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International Mergers with Financially Constrained Owners

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Abstract

This paper proposes a cross-border M&A model with financially constrained owners in which the identity of the buyer and seller can be determined. We show that policies blocking foreign acquisitions to protect the domestic industry can be counterproductive. Foreign acquisition can increase the domestic owner's investment in growth industries by reducing their financial restrictions. This calls for a "financial" efficiency defense in the merger law. We also show that cross-border M&As are not only driven by effects on the merged entity, but also driven by the seller's alternative investment opportunities.

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1. Introduction

Many countries are re-evaluating their regulations of foreign acquisitions with the concern that foreign owners will be less beneficial for the local economy than domestic owners, .i.e. that foreign owners will relocate production abroad and invest less.¹ For instance, in 2005, the rumors about a takeover bid of the French dairy producer Danone by the American company PepsiCo provoked an outcry on the French political arena. A few weeks later, the French government officially proposed to shield ten "strategic" industries, including biotechnologies and secure information systems, from foreign acquisitions. Similar processes have recently taken place in several countries including Canada, China, Italy and USA.² On the other hand most countries are positive to their own firms expanding internationally by acquiring foreign firms – building up so called national champions.

In this paper we show that blocking foreign acquisitions might be counterproductive, leading to less investment in the host country since less financial capital becomes available to domestic corporate owners.

To this end, we develop a theoretical model with the following basic framework: The buyer and seller identities will be determined within a bargaining framework. Firms are active in a mature market and possibly also in a new growth market. The novel feature of our model is that it captures the fact that a large share of sellers in cross-border M&As are owners that will use the proceeds to undertake other corporate investments. First, a large share of all sellers are conglomerates that divest affiliates.³ Second, in many countries sellers in cross-border M&As are corporate owner groups.⁴ To capture this we assume that the two owners (groups) are unique in their ability to manage firms. Moreover, owners

¹See Graham and Marchick (2006).

²See "China adopts anti-monopoly law", August 30, 2007, *China Daily*, "Canadians worried about foreign takeovers, want action: poll", September 7, 2007, CBC news, "Bank chief in Italy off EU hook?", *International Herald Tribune, Business*, September 17, 2005, "America for sale, 2 outcomes when foreigners buy factories", April 7, 2008, *New York Times* and Graham and Marchick (2006).

³See for instance Maksimovic and Phillipps (2002).

⁴See Morck 2005; Gourevitch and Shinn 2005).

are assumed to be financially constrained, and need to borrow for investment, where the interest rate is decreasing in own liquidity.

In order to determine the buyer and seller identities in the bargaining game we use the following stability condition: the equilibrium outcome must be such that there exists no deviation that is profitable for both parties. We show that this implies that the direction of sale is determined by the industry structure that gives the highest aggregate post-acquisition profits. This finding has several implications: (i) an owner may sell corporate assets to a less efficient owner, since its use of finance in other corporate investments might compensate this loss, and (ii) an improved outside investment opportunity for an owner may trigger a corporate sale and may benefit the acquirer through a lower acquisition price.

We then turn to implications for the international investment pattern of the outcome in the acquisition bargaining game. We show that a foreign acquisition increases the home owner's investments in the growth industry, while the foreign owner decreases her investment in the same. The reason is that the home firm's owner will become financially stronger due to the sale of their firm in the mature industry, reducing the financial cost when borrowing to invest in the growth industry, thus leading to higher domestic investment in the growth industry. The foreign owner on the other hand becomes financially weaker and is "locked in" with industry specific capital in her country and will therefore reduce her investment in the growth industry.

We also show that the home country may obtain an increased capital stock even if production in mature products is shut down, since the increase in investment in the growth industry maybe substantial.

We then turn to implications for (international) merger policy In most countries, the market for corporate control in concentrated markets is scrutinized through merger control by an Antitrust Authority (AA). When evaluating a merger, Antitrust Authorities in most jurisdictions try to estimate whether merger specific efficiency gains are likely to offset the higher market power enjoyed by the merging firms. The typical assumption is that these

merger specific efficiencies must be used by the buying owners. However, as shown in the above analysis, an acquisition can create merger specific financial efficiencies that the selling owners exploit in other markets. We then establish that a financial efficiency defence in the merger law can improve efficiency by inducing a more efficient use of ownership skills when owners are financially constrained.

An alternative policy to block foreign acquisitions might be to put restrictions on shutting down the selling firms plant in the mature industry. This would preserve jobs in the mature industry while at the same time ensure a transition to the emerging industry. However, such a policy will reduce the acquisition price, which in turn will reduce investment in the growth industry and might therefore be counterproductive.

The investment strategy of Investor (the largest investment bank in Sweden) in the last decade is an example where the selling of firms in mature industries has lead to investments in growth industries in the domestic country. Between 1999 and 2009 Investor almost trebled the share of their portfolio invested in new growth markets, while at the same time scaling back their more traditional investments where they controlled a few very large firms. Of these new investments 62 percent went to the Nordic region (Investor Annual Report 2001, 2010). The selling to foreign investors do not seem to have affected the number of Swedish employees in these firms in any remarkable way either. For example, the selling of Scania, the most notable of Investor's transactions, has not lead to a decrease in the number employed in their Swedish operations, rather this number has somewhat increased over the decade as Investor started to scale down their ownership (Scania Annual Report 2000, 2009).⁵

Our model is related to the recent theoretical literature on cross-border M&As and greenfield investment which, in contrast to the traditional FDI literature, emphasizes that greenfield investments and cross-border acquisitions are not perfect substitutes: the entry

⁵The selling of Scania was conducted in several steps, but in 1999 Investor went from contolling 49.3 percent of the votes to contolling only 15.3 percent.

modes of FDI matter.⁶ Norbäck and Persson (2007, 2008) show that cross-border M&As can lead to sequential investment due to synergies and market power effects. Nocke and Yeaple (2007, 2008) study how differences in firm productivity influence the greenfield versus acquisition choice of MNEs according to the nature of assets, i.e. their degree of international mobility. Our model, based on an acquisition-investment-oligopoly framework, examines how financial restrictions affect cross-border activity and sequential investment. In particular, we show that selling of domestic industry specific assets to foreign owners, can increase domestic investment by easing home biased domestic owner's investment in new industries. and thereby increase domestic welfare.

