if economies of scale and/or greenfield investment cost are sufficiently large. Similar to our previous discussion for exporting, this result is in line with the traditional merger literature for moderate or low greenfield investment costs. If economies of scale are not too large, a single firm acquisition is not attractive compared to greenfield investment. As shown by Figure 5, the critical degree of economies of scale falls with the greenfield investment cost (g). It is important to note that the choice of entry mode at this subgame serves as a credible threat towards the first domestic target firm h when it receives an acquisition offer from the foreign firm and decides whether to accept or reject at subgame (ii).

Subgame (iv) may lead to a potential monopolization, following the foreign firm's successful acquisition of the first domestic target firm h . To this end, we next move to subgame (iii) where the foreign firm decides to make this acquisition offer to the second domestic firm or not, and this depends on the monopoly profit, net of the acquisition prices a and a' paid to the domestic firms h and h' , respectively. If the foreign firm prefers monopolizing the host country's market, it proceeds to make an acquisition offer $a' = \pi_{h'}^A$ to the second target firm h' . If the foreign firm does not want to monopolize the host country's market, the outcome is a duopoly, M^A , with the foreign firm having acquired the first target firm, h .

Before moving back to subgames (ii) and (i), we summarize our findings so far:

- If $t < t(X - G)$ holds, the acquisition of the second domestic target firm h' , $A'(X)$ is a credible threat to the first domestic target firm only if $t > t(A'(X) - X)$ holds. However, if $t < t(A'(X) - X)$, X is a credible threat to the first domestic target firm.
- If $t > t(X - G)$ holds, the acquisition of the second domestic target firm h' , $A'(G)$ is a credible threat to the first domestic target firm only if $\gamma > \gamma(A'(G) - G)$, while greenfield investment, G , is a credible threat to the first domestic target firm h if $\gamma < \gamma(A'(G) - G)$ holds.

These are the credible threats to the first and second domestic target firms if the foreign firm wants to make (serious) acquisition offers. We are now ready to identify the equilibrium entry modes for the foreign firm and the equilibrium market structure in the host country. The following lemma will prove useful.

Lemma 1. *In case of a single acquisition only, both $A'(X)$ and $A'(G)$ are preferred to $A(A')$ since $\pi_h^{A'} > \pi_{h'}^X$ and $\pi_h^{A'} > \pi_{h'}^G$ for all g , γ and t .*

Lemma 1 shows that the foreign firm will acquire the second target firm h' and not the first target firm h if it wants to do a single acquisition only. This result is closely linked to the well-known free riding result in the merger literature: the non-acquired firm benefits more from the acquisition of the other firm through a larger higher market share at a higher market price (due to the anti-competitive effect). Consequently, the acquisition price for the first target firm h is larger than that for the second target firm h' : $\pi_h^{A'} > \pi_{h'}^X$ and $\pi_h^{A'} > \pi_{h'}^G$ for all g , γ and t . Therefore, we can rule out $A(A')$ as a candidate for an equilibrium entry mode.

Finally, we are ready to roll back to subgame (ii) and subgame (i). The first domestic target firm h decides to accept or reject the acquisition offer of the foreign firm in subgame (ii) while the foreign firm decides on its entry mode (export, greenfield investment, or the acquisition of the first domestic target firm, h) in subgame (i). To examine the incentives of the foreign firm, we have to distinguish four cases:

- (i) $t(A'(X) - X) < t < t(X - G)$: exporting is more profitable than greenfield investment for the foreign firm, and $A'(X)$ is a credible threat to the first domestic target firm h .
- (ii) $t < \min[t(X - G), t(A'(X) - X)]$: exporting is more profitable than greenfield investment for the foreign firm, and exporting X is a credible threat to both domestic target firms.
- (iii) $t > t(X - G)$ and $\gamma < \gamma(A'(G) - G)$: greenfield investment is more profitable than exporting for the foreign firm, and greenfield investment is a credible threat to both domestic target firms.

- (iv) $t > t(X - G)$ and $\gamma > \gamma(A'(G) - G)$: greenfield investment is more profitable than exporting for the foreign firm, and the acquisition of the second domestic target firm h' , $A'(G)$ is a credible threat to the first domestic target firm h .

