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ABSTRACT

Globalization and Profitability of Cross-border Mergers & Acquisitions*

This paper studies how the surplus generated by the globalization process is divided between MNEs and owners of domestic assets. We construct an oligopoly model where the equilibrium acquisition pattern, the acquisition price and firms' greenfield investments are endogenously determined. Acquisition entry is shown to be more likely when the complementarity between domestic and foreign assets is high. However, we show that such acquisitions might have a low profitability, since the bidding competition over the domestic assets is then so fierce that the firms involved would be better off not starting a bidding war. Risks associated with different entry modes are also examined.

JEL Classification: F23, G34 and L13
Keywords: FDI, greenfield investments, investment liberalization. and mergers and acquisitions

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1. Introduction

One of the most prominent features of the globalization process is the emergence of new investment opportunities in developing and transition countries for leading firms in developed countries, referred to as Multinational Enterprises (MNEs), due to large privatizations and deregulation programs[1] and the increase in local demand. Indeed, the increase in foreign direct investment, both in the form of cross-border acquisitions and de novo entry (greenfield), has been strong in the last decade: in the early 1990s, the value of inward FDI in developing countries was about \$50 billion and in the early 2000s, it exceeded \$200 billion.[2] It is expected to increase even further due to the opening of huge markets in China, India and the former Soviet Union. For instance, in China, two thirds of the \$400 billion market value of the companies listed on the Shanghai and Shenzhen stock exchanges are held by provinces, cities or the central government. On May 1, 2005, the China Securities Regulatory Commission issued guidelines for how to sell these stocks. As part of a trial program, the state will start selling shares in a small number of listed companies.[3] This development is expected to lead to a large increase in profit flows for MNEs.

The purpose of this paper is to study how the surpluses generated by this part of the globalization process are divided between MNEs and owners of domestic assets and how this division depends on how the entry into the domestic market takes place, i.e. cross-border acquisitions or greenfield entry, and the level of complementarity between domestic and foreign assets. To this end, we construct a model with the following features. The domestic firm is initially located in the domestic market. There are also several symmetric MNEs located in the world market. The domestic market will now be exposed to international competition and interaction takes place in three stages. In

[1] Over the period 1991-1999, approximately 97 per cent of a total of 1035 changes in the regulatory Foreign Direct Investment (FDI) regimes of countries were in the direction of liberalization and mostly involved the opening of industries previously closed to FDI. World Investment Report (WIR) 2000.

[2] See World Investment Report (WIR) 2003.

[3] See, "Hangover cure: China is finally dealing with the share overhang depressing its stockmarket" *The Economist* May 5, 2005.

the first stage, MNEs might acquire the domestic firm's assets and in the second stage, MNEs have the option of investing greenfield in new assets where greenfield entry is associated with a risk of failure. Finally, in the third stage, firms compete in oligopoly fashion generating profits.

We first address the issue of how entry into these new markets will take place. To this end, we make the following distinction between entry by acquisition and greenfield entry: the domestic assets held by domestic firms are assumed to be in scarce supply, and the price is determined in an auction acquisition game. The limited availability of these assets may be associated with the domestic target firm having privileged access to a distribution system, ownership of land or permits, knowledge of the specific characteristics of the local market, locally well-known brand names or assets already in the market allowing early entry. The variable cost of greenfield investment (new investments) is, on the other hand, assumed to be constant. This is motivated by the supply of inputs (labor and capital) used in these investments to a large extent consisting of inputs used in many other industries in the economy. The investor in a particular industry could then be seen as a price taker. This seems to be in line with the discussions in the business literature, where the main motivation for choosing cross-border M&As over greenfield investments is claimed to be that the buyer then quickly obtains unique assets.[4] The importance of the domestic assets will depend on the strength of the complementarities between MNEs' firm-specific assets and the domestic assets. For example, the combination of an MNE's strong brand name and the acquired firm's knowledge of the market or strength in distribution, may provide the acquiring MNE with a strong market position.

Then we show that, in equilibrium, a high complementarity between domestic and foreign assets is indeed conducive to acquisitions. However, while acquisition entry is associated with a high complementarity between foreign and domestic assets, we also show that, in equilibrium, such acquisitions might have low expected profitability. The result that the acquirer's expected profit (i.e. the expected product market profit net the acquisition price) may decrease in the complementarity between foreign and domestic

[4] See World Investment Report (WIR) 2000 and its reference to different studies of cross-border M&As.

assets seems counterintuitive at first sight, since the domestic firm's assets are then more valuable to the MNEs when acquired. However, this result is intuitive when taking into account how the level of complementarity between the foreign and the domestic assets affects the equilibrium acquisition price. It is shown that, in equilibrium, the price of the assets is a non-acquiring MNE's willingness to pay, which consists of two profit terms: the expected product market profit for this firm if it were instead to obtain the domestic firm's assets, net the corresponding profit when not buying. It then follows that the first profit term increases to exactly the same extent as that of the acquirer due to an increase in the strategic value of the domestic assets, and will thus off-set the acquirer's profit increase. Moreover, the second profit term will decrease, the more strategically valuable the domestic assets are, since the non-acquirer will then face a stronger competitor in the product market. This implies that the willingness to pay increases further for the non-acquirer. The acquisition price increases more than the acquirer's product market profit, when the domestic assets become more strategically valuable. Consequently, it is not, as might at first sight be expected, in markets with the most suitable targets firms that MNEs will make most money from the globalization process.

The motive for paying a high price for important complementarity assets indeed seems to have been important in several recent large acquisitions. One example is the bidding competition between Britain based SABMiller and its American rival Anheuser-Busch (the largest brewers in the world) for Harbin Brewery (China's fourth-largest brewer). On May 5, 2004, SABMiller launched a $550m bid since Anheuser had in the previous week agreed to buy a 29% stake in Harbin, a firm that SAB thought it had all stitched up via its 29.6% holding, acquired in 2003. SABMiller's offer of $550m for Harbin was then topped by Anheuser-Busch's $720m, which SABMiller left unchallenged. According to the *Economist*, the Chinese government official used the tough rivalry between the two firms to have them "overpay": "Bid battles are recipe for overpayment. Chinese government officials have no scruples about playing off foreigners against each other."[5]

[5] "This round is mine: Multinationals are starting to fight over Chinese assets", *The Economist* May 6, 2004, and "The beers are on Anheuser: SABMiller is admitting defeat and dropping its hostile bid for Harbin Brewery", *The Economist* June 3, 2004.

In the literature on MNEs[6], it has also been argued that one of the main benefits from acquiring a local competitor instead of entering greenfield is that the acquisition helps the firm avoid risks due to lack of knowledge of the specific characteristics of the local market. By entering through an M&A, an MNE avoids the individual plant risk of unsuccessful greenfield entry. But firms also face a market risk since the realized product market profit for a firm may differ from the expected profit, due to the uncertainty of how many greenfield entrants will successfully be able to enter the market. We show that if acquisition entry implies a large market share and product market competition becomes tougher than expected, the aquirer's ex post profit will be lower than that of a successful greenfield entrant. Thus, acquisition entry may be more risky than greenfield entry due to a market risk.

The related theoretical literature on foreign direct investment FDI and MNEs is surveyed in Barba Navaretti and Venables (2004), and Markusen (1995). Typically, this literature does not explicitly address the question of whether entry into a foreign market is greenfield or through the acquisition of assets already in the market, or both; an issue which constitutes the focus of our study.[7] There is also a recent theoretical literature addressing aspects of cross-border mergers in international oligopoly markets.[8] However, the equilibrium acquisition price, which is the focus of our study, is not determined in

[6] See Caves (1996).

[7] See Das and Sengupta (2001), Görg (1997), Klimenko and Saggi (2005), Mattoo, Olarrega and Saggi (2004), Nocke and Yeaple (2006), and Norbäck and Persson (2004) for papers addressing the choice of entry mode.

However, these papers abstract from the strategic bidding competition between MNEs over the target firm in an oligopolistic market, which is the focus of our study. Bjorvatn (2004) allows for competition between MNEs, but studies how the pattern and profitability of cross-border acquisitions depend on trade costs and greenfield costs.

In a companion paper, Norbäck and Persson (2005), we analyze the welfare effects of a restrictive cross-border merger policy.

[8] This literature includes papers by, for example, Head and Reis (1997), Horn and Persson (2001), Lommerud, Straume and Sorgard (2006), Neary (2003), Saggi and Yildiz (2006), Straume (2003) and Yildiz (2003).

those studies.

This paper could also be seen as a contribution to the literature on the interplay between mergers and other firm investments in concentrated markets.[9] We add to this literature by constructing an oligopoly model where the equilibrium acquisition pattern, the acquisition price and firm investments are endogenously determined and where comparative statics analysis is tractable. These features should make this framework useful for analyzing issues where the focus is on the interplay between M&A, firm investments and government policies. Examples of such situations are the interplay between (i) M&As, R&D, and industrial policy, (ii) M&As, investments and tax policy, and (iii) M&As, entry deterrence and merger policy, for instance.

The model is spelled out in Section 2. In Section 3, we derive the equilibrium market structure and the equilibrium profits for different entry modes. Section 4 uses the findings in the previous section to derive implications for the profitability of the different entry modes. Section 5 is an extension where we more briefly examine other important aspects of the globalization process on MNEs' profitability, namely the effects of a larger number of domestic firms in the markets in developing countries, the effects of seller competition and the effects of endogenizing the number of greenfield entrants. Section 6 concludes. Finally, most proofs appear in the Appendix.

2. The Model

Consider a country H, where the market has previously been served by a single domestic firm, labelled d, possessing k_0 domestic assets, and M exporting MNEs, labeled $m_1, m_2, ..m_M$. This market will now be exposed to international investments. There are several different reasons why the market is open to international investments. For instance, the country might be investment liberalizing, the expansion might be a natural step in the life cycle of a product or stem from increasing local demand, or the administrative costs of cross-border acquisitions and greenfield entry may have been reduced in the globalization process. The interaction takes place in three stages. In the first stage,

[9] See, for instance, Gowrisrankaran (2000), Gowrisrankaran and Holmes (2004) and Persson (2004).

the MNEs might acquire the domestic firm's assets. In the second stage, MNEs have the option of investing greenfield in new assets in country H, where greenfield entry is associated with a risk of failure. Finally, in the third stage, firms compete in oligopoly fashion in country H.

The next sections describe the product market interaction game, the greenfield investment game and the acquisition game.

2.1. Stage three: product market interaction

The firm profits will depend on the distribution of asset ownership, given from the investment game in stage 2, and the acquisition game in stage 1. To capture this, we will work with the following notation: Let the set of firms in the industry be $\mathcal{I} = \{d, m_1, m_2, ..m_M\}$, and let the set of (potential) ownerships of the domestic assets, k_0, be $\mathcal{L} = \{d, m_1, m_2, ..m_M\}$. Assuming multinationals $m_1, m_2, ..m_M$ to be symmetric, we will often distinguish between two types of ownership: *domestic ownership* denoted $l = d$ arising when firm d does not sell, and *multinational ownership*, i.e. $l = m$, when one of the symmetric MNEs acquires the domestic assets k_0.

To proceed, let $R_i(\mathbf{x},\kappa_i,l)$ be the product market profit in stage 3, where $\mathbf{x} = (x_i, x_{-i})$ is the vector of actions taken by firms in the product market interaction in stage 3, x_i is the action taken by firm i and x_{-i} is the set of actions taken by i's rivals. κ_i is firm i's stage 2 investments in new assets. $l \in \mathcal{L}$ is the ownership of the domestic assets, given from the acquisition game in stage 1. Given its investment in stage two, κ_i, and the ownership of the domestic assets k_0 given from stage one, l, firm i chooses an action $x_i \in \mathcal{R}^+$ to maximize $R_i(x_i, x_{-i} : \kappa_i,l)$, taking as given competitors' actions x_{-i}. We may consider action x_i as setting a quantity or a price. There is assumed to exist a unique Nash-equilibrium, defined from:

$$R_i(x_i^*, x_{-i}^* : \kappa_i,l) \geq R_i(x_i, x_{-i}^* : \kappa_i,l), \quad \forall x_i \in R^+. \tag{2.1}$$

From (2.1), the Nash-equilibrium can be written, $\mathbf{x}^*(\boldsymbol{\kappa},l)$, where $\boldsymbol{\kappa} = (\kappa_i, \kappa_{-i})$ denotes the vector of firms' investments in new assets from stage two, where κ_i is the investment taken by firm i and κ_{-i} is the set of investments taken by i's rivals. We can then define a reduced-form product market profit for a firm i, taking as given the ownership l of the domestic assets k_0 and the vector of new investments $\boldsymbol{\kappa}$, as $R_i(\boldsymbol{\kappa},l) \equiv R_i(x_i^*(\boldsymbol{\kappa},l), x_{-i}^*(\boldsymbol{\kappa},l), \kappa_i, l)$.