The paper is also related to the merger literature. A large set of papers (see, for instance, Salant et al. (1983), Perry and Porter (1985), Deneckere and Davidson (1985) or Farrell and Shapiro (1990)) clarifies how mergers affect prices, profits and welfare, depending on the market structure in various static oligopoly models. Such papers are sometimes referred to as the exogenous merger literature – the firms that merge are exogenously chosen. They are silent on the terms of the deal, who acquires and who sells. There is also a small literature on endogenous mergers: who merges with whom is the central question and there is an explicit modeling of the acquisition game (see, for instance, Fridolfsson and Stennek (2005) and Horn and Persson (2001)). However, they do not address the kind of financial and sequential investment on which we focus. A small set of papers theoretically examines the evolution of industry investment over time and allows for mergers or takeovers. Pesendorfer (2005), for instance, shows that a merger today may become profitable by triggering future mergers. He uses exogenous merger criteria. Using numerical methods, Gowrisankaran (1999) models the evolution of a dominant firm industry allowing for entry, exit and investments as well as mergers. Consequently, the determining of buyers

⁶See, for instance, Bjorvatn (2004), Mattoo *et al.* (2004), Norbäck and Persson (2008) or Raff *et al.* (2005). There is also a small theoretical literature addressing welfare aspects of cross-border mergers in international oligopoly markets. This literature includes papers by, for example, Head and Ries (1997), Horn and Persson (2001b), Lommerud *et al.* (2004), Neary (2007).

and sellers as well as the financial and strategic effects, on which we focus in our study, are abstracted from in those studies. This previous merger literature has shown mergers to be driven by access to markets, low production costs, synergies and market power. We here identify another important factor: the sellers need for financial resources to be able to invest in new growth markets. Moreover, we also show that a financial efficiency defence in the merger law can improve efficiency by inducing a more efficient use of ownership skills.

The paper adds to the literature that examines the interaction between financial structures and product markets. For example, Brander and Lewis (1986) demonstrated that limited liability commit a leveraged firm to producing more output in the product market since shareholders care more about positive than negative states of the world.⁷ Cestone and Fumagalli (2005) show that in business groups with efficient internal capital markets, resources may be channelled to either more or less profitable units. We add to this literature by showing that financial restrictions and ability will affect the allocation of owner specific ability and industry specific capital in the product market.

Finally, the paper is also related to the literature on industrial reorganization in the financial literature, which shows that M&A activity can be triggered by changes in owner productivity and cost of new capital, where more productive owners buy assets from less productive owners. (See Jovanovic and Rosseau (2002) and Maksimovic and Phillips (2002). We add by showing that financial constraints may affect this pattern by triggering mergers where efficient owners sell industry specific assets to invest in even more productive assets in other industries.⁸

⁷See also Maksimovic (1988), Bolton and Scharfstein (1990), and Fudenberg and Tirole (1986).

⁸Investment levels of financially constrained firms have been shown to be sensitive to the availability of liquidity (see, e.g., Fazzari et al., 1988, and Hoshi et al. 1991), and that increases in asset liquidity trigger mergers (Harford, 2004).

Furthermore, Hovakimian and Titman (2006) finds that asset sales are a significant determinant of corporate investment, a finding corroborated by Warusawitharana (2008).

2. Cross-border M&As and the market for corporate control in Sweden

In this section we describe institutional facts on which we will build our model of cross-border M&As and the international market for corporate control and investments. It is well established that cross-border mergers and acquisitions play a key role in the global industrial development and restructuring process. In particular, many studies examine how the change in ownership affects the merged entity's performance.⁹

However, less is known about the sellers' characteristics and what the sellers are doing with the sales proceeds. To address this issue we will rely heavily on the work of Henrekson and Jakobson (2012) which examines the evolution of the Swedish stock market in detail over the last 80 years.

2.1. Seller characteristics

Who sells corporate assets on the Swedish Stock Exchange (SSE)? In Sweden most firms have traditionally been controlled by owner groups or closed end investment funds (CEIFs) that have specialized in controlling large firms. In Sweden, CEIFs enjoy a privileged tax status: capital gains and dividends on their holdings are tax exempt. The most important of these CEIFs were started (or converted) as a result of new legislation in 1934 that prohibited banks from owning stock. New CEIFs, all with close ties to specific banks, were formed in a second wave in the first half of the 1960s.

Despite the deregulation of credit markets in the 1980s, the use of dual-class shares, pyramiding and numerous takeovers led to a substantial increase in the concentration of ownership control. Moreover, in this period many of these firms became large multi-

⁹In the finance literature see, for instance, Maksimovic and Phillipps (2002) for theoretical work and Andrade et al. (2001) and Maksimovic and Phillipps (2001), for empirical work.

In the IO literature see for instance Salant (1983) and Farrell and Shapiro (1996) for theoretical work, and Kim and Singhal (1993) and Nevo (2000) for empirical work.

national enterprises (MNE) such as Asea, Astra, Ericsson and Volvo. These MNEs were firms with firm specific assets such as patents, know-how and image, that they exploit internationally.

Between 1989 and 1993, the government undertook measures that blew the market for foreign ownership wide open. This led to a rapidly increasing share of foreign ownership; at just 7 percent in 1989, this share skyrocketed to 40 percent ten years later. Despite this steep increase in foreign ownership, control of the listed companies became even more concentrated at first. In 1993, the share of the market cap of the SSE controlled by CEIFs peaked at 83 percent, and the two leading CEIFs—Investor controlled by the Wallenbergs, and Industrivärden controlled by interests with close ties to Svenska Handelsbanken (SHB)—controlled 63 percent. Since then, CEIF control has declined substantially. By 2010, CEIFs controlled less than half of the SSE, and the combined Investor/Industrivärden share had declined to 36 percent.