We now examine these cases in detail in order to derive the equilibrium market structures. In case (i), three entry modes are possible: $A(A')$, $A'(X)$, and $M(A' - A)$. Using Lemma 1, we can immediately rule out $A(A')$ as a candidate for the equilibrium entry mode. As illustrated by Figure 6, we find a critical threshold level of trade cost above which the foreign firm has an incentive to monopolize the host country's market, $M(A' - A)$ with acquisition prices $a = \pi_h^{A'}$ and $a' = \pi_{h'}^A$ rather than acquiring the second target firm h' only under $A'(X)$ with an acquisition price $a' = \pi_{h'}^X$:

$$(\pi_f^M - \pi_h^{A'} - \pi_{h'}^A) - (\pi_f^{A'} - \pi_{h'}^X) \geq 0 \text{ iff } t \geq t(M(A' - A) - A'(X))$$

$$\text{where } t(M(A' - A) - A'(X)) = \frac{(1 - 2\gamma)(\alpha - c)[(2 - \gamma)\sqrt{2(1 - 2\gamma)^2 + (1 - 4\gamma)} - 1]}{(3 - 2\gamma)(1 - \gamma)}.$$

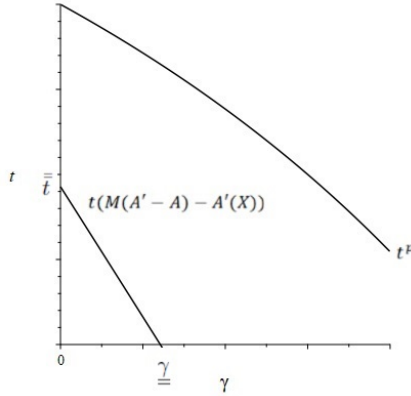


Figure 6: Critical threshold trade cost $t(M(A' - A) - A'(X))$

Note that the foreign firm's profit does not change with trade costs if the entry mode is $M(A' - A)$ while trade costs reduce the profit of the foreign firm under $A'(X)$ due to a rising acquisition price of h' . Moreover, economies of scale increase the foreign firm's incentive to monopolize the market, and thus its profit rises more under $M(A' - A)$ relative to the one under $A'(X)$. This implies that, for the foreign firm to be indifferent between $M(A' - A)$ and $A'(X)$ as trade costs decline, economies of scale must rise, and thus we find that $\partial t(M(A' - A) - A'(X))/\partial \gamma < 0$ holds. Similar to our previous discussion, we also show that, for the monopolization to be profitable compared to a single acquisition, the foreign firm must either save on a high acquisition price under $A'(X)$ (due to high trade costs) and/or benefit sufficiently from economies scale. More precisely:

$$t(M(A' - A) - A'(X)) = \bar{t} = \frac{(\alpha - c)(2\sqrt{3} - 3)}{3} \text{ if } \gamma = 0$$

and

$$t(M(A' - A) - A'(X)) = 0 \text{ if } \gamma = \underline{\gamma} = \frac{3 - \sqrt{4 + \sqrt{13}}}{2} \approx 0.121092.$$

Next, we move to case (ii) where we can immediately argue that the foreign firm always prefers exporting to the single acquisition of a domestic firm, implying two possible equilibrium entry modes, that is, $M(X - A)$ and X . The foreign firm always has an incentive to monopolize the host country's market via $M(X - A)$ with acquisition prices $a = \pi_h^X$ and $a' = \pi_h^A$: $(\pi_f^M - \pi_h^X - \pi_h^A) - \pi_f^X > 0$ if $t < t(X - G)$ and $t < t(A'(X) - X)$ hold. Figure 7 shows a critical threshold of greenfield investment cost, $\bar{g}$, at which $t(X - G)$, $t(A'(X) - X)$ and $t(M(A' - A) - A'(X))$ intersect. Later, in our equilibrium market structure discussion, $\bar{g}$ will serve as our 'high greenfield investment cost' benchmark.

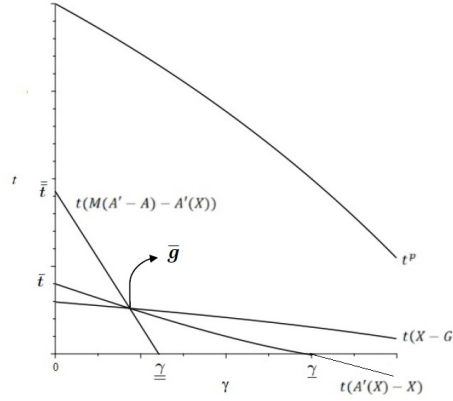


Figure 7: Critical threshold trade costs at $\bar{g}$

In case (iii), the foreign firm always prefers greenfield investment to $A'(G)$ and greenfield investment is a credible threat to both domestic target firms, implying two possible equilibrium entry modes, that is, $M(G - A)$ and G . We find that the foreign firm always has an incentive to monopolize the host country's market (rather than choosing greenfield investment) via $M(G - A)$ with acquisition prices $a = \pi_h^G$ and $a' = \pi_h^A$: $(\pi_f^M - \pi_h^G - \pi_h^A) - \pi_f^G > 0$ if $t > t(X - G)$ and $\gamma < \gamma(A'(G) - G)$. Recall from our previous discussion and Figure 5 that $\partial\gamma(A'(G) - G)/\partial g < 0$ holds, implying that the range of economies of scale in which greenfield investment is preferable to a single acquisition declines with an increasing g and disappears if g is sufficiently large.

