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Cross-border Acquisitions and Restructuring: Multinational Enterprises and Private Equity-firms*

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ABSTRACT

An increasingly large share of cross-border acquisitions are undertaken by private equity-firms (PE-firms) and not by traditional multinational enterprises (MNEs). We propose a model of cross-border acquisitions in which MNEs and PE-firms compete over domestic assets and which incorporates endogenous financial frictions. MNEs' advantages lie in firm-specific synergies and access to internal capital markets, whereas PE-firms are good at reorganizing target firms. We show that stronger firm-specific synergies, lower restructuring advantages for PE-firms, higher exit costs for PE-firms, better access to internal capital markets, a higher risk premium on lending, higher moral hazard problems, and higher trade costs all favor MNEs over PE-firms. We also present cross-country correlations that are consistent with these predictions.

Keywords: Cross-border acquisitions, Institutions, Private Equity, M&As, Trade.
JEL Codes: F23, F65, L13.

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1 Introduction

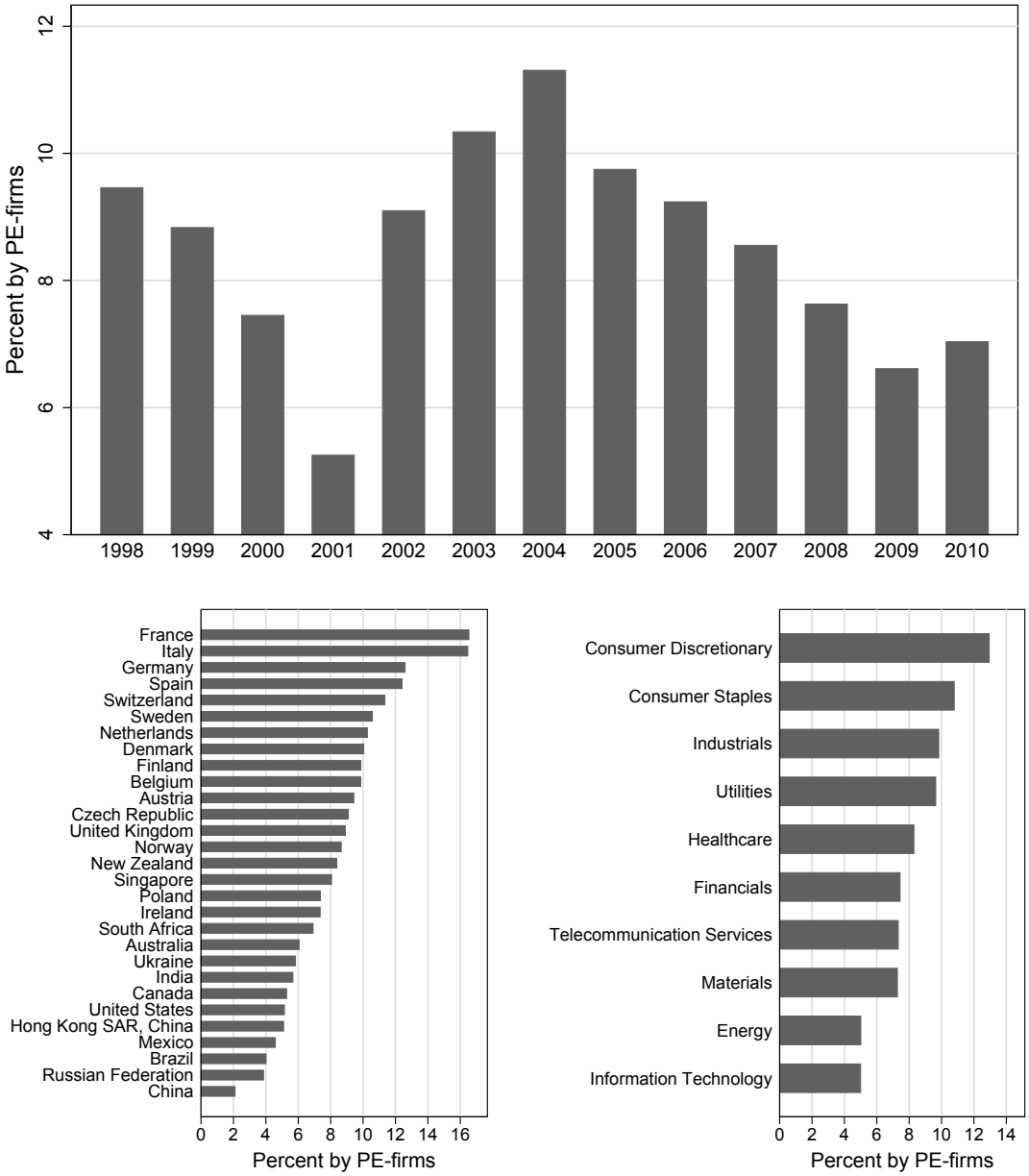
It is well established that cross-border acquisitions by multinational firms (MNEs) play a key role in the global industrial development and restructuring process. It is less known, however, that more than 8 percent of all cross-border acquisitions that took place during 1998-2010 were cross-border acquisitions undertaken by private equity firms (PE-firms). PE-firms are financial buyers of assets that acquire firms with the goal of restructuring and then reselling them. Data from the Capital IQ database displayed in Figure 1 shows that there is a substantial variation over time, across countries, and across sectors in the share of cross-border acquisitions that are acquisitions by PE-firms as opposed to by MNEs (the "PE cross-border share").