2.2. Stage two: greenfield entry and new investments

In stage two, firm i invests in new assets κ_i, given the ownership l of the domestic assets, k_0, determined in the acquisition game in stage one. This investment can be in capacity, R&D or marketing, for instance. New investments are labeled *greenfield* investments for non-acquiring MNEs, and *sequential* investments for the acquiring MNE (if a sale occurs) and the domestic firm (if no sale occurs).

In the literature on MNEs, greenfield entry is considered risky due to the lack of knowledge of the specific characteristics of the local market. For example, Caves (1996) argues that one of the main benefits of acquiring a local competitor instead of entering greenfield is the avoidance of such risks. To model the risk associated with greenfield entry, we assume that at the beginning of stage 2, each potential greenfield entrant enters successfully with an exogenously given probability $\mathrm{p} \in [0,1]$ and will not enter with probability $1-\mathrm{p}$. $N(l)$ is the number of MNEs drawn as successful greenfield entrants. Successful greenfield entrants then choose their optimal level of new assets simultaneously with the owner of the domestic assets and unsuccessful greenfield entrants are assumed not to invest, but become exporters (E) to the market in H, i.e. set $\kappa_E(l) = 0$. Successful greenfield entrants (G) are, due to symmetry, assumed to set the same level of new investment, $\kappa_G(l)$.

Firm $i \in \mathcal{I}$ then makes its choice $\kappa_i \in R^+$ to maximize the stage 2 profit $R_i(\boldsymbol{\kappa},l) - F_i(\kappa_i)$, where $F_i(\kappa_i)$ is the costs of new investments, which we rewrite as $R_i(\kappa_i,\kappa_{-i} : l) - F_i(\kappa_i)$. We assume there to exist a unique Nash-equilibrium, $\boldsymbol{\kappa}^*(l)$, defined as:

$$R_i\left(\kappa_i^*,\kappa_{-i}^* : l\right) - F_i(\kappa_i^*) \geq R_i\left(\kappa_i,\kappa_{-i}^* : l\right) - F_i(\kappa_i), \quad \forall \kappa_i \in R^+. \tag{2.2}$$

Then, let $\pi_i(l)$ be firm i's reduced-form product market profit net costs of new investments under ownership l, when the number of greenfield entrants is $N(l)$, encompassing the firms' optimal actions in stage 3, $\mathbf{x}^*(l)$, and optimal investments in new assets in stage 2, $\boldsymbol{\kappa}^*(l)$. For brevity, we will below refer to this profit as firm i's *realized product market profit*:

$$\pi_i(l) \equiv \pi_i(\boldsymbol{\kappa}^*(l), l) \equiv R_i(\mathbf{x}^*(\boldsymbol{\kappa}^*(l), l), \kappa_i^*(l), l) - F_i(\kappa_i^*(l)). \tag{2.3}$$

The properties of the profit function $\pi_i(l)$ will be crucial for determining the equilibrium acquisition pattern and the equilibrium profit effects of the new investment opportunities. These properties will be discussed in detail here. As noted above, since MNEs $m_1, m_2, ..., m_M$ are symmetric before the acquisition, there are two types of ownerships; *domestic* ownership ($l = d$) and *foreign (MNE)* ownership ($l = m$). A change from domestic to foreign ownership might induce a different use of the domestic assets, k_0. Then, we make use of the following definition:

Definition 1. *Let $\gamma(m) = \gamma$ be a measure of the complementarity between the domestic assets k_0 and MNEs' firm-specific assets.*

Definition 1 implies that the "effective size" of the domestic assets k_0 under foreign ownership is γk_0 (i.e. $\gamma(m) = \gamma$ and $\gamma(d) \equiv 1$). MNEs are typically leading firms in their respective industries, and possess firm-specific knowledge in terms of technology or know-how of organization of production and marketing (see Markusen (1995) and Caves (1995)). It is likely that at least some of this knowledge is transferred under a change of ownership, resulting in a more efficient use of the local assets, k_0. This would correspond to a γ larger than one in the model.[10] If $\gamma < 1$, an MNE is less efficient in using $\bar{k}$ than the domestic firm.

The asset ownership structure $\mathbf{K} = (k_d, k_{m_{1,...,}} k_{m_M})$ specifies the asset ownership of each firm. The first entry refers to firm d's asset holdings, the second to MNE 1's asset holdings, etc. There are two types of asset ownership structures: $\mathbf{K}(m)$ and $\mathbf{K}(d)$:

$$\begin{aligned} \mathbf{K}(m) &= (0, \gamma k_0 + \kappa_A^*(m), \underbrace{\kappa_G^*(m), ..., \kappa_G^*(m)}_{N(m)}, \underbrace{0, ..., 0}_{M-N(m)-1}), && (2.4) \\ \mathbf{K}(d) &= (k_0 + \kappa_d^*(d), \underbrace{\kappa_G^*(d), ..., \kappa_G^*(d)}_{N(d)}, \underbrace{0, ..., 0}_{M-N(d)}). && (2.5) \end{aligned}$$

[10] There are many studies confirming that technologies and knowledge are transferred to host-countries through FDI (see Caves 1995).

Note that there are four types of firms of which to keep track, $h = \{d, A, G, E\}$, i.e. the domestic firm (d), an acquiring MNE (A), greenfield entrants (G), and exporters (E). The non-acquiring MNEs are thus referred to as greenfield entrants and exporters. The first entry in $\mathbf{K}(l)$ shows the asset ownership of the domestic firm, d, the second entry is the asset ownership of the potentially acquiring MNE (MNE 1), and the remaining entries show the asset ownership of greenfield entrants and exporters, respectively (note that $\kappa_E^* = 0$). Under MNE ownership, there is one acquiring MNE and $N(m)$ non-acquiring MNEs investing greenfield, whereas $M - N(m) - 1$ MNEs export. Under domestic ownership, there are $N(d)$ MNEs successfully investing greenfield and $M - N(d)$ MNEs exporting.

We make the following assumptions about $\pi_h(l)$, as shown in table 2.1:

Table 2.1: Basic assumptions.

Assumption	
$A1$:	$\pi_h(l) > \pi_E(l) \geq 0, \qquad h = \{A, G\}$
	$\pi_d(d) > \pi_d(m) \equiv 0$
$A2$:	$\dfrac{d\pi_A(m)}{d\gamma} > 0, \quad \dfrac{d\pi_G(m)}{d\gamma} < 0, \quad \dfrac{d\pi_E(m)}{d\gamma} < 0, \quad \dfrac{d\pi_h(d)}{d\gamma} \equiv 0, \quad h = \{d, G\}$
$A3$:	$\pi_i(l, N(l)) > \pi_i(l, N(l) + 1)$

Assumption A1 states that a firm's realized product market profit is higher for an acquiring firm and for a successful greenfield entrant than for an exporter. This assumption then forms the basic motive for FDI in terms of acquisition or greenfield entry, stemming from trade cost avoidance or lower factor costs. Moreover, we assume that the domestic firm will not make any profit without its assets, i.e. $\pi_d(m) = 0$.

A change in ownership of existing domestic assets k_0 from domestic to foreign ownership may also affect firms' realized product market profits. Assumption A2 states that an increase in the complementarity parameter, γ, increases the acquirer's profit, whereas the profit for a non-acquirer (i.e. as a greenfield investor or an exporter) decreases. From (2.3), these profit effects may, for instance, emerge from direct effects on productivity, or by indirectly affecting firms' optimal actions in the stage-three product market game ($\mathbf{x}^*$), or affecting these actions by affecting firms' investment in new assets in stage two ($\boldsymbol{\kappa}^*$). For example, the combination of an MNE's strong brand name and the acquired firm's knowledge of the market or its strength in distribution may provide the acquiring MNE with a strong market position. Or, if the domestic assets are sold at an early stage, the acquirer may gain a strong first-mover advantage, thereby creating a dominant position in the product market. In section A.2 in the Appendix, we provide a Linear-Quadratic Cournot model consistent with these effects.[11] Note that in assumption A2, we assume the number of greenfield entrants to be independent of the level of complementarity, γ, to simplify the analysis. In Section 5.3, we discuss the effects of relaxing this assumption.

Finally, Assumption A3 states that the realized product market profit for all firms decreases in the number of successful greenfield entrants, $N(l)$.

2.3. Stage one: the acquisition game

To focus on the bidding competition among MNEs as the determinant of the equilibrium buyer, we assume that MNEs post bids for the domestic firm, which that firm may accept or reject. More specifically, the acquisition process is depicted as an auction where M MNEs simultaneously post bids, which are then either accepted or rejected by the domestic firm. Each MNE i announces a bid, b_i, for the domestic firm. $b = (b_1, b_2, ..., b_M) \in R^M$ is the vector of these bids. Following the announcement of b, the domestic firm may be sold to one of the MNEs at the bid price or remain in the ownership of firm d.[12] The acquisition is solved for Nash equilibria in undominated pure strategies.

It is assumed that firm d cannot make a bid for the MNEs. This assumption might be motivated by the domestic owner being financially weaker or lacking the competence

[11] Our set-up and assumptions are also compatible with several other different investment and oligopoly models. One example would be Perry and Porter (1985).

[12] If more than one bid is accepted, the bidder with the highest bid obtains the domestic assets. If there is more than one MNE with such a bid, each such MNE obtains the assets with equal probability. There is a smallest amount, ε, chosen such that all inequalities are preserved if ε is added or subtracted.

to efficiently run the larger business. Moreover, it is assumed that MNEs cannot make bids on each other's firms. This assumption might be supported in two basic ways in a full merger model. One way is to assume that the profit of a merged entity is sufficiently small to imply that no merger takes place between MNEs, the second is to assume that mergers between MNEs would not be permitted by the competition authorities.

We now turn to the firms' expected profits from possessing the domestic firm's assets, k_0. Note that when forming its expected profit in stage one, a firm does not know the outcome of the greenfield game in stage two. Hence, the number of successful greenfield entrants, $N(l)$, is stochastic. We can then define firm i's *expected product market profit* under ownership l of the domestic assets k_0, $\bar{\pi}_i(l)$, as:

$$\bar{\pi}_i(l) \equiv \sum_{N(l)=0}^{N^{\max}(l)} \rho(l)\pi_i(l), \tag{2.6}$$

where $\pi_i(l) = \pi_i(l, N(l))$ is the realized product market profit for firm i, when $N(l)$ firms successfully enter greenfield, defined in (2.3), $\rho(l) = \rho(N(l)) = \binom{N^{\max}(l)}{N(l)}\mathrm{p}^{N(l)}(1 - \mathrm{p})^{N^{\max}(l)-N(l)}$ denotes the joint probability of observing $N(l)$ greenfield entrants, where $N^{\max}(m) = M - 1$, $N^{\max}(d) = M$ and $\binom{N^{\max}(l)}{N(l)}$ denotes the combinatorial function.

We can note that:

$$\frac{d\bar{\pi}_i(l)}{d\gamma} = \sum\nolimits_{N(l)=0}^{N^{\max}(l)} \rho(l)\frac{d\pi_i(l)}{d\gamma}, \tag{2.7}$$

since the probability $\rho(l)$ is independent of the complementarity γ, since p and $N(l)$ are independent of γ. It then follows that the effects on realized product market profits of changes in γ assumed in Assumption A2 carry over to firms' expected product market profits $\bar{\pi}_i(l)$, i.e. $\frac{d\bar{\pi}_A(m)}{d\gamma} > 0$, $\frac{d\bar{\pi}_G(m)}{d\gamma} < 0$, $\frac{d\bar{\pi}_E(m)}{d\gamma} < 0$ and $\frac{d\bar{\pi}_h(d)}{d\gamma} = 0$. In Section 5.3, we discuss the effects of relaxing the assumptions that p and $N(l)$ are independent of γ.

To solve the acquisition game, it is convenient to define the valuation of possessing the domestic firm's assets, k_0 The valuation of keeping the assets for the domestic firm is denoted by v_d:

$$v_d = \bar{\pi}_d(d), \tag{2.8}$$

where $\bar{\pi}_d(d)$ is firm d's expected product market profit when not selling its assets k_0.