For a sufficiently large g , we are in case (iv) with three possible entry modes: $A(A')$, $A'(G)$, and $M(A' - A)$. Using Lemma 1 again, we immediately rule out $A(A')$ as a candidate for an equilibrium entry mode. Comparing entry modes $A'(G)$, and $M(A' - A)$, we first note that, unlike case (i) and case (ii), trade costs do not play any role since $t > t(X - G)$, implying that greenfield entry is always preferable to exporting. Unlike case (iii), the acquisition prices under $A'(G)$ and $M(A' - A)$ do not depend on the greenfield investment cost (g). Therefore, only the degree of the economies of scale is pivotal. As illustrated by Figure 8, we find a critical

threshold degree of economies of scale above which the foreign firm will want to monopolize the host country's market via $M(A' - A)$ with acquisition prices $a = \pi_h^{A'}$ and $a' = \pi_{h'}^A$ rather than acquiring the second target firm h' , $A'(G)$ with an acquisition price $a' = \pi_{h'}^G$.¹¹

$$(\pi_f^M - \pi_h^{A'} - \pi_{h'}^A) - (\pi_f^{A'} - \pi_{h'}^G) > 0 \text{ iff } \gamma > \gamma(M(A' - A) - A'(G)) = \underline{\underline{\gamma}}.$$

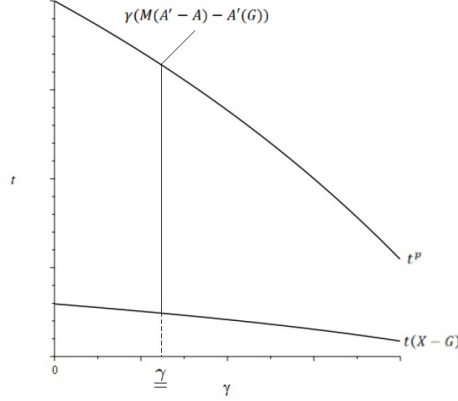


Figure 8: Critical threshold degree of economies of scale $\gamma(M(A' - A) - A'(G))$

$\gamma(M(A' - A) - A'(G))$ does not change with g while $\gamma(A'(G) - G)$ declines with g . Therefore, we can easily demonstrate that $\gamma(A'(G) - G)$ converges to $\gamma(M(A' - A) - A'(G))$ only if the greenfield investment cost is sufficiently low so that foreign firm's profits under $M(A' - A)$ and G are identical:

$$\gamma(M(A' - A) - A'(G)) = \gamma(A'(G) - G) \text{ iff } g = \underline{\underline{g}}.$$

$g = \underline{\underline{g}}$ will serve as our benchmark for the 'low greenfield investment cost' scenario. Consequently, we have three critical greenfield investment cost levels that play major roles in our discussion of equilibrium market structure: $\underline{\underline{g}}$, $\underline{g}$ and $\bar{g}$ where $\bar{g} \geq \underline{g} \geq \underline{\underline{g}}$. In what follows, we will scrutinize the equilibrium market structures for two scenarios: (i) 'high greenfield investment cost' ($g \geq \bar{g}$) and (ii) 'low greenfield investment cost' ($g < \underline{\underline{g}}$).

3 Entry without merger policy

We are now ready to derive the equilibrium market structures for both 'low greenfield investment cost' and 'high greenfield investment cost' scenarios. In this section, we consider the case of unrestricted entry, that is, no intervention by the antitrust authority via any merger policy, and we call this 'laissez-faire policy'. Four effects will play critical roles in determining the foreign firm's entry mode into the host country. First, the *trade cost saving* effect materializes when the foreign firm does a greenfield investment or acquires a domestic firm rather than

¹¹ Note that $\gamma(M(A' - A) - A'(G)) = \underline{\underline{\gamma}}$ holds since the payoff comparison between $M(A' - A)$ and $A'(X)$ and the one between $M(A' - A)$ and $A'(G)$ coincides for $t = 0$.

exporting. Second, a *greenfield investment cost* saving effect materializes when the foreign firm chooses to export or to acquire a domestic firm rather than engaging in greenfield investment as it avoids the additional plant cost. Third, economies of scale imply a *cost reduction* effect as the average cost declines with output levels. In particular, the foreign firm will produce more compared to greenfield investment and exports if it acquires a domestic firm. Due to this effect, the foreign firm's willingness to acquire a domestic firm increases with the degree of economies of scale (γ), potentially implying monopolization. Finally, acquisitions imply an *anti-competitive* effect because they reduce the number of independent firms in the market.