Despite a burgeoning literature on cross-border acquisitions by MNEs, there is, to our knowledge, no work on the determinants and effects of cross-border acquisitions undertaken by PE-firms and their interaction with cross-border acquisitions undertaken by MNEs. What are the potential determinants behind the variation we observe in Figure 1?

To answer these questions, we develop a theory of cross-border acquisitions by MNEs and PE-firms. The starting point is that MNEs and PE-firms differ along five important dimensions. First, MNEs have firm-specific assets in the global marketplace. These include production facilities and intellectual property. MNEs can thus benefit from synergies by buying the target firm. Second, MNEs also have access to internal capital markets such that they need not rely on outside investors to finance acquisitions to the same extent as do PE-firms, which typically finance acquisitions with high levels of debt from outside investors. Third, MNEs engage in exporting. Fourth, PE-firms excel at reorganizing target firms to improve their productivity and profitability such that the production costs are lower when the restructuring efforts are successful. As such, they do not have to rely on synergies to profit from acquisitions. Finally, PE-firms are temporary owners of assets while MNEs are more permanent owners of assets. This implies that PE-firms face additional costs associated with reselling the target firms they acquire once they have restructured them.

Using this distinction between MNEs and PE-firms, we develop a novel model of competition between MNEs and PE-firms that incorporates endogenous financial frictions. Formally, we introduce the framework of Holmström and Tirole (1997) into an auction acquisition model with heterogeneity in bidders along the lines of Norbäck and Persson (2004). We consider an economy consisting of several domestic firms, several foreign MNEs that export to the domestic market, and several foreign PE-firms. One of the domestic firms is up for sale because the current fixed costs make it unable to operate profitably. MNEs and PE-firms compete with each other to acquire the domestic target firm and make it profitable again, and they may both need to obtain financing from external investors to finance the acquisition. Specifically, in Stage 1, the target firm is up for sale through a first price perfect information auction. The bidders in this auction are the MNEs and the PE-firms. When bidding in the auction, MNEs and PE-firms can write contracts with external investors to finance the acquisition. In Stage 2, the new owners undertake any effort to restructure the target firm to make production profitable. The owners choose high or low effort levels, with higher effort levels resulting in a higher chance of success but also lower private benefits to the owners. Finally, in Stage 3, if the restructuring efforts are successful, the new owner sets product market actions and produces on the market. If the PE-firm acquired the target in stage 2, it will need to resell the target firm.

Figure 1: The percentage of cross-border acquisitions undertaken by PE-firms



Notes. These figures display the percentage of all cross-border acquisitions between 1998 and 2010 in the Capital IQ database undertaken by PE-firms across time (top), country (bottom left), and sector (bottom right). We selected all "Mergers/Acquisitions" that had the feature "Cross-border" and "Acquisition of Majority Stake" and with the transaction status "Closed" or "Effective". Then, we characterized the transaction as a transaction by a PE-firm if the transaction had the secondary feature of "LBO (Leveraged Buyout)". The figures display the percentage of all cross-border transactions across time, country and industry for countries with more than 500 transactions in total.

We first establish how the MNEs' and PE-firms' willingness to pay for the target firms depends on the different exogenous factors in the model. Then, we show that if a firm has sufficient access to capital, it will not be credit constrained and the firm's willingness to pay for the target will depend on how efficiently the target firm's assets are restructured, and on the costs associated with non-financial institutional factors such as transaction and trade costs. On the other hand, if a firm does not have sufficient access to capital, it will be credit constrained and financial market factors and institutions will come into play. In particular, we show the following:

1. Acquisitions by PE-firms are more likely when the exit costs of PE firms are lower. This follows directly from the fact that only PE-firms will resell the target firm in our model. Then, note that in countries with developed financial markets, there are more exit opportunities, and it is common that PE-firms exit their investments by listing the target firm on a stock exchange. Our model thus predicts that financial market development would increase the PE cross-border acquisition share.