The expected valuation for an MNE of acquiring the domestic assets k_0 is more involved and it will depend on which firm will otherwise possess the domestic assets:

$$v_{ml} = \begin{cases} v_{md} = \bar{\pi}_A(m) - [\mathrm{p}\bar{\pi}_G(d) + (1-\mathrm{p})\,\bar{\pi}_E(d)]\,, & l = d, \\ v_{mm} = \bar{\pi}_A(m) - [\mathrm{p}\bar{\pi}_G(m) + (1-\mathrm{p})\,\bar{\pi}_E(m)]\,, & l = m. \end{cases} \tag{2.9}$$

The upper line in (2.9), v_{md}, is the "classical" *takeover-valuation* of a merger. The first term $\bar{\pi}_A(m)$ shows the expected product market profit when the MNE obtains control of firm d with its assets k_0 through the acquisition. The second term $\mathrm{p}\bar{\pi}_G(d)+(1-\mathrm{p})\,\bar{\pi}_E(d)$ is the expected product market profit of *not* acquiring when *no* merger occurs and firm d keeps its assets. The MNE will enter greenfield in stage 2 with probability p, and will export with probability $1-\mathrm{p}$.

The lower line in (2.9), v_{mm}, is the *preemptive-valuation.* v_{mm} shows the value of obtaining the domestic assets when the alternative is an acquisition by a rival. Note that a change from domestic ($l = d$) to foreign ownership ($l = m$) implies an increase in the expected concentration on the market and likely also a different productive use of the domestic assets k_0 from Definition 1. These two effects imply that the expected product market profits as a non-acquirer $p\bar{\pi}_G(l)+(1-\mathrm{p})\,\bar{\pi}_E(l)$ in (2.9) will typically not be the same under the two ownership structures and therefore, valuations v_{md} and v_{mm} will typically differ.

We will now use firms' valuations defined in (2.8) and (2.9) to derive the equilibrium bidding behavior and the equilibrium acquisition and investment pattern.

3. The equilibrium ownership structure and complementarities

The equilibrium ownership structure (EOS) and the acquisition price, S, are described in table 3.1, and the proofs can be found in the Appendix. Since MNEs are symmetric, valuations v_{mm}, v_{md} and v_d can be ordered in six different ways and the EOS is solved for each inequality I1-I6. Three types of ownership structures arise in equilibrium: The one where firm d keeps its assets k_0 is denoted $\mathbf{K}(d)$ arising under I5 or I6; the one where k_0 is obtained by one of the MNEs is denoted $\mathbf{K}(m)$, where the acquisition price is $S^* = v_{mm}$ under inequalities $I1$, $I2$ or $I3$, and $S^* = v_d$ under inequality $I4$.[13]

Table 3.1: The equilibrium ownership structure and acquisition price.

Inequality:	Definition:	Ownership structure:	Acquisition price, S*:
I1:	$v_{mm} > v_{md} > v_d$	$\mathbf{K}(m)$	v_{mm}
I2:	$v_{mm} > v_d > v_{md}$	$\mathbf{K}(m)$ or $\mathbf{K}(d)$	v_{mm},.
I3:	$v_{md} > v_{mm} > v_d$	$\mathbf{K}(m)$	v_{mm}
I4:	$v_{md} > v_d > v_{mm}$	$\mathbf{K}(m)$	v_d
I5:	$v_d > v_{mm} > v_{md}$	$\mathbf{K}(d)$	.
I6:	$v_d > v_{md} > v_{mm}$	$\mathbf{K}(d)$	.

Let us now turn to how the equilibrium ownership structure depends on the level of complementarities between foreign and domestic assets. From Assumption A2, (2.6), (2.8) and (2.9), we can state the following Lemma:

Lemma 1. *There exists a unique γ^T defined from $v_{md}(\gamma^T, \cdot) = v_d$, a unique γ^P defined from $v_{mm}(\gamma^P, \cdot) = v_d$, and a unique γ^R defined from $v_{md}(\gamma^R, \cdot) = v_{mm}(\gamma^R, \cdot)$.*

To explain and illustrate our results, we will make use of the following assumption, which, for instance, holds in the LQC model.

Assumption A4: $\gamma^P > \gamma^T > 0$.

Assumption A4 allows us to derive a simple graphical solution to the model, while ensuring that all types of equilibrium ownership structures arise when varying the complementarity γ.[14] We can state the following Proposition, which is proven in the text below:

[13] Note that when $I2$ holds, there exist multiple equilibria. Moreover, the equilibrium ownership structure depends on $\bar{N}(l)$, but to simplify the notation we use $\mathbf{K}(l)$.

[14] Comparing Figure 3.1(i) and table 3.1, assumption A4 eliminates inequalities I2 and I5. Basically, we rule out an equilibrium pattern where we have no acquisitions for low levels of complementarities and preemptive-acquisitions for high complementarities and thus, no takeover-

Proposition 1. *(i) No acquisition will take place if the complementarity between MNEs' firm-specific assets and the domestic assets is low, $\gamma \in (0, \gamma^T)$, (ii) a foreign takeover-acquisition will take place with $S^* = v_d$ if the complementarities are intermediate, $\gamma \in [\gamma^T, \gamma^P)$, and (iii) a foreign preemptive-acquisition will take place with $S^* = v_{mm}$ if the complementarities are high, $\gamma \geq \gamma^P$.*

Proposition 1 is illustrated in Figure 3.1 (i) and (ii). When complementarities are low $\gamma \in (0, \gamma^T)$, an MNE's takeover-valuation is lower than the domestic firm's value of keeping its assets, $v_{md} < v_d$. From (2.9), this can be expressed as $\bar{\pi}_A(m) < [\mathrm{p}\bar{\pi}_G(d) + (1-\mathrm{p})\,\bar{\pi}_E(d)] + \bar{\pi}_d(d)$, i.e. the combined expected product market profit of the acquiring MNE and the domestic target firm is lower than their stand-alone expected profits. Thus, without sufficiently high efficiency gains, an increase in concentration is not sufficient to make an acquisition profitable and the EOS is $\mathbf{K}(d)$. This equilibrium is illustrated in the region $\gamma \in (0, \gamma^T)$ in Figure 3.1 (i) and (ii), where inequality I6 holds.

Let us now turn to the case with intermediate levels of complementarity between MNEs' assets and domestic assets $\gamma \in [\gamma^T, \gamma^P)$. From Assumption A2, the takeover-valuation v_{md} increases in the complementarity, γ, since the expected product market profit as the acquirer $\bar{\pi}_A(m)$ increases in γ, whereas the domestic firm's valuation v_d and the MNE's expected product market profit as a non-acquirer $\mathrm{p}\bar{\pi}_G(d) + (1-\mathrm{p})\,\bar{\pi}_E(d)$ are independent of γ.

$$\frac{dv_{md}}{d\gamma} = \underset{(+)}{\frac{d\bar{\pi}_A(m)}{d\gamma}} - \left[\mathrm{p}\underset{(=0)}{\frac{d\bar{\pi}_G(d)}{d\gamma}} + (1-\mathrm{p})\underset{(=0)}{\frac{d\bar{\pi}_E(d)}{d\gamma}}\right] > \frac{dv_d}{d\gamma} = \frac{d\bar{\pi}_d(d)}{d\gamma} = 0. \tag{3.1}$$

Assumption A4 then states that at $\gamma = \gamma^T$, $v_{md} = v_d > v_{mm}$. From (3.1), it follows that a further increase in complementarities $\gamma \in [\gamma^T, \gamma^P)$ will make a takeover-acquisition strictly profitable as $v_{md} > v_d$. An MNE can then ensure a positive expected net-gain by paying $S^* = v_d = \bar{\pi}_d(d)$, whereas the domestic firm is indifferent to selling. Note also that other MNEs will not preempt a rival acquisition in this region. To see this, note

acquisitions would appear in such a situation. We refer to the Appendix for a full proof of the EOS including these inequalities.

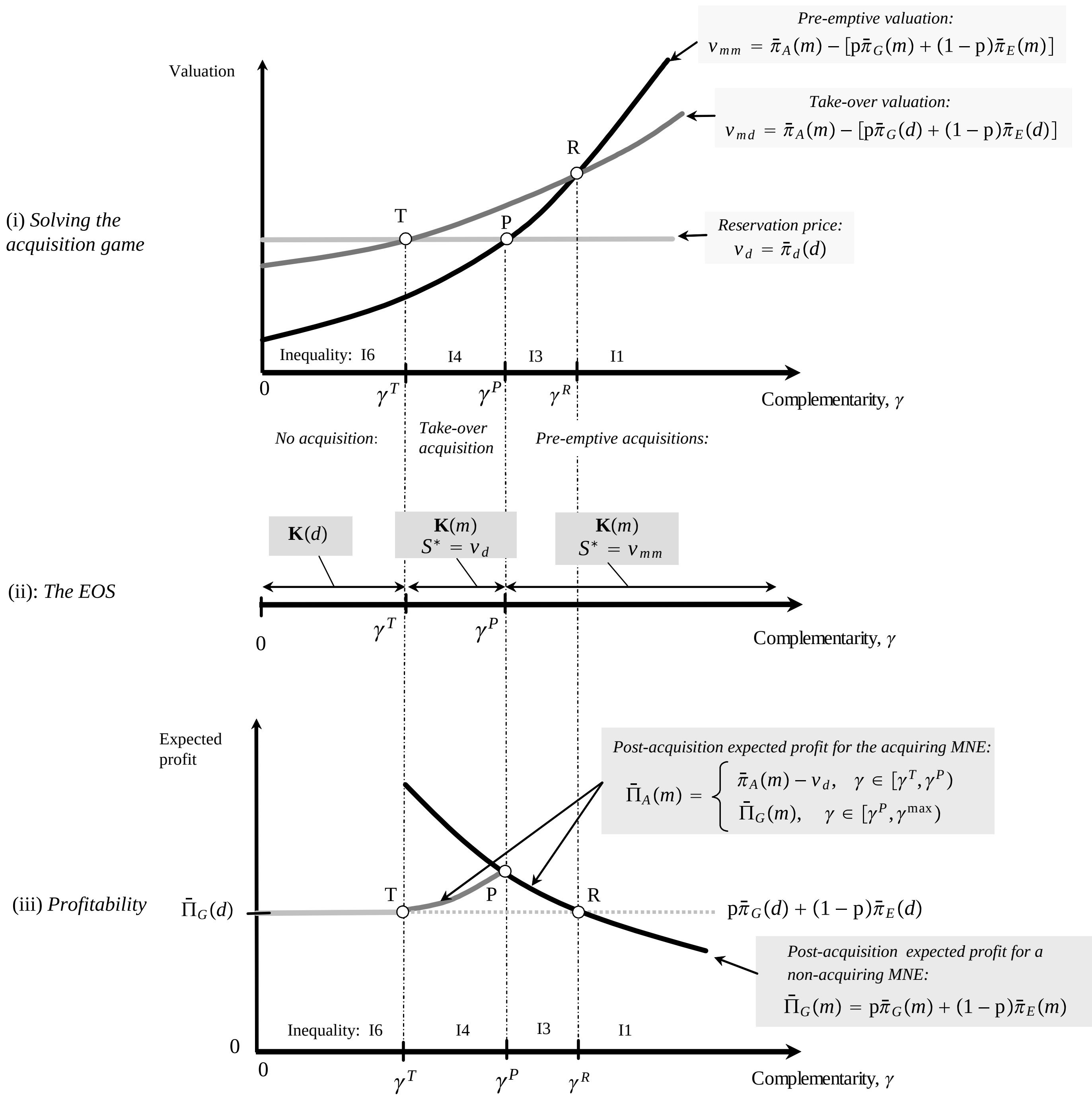

Figure 3.1: Deriving the Equilibrium Ownership Structure (EOS) and post-acquisition expected profits.

that Assumption A4 implies that $v_{mm} < v_d$ holds at $\gamma = \gamma^T$. This implies that a non-acquiring MNE would need to pay a price at least as high as v_d, which is indeed higher than its valuation. The EOS is $\mathbf{K}(m)$ with $S^* = v_d$. This equilibrium is illustrated in the interval $\gamma \in (\gamma^T, \gamma^P)$ in Figure 3.1 (i) and (ii), where inequality I4 holds.[15]

Finally, turning to the case with high levels of complementarity between MNEs' assets and domestic assets, $\gamma \geq \gamma^P$. Using Assumption A2, we can note MNEs' preemptive-valuation v_{mm} to be increasing in γ and that it increases more than the MNEs' takeover-valuation v_{md}:

$$\frac{dv_{mm}}{d\gamma} = \underset{(+)}{\frac{d\bar{\pi}_A(m)}{d\gamma}} - \left[\mathrm{p} \underset{(-)}{\frac{d\bar{\pi}_G(m)}{d\gamma}} + (1-\mathrm{p}) \underset{(-)}{\frac{d\bar{\pi}_E(m)}{d\gamma}} \right] > \underset{(+)}{\frac{d\bar{\pi}_A(m)}{d\gamma}} = \frac{dv_{md}}{d\gamma}. \tag{3.2}$$

The preemptive-valuation v_{mm} will increase more than the takeover-valuation ($\frac{dv_{md}}{d\gamma} = \frac{d\bar{\pi}_A(m)}{d\gamma} > 0$), since increasing complementarities also decrease the expected product market profit as a non-acquirer (i.e. $\frac{d\bar{\pi}_h(m)}{d\gamma} < 0$ for $h = G, E$). Thus, the preemptive-valuation v_{mm} is not only driven by the benefits from obtaining a strong position in the product market as the acquirer, but also by the *preemptive motive* for avoiding a weak position as a non-acquirer.[16] Assumption 4 then states that at $\gamma = \gamma^P$, $v_{md} > v_{mm} = v_d$. From (3.2), it then follows that a further increase in complementarities into $\gamma > \gamma^P$ will make a preemptive-acquisition strictly profitable as $v_{mm} > v_d$. Paying the reservation price $S = v_d$ can then not be an equilibrium, since an MNE would have a strictly positive expected net-gain from preempting rival MNEs in obtaining the domestic assets. The

[15] Note that in this equilibrium, outsider MNEs are better off than the acquiring MNE. Kamien and Zang (1990) show that such a property might lead to no merger taking place in an auction endogenous merger model. In an auction endogenous acquisition model, Persson (2004) shows that strong firms have an incentive to use multi-firm predation to overcome this hold-up problem. Fridolfsson and Stennek (2005b) show that such a property can delay mergers in a game of timing of endogenous mergers.