The last two effects imply that the foreign firm entering via an acquisition may produce at a lower average cost with larger output levels sold for a higher price. Consequently, the combination of the anti-competitive effect and the cost reduction effect makes an acquisition a profitable entry mode, particularly if economies of scale are sufficiently large.¹² At the same time, a single acquisition leads to stronger free riding incentives for the non-acquired domestic firm. Figure 9 illustrates the market structure for low greenfield costs.

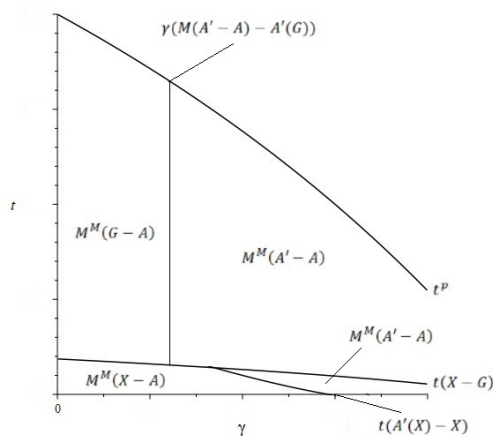


Figure 9: Laissez-faire market structures – low greenfield cost

Proposition 1. *Suppose that greenfield investment costs are sufficiently low ($g < \underline{g}$) and all mergers are allowed. Irrespective of the degree of economies of scale and the size of trade costs, the foreign firm will acquire both domestic firms, implying monopolization as the equilibrium market structure.*

Figure 9 highlights that, while monopolization always arises if g is low, the pathways to monopolization depend on the degree of economies of scale and the size of trade costs, and it is helpful to understand these different pathways as they are important for the optimal design of merger policies. We observe that, for substantial economies of scale, the market is monopolized and $M^M(A' - A)$ is the equilibrium outcome since the firm would also want to

¹² This observation aligns with the results from Salant et al. (1983) showing that, in a Cournot competition with symmetric firms and constant marginal cost and due to the anti-competitive effect of merger, a merger is profitable only if the merged entity will have a market share of at least 80% in the industry.

acquire a single firm if its offer to the first firm were rejected. This is driven by a combination of the large average cost reduction effect and the anti-competitive effect of a monopoly. While the acquisition prices are high, the substantial gain from economies of scale via monopolization outweighs the large acquisition prices. If economies of scale are sufficiently small or zero, an acquisition becomes less profitable compared to exports or greenfield investment. However, small economies of scale also imply a low acquisition price for the first domestic target firm, triggering sequential acquisitions. The low acquisition price is driven by exporting or greenfield investment as the credible second-best option of the foreign firm. Consequently, a monopoly with the foreign firm acquiring domestic firms for low prices, $M^M(G - A)$ or $M^M(X - A)$, is the equilibrium outcome if economies of scale are small or zero.

What happens for high greenfield investment cost, that is, $g \geq \bar{g}$? Figure 10 illustrates the equilibrium market structure. For large economies of scale, the foreign firm prefers monopolization as it does for low greenfield investment costs. However, it is no longer true that the foreign firm always want to monopolize the market for small economies of scale as well. Even more importantly, the preferred mode of entry with an increase in trade costs is switching back and forth between complete monopolization and the acquisition of a single firm only. The following proposition summarizes our findings:

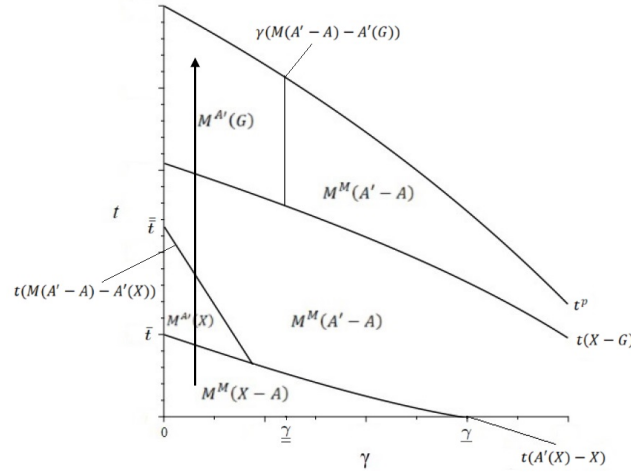


Figure 10: Laissez-faire market structures – high greenfield cost

Proposition 2. *Suppose that greenfield investment costs are sufficiently high ($g \geq \bar{g}$) and all mergers are allowed.*

- (i) *If economies of scale are large, the foreign firm will acquire both domestic firms, implying monopolization as the equilibrium market structure.*
- (ii) *If economies of scale is sufficiently small, the foreign firm's equilibrium entry mode changes with increasing trade costs as follows: (a) full monopolization followed by (b)*

a single acquisition followed by (c) full monopolization followed by (d) a single acquisition.