2. A lower risk premium on lending favors PE-firms over MNEs. Since PE-firms do not have access to internal capital markets as do MNEs, they are more likely to be financially constrained. Reducing the risk premium will then imply that credit constrained PE-firms can increase their lending and thus that the PE-firms' willingness (ability) to pay will increase. If MNEs are less credit-constrained, this result suggests that the PE cross-border share should be higher when the economic conditions are better and when external financing for acquisitions is less costly.

3. Reduced possibilities to extract private benefits in the restructuring phase lead to a higher PE cross-border share. Since PE-firms do not have access to internal capital markets, they are more likely to be financially constrained. If extracting private benefits becomes harder, for example by an improved rule of law or improved minority investor protections in a country, the PE-firm will find it easier to access financing from outside investors and thus the PE-firms' willingness (ability) to pay will increase. Our model thus predicts that improving the rule of law or increasing the minority investor protection would increase the PE cross-border share.

4. Reduced trade costs should lead to more cross-border acquisitions by PE-firms. The reason is that the opportunity cost for the MNE increases when trade costs are reduced since the export profits will then increase. This implies that the MNEs' willingness to pay will decrease. Our model thus predicts that trade liberalization would increase the share of cross-border acquisitions undertaken by PE-firms.

We also take a first look at the data by correlating the cross-border PE share with a set of proxies for central variables of interest in our model and show that these correlations are broadly consistent with predictions one to four listed above. However, we do not make any claims of capturing causal relations.

Our paper contributes to the literature in international economics that incorporates corporate finance elements into models of trade and foreign direct investment (FDI), see Foley and Manova (2015) for a survey. This literature has studied issues such as how financial institutions, financial

constraints, and internal capital markets affect cross-border investments and trade.[1] For example, Antràs et al. (2009) combine a standard model of MNEs with the model of financial frictions presented by Holmström and Tirole (1997) to examine how financial contracting and investor protections affect international trade and FDI decisions of firms. Manova (2013) introduces credit constraints into the Melitz (2003) framework to show how they can prevent profitable firms from exporting. We contribute to this literature by extending models of cross-border M&As to incorporate endogenous financial frictions and the presence of financial buyers in the form of PE-firms. Formally, our model introduces financial markets and credit constraints along the lines of Holmström and Tirole (1997) into an auction acquisition model with heterogeneity in bidders along the lines of Norbäck and Persson (2004, 2007, 2008). The model enables us to provide some novel insights on why the share of cross-border acquisitions accounted for by PE-firms varies across countries and over time (see Figure 1). In particular, we show that strengthened restructuring advantages for PE-firms, lower exit costs for PE-firms, a lower risk premium on lending, reduced possibilities to exert private benefits in the restructuring phase, and lower trade costs increase the share of PE-firm cross-border acquisitions. A noteworthy result from the model is also that improved profitability of the target firm in the form of increased probability of a successful restructuring process will have a double positive effect on the sales price of the domestic assets. Not only will the asset price increase due to increased expected profitability from restructuring but as bidders become less financially constrained, the equilibrium price increases even further.[2]

2 The Difference between MNEs and PE-Firms

To better highlight the difference between MNEs and PE-firms, we start out with a brief primer of the business model of MNEs and PE-firms. MNEs are typically firms with firm-specific assets such as patents, know-how, and a brand image that they exploit internationally. They are often large in size, organized as limited liability companies, listed on a stock market, and have access to internal capital markets. An MNE can expand internationally, either through greenfield investments (setting up a new plant) or by acquiring firms in host countries.

2.1 MNEs

The MNE business model works as follows:

1. A group of entrepreneurs or managers with a business idea sets up a limited liability firm.

[1] Our paper also relates to the emerging finance literature on the differences between strategic and financial buyers of assets in takeover auctions. See, for example, Gorbenko and Malenko (2014), Martos-Vila et al. (2013) and Hege et al. (2012). However, this literature does not focus on explaining and providing predictions of the PE cross-border share.

[2] A crucial difference to Holmström and Tirole (1997) is that in our model, the invested amount is determined in a bidding competition between symmetric bidders without affecting the returns to that investment. With this setup, the IC constraint is more likely to be binding. This is because bidding competition pushes up the acquisition price, the borrowed amount, and thus the repayment. Norbäck et al. (2013, 2015) incorporate PE-firms, but do not incorporate endogenous financial frictions along the lines of Holmström and Tirole (1997). Other related papers of cross-border M&As that do not have endogenous financial frictions include Blonigen (1997), Head and Ries (1997), Falvey (1998), Horn and Persson (2001), Bjorvatn (2004), Mattoo et al. (2004), Bertrand and Zitouna (2006), Fumagalli and Vasconcelos (2006), Lommerud et al. (2006), Neary (2007), Head and Ries (2008), and Raff et al. (2009).