[16] Preemptive merger mechanisms have been demonstrated in different frameworks in the endogenous merger literature: Fridolfsson and Stennek (2005a) in a game of timing framework, Horn and Persson (2001) in a cooperative game theory framework and Norbäck and Persson (2004) and Persson (2005) in an auction framework. Molnar (2005) derives such preemptive mergers triggered by cost synergies and finds empirical support in US data.

EOS is $\mathbf{K}(m)$ with $S = v_{mm}$. This equilibrium is illustrated in interval $\gamma \geq \gamma^P$ in Figure 3.1 (i) and (ii), where inequalities I3 and I1 hold.

4. Profitability

In this section, we will study the profitability of the different entry modes (i) directly after an acquisition takes place and (ii) after the greenfield uncertainty is resolved.

4.1. Post-acquisition expected profits and complementarities

Let us first examine the MNEs' expected profits *after* the resolution of the acquisition stage, but *before* the resolution of greenfield entry, and examine how they depend on the level of complementarity. Then, let $\bar{\Pi}_i(l)$ denote the *post-acquisition expected total profit* of firm i under ownership l in acquisition stage 1 (where we will omit the total abbreviation).

Using Proposition 1, the post-acquisition expected profit for a non-acquiring MNE, $\bar{\Pi}_G(l)$ is:

$$\bar{\Pi}_G(l) = \begin{cases} \bar{\Pi}_G(d) = \mathrm{p}\bar{\pi}_G(d) + (1-\mathrm{p})\,\bar{\pi}_E(d), & \gamma \in (0, \gamma^T) \\ \bar{\Pi}_G(m) = \mathrm{p}\bar{\pi}_G(m) + (1-\mathrm{p})\,\bar{\pi}_E(m), & \gamma \geq \gamma^T, \end{cases} \tag{4.1}$$

whereas the post-acquisition expected profit for the acquirer, $\bar{\Pi}_A(m) = \bar{\pi}_A(m) - S^*$, is:

$$\bar{\Pi}_A(m) = \begin{cases} \bar{\pi}_A(m) - v_d, & \gamma \in [\gamma^T, \gamma^P) \\ \bar{\Pi}_G(m), & \gamma \geq \gamma^P \end{cases} . \tag{4.2}$$

The post-acquisition expected profits are then illustrated in Figure 3.1(iii) and can be explained as follows: When complementarities are *low,* $\gamma \in (0, \gamma^T)$, it follows from Proposition 1 that no acquisition occurs. As shown in (4.1), the post-acquisition expected profit for MNEs is then $\bar{\Pi}_G(d) = \mathrm{p}\bar{\pi}_G(d) + (1-\mathrm{p})\,\bar{\pi}_E(d)$. $\bar{\Pi}_G(d)$ is illustrated as the light grey line in Figure 3.1(iii).

At $\gamma = \gamma^T$, a takeover acquisition will take place and, as illustrated by the black and dark-grey curve, all MNEs will gain from the expected acquisition due to the increase in expected concentration, while the non-acquiring MNEs reap the largest benefit as they bear no cost of the acquisition, $\bar{\Pi}_G(m) > \bar{\Pi}_A(m) > \bar{\Pi}_G(d)$. Figure 3.1(iii) also shows that the acquirer's post-acquisition expected profit $\bar{\Pi}_A(m) = \bar{\pi}_A(m) - v_d$ increases in γ, whereas the non-acquiring MNE's post-acquisition expected profit $\bar{\Pi}_G(m) = p\bar{\pi}_G(m) + (1 - \mathrm{p})\,\bar{\pi}_E(m)$ decreases in γ. This follows directly from Assumption A2, since more complementary assets improve the acquirer's competitiveness on the product market, while deteriorating the position of a non-acquirer. The loci for the post-acquisition expected profits for the acquiring MNE and a non-acquiring MNE therefore converge when the complementarity approaches γ^P.

When complementarities are *high,* $\gamma \geq \gamma^P$, it follows from Proposition 1 that preemptive acquisitions take place at the acquisition price $S^* = v_{mm}$. As illustrated in Figure 3.1(iii), the acquiring MNE's and the non-acquiring MNEs' post-acquisition expected profits are equalized $\bar{\Pi}_A(m) = \bar{\Pi}_G(m) = \mathrm{p}\bar{\pi}_G(m) + (1 - \mathrm{p})\,\bar{\pi}_E(m)$ and all MNEs face an identical decline in expected profits when complementarity increases.

It is instructive to see why the post-acquisition expected profit for the acquirer decreases, despite this firm improving its competitiveness and increasing its expected *product* market profits. The post-acquisition expected profit for the acquirer is $\bar{\Pi}_A(m) = \bar{\pi}_A(m) - v_{mm}$. Using (2.9), we have:

$$\frac{d\bar{\Pi}_A(m)}{d\gamma} = \underset{(+)}{\frac{d\bar{\pi}_A(m)}{d\gamma}} - \underbrace{\left(\underset{(+)}{\frac{d\bar{\pi}_A(m)}{d\gamma}} - \left[\mathrm{p}\underset{(-)}{\frac{d\bar{\pi}_G(m)}{d\gamma}} + (1-\mathrm{p})\underset{(-)}{\frac{d\bar{\pi}_E(m)}{d\gamma}}\right]\right)}_{\text{Change in sales price } S^*=v_{mm}} \tag{4.3}$$

$$= \mathrm{p}\underset{(-)}{\frac{d\bar{\pi}_G(m)}{d\gamma}} + (1-\mathrm{p})\underset{(-)}{\frac{d\bar{\pi}_E(m)}{d\gamma}} = \frac{d\bar{\Pi}_G(m)}{d\gamma} < 0. \tag{4.4}$$

While acquisition entry is associated with a high complementarity between foreign and domestic assets, expression (4.4) shows that such acquisitions may have a low expected profitability. This seems counterintuitive at first sight, since the domestic firm's assets are then more valuable for the MNEs when acquired. However, this result is intuitive, when taking into account how the level of complementarity between the foreign and the domestic assets affects the equilibrium acquisition price. The price of the domestic assets is a non-acquiring MNE's willingness to pay, v_{mm}, which consists of two profit terms: the expected product market profit for this firm if it were instead to obtain the domestic firm's assets $\bar{\pi}_A(m)$, net the corresponding profit when not buying $p\bar{\pi}_G(m) + (1 - \text{p})\,\bar{\pi}_E(m)$. It then follows that the first profit term increases to exactly the same extent as that of the acquirer from an increase in the complementarity and will thus off-set the acquirer's profit increase. Moreover, the second profit term will decrease, the more complementary the domestic assets are, since a non-acquirer will then face a stronger competitor in the product market. This implies that the willingness to pay increases further. Thus, as MNEs bid aggressively to preempt rivals from obtaining more complementary assets, the acquisition price S^* thus increases more than the acquirer's expected product market profit $\bar{\pi}_A(m)$, thereby reducing the acquirer's post-acquisition expected (total) profit $\bar{\Pi}_A(m)$.

In fact, the bidding competition can be so fierce that MNEs would face a higher expected profit under domestic ownership. This is illustrated in Figure 3.1(iii). Note that it follows from (3.2) and Assumption A4 that $\gamma^R > \gamma^P > \gamma^T$. It then also follows that on the right-hand side of point R, the post-acquisition expected profits for MNEs are lower under an acquisition than absent an acquisition, i.e. $\bar{\Pi}_A(m) = \bar{\Pi}_G(m) < \bar{\Pi}_G(d)$ for $\gamma > \gamma^R > \gamma^P$. However, when complementarities are not too high, the increase in concentration and efficiency from an acquisition makes all MNEs gain from an acquisition, despite preemptive bidding. This is illustrated in Figure 3.1(iii), where on the left-hand side of point R, we have $\bar{\Pi}_A(m) = \bar{\Pi}_G(m) < \bar{\Pi}_G(d)$ for $\gamma \in [\gamma^P, \gamma^R)$.

We can summarize the results derived above in the following proposition.

Proposition 2. *(i) For an intermediate level of complementarities, $\gamma \in [\gamma^T, \gamma^P)$, there will be a foreign takeover-acquisition and the post-acquisition expected profit for the acquiring MNE $\bar{\Pi}_A(m)$ increases in the level of complementarity and the post-acquisition expected profit for the non-acquiring MNE $\bar{\Pi}_G(m)$ decreases in the level of complementarity. The post-acquisition expected profits for both types of MNEs are higher than in the no-acquisition equilibrium, and the non-acquiring MNE benefits the most, i.e. $\bar{\Pi}_G(m) > \bar{\Pi}_A(m) > \bar{\Pi}_G(d)$. (ii) For a high level of complementarities, $\gamma \geq \gamma^P$, there will be a foreign preemptive-acquisition and the MNEs' post-acquisition expected profits will* *decrease in the level of complementarity, and (iii) the post-acquisition expected profits for MNEs are lower than under maintained domestic ownership of the domestic assets at very high complementarities, i.e.* $\bar{\Pi}_A(m) = \bar{\Pi}_G(m) < \bar{\Pi}_G(d)$ *for* $\gamma > \gamma^R > \gamma^P$.

Proof. (i) Formally, under inequality I4 where $v_{md} > v_d > v_{mm}$, the acquisition price is $S = v_d < v_{md}$. From (2.9), this implies that $\bar{\Pi}_A(m) = \bar{\pi}_A(m) - v_d > \mathrm{p}\bar{\pi}_G(d) = \bar{\Pi}_G(d)$. Moreover, rewriting $v_{md} > v_{mm}$ implies that $\bar{\Pi}_G(m) = \mathrm{p}\bar{\pi}_G(m) > \mathrm{p}\bar{\pi}_G(d) = \bar{\Pi}_G(d)$. Finally, since $v_d > v_{mm}$, this implies that $\bar{\Pi}_A(m) = \bar{\pi}_A(m) - v_d < \mathrm{p}\bar{\pi}_G(m) = \bar{\Pi}_G(m)$. (ii) and (iii) From Lemma 1 and Assumption A4, it follows that $\bar{\Pi}_G(m) > \bar{\Pi}_G(d)$ at $\gamma = \gamma^P$. From Assumption A2, $\bar{\Pi}_G(m)$ is decreasing in γ and from the above analysis we know that there exists a $\gamma = \gamma^R$ such that $\bar{\Pi}_G(m) > \bar{\Pi}_G(d)$ for $\gamma \in [\gamma^T, \gamma^R)$ and $\bar{\Pi}_G(m) < \bar{\Pi}_G(d)$ for $\gamma > \gamma^R$ ■

Regarding the effect of foreign acquisitions on domestic producer surplus, it follows that under takeover acquisitions, the acquiring MNE pays firm d's reservation price, $S^* = v_d$, i.e. the domestic producer surplus is not affected by whether acquisitions are allowed or not. When preemptive acquisition occurs for high complementaries $\gamma > \gamma^P$, the bidding competition among MNEs implies that the acquisition price will exceed the reservation price, $S^* = v_{mm} > v_d$, i.e. the domestic producer surplus is higher when acquisitions are allowed.