We can then state our first key fact:

Key feature 1: *(i) A large share of the firms on the Swedish stock market, including the Swedish MNEs have been, and to a large extent still are, controlled by owner groups or CEIFs. These owner groups and CEIFs have developed owner specific assets that they exploit nationally and internationally by undertaking acquisitions and greenfield investment. (ii) A large share of cross-border M&As into Sweden consist of MNEs selling affiliates or divisions or CEIFs selling control ownership, in concentrated markets where firm- and industry specific assets are important.*

We believe that this key feature of cross-border M&As and the market for corporate control is present in many other countries. There are two basic models of corporate governance of public firms: (i) dispersed ownership and management control, and (ii) concentrated ownership and private blockholder control. The first model predominates in the Anglo-American world, where common law judicial systems largely govern. The second model, which exists in several varieties, dominates in virtually all other countries

(Morck 2005; Gourevitch and Shinn 2005). Then using the fact that cross-border M&As has increased in importance in most European countries makes us confident that our key feature 1 should be valid in many European Countries.

2.2. Post selling corporate investments

What does the seller of corporate assets on the Swedish stock market do with the sales proceeds? The Wallenberg group held controlling positions in companies accounting for 42 percent of the market cap of the SSE in 1998. By November 2, 2010, their control had declined to 17.1 percent of the total market cap. The number of SSE-listed companies controlled by the group had also declined from 14 to 7. It is also explicitly stated in Investor's Annual Report (2010, p. 10) that "[...] we evaluate the long-term return potential of all investments. If our assessment shows that the potential of a holding does not meet our requirements, or is higher in another ownership structure, we look to exit the holding." Between 1999 and 2009 Investor almost trebled the share of their portfolio invested in new growth markets, while at the same time scaling back their more traditional investments where they controlled a few very large firms. Of these growth investments, 62 percent went to the Nordic region (Investor Annual Report 2001, 2010).

Moreover, during the period several other Swedish MNEs divested affiliates while investing in their core investments in Sweden. For instance, Ericsson divested its mobile phone units to Sony, at the same time expanding its investments in systems in Sweden.

This gives rise to the second key feature of cross-border M&As and the market for corporate control:

Key feature 2 An MNE or CEIF seller of corporate assets on the Swedish stock market will increase its investments in other corporate assets. Investment following divestment exhibits "home bias".

We also believe that this key feature of cross-border M&As and the market for corporate control is present in many other countries. Bates (2005) examines the allocation of

cash proceeds following 400 subsidiary sales between 1990 and 1998. The finding is that retention probabilities increase in the divesting firm's contemporaneous growth opportunities and expected investment. Retaining firms, however, also systematically over-invest relative to an industry benchmark.¹⁰

The strong bias in favor of domestic securities is also a well-documented characteristic of international investment portfolios – Lewis (1999).¹¹

We will now incorporate these key features to construct a model of cross-border M&As and the international market for corporate control and investment.

3. The Model

Consider a mature market denoted M (which could be a domestic market or a world market) where firms with different nationalities are competing. Among these firms we focus on two: firm h in country H and firm f in country F (define this set as $\mathcal{I} = \{h, f\}$). Thus

¹⁰The finance literature cites countervailing costs and benefits associated with the retention of sales proceeds for subsequent investment by a divesting firm. On one hand, capital market frictions make raising external capital costly for firms. Hite, Owers, and Rogers (1987) posit that from an efficiency perspective a portion of the value realized from an asset sale can include gains from the application of proceeds to the remaining unfunded but positive net present value (NPV) projects of the firm. On the other hand, managerial incentives to retain proceeds may extend primarily to the financing of projects that benefit managers themselves rather than shareholders. The lack of explicit constraints over management's application of retained proceeds has led others, including Lang, Poulsen, and Stulz (1995), to argue that any potential financing benefits are likely offset by the agency costs of managerial discretion. From this perspective one might expect that the agency problem is less strong on owner level and thus one might conjecture that increased cash at ownership level should spur sequential investment.

¹¹What explains this home bias? Ahearne, Grier and Warnock (2004) find that the effects of direct barriers to international investment, when statistically significant, are not economically meaningful. More important are information asymmetries owing to poor quality and low credibility of financial information in many countries. Coval and Moskowitz (1999) show that the preference for investing close to home also applies to portfolios of domestic stocks. Specifically, U.S. investment managers exhibit a strong preference for locally headquartered firms, particularly small, highly leveraged firms that produce nontraded goods.

these firms are already in business in the market for mature products (e.g. trucks), but who wish to expand their line of business in to a distinct/separate emerging market (e.g. information technology), E . We define the set of markets as $\mathcal{M} = \{M, E\}$.¹² Each firm owns existing assets \bar{k} used for production in the mature market. To become active in the emerging market firms need to invest in new assets, and each firm will undertake its investment in its respective home country (i.e. firms are fully home biased).

We assume the following timing of events: In the first stage firm h (or firm f) can buy its opponents assets \bar{k} in the mature market. In the second stage, firms invest in new assets in their respective home market in order to be able to operate in the emerging market (and possibly also restructure the mature market). The firms (or their owners) are assumed to be financially constrained and need to borrow at a *firm specific* interest rate r_i for investment, where it will be assumed that the interest rate is decreasing in own liquidity (L_i).