2. Due to proficient management and the creation of high-quality firm-specific assets such as patents and know-how, they grow and expand internationally.

3. The firm then exploits its firm- and industry-specific assets and its access to internal capital markets internationally by exporting and/or undertaking foreign direct investment. It can also engage in greenfield investments or cross-border acquisitions at this stage.

4. This process then continues and shareholders benefit from an increased stock market value and dividends.

2.2 PE-firms

In contrast, PE-firms are partnerships set up to acquire, restructure and resell firms with the help of money from institutional investors and from banks. This business model emerged in the United States in the 1980s but has since then spread out worldwide.[3] The private equity business model works as follows:

1. A group of experienced entrepreneurs or managers with an idea of how to improve the profitability of existing businesses sets up a PE-firm and an associated PE-fund with a predetermined life span (usually around 10 years).

2. The partners in the PE-firm raise capital from institutional investors such as pension funds and wealthy individuals.

3. After the target amount of capital for the PE-fund has been raised, the fund is closed and the PE-firm starts looking for firms to acquire, restructure and then resell.

4. Once a firm has been identified, debt is raised to finance the acquisition. PE-firms usually acquire multiple firms in each fund, and each acquisition is financed with 60%-90% debt.

5. The target firm is acquired and restructured. Cash flows from the firm are used to pay off part of the debt.

6. After the firm has been restructured, the PE-firm resells the firm. The most common exit routes are listing the company on a stock exchange or selling it to another firm.

7. The returns from cash flows during the restructuring period and from the sale of the firms in the fund are split on a 80/20 basis with 80% going back to the investors in the PE-fund and 20% going to the PE-firm. The PE-firm also charges a management fee of 1%-2% of the capital committed to the fund.

This business model gives PE-firms several advantages over publicly listed MNEs in the restructuring process. First, concentrated ownership implies that agency costs are lower than in publicly listed firms and that the high leverage that PE-firms put on target firms puts pressure on managers to generate cash flow and not waste money on unprofitable investments (Jensen 1986; 1989). Second,

[3] See Kaplan and Strömberg (2009) or Tåg (2012) for surveys of the literature on PE-firms.

PE-firms are temporary owners of the target firms and therefore have stronger incentives to both restructure target firms and take on debt to give the management incentives to undertake restructuring activities (Norbäck et al., 2013). Finally, PE-backed firms are not listed on a stock exchange and can therefore have an advantage over publicly traded firms due to less stringent reporting requirements (Ferreira et al., 2014).

2.3 Are MNEs and PE-firms bidding for the same targets?

Although MNEs and PE-firms have different business models, there is evidence that they are bidding for the same targets. Dittmar et al. (2012) use data on over 100 000 merger bids from the Securities Data Corporation and report that over the period 1980-2007, close to a quarter (23%) of all competing bids made on bids by strategic buyers were made by financial buyers, with peaks of 42% in 1998 and 36% in 2006.[4]

Moreover, FT Remark (the research arm of the Financial Times Group) did in early 2016 survey global senior executives about their experience with cross-border M&As and their outlook for the next three years (Herbert Smith Freehills, 2016). Among the respondents, 46% stated that strategic buyers generally outcompete private equity buyers, 40% stated that there is a balance between strategic buyers and private equity buyers, and 14% agreed that private equity buyers generally out-compete strategic buyers. According to Herbert Smith Freehills (2016): "As cash-rich corporates became even more competitive in the M&A market in 2015 and valuations rose to post-crisis highs, private equity (PE) firms became more cautious in their approach–eager not to pay over-heated prices in the auction process."

3 The Model

Throughout the paper, we will focus on five differences between MNEs and PE-firms that derive from the above description. First, MNEs have firm-specific assets in the global marketplace. These include production facilities and intellectual property. MNEs can thus benefit from synergies by buying the target firm. Second, MNEs also have access to internal capital markets such that they need not rely on outside investors to finance acquisitions to the same extent as do PE-firms, which typically finance acquisitions with high levels of debt from outside investors (Kaplan and Strömberg 2009). Third, MNEs engage in exporting. Fourth, PE-firms excel at reorganizing target firms to improve their productivity and profitability such that the production costs are lower when the restructuring efforts are successful.[5] As such, they do not have to rely on synergies to profit from acquisitions. Finally, PE-firms are temporary owners of assets while MNEs are more permanent owners of assets. This implies that PE-firms face additional costs associated with reselling the target firms they acquire once they have restructured them.