Why does the foreign firm want to switch back and forth with increasing trade costs? Proposition 2 demonstrates impressively the crucial role of changing credible threats with trade costs in our analysis. For small economies of scale, monopolization can be the preferred option only for reasons of market power. Consider the arrow in Figure 10. For sufficiently low trade costs, we are in the area denoted by $M^M(X - A)$. In this area, the foreign firm's credible threat to the first target firm is exporting since trade costs are substantially low. If the first domestic target firm rejects the acquisition offer, the foreign firm will not extend an acquisition offer to the second target firm but will export to the domestic market. Then, the first target firm is compensated by the triopoly profit of export competition, and the second target firm receives the duopoly profit as a compensation to form a monopoly. Since its profit rises with trade costs, the compensation to the first target firm h increases with trade costs.

If trade costs exceed $\bar{t}$ and thus we surpass $t(A'(X) - X)$, exporting is no longer a credible threat against the first target firm in area $M^{A'}(X)$, and this completely changes the whole dynamics of the potential acquisition process. The first potential target firm correctly anticipates that the foreign firm will not export if it rejects the offer, but it instead extends an acquisition offer to the second target firm. Consequently, in this area, the trade costs are too large for exports to serve as a credible threat against the first target firm, but are still sufficiently low to serve as a credible threat against the second target firm. This loss of the credible export threat against the first target firm means that the foreign firm can acquire the first target firm only if the compensation is at least equal to the duopoly profit. If it did, the second target firm would also have to receive the duopoly profit. In this area, acquiring both firms becomes so expensive that the foreign firm opts for acquiring the second target firm only.

As trade costs increase further and surpass $t(M(A' - A) - A'(X))$, the single acquisition of the second target firm has become more and more expensive as the profit of the second target firm increases with t under exporting. Thus, we enter the area where $M^M(A' - A)$ is the equilibrium market structure since the compensation price for h' for a single acquisition with an export threat becomes too large compared to acquiring both firms and paying each of them the duopoly profit to become a monopolist. In this area, trade costs do not affect the duopoly profits. Consequently, acquiring both firms is the optimal foreign strategy in this range.

If trade costs are sufficiently large, we cross the threshold trade cost $t(X - G)$ and greenfield investment becomes the credible threat against the second target firm. However, the greenfield investment cost is too large to be a credible threat against the first target firm as well. Again, the first target firm anticipates that the foreign firm will acquire h' rather than entering via greenfield if it rejects the acquisition offer. In this sense, the greenfield entry option has not

enough thrust to serve as a credible greenfield threat against the first target firm as it does in case of low greenfield investment costs. Consequently, the acquisition of both firms is too expensive and the foreign firm will acquire the second target firm only.

4 Host country welfare and merger policy

Until now, we have analyzed the equilibrium entry modes for a laissez-faire policy (no merger policy). We now investigate (i) which market structure the host country will prefer and (ii) whether an optimal merger policy is able to induce the preferred market structure. Note that these are two different questions as the antitrust authority cannot impose a certain entry mode on private firms, but only prohibit an acquisition/merger. Thus, in terms of the game depicted by Figure 2, the variation is now that any acquisition requires approval by the antitrust authority. If the foreign firm's chosen entry mode is aligned with the host government's preferred entry mode, no policy intervention is needed. However, if there is a conflict of interest between the host government and the foreign firm regarding the acquisition of domestic firms within the host country, the antitrust authority of the host country can consider to implement a welfare-improving merger policies: a *strict* merger policy that prohibits any acquisition or a *lenient* merger policy that allows one acquisition but not monopoly.

The antitrust authority acts in the interest of the domestic government and evaluates entry modes of the foreign firm based on domestic country welfare. We use a traditional welfare definition, and welfare of the host country under entry mode Z , denoted by W^Z , is defined as the sum of consumer surplus (CS^Z), total profits earned by its domestic firms, and of the value of acquired domestic firm (in the case of acquisition) which depends on the credible threat E to the acquired domestic target firm:¹³

$$W^Z = \underbrace{\frac{Q^{Z^2}}{2}}_{CS^Z} + \left\{ \begin{array}{ll} \underbrace{\sum_{i=h,h'} \pi_i^Z}_{PS^Z} & \text{where } Q^Z = \sum_{i=f,h,h'} q_i^Z \text{ for } Z = X, G, \\ \pi_{h'}^A + \underbrace{\pi_h^E}_{\text{value of firm } h} & \text{where } Q^Z = \sum_{i=f,h'} q_i^A \text{ for } E = X, G, A', \\ \pi_h^{A'} + \underbrace{\pi_{h'}^E}_{\text{value of firm } h'} & \text{where } Q^Z = \sum_{i=f,h} q_i^{A'} \text{ for } E = X, G, \\ \underbrace{\pi_h^E}_{\text{value of firm } h} + \underbrace{\pi_{h'}^A}_{\text{value of firm } h'} & \text{where } Q^Z = q_f^M \text{ for } E = X, G, A'. \end{array} \right.$$