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

3.1. Period three: product market interaction

The product market profits will depend on the distribution of asset ownership, given from the investment game in period 2, and the acquisition game in period 1. Let l be a variable indicating the ownership of both \bar{k} assets in the mature market, i.e. the outcome of the acquisition game in stage 1, and let $l = \{h, f, n\}$ (where $l = h$ (f) implies that firm h (f) possesses the two \bar{k} , and where $l = n$ implies that no acquisition has occurred), and let $R_{im}(\mathbf{x}_m, \boldsymbol{\kappa}_m, l)$ denote the product market profit of firm i in market m , where $\boldsymbol{\kappa}_m$ is the vector of all firms' capital holdings in market m (which is decided in the investment game in period 2), and \mathbf{x}_m is the vector of firms' output. If firm i (j) acquires (sells) its mature

¹²Note that both markets may have other incumbents. We also remain agnostic regarding the degree of competition in the two markets.

market assets \bar{k} in Stage 1 at the price S , then total firm profits are given by

$$\begin{aligned}\Pi_i(\mathbf{x}, \boldsymbol{\kappa}, i, S) &= R_{iM}(\mathbf{x}_M, \boldsymbol{\kappa}_M, i) + R_{iE}(\mathbf{x}_E, \boldsymbol{\kappa}_E) - S - \sum_{m \in \mathcal{M}} r_i(\boldsymbol{\kappa}_i, L_i(i, S)) \kappa_{im}, \quad i \in \mathcal{I}, \\ \Pi_j(\mathbf{x}, \boldsymbol{\kappa}, i, S) &= R_{jM}(\mathbf{x}_M, \boldsymbol{\kappa}_M, i) + R_{jE}(\mathbf{x}_E, \boldsymbol{\kappa}_E) + S - \sum_{m \in \mathcal{M}} r_j(\boldsymbol{\kappa}_j, L_j(i, S)) \kappa_{jm}, \quad i, j \in \mathcal{I}, i \neq j,\end{aligned}\tag{3.1}$$

Note that the cost of investment in new assets κ_{iE} in period 2, $r_i(\kappa_{iE}, L_i(i, S))$, depends on the liquidity holdings of firm i , L_i , where an acquisition will lead to the buyer having lower liquidity in the investment stage, whereas the seller will obtain a higher liquidity. The interest rate is assumed decreasing in liquidity, but increasing in κ_{im} . We then assume that the cost of investment is increasing and convex. This is the fundamental assumption in our model.

In order to focus on the implications of this occurrence we have not modelled the underlying mechanism. The unseen criminal in the drama is asymmetric information. Froot et al. (1993) demonstrated that this type of model can be mapped precisely in to the models of Townsend (1979), and Gale and Hellwig (1985), where lenders need to incur a fixed cost to verify the state of the world. Stein (1998) shows that an appropriately parameterized version of the Myers and Majluf's (1984) adverse-selection model (in which managers choose to issue equity when their private information regarding the state of the world is negative, and debt when it is positive; akin to the "lemon" problem examined by Akerlof [1970]) leads to essentially the same reduced form for firm profits (Stein, 2003). As shown by Kaplan and Zingales (1997), investments in these types of models are weakly increasing in firm wealth, and weakly decreasing in the convexity of borrowing costs.

We may consider the action x_{im} as setting a quantity à la Cournot, or a price à la Bertrand. Regardless, we assume there to exist a unique Nash-Equilibrium in market m , $\mathbf{x}_m^*(\boldsymbol{\kappa}_m, l)$, defined as:

$$R_{im}(x_{im}^*, x_{-im}^* : \boldsymbol{\kappa}_m, l) \geq R_{im}(x_{im}, x_{-im}^* : \boldsymbol{\kappa}_m, l), \quad \forall x_{im} \in \mathbb{R}_+.\tag{3.2}$$

We assume this NE to exist regardless whether h and f compete with each other, or against other players in the markets.

From (3.2), we can define a reduced-form profit for firm i in market m as $\pi_{im}(\boldsymbol{\kappa}_m, l, S) \equiv R_{im}(x_{im}^*(\boldsymbol{\kappa}_m, l, S), x_{-im}^*(\boldsymbol{\kappa}_m, l, S), \boldsymbol{\kappa}_m, l) - r_i(\boldsymbol{\kappa}_i, L_i(l, S))\kappa_{im}$.

3.2. Period two: investments

In period 2, firms invest in new assets κ_{im} in their respective home country, given the ownership structure l of the assets in the mature industry, determined in the first period, and the effect the acquisition price has on liquidity and, hence, interest rates. This investment can be in capacity, R&D or marketing, for instance. We make the standard assumptions that reduced-form profit $\pi_{im}(\boldsymbol{\kappa}_m, l, S)$ decreases in the number of firms in the market, and that for a given number of firms in the market the reduced-form profit $\pi_{im}(\boldsymbol{\kappa}_m, l, S)$ is decreasing in rivals' investments κ_{-im} (i.e. investments are strategic substitutes), is strictly concave in own investments κ_{im} , and is increasing in κ_{im} for some κ_{im} .

We then assume that the investment decisions by these firms takes place simultaneously. Formally, firm i makes its choice $\kappa_{im} \in \mathbb{R}_+$ to maximize the reduced-form profit, $\pi_{im}(\boldsymbol{\kappa}_m, l, S)$ which we rewrite as $\pi_{im}(\kappa_{im}, \kappa_{-im}, l, S)$, where κ_{-im} denotes investments in new assets by i 's rivals. We assume that there are no links between the two product markets and thus we can solve for the owners' optimal investments in each market separately, but we need to take into account the wealth position of the owners.

We assume there to exist a unique Nash-Equilibrium, $\boldsymbol{\kappa}^*(l, S)$ defined by¹³

$$\pi_{im}(\kappa_{im}^*, \kappa_{-im}^*, l, S) \geq \pi_{im}(\kappa_{im}, \kappa_{-im}^*, l, S), \quad \forall \kappa_{im} \in \mathbb{R}_+, \quad i \in \mathcal{I}, \quad m \in \mathcal{M}, \quad (3.3)$$

where κ_{im}^* is determined by the following first order condition

$$\frac{\partial R_{im}}{\partial \kappa_{im}} = r_i(\boldsymbol{\kappa}_i, l, S) + \frac{\partial r_i}{\partial \kappa_{im}} [\kappa_{iM}^*(l, S) + \kappa_{iE}^*(l, S)]. \quad (3.4)$$

The condition in equation (3.4) illustrates the fact that the firm not only has to take the interest on additional capital into account (the first term on the right-hand side), but

¹³Notice that h and f may, or may not, be competitors on the emerging market.

also has to consider the effect further borrowing will have on the interest rate of all the borrowed capital (second term on the right). Recall that we have assumed that the interest rate is decreasing in own liquidity (L_i).