[4] See also the literature in finance studying the competition between strategic and financial bidders in auctions. Examples include Gorbenko and Malenko (2014), Boone and Mulherin (2007), Martos-Vila et al. (2013) and Hege et al. (2012).

[5] See Davis et al. (2014) and Olsson and Tåg (2017) for recent evidence on productivity improvements and Kaplan and Strömberg (2009) or Tåg (2012) for surveys of the literature.

3.1 Setup

Our model introduces financial markets and credit constraints along the lines of Holmström and Tirole (1997) to an auction acquisition model with heterogeneity in bidders along the lines of Norbäck and Persson (2004). Consider an economy consisting of several domestic firms, several symmetric foreign MNEs that export to the domestic market, and several symmetric foreign PE-firms. One of the domestic firms is up for sale because current fixed costs make it unable to operate profitably. MNEs and PE-firms compete with each other to acquire the domestic target firm and make it profitable again, and they may both need to obtain financing from external investors to finance the acquisition. The timing of the model is as follows:

Stage 1. *The acquisition auction and financial contracting.* The target firm is up for sale through a first price perfect information auction. The bidders in this auction are the MNEs and the PE-firms. All bidders are completely informed about their own and other bidders' characteristics. This setup allows us to study the effects of credit market frictions, institutional environments, and differences between bidders without introducing distortions into the bidding process that arise from incomplete information.[6] When bidding in the auction, MNEs and PE-firms can write contracts with external investors to finance the acquisition with promises of repayments at the end of Stage 3. We assume frictionless financial markets with many participants, ensuring that outside investors break even on financing the acquisition.

Stage 2. *Restructuring under moral hazard.* The new owners undertake effort to restructure the target firm to make production profitable. The owners choose high or low effort levels, with higher effort levels resulting in a higher probability of success but also lower private benefits to the owners.

Stage 3. *Product market actions.* If the restructuring efforts are successful, the new owner sets product market actions and produces on the market. If the PE-firm acquired the target in Stage 2, it will need to resell the target firm. Repayments are made to outside investors, possible costs of reselling the assets are incurred, and the game ends.

We solve the game by backward induction starting with the product market competition stage.

3.2 Stage 3: The Product Market

The set of potential owners of the target firm is $\mathcal{L} = \{m_1, m_2, .., m_n, p_1, p_2, .., p_r\}$. The first n entries refer to the n number of symmetric MNEs (m) and the final r entries to the r number of symmetric PE-firms (p). We use $l \in \{m, p\}$ to distinguish the two possible owner types from each other. Denote the profits of the target by $\pi(x, l)$, where x is the product market action (a price or a quantity) chosen

[6] An alternative to the auction set-up would be to use a bargaining framework. Bulow and Klemperer (2009) show that under reasonable assumptions, an auction setup is always preferable when bidders' signals are independent. We note that our main results would likely also hold when bidders have private information and independent signals about the restructuring cost. This is because in a second price auction, it is optimal for a bidder to bid her true valuation and in a first price ascending auction, the bidder with the highest valuation will buy the target and pay a price equal to the valuation of the bidder with the second highest valuation.

by the owner l. To simplify, we will assume that each firm produces a differentiated good without strategic interaction between firms.[7]

Suppose first that *an MNE acquired the target* and that the restructuring in Stage 2 was successful. The MNE's profit is then

$$\pi(x, m) - F_m - R_m. \tag{1}$$

In this expression, F_m refers to fixed operating costs, while R_m refers to repayments made to outside investors who helped finance the acquisition.

If *a PE-firm acquired the target* and succeeds with restructuring, it has profits

$$\pi(x, p) - F_p - E - R_p, \tag{2}$$

where F_p is the fixed operating cost of a PE-firm, E is an exit cost incurred by PE-firms and R_p is the repayment to investors. On basis of our description of the PE and MNE business models in the previous section, in what follows, we assume that exit costs are positive, $E > 0$, and that fixed operating costs after successful restructuring are lower for PE firms than those of MNEs, $F_p < F_m$.

If, on the other hand, *the MNE failed in its restructuring of the target firm*, it will serve the market by maximizing its export profit

$$\pi(x, e) - F_e, \tag{3}$$

where we denote this firm type $l = e$ and where we will normalize the fixed operating costs to zero, $F_e \equiv 0$. No repayment to outside investors will be made when the restructuring fails.

Finally, if *the PE failed in its restructuring of the target firm,* it lacks the opportunity to serve the market and so earns zero profits.

The maximization of the profits in (1)-(3) simply involves maximizing the product market profit, $\pi(x, l)$. Let $x^*(l) = \arg\max_x \pi(x, l)$ be the optimal product market action by owner l, where we suppose that the second-order condition is satisfied. Then, define $\pi(l) = \pi(x^*(l), l)$ as the reduced profit of owner l. Thus, $\pi(m)$ is then the reduced-form profit when the target is acquired by an MNE, while $\pi(e)$ is the MNE's profit if the MNE exports. $\pi(p)$ is the reduced-form profit when the target is run by a PE-firm.