4.2. Profitability when the greenfield uncertainty is resolved

Let us now examine the level of profits for MNEs when the greenfield uncertainty is resolved, i.e. firms' *post-greenfield total profits* denoted $\Pi_i(l)$ (where we will omit the total abbreviation). We will normalize export profits to zero to highlight the mechanisms involved, i.e. $\pi_E(l) = 0$. Using Proposition 1, it follows that the post-greenfield profit for a successful greenfield entrant $\Pi_G(l)$ is:

$$\Pi_G(l) = \begin{cases} \Pi_G(d) = \pi_G(d), & \gamma \in (0, \gamma^T) \\ \Pi_G(m) = \pi_G(m), & \gamma \geq \gamma^T, \end{cases} \tag{4.5}$$

whereas the post-greenfield profit for the acquiring MNE, $\Pi_A(m) = \pi_A(m) - S^*$, is:

$$\Pi_A(m) = \begin{cases} \pi_A(m) - v_d, & \gamma \in [\gamma^T, \gamma^P) \\ \pi_A(m) - \underbrace{[\bar{\pi}_A(m) - \mathrm{p}\bar{\pi}_G(m)]}_{v_{mm}}, & \gamma \geq \gamma^P \end{cases} . \tag{4.6}$$

Firms face two types of risks in the model: (i) a non-acquiring MNE faces an individual risk of not being able to enter greenfield and, in addition, (ii) all firms face a market risk, since a particular realization of the product market profits $\pi_i(l)$ may differ from the expected, $\bar{\pi}_i(l)$.

To highlight the effect of individual risk on the post-greenfield profit, let us assume the complementarity to be sufficiently high to induce a preemptive acquisition in stage 1, i.e. let $\gamma \geq \gamma^P$. As shown in (4.6), the post-greenfield profit for the acquirer $\Pi_A(m) = \pi_A(m) - S^*$ can then be written $\Pi_A(m) = \pi_A(m) - \bar{\pi}_A(m) + \mathrm{p}\bar{\pi}_G(m)$, whereas the post-greenfield profit for a greenfield entrant is simply $\Pi_G(m) = \pi_G(m)$. Furthermore, assume the expected and realized product market profits to be the same, i.e. $\bar{\pi}_A(m) = \pi_A(m)$ and $\bar{\pi}_G(m) = \pi_G(m)$, which eliminates the market risk. It then follows that the post-greenfield profit for successful greenfield entrants exceeds its expected value, i.e. $\Pi_G(m) - \bar{\Pi}_G(m) = (1-p)\bar{\pi}_G(m) > 0$. Since $\Pi_A(m) = \bar{\Pi}_A(m) = \bar{\Pi}_G(m)$, we have the following proposition:

Proposition 3. *Assume complementarities to be sufficiently high to generate a foreign preemptive acquisition, $\gamma \geq \gamma^P$ and suppose expected product market profits to equal realized product market profits, i.e. $\bar{\pi}_h(m) = \pi_h(m)$ for h=A,G. Then, when greenfield entry is resolved, the post-greenfield profit of a successful greenfield entrant exceeds that of the acquirer $\Pi_A(m) < \Pi_G(m)$.*

By entering by an M&A, an MNE avoids the individual plant risk of unsuccessful greenfield entry. However, the bidding competition over being successfully located in the market with certainty drives up the acquisition price to such a level that being a greenfield entrant is more profitable ex-post.

Let us now incorporate the market risk in the analysis, which stems from the fact that the realized product market profit in (2.3), $\pi_h(m)$, might differ from the expected

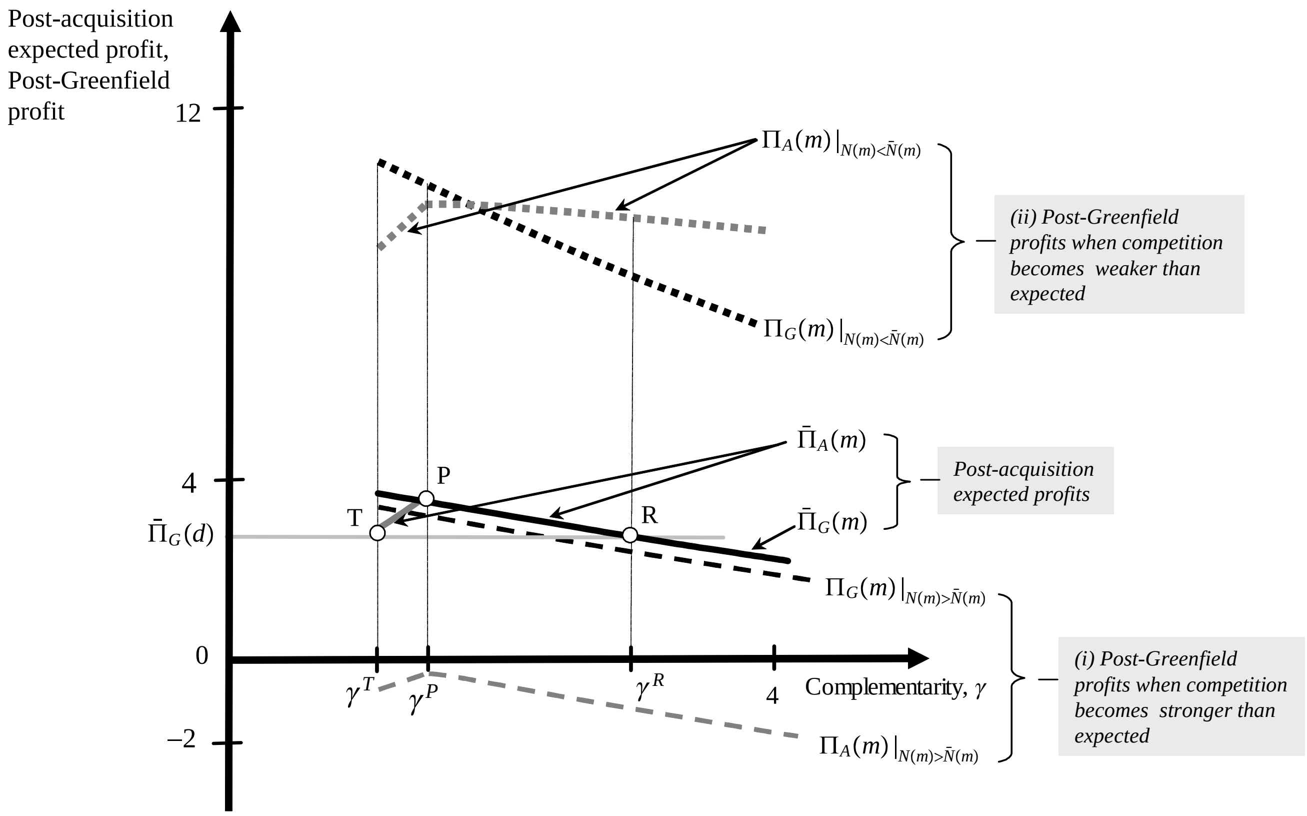

Figure 4.1: (i) Realized competition stronger than expected, $N(m) = 3 > 2 = \bar{N}(m)$. (ii) Realized competition weaker than expected, $N(m) = 1 < 2 = \bar{N}(m)$. Other parameter values in the Linear-Quadratic model (LQM) set at p= 0.6, $\bar{k} = 0.25$, $\eta = 0.2$, $s = 5$, $\Lambda = a - c = 5$ and $\theta = 0.3$.

product market profit in (2.6), $\bar{\pi}_h(m)$. To proceed, we then make use of the Linear Quadratic Cournot model described in the Appendix.

In the Appendix, it is shown that in equilibrium, the acquiring firm will always have the largest market share. This then implies that its post-greenfield profits $\Pi_A(m)$ will be more sensitive to the outcome in the greenfield game. To see this, first suppose that realized competition becomes more intense than expected, i.e. the actual number of successful greenfield entrants is higher than the expected $N(m) > \bar{N}(m)$. This is illustrated as case (i) in Figure 4.1, where we depict the post-greenfield profits for the acquirer $\Pi_A(m)$ and the corresponding post-acquisition expected profit $\bar{\Pi}_A(m)$, as well as the corresponding profits for an MNE entering greenfield. Since the acquiring firm pays an acquisition price based on the expected market position and has the largest market share, the higher than expected intensity of competition on the market has a stronger negative impact on the acquirer. In fact, in this particular example, the acquirer has a negative post-greenfield profit, $\Pi_A(m) < 0$.

Suppose now that competition becomes less intense, i.e. $N(m) < \bar{N}(m)$. The post-greenfield profit for the acquiring MNE $\Pi_A(m)$ may then exceed that of a successful greenfield entrant, $\Pi_G(m)$. Intuitively, the acquirer has a large market share and therefore, gains more from the increase in the product market price associated with less than expected entry than does a smaller greenfield entrant. This is illustrated as case (ii) in Figure 4.1, where the post-greenfield profit for the acquirer may even exceed that of a successful greenfield entrant, $\Pi_A(m) > \Pi_G(m)$.

This finding thus provides an example showing that acquisition entry may be more risky than greenfield entry due to the market risk.

5. Extensions

To illuminate the mechanisms identified in a simple way, we have abstracted from several potentially important aspects of the globalization process. Some of these issues are addressed below, namely the effects of a larger number of local rival firms, the effects of seller competition, and the effects of endogenizing the number of greenfield entrants.

5.1. Lager number of active domestic rival firms in the market

Let us now examine a situation with more than one domestic firm in the market, while keeping the assumption that only one domestic firm is for sale, i.e. we add a number of symmetric local firms $z_1, ..z_Z$ which are not for sale. The set of firms in the industry is then $\mathcal{I} = \{d, z_1, z_2, ..z_Z, m_1, m_2..m_M\}$. Let $\pi_i(l, Z)$ be the realized product market profit of firm i under ownership l of the domestic assets k_0, when there are Z additional domestic firms present in the market, and let $\bar{\pi}_i(l, Z)$ be the corresponding expected product market profit. Since firm d is the only domestic firm that can potentially be sold, we have two potential types of ownership to consider: *domestic* ownership, where firm d keeps its assets k_0 ($l = d$) and *foreign (MNE)* ownership ($l = m$), where one of the symmetric MNEs obtains assets k_0. There are now five firm types, $h = A, G, E, d, D$ of which to keep track, where D denotes the additional domestic firms. The asset ownership structures now take the form:

$$\begin{aligned}
\mathbf{K}(m) &= (0, \gamma k_0 + \kappa_A^*(m), \underbrace{\kappa_D^*(m), ..., \kappa_D^*(m)}_{Z}, \underbrace{\kappa_G^*(m), ..., \kappa_G^*(m)}_{N(m)}, \underbrace{0, ., 0}_{M-N(m)-1}), \\
\mathbf{K}(d) &= (k_0 + \kappa_d^*(d), \underbrace{\kappa_D^*(d), ..., \kappa_D^*(d)}_{Z}, \underbrace{\kappa_G^*(d), ..., \kappa_G^*(d)}_{N(d)}, \underbrace{0, .., 0}_{M-N(d)}).
\end{aligned}$$

Firm d's reservation price and the MNEs' valuations in the acquisition game can then be written:

$$v_d = \bar{\pi}_d(m, Z) \tag{5.1}$$

$$v_{ml} = \bar{\pi}_A(m, Z) - [\mathrm{p}\bar{\pi}_G(l, Z) + (1 - \mathrm{p})\, \bar{\pi}_E(l, Z)]\,, \;\; l = d, m. \tag{5.2}$$

To proceed, we keep Assumptions A1-A4 and make an analogous assumption to Assumption A3 on how profits are affected by additional domestic firms:

Assumption A5 $\pi_h(l, Z) > \pi_h(l, Z + 1)$

Let us now study the effects on MNEs' post-acquisition expected profits, denoted $\bar{\Pi}_h(l, Z)$, of an an increased number of domestic rivals. These are illustrated in Figure 5.1 using the LQC model.[17] Let γ^T and γ^P, defined in Lemma 1, be associated with

[17] Note that Assumptions A1-A5 hold in the figure.

Z (additional) domestic competitors and $\gamma^{T'}$ and $\gamma^{P'}$ be associated with $Z' > Z$ (additional) domestic competitors. From Assumption A5, it then follows that if ownership l of k_0 does not change, when increasing the number of domestic firms, the post-acquisition expected profit of a non-acquiring MNE $\bar{\Pi}_G(l, Z) = p\bar{\pi}_G(l, Z) + (1 - \mathrm{p})\,\bar{\pi}_E(l, Z)$ will decrease, i.e. $\bar{\Pi}_G(l, Z) > \bar{\Pi}_G(l, Z')$. It also follows that under preemptive acquisitions, $\gamma \geq \gamma^{P'}$, increased domestic competition decreases the post-acquisition expected profit of the acquirer, $\bar{\Pi}_A(l, Z) > \bar{\Pi}_A(l, Z')$, since $\bar{\Pi}_A(l, Z) = \bar{\Pi}_G(l, Z)$ holds in this region. But then, as illustrated by Figure 5.1, it follows from Assumption A2 that our main result that a high complementarity between domestic and foreign assets is likely to lead to a foreign acquisition – but not necessarily to a profitable acquisition – also holds in a setting with a larger number of domestic firms in the market.