To simplify, we assume that a firm which sells its mature assets \bar{k} does not reinvest in that market and thus is *not active* in the mature product market. The asset ownership of a firm can then take three different shapes, one for each value of l . These are given by

$$\begin{aligned}\kappa_i(i, S) &= (2\bar{k} + \kappa_{iM}^*(i, S), \kappa_{iE}^*(i, S)), \\ \kappa_i(j, S) &= (0, \kappa_{iE}^*(j, S)), \\ \kappa_i(n) &= (\bar{k} + \kappa_{iM}^*(n), \kappa_{iE}^*(n)).\end{aligned}\tag{3.5}$$

A complete description of asset ownership is then given by

$$\mathbf{K}(l, s) = (\kappa_i^*(l, S), \kappa_j^*(l, S)).\tag{3.6}$$

This allows us to define $\pi_{im}(l, S) \equiv \pi_{im}(\kappa_m^*(l, S), l) \equiv \pi_{im}(\mathbf{x}_m^*(\kappa_m^*(l, S)), \kappa_m^*(l, S), l)$ as a reduced-form profit function for firm i in market m under ownership structure l in the mature market, encompassing the firms' optimal actions in period three, \mathbf{x}_m^* , and optimal investments in new assets in period two, κ_m^* .

3.3. Stage one: the acquisition game

In case of an acquisition, the foreign firm f and domestic firm h negotiate the distribution of the realized surplus. Note that the surplus can not be divided after the realization of profits, rather, any division is determined by the acquisition price S that gives rise to the set upon division. Define $\Pi_i(l, S) = \pi_{iM}(l, S) + \pi_{iE}(l, S)$ as the reduced-form total profit for all i and l (notice that the first term on the right-hand side is S if the firm sells its mature assets).

A condition for there to be a sale is, of course, that both firms benefit from it. Denote

the set of acceptable bids for firm i as A_i we can then define

$$A_i(l) = \{S \in \mathcal{S}; \Delta\Pi_i(l, S) \geq 0\}, \quad i, l = \{h, f\}, \quad (3.7)$$

where $\Delta\Pi_i(l, S) = \Pi_i(l, S) - \Pi_i(n)$ for $l = \{h, f\}$, and $\mathcal{S} = \mathbb{R}$ is the set of all possible bids.

If we define the lowest possible S accepted by the seller (j) as \underline{S} and the highest price the buyer (i) is willing to pay as \bar{S} then we can write¹⁴

$$A_j(i) = (\underline{S}, \infty), \quad (3.8)$$

$$A_i(i) = (-\infty, \bar{S}). \quad (3.9)$$

The set of possible outcomes then becomes

$$A(i) = A_j(i) \cap A_i(i). \quad (3.10)$$

Thus, for $A(i)$ to be a non-empty we must have $\underline{S} \leq \bar{S}$, which, obviously, puts restrictions on the convexity of costs as well as the shape of the demand in the two markets. Needless to say, we will assume that there exists i such that this condition is fulfilled.

It is worth noting the following regarding market profits,

$$\frac{dR_{iM}(j, S)}{dS} = 0, \quad \frac{dR_{iE}(j, S)}{dS} \geq 0, \quad \frac{dr_i(j, S)}{dS} \leq 0; \quad (3.11)$$

$$\frac{dR_{iM}(i, S)}{dS} \leq 0, \quad \frac{dR_{iE}(i, S)}{dS} \leq 0, \quad \frac{dr_i(i, S)}{dS} > 0 \quad (3.12)$$

$$\implies \frac{d\Pi_i(j, S)}{dS} > 0, \quad \frac{d\Pi_i(i, S)}{dS} < 0. \quad (3.13)$$

If a firm sells (buys) assets, then the increase (decrease) in liquidity decreases (increases) the interest paid on further loans. The change in interest rates will affect the amount of investments undertaken by a firm according to equation (3.4), and, since it is assumed that product market profit (R_{im}) is an increasing and strictly concave function of κ_{im} ,

¹⁴That is, \underline{S} and \bar{S} solves $\Delta\Pi_i(l, S) = 0$ for l equalling j and i respectively. These bounds are well defined and unique according to (3.13).

product market profit (R_{im}) will be affected positively (negatively) for the seller (buyer) (that product market profit from the mature market is unchanged for the seller is only due to our simplifying assumption that the seller does not re-enter the market after a sale). From this the result in equation (3.13) follows. Equations (3.7) and (3.13) define the negotiation problem: even if it is in both firms' interest to come to an agreement, they are still rivals when it comes to distributing the realized surplus from an acquisition, and it is this distribution the firms bargain over by negotiating S .

We assume that the firms follow a Nash bargaining protocol and the solution (NBS) to any bargaining game is given by the sale price

$$S^*(i) = \arg \max_S [\Pi_i(i, S) - \Pi_i(n)] [\Pi_j(i, S) - \Pi_j(n)], \quad i, j \in \mathcal{I}, \quad i \neq j, \quad (3.14)$$

where equal bargaining power is assumed.

4. Who acquires whom and why?

In this section we will begin by solving the bargaining game: determining the price and direction of an acquisition, as well as making some statements about the characteristics of buyers and sellers.

Before we can proceed with any further analysis we must clarify the problems of who buys whom, at which price, and why. Solving the problem postulated in (3.14) yields the following condition:

$$\frac{\frac{\partial \Pi_j(i, S^*(i))}{\partial S}}{\Pi_j(i, S^*(i)) - \Pi_j(n)} = - \frac{\frac{\partial \Pi_i(i, S^*(i))}{\partial S}}{\Pi_i(i, S^*(i)) - \Pi_i(n)}. \quad (4.1)$$

The left-hand-side is the increase in the net profit in case of agreement for the seller when the acquisition price increases marginally, while the right-hand-side gives corresponding relative reduction in the buyer's net profit in case of agreement.

From equation (3.13) it follows that the NBS in (4.1) is unique for a given ownership

$l = \{h, f\}$, but the outcome may differ depending on who acquires whom. To decide the direction of the sale we apply the following criterion:

Stability Criterion The equilibrium outcome must be such that there exists no deviation that is profitable for both parties.