The potential owners of the target firm differ in terms of how efficient they are at utilizing the target firm's assets. Define an ownership efficiency or synergy parameter $\gamma \in [0, \gamma^{\max}]$. We will assume that synergies are $\gamma_m = \gamma$ under MNE ownership and normalize synergies to unity under PE-ownership ($\gamma_p = 1$). Synergies thus vary across ownership types, but are constant within ownership types. Hence, $\gamma > 1$ says that an MNE firm would be able to make better use of the target's assets than a PE-firm, whereas if $\gamma < 1$, then an MNE is less efficient than a PE-firm at running the target. From the envelope theorem, the ownership efficiency parameter only affects the reduced-form profits of the agents through the direct effect on the reduced-form profit. The total effect is:

$$\frac{d\pi(m)}{d\gamma} = \frac{\partial \pi(m)}{\partial \gamma} > 0 = \frac{d\pi(l)}{d\gamma} = \frac{\partial \pi(l)}{\partial \gamma} \quad \text{for} \quad l = \{p, e\}. \tag{4}$$

[7]This could be modeled as monopolistic competition. Each firm is then assumed to be very small compared to the market so variations in the ownership structure do not create any externalities on other firms' profits (see Antràs and Yeaple, 2014).

Thus, higher synergies mean higher product market profits for the MNE.

We will also assume that there are standard location advantages in producing in the host country through avoidance of tariffs or transport costs, t, where $\frac{d\pi(e)}{dt} < 0$. Finally, we need to assume that locational advantages are sufficiently strong such that an MNE always prefers to produce in the target firm if its successfully restructures that target, i.e. $\pi(m) - F_m > \pi(e)$.[8]

3.3 Stage 2: Restructuring under Moral Hazard

In this stage, the owners that acquired the target decide on how much effort to undertake in restructuring. Restructuring will lower the fixed operating costs from $F > \pi(l)$ to $F_l < \pi(l)$, making production viable in the target. If restructuring fails, it will not be profitable to operate on the product market since $F > \pi(l)$.

Restructuring is done under moral hazard, which endogenously creates financial frictions and thus a value for the access to internal capital markets of MNEs. High effort, $e = H$, gives a probability p^H of reducing the fixed operating cost to $F_l < F$, whereas low effort, $e = L$, gives the probability $p^L < p^H$ of lowering the operational fixed costs. Moral hazard arises since the effort choice also affects private benefits to the owners. Under low effort, the MNE or its managers can divert resources that should have been devoted to restructuring, providing private benefits $B^L = B > 0 = B^H$. Thus, if high effort is provided, no private benefit accrues to the owner.

The IC constraint for MNEs. An MNE will exert high effort if the following incentive compatibility constraint (IC) is fulfilled:

$$p^H[\pi(m) - F_m - R_m] + (1 - p^H)\pi(e) \geq p^L[\pi(m) - F_m - R_m + B] + (1 - p^L)[\pi(e) + B]. \quad (5)$$

Simplifying this expression, we get the IC condition which needs to be fulfilled to induce an MNE to choose high effort in restructuring:

$$(p^H - p^L)[\pi(m) - F_m - \pi(e) - R_m] \geq B. \quad (6)$$

That is, the benefits from exerting high effort in order to increase the probability of successfully restructuring the target and reaping the benefit of local production need to outweigh the private benefits from providing a low effort.

It will be useful to derive the maximum *pledgeable income*, $\tilde{R}_m$, which is the maximum amount an MNE can repay investors and still keep the IC constraint satisfied. From (6), we have

$$\tilde{R}_m = [\pi(m) - F_m - \pi(e)] - \frac{B}{p^H - p^L}. \quad (7)$$

The first term is the increase in profit for the MNE when it succeeds in restructuring the target and switches from exporting to serving the market from the target. The second term is an *agency rent*, which captures the fact that due to the moral hazard problem, outside financiers need to leave some surplus to the MNE to preserve the incentives to exert high effort.

[8] This condition will be fulfilled in equilibrium. Otherwise an MNE would not find it profitable to acquire the target.