However, we should note that when takeover acquisitions occur, $\gamma \in (\gamma^{T'}, \gamma^{P'})$, the effect on the acquirer's post-acquisition expected profit is ambiguous since $\bar{\Pi}_A(m, Z) = \bar{\pi}_A(m, Z) - v_d$, where both $\bar{\pi}_A(m, Z)$ and $v_d = \bar{\pi}_d(d, Z))$ decrease in Z from Assumption A5. In addition, we cannot infer how the Equilibrium Ownership structure (EOS) is affected by an increase in the number of domestic firms, since from Assumption A5, (5.1) and (5.2), v_d will decrease in Z, whereas v_{md} and v_{mm} can increase or decrease in Z. Figure 5.1 then provides an example of the fact that the incentive for acquisition entry can increase with domestic competition.

5.2. Seller competition: One MNE and many domestic firms for sale

Let us now study a case where there are more potential domestic sellers than foreign buyers. To this end, consider the following modified set-up: There are Z symmetric domestic firms for sale, $d_1, d_2, ..d_Z$, each possessing k_0 units of domestic assets, and only one MNE, m_1, in the market. Hence, the set of firms is $\mathcal{I} = \{d_1, d_2, ..d_Z, m_1\}$. We assume that one and only one of these domestic firms can potentially be sold to the MNE. To simplify further, we assume that the MNE will enter greenfield with certainty if an acquisition does not take place, i.e. we assume p = 1.

There are two types of ownership of domestic assets: *domestic* ownership, where all

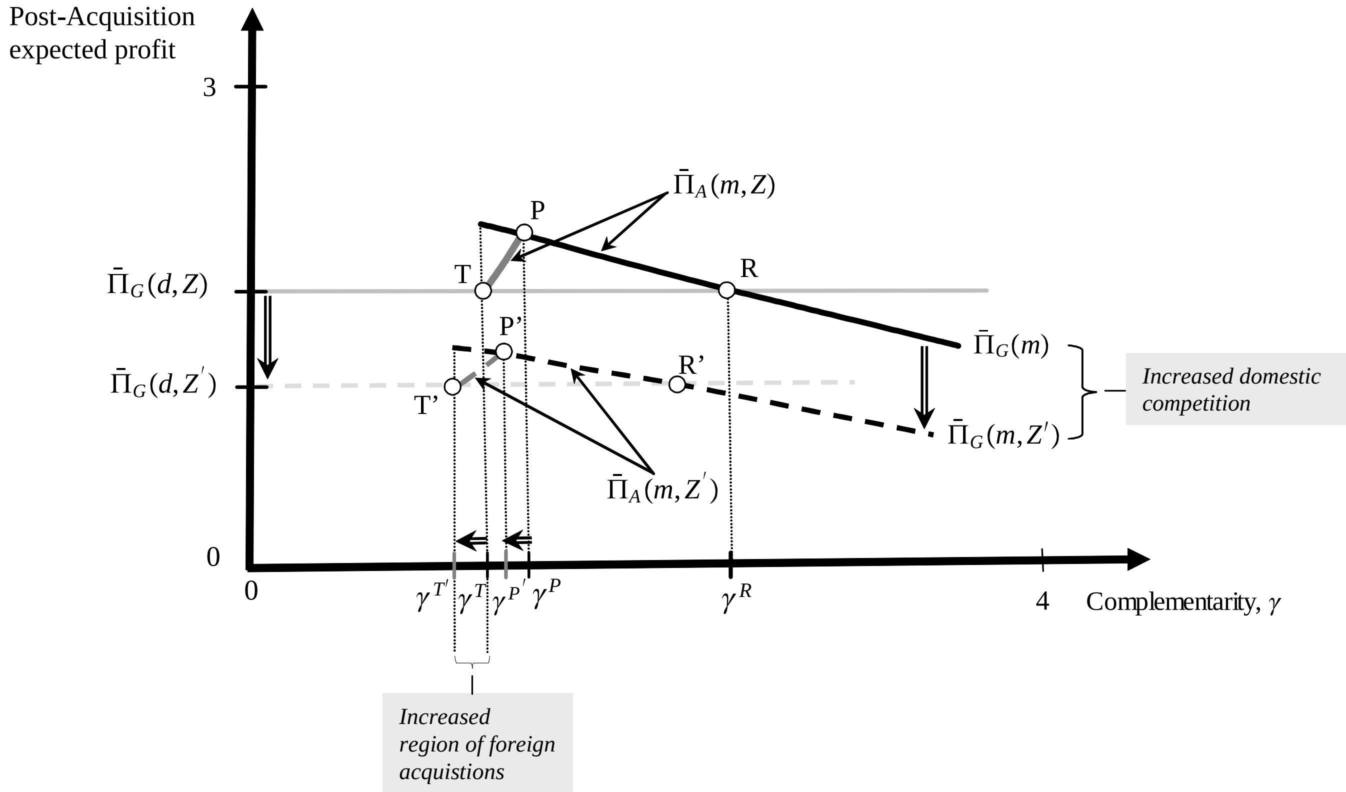

Figure 5.1: Increased domestic competition illustrated by $Z' = 2 > Z = 1$. Other parameter values in the Linear-Quadratic model (LQM) set at p= 0.6, $\bar{k} = 0.25$, $\eta = 0.2$, $s = 5$, $\Lambda = a - c = 5$ and $\theta = 0.3$.

domestic firms keep their assets k_0 $(l = d)$ and *foreign (MNE)* ownership $(l = m)$, where the MNE m_1 obtains assets k_0 from one of the domestic firms. The asset ownership structures now take the form:

$$\begin{aligned}
\mathbf{K}(m) &= (0, \underbrace{k_0 + \kappa_d^*(m), ..., k_0 + \kappa_d^*(m)}_{Z-1}, \gamma k_0 + \kappa_A^*(m)), \qquad \gamma > 0 \\
\mathbf{K}(d) &= (\underbrace{k_0 + \kappa_d^*(d), ..., k_0 + \kappa_d^*(d)}_{Z}), \kappa_G^*(d)).
\end{aligned}$$

In the acquisition game, there are three valuations to consider:

$$v_{dd} = \pi_d(d) \tag{5.3}$$

$$v_{dm} = \pi_d(m) \tag{5.4}$$

$$v_m = \pi_A(m) - \pi_G(d). \tag{5.5}$$

Inspecting (5.3)-(5.5), we note that (5.5) is the value for the MNE entering by an acquisition instead of entering greenfield. The reservation price for a domestic firm is here more involved and will depend on whether a rival domestic firm sells its assets. $v_{dd} = \pi_d(d)$ in (5.3) is the value for a domestic firm of keeping its assets when there is no sale by a rival to the MNE, whereas $v_{dm} = \pi_d(m)$ in (5.4) is the value for a domestic firm of keeping its assets if another domestic firm sells its assets to the MNE.

To focus on the selling competition among domestic firms as the determinant of the equilibrium ownership structure, we assume that each domestic firm i announces a selling bid, r_i, for selling their respective firm. $r = (r_{d_1}, r_{d_2}, ..., r_{d_Z}) \in R^Z$ is the vector of these bids. Following the announcement of r, one of the bids of the domestic firm might be accepted by the MNE or no acquisition takes place. The acquisition game is solved for Nash equilibria in undominated pure strategies. The equilibrium ownership structure (EOS) and the acquisition price, S, are then described in table 5.1, and the proofs can be found in the Appendix. Since the domestic firms are symmetric, valuations v_m, v_{dm} and v_{dd} can be ordered in six different ways and the EOS is solved for each inequality I1'-I6'. Three types of ownership structures arise in equilibrium: The one where no acquisition takes place is denoted $\mathbf{K}(d)$ arising under I5' or I6'; the one where the MNE obtains assets k_0 from one of the domestic firms, denoted $\mathbf{K}(m)$, and where the acquisition price is $S^* = v_m$ under inequality I4', and finally the one where $S^* = v_{dm}$ under I1', I2' and I3'.[18]

Table 5.1: The equilibrium ownership structure and acquisition price under selling competition.

Inequality:	Definition:	Ownership structure:	Acquisition price:
I1':	$v_{md} > v_{dd} > v_{dm}$	$\mathbf{K}(m)$	v_{dm}
I2':	$v_{md} > v_{dm} > v_{dd}$	$\mathbf{K}(m)$	v_{dm}
I3':	$v_{dd} > v_{md} > v_{dm}$	$\mathbf{K}(m), \mathbf{K}(d)$	$v_{dm}, .$
I4':	$v_{dm} > v_{md} > v_{dd}$	$\mathbf{K}(m)$	$v_m .$
I5':	$v_{dd} > v_{dm} > v_{md}$	$\mathbf{K}(d)$	.
I6':	$v_{dm} > v_{dd} > v_{md}$	$\mathbf{K}(d)$	.

Applying Assumption A2 in this setting, we have:

$$\frac{d\pi_A(m)}{d\gamma} > 0 = \frac{d\pi_d(d)}{d\gamma} > \frac{d\pi_d(m)}{d\gamma}. \tag{5.6}$$

From (5.3)-(5.5) and (5.6), it follows that the MNE's valuation v_{md} increases monotonously in the complementarity γ, the reservation price v_{dm} decreases in γ, whereas v_{dd} is independent of γ. Thus, we can state the following Lemma:

Lemma 2. *There exists a unique γ^C defined from $v_{dm}(\gamma^C, \cdot) = v_m(\gamma^C, \cdot)$, a unique γ^{NC} defined from $v_m(\gamma^{NC}, \cdot) = v_{dd}$, and a unique γ^R defined from $v_{dm}(\gamma^R, \cdot) = v_{dd}$.*

To derive a simple graphical solution to the model, we make use of the following assumption which, for instance, holds in the LQC model.[19]

[18] When I3' holds, there exist multiple equilibria.

[19] Assumption A5 ensures that all types of equilibrium ownership structures arise when varying the complementarity γ. Comparing Figure 5.2 (i) and table 5.1, assumption A5 eliminates inequalities I3' and I5'. We refer to the Appendix for a full proof of the EOS including these inequalities.

Assumption A6: $\gamma^C > \gamma^{NC} > 0$.

We can state the following Proposition, which is proven in the text below:

Proposition 4. *(i) No acquisition will take place if the complementarity between MNEs' firm-specific assets and the domestic assets is low, $\gamma \in (0, \gamma^{NC})$, (ii) a foreign acquisition will take place with $S^* = v_m$ if the complementarities are intermediate, $\gamma \in [\gamma^{NC}, \gamma^C)$, and (iii) a foreign acquisition will take place with $S^* = v_{dm}$ if the complementarities are high, $\gamma \geq \gamma^C$.*

In Figure 5.2 (i), the acquisition game is solved. When complementarities are low $\gamma \in (0, \gamma^{NC})$, a domestic firm has no incentive to sell as the MNE's valuation is too low, i.e. $v_m < v_{dd} < v_{dm}$. Thus, without sufficiently high efficiency gains, an increase in concentration is not sufficient to make an acquisition profitable and the EOS is $\mathbf{K}(d)$. This equilibrium is illustrated in the region $\gamma \in (0, \gamma^{NC})$ in Figure 5.2 (i) and (ii), where inequality I6' holds.

However, at increasing complementarities, the MNE's valuation increases and, at some point, $\gamma = \gamma^{NC}$, $v_m = v_{dd} < v_{dm}$. This implies that an acquisition takes place. In this region $\gamma \in [\gamma^{NC}, \gamma^C)$, a domestic firm will offer the MNE to buy at a price v_m, which will be accepted by the MNE. We may consider a sale of a domestic firm to the MNE in this region as noncompetitive (NC). Since $v_m < v_{dm}$, rival domestic firms will not supply competing sale bids, but will free ride on the increased concentration of the acquisition. The EOS is thus $\mathbf{K}(m)$ and $S^* = v_m$. This equilibrium is illustrated in the interval $\gamma \in (\gamma^{NC}, \gamma^C)$ in Figure 5.2 (i) and (ii), where inequality I4' holds.