We find this criterion both intuitive and justifiable on the grounds of rationality. Using the stability criterion we can state the following proposition.

Proposition 1. (i) *The direction of sale is determined by the industry structure that gives the highest aggregate post-acquisition profits, $l^* = \arg \max_l [\Pi_i(l, S^*(l)) + \Pi_j(l, S^*(l))]$, $l = \{h, f\}$, $i \neq j$.* (ii) *The acquisition price, $S(l^*)$, is unique and determined by equation (4.1).*

Proof. (i) Assume the equilibrium outcome is $s^*(i)$, but also that $\Pi(i, s^*(i)) < \Pi(j, s^*(j))$, where $i, j \in \mathcal{I}$, $i \neq j$. Two possibilities then arise:

- 1) $\Pi_i(i, s^*(i)) < \Pi_i(j, s^*(j))$, $\forall i \in \mathcal{I}$.

- 2) $\Pi_i(i, s^*(i)) < \Pi_i(j, s^*(j))$, and $\Pi_j(i, s^*(i)) \geq \Pi_j(j, s^*(j))$, $i, j \in \mathcal{I}$, $i \neq j$.

The first case obviously violates the stability criterion since a reversal of the roles would be beneficial for both parties. In the latter case we can use that the aggregate profit functions are continuous in s to conclude that there exists a s' such that $\Pi_j(i, s^*(i)) = \Pi_j(j, s')$. Then, for (j, s') we must have either $\Pi_i(i, s^*(i)) < \Pi_i(j, s')$ or $\Pi_i(i, s^*(i)) \geq \Pi_i(j, s')$, either way a contradiction.

(ii) The equilibrium price of any transaction is given by maximizing the Nash product in (3.14), resulting in the equilibrium condition given in (4.1). From the assumption that Π_i is concave in own liquidity, for all i , it then follows directly that $s^*(l)$ is unique, and together with the first part of the proposition this shows that also $s(l^*)$ is unique. ■

We can now use this proposition to derive predictions on the identity of the acquirer. To this end we define efficiency of ownership of an asset as how much profit an owner can generate from operating this asset. We can then state the following result:

Corollary 1. *(i) All else equal, a firm will be the acquirer if it is a more efficient owner of assets in the mature market. (ii) All else equal, a firm is more likely to be the acquirer if it has sparse investment opportunities in the new market.*

This result follows directly from Proposition 1: if a firm becomes a more efficient owner of the mature assets i.e. can extract more profits from its operation, the aggregate industry profit will increase if it acquires the old assets. Equivalently, if a firm's investment opportunity as a seller decreases, an acquisition by the rival becomes less profitable. Given that the magnitude of the advantage in a sector is proportional to the size of the market, then Proposition 1 and Corollary 1 are also consistent with the findings of Maksimovic and Phillips (2001) that firms with several divisions tend to focus on their core activities when these experience positive demand shocks, and diffuse their focus under negative demand shocks.

However, it is not only the absolute efficiency of ownership that matters, but also the relative efficiency of ownership, as shown by the following proposition:

Proposition 2. *(i) Even though one firm is a more efficient owner of assets in the mature market, it will not be the acquirer, if it is even more efficient owner of new assets. (ii) Even though one firm is a more efficient owner of assets in the mature market, it will not be the acquirer, if its access to cash triggers a sufficient increase in investment in the new market.*

Proposition 2 follows directly from Proposition 1: a firm might be a more efficient owner of the mature assets (i.e. they can extract more profits from its operation) but makes sufficiently greater use of extra liquidity so that the solution l^* that maximizes aggregate profits is the inefficient owner. For example, consider the extreme case where h can produce at constant marginal cost c operating as a monopolist in the mature industry, while the corresponding figure for f is $c + \varepsilon$. Furthermore, assume that h is (for any reason) restrained from borrowing for new investments even though management has projects they know have positive net present value (NPV), while f can borrow at zero interest but has

no positive NPV projects. In this case there will exist $\varepsilon > 0$ where total surplus from the acquisition (which would here consist of the NPV of new projects undertaken by h , and the difference between duopoly and monopoly profits in the mature sector) is such that both firms are better off with f as the acquirer, even though the running of the mature industry could be better handled by h . That both firms are better off follows from the equilibrium price being sufficiently lower when h is the seller rather than the buyer. Note that the case where i is assumed to be disadvantaged in the money market is isomorphic to the case where i has greater investment opportunities in the emerging sector; either way cash is more useful.¹⁵

It then follows that the sale might allocate financing to the owner that can use the financing in the new market more efficiently, such that the increase in profit in the new market compensates for a merger loss in the mature market. Thus, we can state the following result:

Corollary 2. *A merger might take place even though the combined profit of the merged entities in the mature market is lower post-transaction than the sum of the entities' profits pre-transaction in the mature market.*

This phenomenon has been found in the empirical literature, however, it has then been viewed as an indication of managers' preferences for empire building, not as a rational consequence of profit maximizing behavior.

4.1. Domestic investment effects of cross-border acquisitions

Let us now examine the investment effects of a cross-border acquisition. Suppose that an acquisition occurs in the mature industry where the acquiring firm shuts down production in the selling country and both firms only invest new capital in their respective home countries, i.e. complete home bias. The shut-down of production in the mature

¹⁵Of course this only refers to the problem of deciding the direction of a sale and distributing realized surpluses, not if we, for example, were to consider the effects on consumers and lenders.

industry causes a loss of jobs in the seller's country which may warrant restrictions on the acquisition, or even an outright prohibition of the merger.