The IC constraint for PE-firms. Likewise, a PE-firm will provide a high effort in restructuring if the following condition is fulfilled

$$p^H[\pi(p) - F_p - E - R_m] \geq p^L[\pi(p) - F_p - E - R_m + B] + (1 - p^L)B. \tag{8}$$

A difference arises as compared to MNEs since PE-firms cannot supply the market if they fail at restructuring. Moreover, PE-firms also face the exit cost as they will use an IPO to exit their investment. Simplifying (8), we obtain:

$$(p^H - p^L)[\pi(p) - F_p - E - R_p] \geq B. \tag{9}$$

That is, the benefits of exerting high effort in order to increase the probability of successfully restructuring the target, accounting for the exit costs, need to outweigh the private benefits from providing a low effort. The maximum pledgeable income for PE-firms,

$$\tilde{R}_p = [\pi(p) - F_m - E] - \frac{B}{p^H - p^L}, \tag{10}$$

follows directly from the IC constraint (9).

3.4 Stage 1: The Acquisition Auction

At this stage, we determine the ownership and the acquisition price of the target's assets and also pin down the financial contract offered by outside investors to finance the acquisition. The acquisition process is depicted as an auction where all MNEs and PE-firms simultaneously post bids. Everyone announces a bid, b_i, which is either accepted or rejected by the target's owner. Following the announcement of bids, the target's assets are sold at the highest bid price. The acquisition is solved for Nash equilibria in undominated pure strategies. There is a smallest amount ε chosen such that all inequalities are preserved if ε is added or subtracted. Note that since continued production for the target is not profitable due to high fixed costs, the target's reservation price is assumed to be zero.

3.4.1 Determining valuations

To derive how firms will bid, we need to derive their valuations for the target firm. We will assume that firms can get financing for the acquisition from a perfectly competitive capital market. To make things interesting, we will assume that investors will never finance an acquisition that will be followed by restructuring under low effort (in order for the acquiring firm or its management to secure private benefits, B).

The IC constraint will play a crucial role for determining bidders' valuations by affecting how much they can borrow to finance the acquisition. We will then need to derive the valuation of the target firm in two cases. The first case is when bidders have sufficient access to internal capital such that the IC conditions (6) and (9) are not binding. The other case is when these IC constraints are binding.

The IC constraint for MNEs is not binding. Let us first assume that the IC constraint (6) for the MNEs is not binding. To solve for the acquisition auction and determine the bids, we need

to determine the maximum valuation, v_m, for the MNEs for obtaining the assets at price S. To aid in this, we introduce the net gain function $N_m(S)$ which defines the net gain if the acquisition price is S. Suppose that the MNE borrows an amount I_m from outside investors and can secure financing from other sources to the amount of A_m. The net gain function is then the value of the MNE when buying the target at some price S net of the MNE's value when not buying the target:

$$N_m(S) = \underbrace{p^H[\pi(m) - F_m - R_m] + (1 - p^H)\pi(e) + (A_m + I_m) - S}_{\text{Acquire}} - \underbrace{(A_m + \pi(e))}_{\text{Do not acquire}}. \tag{11}$$

The first term consists of expected (p^H) product market profits ($\pi(m)$) net of fixed costs (F_m), and the repayment (R_m) to outside investors. The second term is the expected ($1-p^H$) profit on exports if restructuring fails ($\pi(e)$). The third term is capital accessed from internal capital markets plus capital borrowed from outside investors ($A_m + I_m$) and the fourth term is the acquisition price (S). The final term, $-(A_m + \pi(e))$, captures capital from internal capital markets and export profits, which is what the MNE has if he or she does not acquire the target.[9]

Let us now derive an MNE's valuation of the target from the net gain function. First, note that each MNE need only borrow to finance the part of the acquisition price they cannot finance through internal capital markets. Hence, the MNE needs to borrow

$$I_m = S - A_m. \tag{12}$$

Perfect competition in the capital market then implies that

$$\underbrace{p^H R_m}_{\text{Expected repayment}} = \underbrace{S - A_m}_{\text{Amount borrowed}}. \tag{13}$$

That is, investors will require that the expected repayment $p^H R_m$ is equal to the borrowed amount needed to finance the acquisition, which is simply the acquisition price S net of the funds accessed through internal capital markets A_m. Solving for the repayment $R_m = (S - A_m)/p^H$ from (13) and inserting this expression into the net gain function (11) and using the equality (12), the net gain function can be written

$$N_m(S) = p^H[\pi(m) - F_m - \pi(e)] - S. \tag{14}$$

The unconstrained maximum willingness to pay, v_m^u, is then defined as $v_m^u = \max S$, $s.t \;\; N_m(S) \geq 0$. Solving the simple equation $N_m(S) = 0$, we get an MNE's unconstrained valuation, which is simply

$$v_m^u = p^H[\pi(m) - F_m - \pi(e)]. \tag{15}$$

The IC constraint for MNEs is binding. A bid by an MNE may not be compatible with the IC condition (6). If the MNE borrows extensively to pay a high price for the target, it may prefer to choose a low effort in Stage 2 and go for the private benefits B since the repayment in case of success is too high. Let us explore this problem using the valuation v_m^u. To check if paying this price