At even larger complementarities, $\gamma \geq \gamma^C$, the acquiring MNE now becomes a very efficient rival. This initiates a seller competition among domestic firms and a sale of a domestic firm in this region may be considered as competitive (C). Since $v_m > v_{dm}$ holds in this region, a selling bid at v_m cannot be an equilibrium, since domestic rivals would then gain from undercutting. The seller competition among domestic firms then drives down the equilibrium offer to v_{dm}. Hence, the EOS is $K(m)$ and $S^* = v_{dm}$. This equilibrium is illustrated in the interval $\gamma \geq \gamma^C$ in Figure 5.2 (i) and (ii), where inequalities I1' and I2' hold.

Let us now turn to how the level of complementarities affects post-acquisition profits, denoted $\Pi_h(l)$. This is illustrated in Figure 5.2 (iii). When no sale occurs in the region of low complementarities $\gamma \in (0, \gamma^{NC})$, the post-acquisition profit of the MNE is $\Pi_G(d) = \pi_G(d)$. Increasing complementarities into $\gamma \in (\gamma^{NC}, \gamma^C)$ where an acquisition occurs at price $S^* = v_m = \pi_A(m) - \pi_G(d)$ leaves this post-acquisition profit unchanged since $\Pi_A(m) = \pi_A(m) - v_m = \pi_G(d)$. Note that since the sales price is increasing, the selling domestic firm has an increasing gain from selling in this interval. Rivals also gain from this acquisition due to the increase in concentration, since $v_{dm} > v_m > v_{dd}$ holds.

However, things look different when domestic firms engage in seller competition in the region, $\gamma \geq \gamma^C$. The acquisition price is now $S^* = v_{dm} = \pi_d(m)$. The post-acquisition profit of the MNE is then $\Pi_A(m) = \pi_A(m) - v_{dm} = \pi_A(m) - \pi_d(m)$, which is increasing in complementarities for two reasons. First, the acquirer's product market profit $\pi_A(m)$ is increasing in γ and second, the sales price $S^* = \pi_d(m)$ is decreasing in γ. The latter also implies that all domestic firms can be better off if no acquisition takes place. This indeed holds in the region $\gamma > \gamma^R > \gamma^C$ in Figure 5.2 (iii), where inequality I1' holds.

Thus, emphasizing seller competition – rather than buyer competition as in Section 4.1 – this section has shown that foreign acquisitions are still more likely when domestic and foreign assets become more complementary. However, with seller competition, it is found that the gains from an acquisition at high complementarities accrue to the foreign acquirer, leaving domestic firms worse off. Hence, the scarcity of domestic assets is crucial for our result that cross-border acquisition of strategic assets may have a low profitability.

5.3. Endogenizing the number of greenfield entrants

We have abstracted from the possibility that the number of greenfield entrants is affected by the complementarity, γ, by assuming the probability of successful greenfield entry p to be independent of γ, making $N(l)$ independent of γ. Alternatively, we might assume that greenfield entry continues to take place until the last firm cannot cover its investment costs, that is, the total number of firms on the market N must fulfill

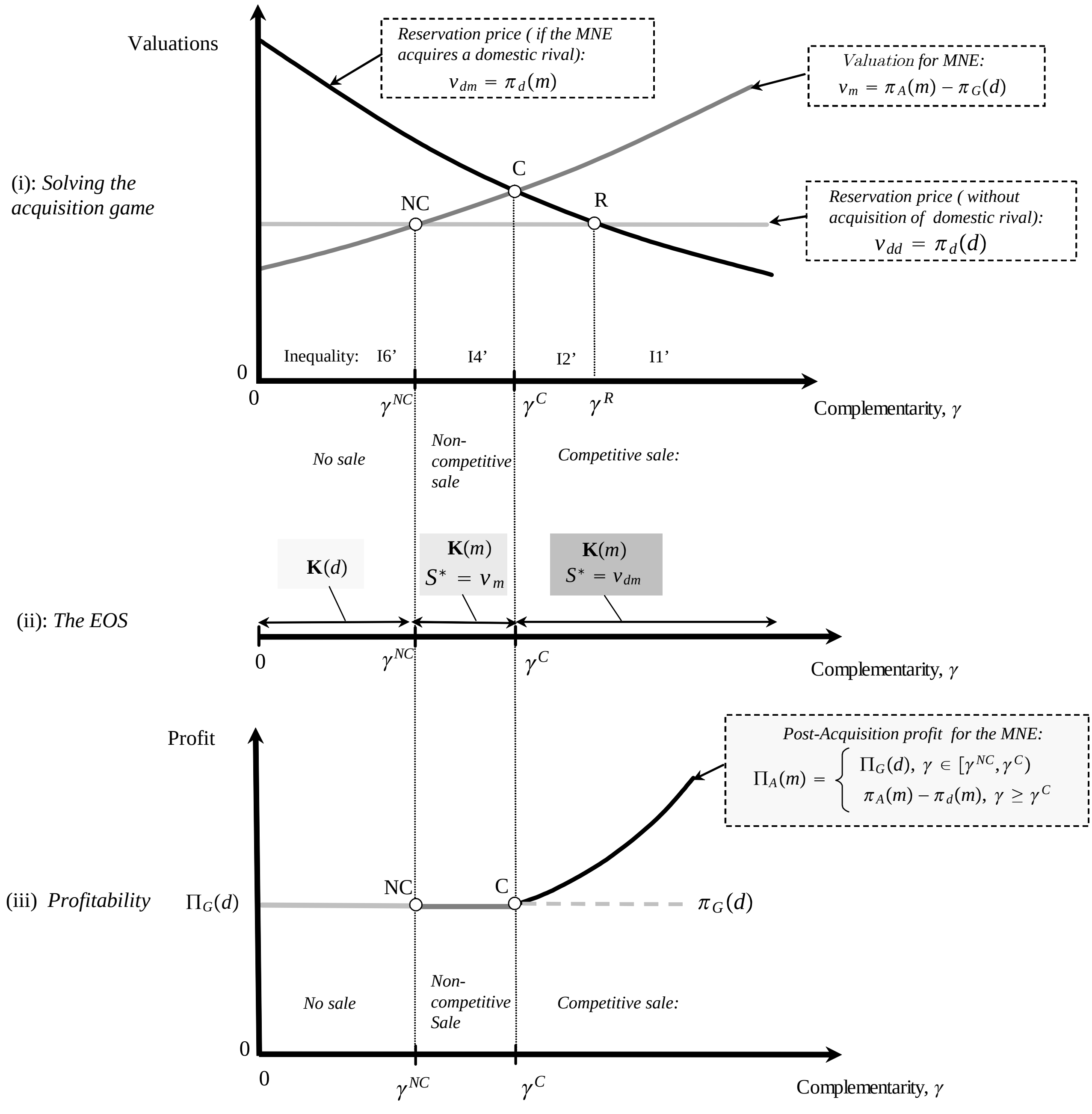

Figure 5.2: Solving the model with seller competition.

$\pi_G(l, N(l)) - \pi_E(l, N(l)) > G$ and $\pi_G(l, N(l)+1) - \pi_E(l, N(l)+1) \leq G$, where G is an additional fixed entry cost in addition to the investments costs in stage two. The probability of successful greenfield entry $p(l)$ is then $\mathrm{p}(m) = \frac{N(m)-1}{M-1}$ if $l = m$ and $\mathrm{p}(d) = \frac{N(d)-1}{M}$ if $l = d$. Under this specification, it follows from Assumption A2 that complementarities γ will affect the probability of greenfield entry under MNE ownership. Our simplification, making p independent of γ, does not qualitatively affect our results, however. Using the Linear-Quadratic Model presented in section A.2 in the Appendix, this is tedious, but straightforward, to show.

6. Concluding remarks

The starting point of this paper is that the globalization process implies that cross-border acquisitions and new entry (greenfield) by multinational national enterprises (MNEs) into developing countries play a very important role for the future profits of these firms. We show that how the surpluses generated by the globalization process are divided between MNEs and owners of domestic assets crucially depends on how entry into the domestic market takes place, i.e. acquisitions or greenfield entry, and the complementarity between domestic and foreign assets. More specifically, we show that in markets where entry takes places through the acquisition of sufficiently scarce domestic assets, the bidding competition over the domestic target firm is so severe that the MNEs' profit would be higher if this opportunity did not arise. Moreover, this implies that the domestic firm will sell its assets at a higher, and possibly substantially higher, price than its reservation price.

We also show that in markets where MNEs enter greenfield or where there is seller competition, they will capture most of the surplus created and, in this case, the domestic owner's wealth decreases when foreign entry takes place.

It has been argued that MNEs prefer entry by acquisition over greenfield entry since they then avoid the individual plant risk of unsuccessful greenfield entry. However, we show that if acquisition entry implies a large market share and product market competition becomes tougher than expected, the aquirer's ex post profit will be lower than that of a successful greenfield entrant. Thus, acquisition entry may be more risky than greenfield entry due to a market risk.

A. Appendix:

A.1. Deriving table 3.1

First, note that $b_i \geq \max v_{ml}$, $l = \{\mathrm{d}, \mathrm{m}\}$ is a weakly dominated strategy, since no MNE will post a bid equal to or above its maximum valuation of obtaining the assets and that firm d will accept a bid in stage 2, iff $b_i > v_d$.

Inequality I1 Consider the equilibrium candidate $\mathbf{b}^* = (b_1^*, b_2^*, ..., yes)$. Let us assume that MNE $w \neq d$ is the MNE that has posted the highest bid and obtains the assets and firm $s \neq d$ the MNE with the second highest bid.

Then, $b_w^* \geq v_{mm}$ is a weakly dominated strategy. $b_w^* < v_{mm} - \varepsilon$ is not an equilibrium, since firm $j \neq w, d$ then benefits from deviating to $b_j = b_w^* + \varepsilon$, since it will then obtain the assets and pay a price lower than its valuation of obtaining them. If $b_w^* = v_{mm} - \varepsilon$, and $b_s^* \in [v_{mm} - \varepsilon, v_{mm} - 2\varepsilon]$, then no MNE has an incentive to deviate. By deviating to no, firm d's payoff decreases since it foregoes a selling price exceeding its valuation, v_d. Accordingly, firm d has no incentive to deviate and thus, $\mathbf{b}^*$ is a Nash equilibrium.

Let $\mathbf{b} = (b_1, , , b_m, no)$ be a Nash equilibrium. Let MNE h be the MNE with the highest bid. Firm d will then say no iff $b_h \leq v_d$. But MNE $j \neq d$ will have the incentive to deviate to $b' = v_d + \varepsilon$ in stage 1, since $v_{md} > v_d$. This contradicts the assumption that $\mathbf{b}$ is a Nash equilibrium.

Inequality I2 Consider the equilibrium candidate $\mathbf{b}^* = (b_1^*, b_2^*, ..., y)$. Then, $b_w^* \geq v_{ij}$ is a weakly dominated strategy. $b_w^* < v_{ij} - \varepsilon$ is not an equilibrium since firm $j \neq w, d$ then benefits from deviating to $b_j = b_w^* + \varepsilon$, since it will then obtain the assets and pay a price lower than its valuation of obtaining them. If $b_w^* = v_{mm} - \varepsilon$, and $b_s^* \in [v_{mm} - \varepsilon, v_{mm} - 2\varepsilon]$, then no MNE has an incentive to deviate. By deviating to no, firm d's payoff decreases since it foregoes a selling price exceeding its valuation, v_d. Accordingly, firm d has no incentive to deviate and thus, $\mathbf{b}^*$ is a Nash equilibrium.

Consider the equilibrium candidate $\mathbf{b}^{**} = (b_1^{**}, b_2^{**}, ..., no)$. Then, $b_w^* \geq v_d$ is not an equilibrium since firm d would then benefit by deviating to yes. If $b_w^* < v_d$, then no MNE has an incentive to deviate. By deviating to yes, firm d's payoff decreases since it then sells its assets at a price below its valuation, v_d. Firm d has no incentive to deviate and thus, $\mathbf{b}^{**}$ is a Nash equilibrium.

Inequality I3 Consider the equilibrium candidate $\mathbf{b}^* = (b_1^*, b_2^*, ..., yes)$. Then, $b_w^* \geq v_{mm}$ is a weakly dominated strategy. $b_w^* < v_{mm} - \varepsilon$ is not an equilibrium since firm $j \neq w, d$ then benefits from deviating to $b_j = b_w^* + \varepsilon$, since it will then obtain the assets and pay a price lower than its valuation of obtaining them. If $b_w^* = v_{mm} - \varepsilon$, and $b_s^* \in [v_{mm} - \varepsilon, v_{mm} - 2\varepsilon]$, then no MNE has an incentive to deviate. By deviating to no, firm d's payoff decreases, since it foregoes a selling price exceeding its valuation v_d. Accordingly, firm d has no incentive to deviate and thus, $\mathbf{b}^*$ is a Nash equilibrium.