Suppose that we first examine a prohibition of the merger. Note that the cost of investment in new assets κ_{iE} in period 2, $r_i(\kappa_{iE}, L_i(l))$, depends on the liquidity holdings of firm i , L_i , where an acquisition will lead to lower liquidity of the buyer in the investment stage, whereas the seller will obtain a higher liquidity.¹⁶ Thus, $L_i(i) = \bar{L} - s^*(i)$ and $L_j(i) = \bar{L} + s^*(i)$ where \bar{L} is (symmetric) initial liquidity. Since interest rates are decreasing in liquidity it directly follows that:

$$r_i(i) > r_i(n) > r_i(j), i, j \in \mathcal{I}, i \neq j. \quad (4.2)$$

Lemma 1. *If firms are symmetric in their ability to borrow, then: $r_i(i) > r_i(n) = r_j(n) > r_j(i)$, $i, j \in \mathcal{I}, i \neq j$.*

Under the standard assumption of the investment game (that investments κ_{iE} are strategic substitutes) an acquisition increases the capital cost for investing in the emerging market for the acquiring firm in the mature market, while reducing the capital cost in the emerging market for the selling firm. Thus, the selling firm can commit to larger investment in the emerging market, whereas the acquirer will reduce its investment. That is, from (4.2), we have:

$$\kappa_{iE}^*(i) < \kappa_{iE}^*(n) < \kappa_{iE}^*(j). \quad (4.3)$$

From (4.3), it follows that given that there is a home bias for investments in the home market for serving the emerging market, total investments in country h can increase even if production is shut-down in the mature market after the merger, if $\kappa_{iE}^*(j) - \kappa_{iE}^*(n) > \bar{k}$.

Proposition 3. *If an acquisition occurs in the mature market, (i) this increases the seller's investments in the emerging market $\kappa_{jE}^*(i) > \kappa_{jE}^*(n)$, while reducing the investments in the emerging market by the acquiring firm $\kappa_{iE}^*(i) < \kappa_{iE}^*(n)$, and (ii) the selling country*

¹⁶Note, from equation (3.14) it follows that L_i is only a function of l in equilibrium.

may face an increased capital stock even if production of mature products is shut down, i.e. $\kappa_{iE}^*(j) - \kappa_{iE}^*(n) > \bar{k}$ may hold.

Proof. (i) follows directly from (4.2) and the assumption of decreasing marginal returns. For (ii) it suffices to note that even though κ_{ij} affects profits in their respective markets, the way they do so is in conjunction with parameters regarding the demand functions. Hence we will always be able to find parameter values for which (ii) holds true. ■

It can be worth noting that the same reasoning can be carried over to the case of employment: if the emerging sector is more labor intensive than the mature sector (which is not unlikely if we look at the current shift away from manufacturing towards services and information), then the acquisition by a foreign competitor can have *positive* net effects on domestic employment.

5. Merger Policy and a financial efficiency defense

Let us now turn to the implications of our findings for (international) merger policy. In most countries, the market for corporate control in concentrated markets is scrutinized through merger control by an Antitrust Authority (AA). When evaluating a merger, Antitrust Authorities in most jurisdictions try estimate whether efficiency gains are likely to offset the higher market power enjoyed by the merging firms.

The US merger guidelines, on this point, read: “[T]he merging firms must substantiate efficiency claims so that the Agency can verify by reasonable means the likelihood and magnitude of each asserted efficiency, how and when each would be achieved (and any costs of doing so), how each would enhance the merged firm’s ability and incentive to compete, and why each would be merger-specific. Efficiency claims will not be considered if they are vague or speculative or otherwise cannot be verified by reasonable means.” (US Department of Justice and US Federal Trade Commission, 1997, Section 4)¹⁷

¹⁷US Merger Guidelines, revised April 8, 1997, Section 4.

More specifically, the US guidelines 2010 states on page 30 that "[T]he Agencies will not challenge a merger if cognizable efficiencies are of a character and magnitude such that the merger is not likely to be anticompetitive in any relevant market", and note 14 states that "[T]he Agencies normally assess competition in each relevant market affected by a merger independently and normally will challenge the merger if it is likely to be anticompetitive in any relevant market. In some cases, however, the Agencies in their prosecutorial discretion will consider efficiencies not strictly in the relevant market, but so inextricably linked with it that a partial divestiture or other remedy could not feasibly eliminate the anticompetitive effect in the relevant market without sacrificing the efficiencies in the other market(s). Inextricably linked efficiencies are most likely to make a difference when they are great and the likely anticompetitive effect in the relevant market(s) is small so the merger is likely to benefit customers overall."

Similarly, the following section was adopted into the 2004 European horizontal merger guidelines: "The Commission considers any substantiated efficiency claim in the overall assessment of the merger. It may decide that, as a consequence of the efficiencies that the merger brings about, there are no grounds for declaring the merger incompatible with the common market pursuant to Article 2(3) of the Merger Regulation. This will be the case when the Commission is in a position to conclude on the basis of sufficient evidence that the efficiencies generated by the merger are likely to enhance the ability and incentive of the merged entity to act pro-competitively for the benefit of consumers, thereby counteracting the adverse effects on competition which the merger might otherwise have. (Commission of the European Communities, 2004, Paragraph 77).

The typical assumption is that these merger specific efficiencies must be used by the buying owners. However, as shown in the above analysis, an acquisition can create merger specific financial efficiencies that the selling owners exploit in other markets. These are investments that would not take place absent the merger, and are thus merger specific investments (efficiencies).

To proceed assume that the two markets, mature and emerging, are both located in the

home country and that we have an active Antitrust Authority (AA) in the home country. The AA is maximizing the consumer surplus CS . Following Motta and Vasconcelos (2005) supposing that the Antitrust Authority is forward looking such that it considers whether other mergers may occur if a merger is blocked or allowed and that it accounts for the implications of such alternative mergers on the consumer surplus. We can then state the following result:

Proposition 4. *A non-financial efficiency defence will lead to lower expected consumer welfare than a financial efficiency defence*

The proposition follows directly from the observation that being able to make the decision contingent on more variables implies that the AA can "credibly" commit to a better policy. Since the Antitrust Authority (AA) can block mergers leading to worse outcomes for consumers, consumer welfare must increase from this possibility. This occurs through two distinct mechanisms:

Corollary 3. *From a consumer perspective, a financial efficiency defence can improve the merger market by allocating ownership efficiently between different markets and in particular when the risk premium is high in the economy.*

To see this consider a situation without a financial efficiency defence. Then consider a merger where the foreign firm proposes to acquire the domestic owner's firm in the mature market and that this merger creates small synergies in the merged entity such that consumer prices will increase slightly due to the proposed acquisition. The AA will then block the merger. But, if the acquisition was allowed, the domestic owner would use the acquired financial strength to expand its investments in the local emerging market to such an extent that the consumer surplus there would substantially increase. This follows immediately from Proposition 3 and the assumption that consumer surplus increases in firm capital stock, i.e. $\frac{\partial CS}{\partial \kappa_i} > 0$. With a financial efficiency defence the proposed acquisition will then go through and total consumer surplus in the domestic country would increase.