Not surprisingly, the trade cost saving effect, the average cost reduction effect and the anti-competitive effect also play an important role in the welfare ranking. Greenfield investment

¹³ Using the reported output and profit levels, we can calculate welfare levels under each market structure in order to prove our results in this section.

leads to a larger output and intensifies competition in the host country. Therefore, the trade cost saving effect of greenfield investment generates a pro-competitive effect which increases consumer surplus more than it reduces domestic profit. In case of an acquisition, economies of scale reduce the average costs but also competition at the same time, reducing consumer surplus but possibly increasing the profits of the non-acquired domestic firm. This anti-competitive effect is partially compensated by a larger efficiency of the foreign firm due to the cost reduction effect. Figure 11 depicts the preferred entry modes for different levels of trade cost t and the degree of economies of scale γ for the case of low greenfield investment costs.

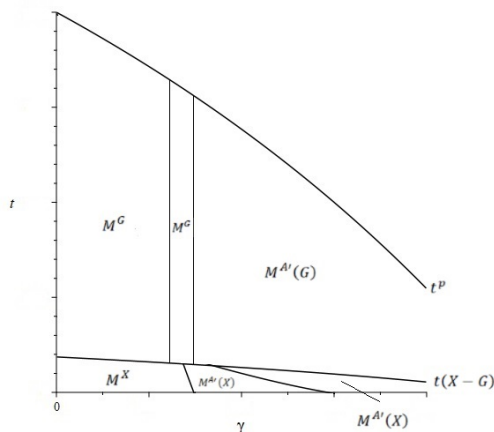


Figure 11: Preferred entry modes – low greenfield cost

Figure 11 shows that a single acquisition is the preferred entry mode, irrespective of the size of trade costs, if economies of scale are sufficiently large. The reason is that an acquisition implies a large average cost reduction effect for both the foreign firm and the non-acquired domestic firm. Furthermore, both the cost reduction and the trade cost saving effect outweigh the anti-competitive effect of the acquisition. However, if economies of scale are sufficiently small, exporting is the preferred entry mode if trade costs are sufficiently low. Note that domestic firms benefit from trade cost protection while larger trade costs lead to less intense competition in the domestic market. Our result shows that the former effect dominates the latter only if the trade cost is sufficiently small. Therefore, if trade costs are sufficiently large and economies of scale are small, greenfield investment is the preferred mode of entry since it intensifies competition, creating a larger consumer surplus that outweighs the lower profits of domestic firms relative to export competition.

As discussed above, the foreign firm always have incentives to go for complete monopolization without any merger policy, and thus we expect the antitrust authority to intervene. Without loss of generality, we impose a *leniency principle* for the authority: whatever the authority wants to achieve, it will always do so with the minimum level of intervention, correctly anticipating which alternative entry mode its intervention will imply. If the antitrust authority goes for a strict merger policy, it will either attain greenfield investment or exporting. If it

goes for a lenient merger policy, it will either attain a single acquisition, greenfield investment or exporting. Figure 12 illustrates the optimal merger policies depending on the size of trade costs and the degree of the economies of scale.

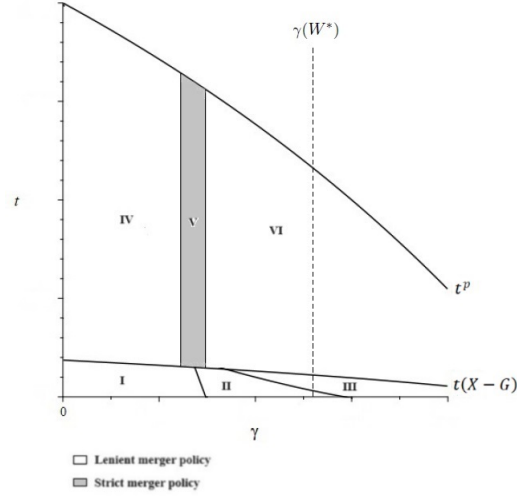


Figure 12: The optimal merger policy – low greenfield cost

Figure 12 shows the following result:

Proposition 3. *Suppose that greenfield investment costs are sufficiently low ($g < \underline{g}$). In this case,*

- (i) *a lenient welfare-improving merger policy is optimal if $t < t(X - G)$; and*
- (ii) *a lenient merger policy is optimal for small and large economies of scale while a strict merger policy is optimal for intermediate levels of economies of scale if $t \geq t(X - G)$.*

Figure 12 distinguishes different regions based on merger policy considerations. We start with region III where economies of scale are sufficiently large and trade costs are sufficiently low. Note that the acquisition implies a strong average cost reduction effect, and without any merger policy, the equilibrium market structure is monopoly while the host country's preferred entry mode is a single acquisition. Consequently, the antitrust authority allows only one merger through a lenient merger policy. Region I features small economies of scale (small average cost reduction effect) but the laissez-faire market structure is still monopoly while the host country's preferred mode of entry is exporting, given that the average cost reduction effect is relatively small. The foreign firm prefers exporting to a single acquisition, and thus the interests of the host government and foreign firm are partially aligned. The domestic government follows a lenient merger policy through which it can induce its most preferred mode of entry.