Let $\mathbf{b} = (b_1, ..., b_M, no)$ be a Nash equilibrium. Firm d will then say no iff $b_h \leq v_d$. But MNE $j \neq d$ will then have the incentive to deviate to $b' = v_d + \varepsilon$ in stage 1, since $v_{md} > v_d$. This contradicts the assumption that $\mathbf{b}$ is a Nash equilibrium.

Inequality I4 Consider the equilibrium candidate $\mathbf{b}^* = (b_1^*, b_2^*, ..., yes)$. Then, $b_w^* > v_d$ is not an equilibrium since firm w would benefit from deviating to $b_w = v_d$. $b_w^* < v_d$ is not an equilibrium, since firm d would then not accept any bid. If $b_w^* = v_d - \varepsilon$, then firm w has no incentive to deviate. By deviating to $b_j' \leq b_w^*$, firm j's, $j \neq w, d$, payoff does not change. By deviating to $b_j' > b_w^*$, firm j's payoff decreases since it must pay a price above its willingness to pay v_{mm}. Accordingly, firm j has no incentive to deviate. By deviating to no, firm d's payoff decreases since it foregoes a selling price above its valuation, v_d. Accordingly, firm d has no incentive to deviate and thus, $\mathbf{b}^*$ is a Nash equilibrium.

Let $\mathbf{b} = (b_1, ..., b_m, no)$ be a Nash equilibrium. Firm d will then say no iff $b_h \leq v_d$. But MNE $j \neq d$ will have the incentive to deviate to $b' = v_d + \varepsilon$ in stage 1 since $v_{md} > v_d$, which contradicts the assumption that $\mathbf{b}$ is a Nash equilibrium.

Inequalities I5 or I6 Consider the equilibrium candidate $\mathbf{b}^* = (b_1^*, b_2^*, ..., no)$, where $b_i^* < v_d$ $\forall i \in M$. It then directly follows that no firm has an incentive to deviate and thus, $\mathbf{b}^*$ is a Nash equilibrium.

Then, note that firm d will accept a bid iff $b_i \geq v_d$. But $b_i \geq v_d$ is a weakly dominating bid in these intervals, since $v_d > \max\{v_{mm}, v_{md}\}$. Thus, the assets will not be sold in these intervals.

A.2. The Linear Quadratic Cournot model

In stage 3, there is Cournot competition in homogenous goods and hence, $x_i = q_i$ The profit for firm i can be written as $\pi_i(\mathbf{q}, \boldsymbol{\kappa}, l) = R_i - F_i$, where $\mathbf{q} = (q_i, q_{-i})$ and where we assume costs to be quadratic in capital, κ_i, $F_i(\kappa_i) = \frac{\mu\kappa_i^2}{2}$. Investments in new assets in stage 2 reduce a firm's marginal cost in a linear fashion, $c_i = \bar{c}_i - \theta\kappa_i$, where θ is a positive constant. Let $\bar{c}_G = c$, $\bar{c}_A = c - \gamma k_0$, $\bar{c}_d = c - k_0$.[20] Hence, *existing assets* k_0 and *new assets* κ_i are imperfect substitutes. Possession of the domestic assets k_0 in stage one alters the intercept term $\bar{c}_i$. The complementarity parameter γ shows the effect of adding foreign firms' firm-specific assets to domestic assets k_0.

Let the inverse demand be $P = a - \frac{1}{s}\sum_{i=1}^{T(l)} q_i$, where $a > 0$ is a demand parameter, s measures market size, $T(l) = N(l) + 1$ is the *total* number of firms on the market and q_i is the quantity supplied by firm i. The game is solved backwards. In stage three, $R_i = (P - c_i)q_i$. From (2.1), $\frac{\partial R_i(\boldsymbol{\kappa}, l)}{\partial q_i} = P - c_i - q_i = 0$ from which optimal quantities $\mathbf{q}^*(\boldsymbol{\kappa}, l)$ are derived. In stage two, (2.2) implies that $\frac{d\pi_i}{d\kappa_i} = \frac{\partial R_i}{\partial \kappa_i} + \sum_{j\neq i}^{T} \frac{\partial R_i}{\partial q_j}\frac{dq_j}{d\kappa_i} - F_i' = 0$, where optimal investments are given from $\kappa_i^*(l) = \frac{\theta}{\mu} q_i^* \frac{2T}{T+1}$. Solving for stage 2 investments $\boldsymbol{\kappa}^*(l)$ and stage 3 sales $\mathbf{q}^*(l)$, we have the reduced-form profits $\pi_i(l)$. It can be shown that these profits take the form $\pi_i(l) = \frac{1}{s}(q_i^*(l))^2\left[1 - \frac{2\eta}{9}\right]$, where $\eta = s\frac{\theta^2}{\mu}$. Define $\Lambda = a - c$, $\Phi(l) = (1 + T(l) - 2T(l)\eta)(1 + 2T(l) + T(l)^2 - 2T(l)\eta)$, $\Omega(l) = \Lambda(1 + T(l) - 2T(l)\eta)$ and $\Gamma(l) = (1 + T(l) - 2\eta)$. Then, we have $q_A^*(m) = \frac{s(T(m)+1)[\Omega(m)+\gamma k_0 T(m)\Gamma(m)]}{\Phi(m)}$, $q_G^*(m) = \frac{s(T(m)+1)[\Omega(m)-\gamma k_0(T(m)+1)]}{\Phi(m)}$, $q_d^*(d) = \frac{s(T(d)+1)[\Omega(d)+k_0 T(d)\Gamma(d)]}{\Phi(d)}$ and $q_G^*(d) = \frac{s(T(d)+1)[\Omega(d)-k_0(T(d)+1)]}{\Phi(d)}$.

[20] When illustrating the effects of additional domestic firms in Figure 5.1, we assume that $\bar{c}_D = c$.

Note that reduced form profits $\pi_i(l)$ then fulfill Assumption A2. Expected profits $\bar{\pi}_i(l)$ are then calculated from (2.6).

A.3. Deriving Table 5.1

First, note that the MNE will accept the highest selling bid r_i in stage 2, iff $r_i \leq v_m$.

A.3.1. Inequality $I1$: $v_m > v_{dd} > v_{dm}$

Consider the equilibrium candidate $\mathbf{r}^* = (r_1^*, r_2^*, ..., yes)$. Let us assume that the domestic firm w is the domestic firm that has posted the lowest selling bid and sells the assets, and the domestic firm s is the domestic firm with the second lowest selling bid.

Then, $r_w^* < v_{dm}$ is a not an equilibrium since firm w would then benefit from deviating to such a high reservation price that it would not sell its assets. $r_w^* > v_{dm} + \varepsilon$ is not an equilibrium since domestic firm $j \neq w$ then benefits from deviating to $r_j = r_w^* - \varepsilon$, since it will then sell its assets and at a price higher than its valuation of keeping them. If $r_w^* = v_{dm} + \varepsilon$, and $r_s^* \in [v_{dm} + \varepsilon, v_{dm} + 2\varepsilon]$, then no domestic firm has an incentive to deviate. By deviating to no, the MNE's payoff decreases, since it foregoes a selling price lower than its valuation, v_m. Accordingly, firm d has no incentive to deviate. Thus, $\mathbf{r}^*$ is a Nash equilibrium.

Let $\mathbf{r} = (r_1, r_2, ..., no)$ be a Nash equilibrium. Let domestic firm h be the domestic firm with the lowest selling bid. The MNE will then say no iff $r_h > v_m$. But domestic firm j will have the incentive to deviate to $r' = v_m$ in stage 1, since $v_{dd} < v_m$. This contradicts the assumption that $\mathbf{r}$ is a Nash equilibrium.

A.3.2. Inequality $I2$: $v_m > v_{dm} > v_{dd}$

Consider the equilibrium candidate $\mathbf{r}^* = (r_1^*, r_2^*, ..., yes)$. Then, $r_w^* < v_{dm}$ is a not an equilibrium. If $r_s \leq v_m$, firm w would then benefit from deviating to such a high reservation price that it will not sell its assets. If $r_s > v_m$, firm w will then benefit from deviating to $r_w = v_m$. $r_w^* > v_{dm} + \varepsilon$ is not an equilibrium since the domestic firm $j \neq w$ then benefits from deviating to $r_j = r_w^* - \varepsilon$, as it will then sell its assets and at a price higher than its valuation of keeping them. If $r_w^* = v_{dm} + \varepsilon$, and $r_s^* \in [v_{dm} + \varepsilon, v_{dm} + 2\varepsilon]$, then no domestic firm has an incentive to deviate. By deviating to *no*, the MNE's payoff decreases, since it foregoes a selling price lower than its valuation, v_m. Thus, $\mathbf{r}^*$ is a Nash equilibrium.

Let $\mathbf{r} = (r_1, r_2, ..., no)$ be a Nash equilibrium. Let domestic firm h be the domestic firm with the lowest selling bid. The MNE will then say *no* iff $r_h > v_m$. But domestic firm j will have the incentive to deviate to $r' = v_m$ in stage 1, since $v_{dd} < v_m$. This contradicts the assumption that $\mathbf{r}$ is a Nash equilibrium.

A.3.3. Inequality $I3$: $v_{dd} > v_m > v_{dm}$

Consider the equilibrium candidate $\mathbf{r}^* = (r_1^*, r_2^*, ..., yes)$. Then, $r_w^* < v_{dm}$ is a not an equilibrium since firm w would then benefit from deviating to such a high reservation price that it will not sell its assets. $r_w^* > v_{dm} + \varepsilon$ is not an equilibrium since domestic firm $j \neq w$, then benefits from deviating to $r_j = r_w^* - \varepsilon$, as it will then sell its assets and at a price higher than its valuation of obtaining them. If $r_w^* = v_{dm} + \varepsilon$, and $r_s^* \in [v_{dm} + \varepsilon, v_{dm} + 2\varepsilon]$, then no domestic firm has an incentive to deviate. By deviating to *no*, the MNE's payoff decreases, since it foregoes a selling price lower than its valuation, v_m. Thus, $\mathbf{r}^*$ is a Nash equilibrium.

Let $\mathbf{r}^{**} = (r_1^{**}, r_2^{**}, ..., no)$ be a Nash equilibrium. Let domestic firm h be the domestic firm with the lowest selling bid and assume that $r_i > v_m$. The MNE will then say *no* since $r_h > v_m$. No domestic firm j will then have an incentive to deviate to $r' = v_m$ in stage 1, since $v_{dd} > v_m$. Thus, $\mathbf{r}^{**}$ is a Nash equilibrium.

A.3.4. Inequality $I4$: $v_{dm} > v_m > v_{dd}$

Consider the equilibrium candidate $\mathbf{r}^* = (r_1^*, r_2^*, ..., yes)$. Then, $r_w^* < v_m$ is not an equilibrium, since firm w would then benefit by deviating to $r_w = v_m$. $r_w^* > v_m$ is not an equilibrium since the MNE would then not accept any bid. If $r_w^* = v_m$, firm w has no incentive to deviate. By deviating to $r_j' \geq r_w^*$, firm j's, $j \neq w$, payoff does not change. By deviating to $r_j' < r_w^*$, firm j's payoff decreases, since it then sells its assets below its valuation, v_{dm}. By deviating to no, the MNE's payoff decreases, since it foregoes a purchase of the domestic assets at a price below v_m. Thus, r^* is a Nash equilibrium.

Let $\mathbf{r} = (r_1, r_2, ..., no)$ be a Nash equilibrium. Let domestic firm h be the domestic firm with the lowest selling bid. The MNE will then say no iff $r_h > v_m$. But domestic firm j will have the incentive to deviate to $r' = v_m$ in stage 1, since $v_{dd} < v_m$. This contradicts the assumption that $\mathbf{r}$ is a Nash equilibrium.

A.3.5. Inequalities $I5$ or $I6$: $v_{dd} > v_{dm} > v_m$ or $v_{dm} > v_{dd} > v_m$

Consider the equilibrium candidate $\mathbf{r}^* = (r_1^*, r_2^*, ..., no)$, where $r_i^* > v_m \; \forall i \in M$. It then directly follows that no firm has an incentive to deviate; thus, r^* is a Nash equilibrium.

Then, note that the MNE will accept a bid iff $r_i \leq v_m$. But $r_i \leq v_m$ is a not an equilibrium since $v_m < \min\{v_{dm}, v_{dd}\}$ and a domestic firm posting such a bid will have an incentive to deviate. Thus, the assets will not be sold in these intervals.

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