Moreover, a proposed acquisition by the domestic owner acquiring the foreign owner's assets in the domestic market might be blocked under the financial efficiency defence since the ensuing expansion in the emerging market by the foreign owner will take place in the foreign market benefitting foreign consumers. This also follows immediately from Proposition 3 and the assumption that consumer surplus increases in firm capital stock.

The general insight from this exercise is that a financial efficiency defence can improve the merger market by inducing a more efficient use of ownership skills when owners are financially constrained.

One of the main obstacles to using a financial looking efficiency defence is asymmetric information problems. Firms that propose to merge are privately informed about merger-specific efficiencies. This enables the firms to influence the merger control procedure by strategically revealing their information to an antitrust authority. (Heidhues and Lagerlöf (2005)). However, financial efficiencies should be easier to prove since information about the risk premium should be easier to verify.

5.1. Employment and investment guarantees

In practise some governments not only use competition law to affect outcomes in the merger market but also use different types of industrial policies. Indeed, governments sometimes use employment and investment guarantees when foreign firms invest. The Proposition 1 hints at a policy which would put restrictions on shutting down the selling firm's plant in the mature industry might be preferred to the blocking of the merger. This would preserve jobs in the mature industry while at the same time ensure a transition to the emerging industry. However, such restriction will reduce the acquisition price, which in turn will affect the level of new investments in the emerging market.

To see this, let ϕ be a restriction measuring how much of the assets \bar{k} have to be used after the acquisition. It is reasonable to assume that such restrictions will reduce the efficiency of the industry so that profits in the mature industry are decreasing in ϕ . This implies that the gains from an acquisition in the mature industry $\Delta\Pi_M(l, \phi)$ ($l = \{h, f\}$)

are also decreasing in ϕ , i.e. $\Delta\Pi'_M(l, \phi) < 0$. However, if the gains from the acquisition are affected, so is the sales price S^* . This in turn implies that investment in stage 2 will be affected since capital costs will be affected from (4.2) and (4.3).

Thus, there is a spillover from the profitability of the merger in the mature industry to the profitability in the emerging industry through capital costs affecting firms investments in the emerging market. Rewriting (4.1) and defining this as a function $\Lambda(l, s(l, \phi), \phi) = 0$, we can use the implicit function theorem to arrive at the following lemma:

Lemma 2. *The sale price is strictly decreasing in the degree of government restriction.*

Proof. According to the implicit function theorem $\frac{ds^*}{d\phi} = -\frac{\Lambda'_\phi}{\Lambda'_s}$, where the subscripts refer to the derivative. Then, using the Nash bargaining solution given in equation (4.1) we see that

$$\frac{ds^*}{d\phi} < 0 \text{ if } \Pi''_{f,ss}\Delta\Pi_h + \Pi''_{h,ss}\Delta\Pi_f < -2\Pi'_{h,s}\Pi'_{f,s}.$$

which must always be true since profits are increasing and concave in liquidity, and since $s \in A$ is a prerequisite for an agreement. ■

Then note that since a reduction in sales price $\frac{dS^*}{d\phi}$ reduces the liquidity of the seller, we have:

$$\frac{d\kappa_{iE}^*(j)}{d\phi} = \underbrace{\frac{d\kappa_{iE}^*(j)}{dr_i}}_{(-)} \underbrace{\frac{dr_i}{dL_i}}_{(-)} \underbrace{\frac{dL_i}{S^*}}_{(+)} \underbrace{\frac{dS^*}{d\phi}}_{(-)} < 0. \quad (5.1)$$

Thus, restrictions that the selling country places on the merger in the mature industry will reduce the amount of investments it receives in the emerging market if the marginal use of cash is diminishing in the amount held. The effect of this depends on how large a share firm h invests in its home market. If the home bias for this investment is very large, then restrictions may potentially reduce the capital stock in the selling country. The opposite holds for the home country of the acquirer. Thus we have derived the following result:

Proposition 5. *Restriction on cross-border acquisition in the mature market may reduce the total assets in the selling country since restrictions reduce new investments in the emerging industry.*

This result is straight forward: since restrictions on the utilization of capital reduces the acquisition price (Lemma 2) it will be more expensive for the seller to borrow compared to the case with no restrictions, and, following the same reasoning as in the proof of Proposition 3, it is feasible that the capital stock will be reduced as a direct consequence.

6. Concluding remarks

The fact that most investors have a home bias seems to indicate that countries should block foreign acquisitions to protect domestic production and investments. In this paper, we show that this is not necessarily the case in an European corporate governance system with active owner groups. The reason is that when foreign acquisitions are allowed, domestic owners improve their financial strength and thereby their investments. Then due to their home bias they will likely invest in *new* ventures in the domestic country. Moreover, the foreign owner becomes "locked in" in industry specific capital in the domestic market when acquiring, and will invest less in new ventures. This might in turn create a strategic advantage in the growth market for the seller. Indeed this finding calls for a financial efficiency defense in the merger law, in order to allow financially constrained owners to create consumer surplus in emerging markets.

In the previous literature, cross-border acquisitions have been shown to be driven by access to low production costs, access to markets, synergies and market power. We here identify another important factor: the seller's need of financial resources to be able to invest in new growth markets. Indeed, we show that the possibility of undertaking new investment can imply that a country (not only the seller) benefits from being a seller instead of a buyer in a cross-border acquisitions.

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