Region II is the region where the host government cannot induce its most preferred entry mode unlike in regions I and III. In region II, economies of scale are larger than in region I, and the host government now prefers the acquisition of a single firm over exporting. However, the

foreign firm has exactly opposite preferences, that is, it prefers exporting over the acquisition of a single firm. So all the antitrust authority can do is to impose a lenient merger policy which will imply that no acquisition will take place and the market will be served by exports. This case shows clearly that governments cannot always induce their most preferred entry mode via their merger policies. The merger policy literature typically assumes that firms always have an incentive to merge and governments can induce the desired market structure by blocking the respective merger proposal. This is not true in region II.

Next we consider the regions where trade costs are sufficiently large ($t > t(X - G)$). Consider region VI that is similar to region III since both feature large economies of scale and the foreign firm wants to monopolize the market. But as in region III, the antitrust authority prefers a single acquisition because of strong average cost reduction effects, and it can induce the most preferred market structure with a lenient merger policy. Region V seems to be the counterpart of region II, but the merger policy implication is quite different. In region II, the host government prefers a single acquisition to exporting while the foreign firm prefers exporting to a single acquisition. However, in region V, the domestic government prefers a greenfield investment over a single acquisition due to an increase in competition. By contrast, the foreign firm now prefers a single acquisition to a greenfield investment since the acquisition price is lower if a greenfield investment rather than exporting is a credible threat due to larger trade costs. Consequently, the antitrust authority has to impose a strict merger policy to induce its most preferred outcome. Note that a greenfield investment is only the third-best option for the foreign firm. In region IV, economies of scale are sufficiently small, and for similar reasons as in region I the firm's second-best option is now a greenfield investment (after monopoly) which is also the most preferred entry choice for the domestic government. Thus, as in region I, a lenient merger policy is able to induce the most preferred market structure.

We now turn to the case of high greenfield investment costs, and Figure 13 and Figure 14 depict the preferred entry modes and the optimal merger policies for the domestic country. For similar reasons as above, the domestic country prefers exports in regions I, II, III and IV and greenfield investment in regions VI and VII. For the same reasons as for the case of low greenfield costs, it prefers a single acquisition in regions V and VIII. We have the following result implying that strict merger policy is more likely under the 'high greenfield investment cost' scenario relative to 'low greenfield investment cost' scenario:

Proposition 4. *Suppose that greenfield investment costs are sufficiently high ($g > \bar{g}$). In this case,*

- (i) *a lenient merger policy is optimal if $t < t(A'(X) - X)$; and*
- (ii) *if $t \geq t(A'(X) - X)$, a strict merger policy is optimal if economies of scale are sufficient small while a lenient merger policy is optimal otherwise.*

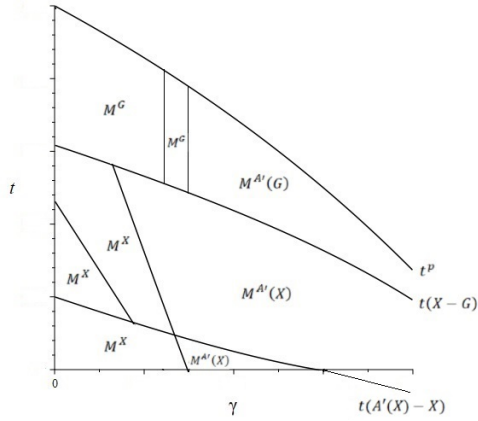


Figure 13: Preferred entry modes – high greenfield investment cost

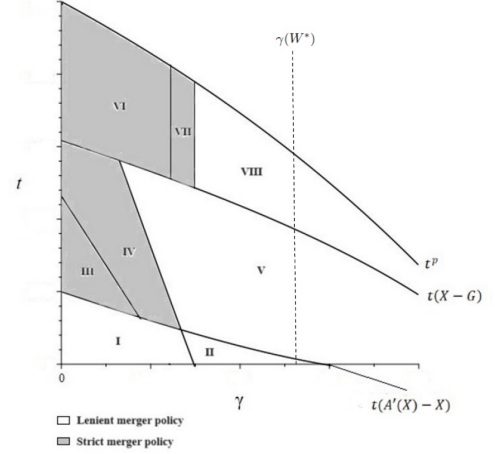


Figure 14: The optimal merger policy – high greenfield investment cost

In regions I and II, monopolization is the equilibrium market structure under a laissez-faire policy, and the foreign firm's second best entry mode is exporting which is the most preferred market structure for the host government only in region I. The host government prefers a single acquisition in region II to exporting. Therefore, as in the 'low greenfield investment cost' scenario, the host government can induce its most preferred entry mode with a lenient merger policy in region I while it fails to induce its most preferred entry mode in region II even though it still follows a lenient merger policy.

Next, we consider regions V and VIII where economies of scale are sufficiently large and monopolization is the outcome under a laissez-faire policy. In these regions, the second-best option for the foreign firm is a single acquisition which is also the preferred mode of entry for the host government, and thus a lenient merger policy is able to induce the most preferred market structure.

We next consider all other four regions where a strict merger policy is required to induce the most preferred mode of entry. In region III, the domestic government prefers exporting, but the foreign firm prefers a single acquisition over exporting such that a lenient merger policy is not sufficient. In region IV, while exporting is the most preferred mode of entry for the host government, the foreign firm prefers monopolization, followed by a single acquisition, and thus only a strict merger policy can avoid these outcomes and induce exporting instead. Finally in regions VI and VII, since economies of scale are sufficiently small, greenfield investment is the most preferred entry mode for the government while the equilibrium market structure under a laissez-faire policy is a single acquisition with a credible threat of greenfield investment in region VI while it is monopoly in region VII. Thus, a strict merger policy is necessary to induce greenfield investment in both regions.

So far, we have worked out the optimal merger policies of the domestic country. Merger

policy decision are based on the domestic country's welfare and do not take into account the foreign firm's profits. Furthermore, they either allow no merger, one merger, or two mergers, but they do not necessarily maximize aggregate world welfare that is the sum of foreign profits and domestic welfare. The reason is that there is no merger tax that could be used to divide any surplus. Is there a range in which domestic merger policies are excessive in terms of aggregate world welfare? In Figure 12 and Figure 14, we show that it is a possibility if economies of scale are sufficiently large:

Proposition 5. *Aggregate world welfare is larger if the government allows monopolization and economies of scale are sufficiently large, regardless of trade and greenfield investment costs: $\pi_f^M + W^M \geq \pi_f^Z + W^Z$ if $\gamma \geq \gamma(W^*)$ for all $Z = X, G, A, A'$.*

If $\gamma \geq \gamma(W^*)$, a supranational antitrust authority would have approved monopolization since aggregate welfare is maximized: the social and private incentives get aligned due to large average cost reduction effect. In such a case, the host government merger policy is excessive. In other words, merger policies can be restrictive only and cannot divide the potential gains from foreign monopolization, and since the domestic country would be worse off by allowing monopolization, it will never be an equilibrium outcome with endogenous merger policies.

5 Concluding remarks

In recent decades, the world economy has experienced substantial merger waves, in particular many cross-border mergers and acquisitions as a significant form of foreign direct investment. The present paper examines the equilibrium entry mode of a foreign firm and the optimal merger policy in an oligopoly model with economies of scale. To the best of our knowledge this is the first paper that endogenizes entry modes (exporting, greenfield entry and acquisitions) and derives the optimal merger policy under economies of scale. Economies of scale imply that all firms' average costs will be determined endogenously depending on the foreign entry mode.

We first show that economies of scale play a crucial role for firms' profits under different modes of entry, for acquisition prices, and for the design of optimal merger policies. Given that complete monopolization reduces competition substantially, we find that antitrust authorities will never allow complete monopolization. However, since average costs decline substantially if economies of scale are sufficiently large, this cost effect counteracts the anti-competitive effects of acquisitions such that the host government is willing to allow a single acquisition in this case. In addition to economies of scale, greenfield investment and trade costs affect the acquisition prices of the domestic firms and thus the welfare of the domestic country.

In our model, the antitrust authority can only approve or block a merger proposal and may thus fail to induce its most preferred market structure. We show that the host government can induce the most preferred market structure via a lenient or a strict merger policy only if

the foreign firm has an incentive to acquire at least one domestic firm. We show that this is not the case if trade costs are sufficiently small and economies of scale are moderate. We also find that the stringency of a merger policy is very sensitive to the level of trade and greenfield investment costs. While a strict merger policy is more likely to be optimal for high levels of greenfield investment and trade costs with weaker economies of scale, it becomes more lenient as both greenfield investment and trade costs decline.

Our model takes the levels of both trade and greenfield investment costs as given. Trade and investment policies, for example through a deep regional trade agreement, will affect these levels. We have scrutinized the foreign market entry and the response of national merger policies. A straightforward extension could examine whether two countries have an incentive to reduce trade and/or investment costs, correctly anticipating its effect on some oligopolistic industries like the one we consider here. In this context, an interesting question would be whether countries would prefer to continue to have national antitrust authorities or whether they could agree on setting up a supra-national antitrust authority. We leave these questions to future research.

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