[9] We assume that return on capital accessed internally equals the risk free rate, which is zero.

is incentive compatible, insert the repayment $R_m = (S - A_m)/p^H$ from (13) into the IC-condition (6) and evaluate at the acquisition price $S = v_m^u$. After simplification, this gives:

$$A_m > \tilde{A} = \frac{p^H}{p^H - p^L} B. \tag{16}$$

Thus, an MNE's valuation will only be given from (15) if the MNE has access to sufficient capital from internal capital markets, $A_m > \tilde{A}$. Whenever $A_m \leq \tilde{A}$, the IC condition will be binding and effectively the MNE will be credit constrained.

Having access to more funds from internal capital markets helps MNEs secure financing, because the repayment will then be lower and the IC constraint easier to satisfy. Without access to internal capital markets, the MNE would need to borrow the full amount S. Note that S evaluated at the maximum willingness to pay simply equals the full expected net profit from acquiring the target, $p^H[\pi(m) - F_m - \pi(e)]$, and so there would be no agency rent left to ensure that the MNE exerts effort. So the MNE must have access to *at least* $\tilde{A}$ to ensure that the repayment *at least* covers the expected agency rent $\frac{p^H}{p^H - p^L} B$.

The valuation of an MNE v_m^c is then determined from the repayment R_m when the IC constraint (6) is binding. Note that when the IC condition is binding, we derived the maximum pledgeable income that the MNE can promise investors $\tilde{R}_m$ in (7). To solve for the MNE's valuation, we can then make use of perfect competition in the capital market, noting that the repayment must fulfill $R_m = (S - A_m)/p^H$ from (13). Substituting in the expression for the maximim pledgeable income $\tilde{R}_m$ from (7), we get:

$$\underbrace{[\pi(m) - F_m - \pi(e)] - \frac{B}{p^H - p^L}}_{\text{Maximum pledgeable income } \tilde{R}_m \text{ (binding IC)}} = \underbrace{\frac{(S - A_m)}{p^H}}_{\text{Repayment when investors break even}}. \tag{17}$$

Solving for the acquisition price S from (17), we obtain an MNE's valuation when it is credit constrained $S = v_m^c$ as

$$v_m^c = p^H[\pi(m) - F_m - \pi(e)] - \left[\tilde{A} - A_m\right] < v_m^u, \tag{18}$$

where we have made use of the definition of $\tilde{A} = \frac{p^H}{p^H - p^L} B$ from (16). Equation (18) has several noteworthy features:

First, when an MNE is credit constrained, $A_m < \tilde{A}$, investors will not lend the full amount of the expected increase in net profit from acquiring the target $p^H[\pi(m) - F_m - \pi(e)]$. The reason is yet again that this would give the MNE an incentive to misbehave. Investors will thus reduce lending by $\tilde{A} - A_m > 0$ to ensure that the MNE will provide high effort in the subsequent restructuring phase. Thus, being credit constrained reduces an MNE's valuation, $v_m^c < v_m^u$.

Second, note for later reference that the probability of success affects the constrained valuation, v_m^c, in two ways. If the probability of success p^H increases, there is a direct effect which increases the maximum willingness to pay when the probability of successfully restructuring the target goes up, $\pi(m) - F_m - \pi(e) > 0$. But there is also an indirect effect. Since success at the restructuring stage is now more likely, the amount to which the MNE needs to have access from internal capital

markets to secure full financing ($\tilde{A}$) decreases. This occurs because a higher probability of successfully restructuring the target in case of high effort relaxes the IC constraint. This means that the MNE can borrow more and pay a higher price in the auction while still satisfying the IC constraint, so v_m^c increases.

Third, note that when the MNE is constrained, an increase in A_m will lead to a one to one increase in the valuation v_m because the borrowed amount remains the same, yet capital from internal capital markets A_m increases.[10]

IC constraint for PE-firms is not binding. Proceeding as for MNEs above, the net gain for a PE firm from buying the target is

$$N_p(S) = \underbrace{p^H[\pi(p) - F_p - E - R_m] + (A_p + I_p) - S}_{\text{Acquire}} - \underbrace{A_p}_{\text{Do not acquire}}, \tag{19}$$

where we again note that PE-firms cannot serve the market without buying the target and $A_p < A_m$ where A_p measures the access to capital invested in the PE-fund by institutional investors (see the description of the PE-business model in Section 2). We suppose that $A_p < A_m$, since MNEs are presumed to have an advantage over PE-firms in their access to internal capital markets. As for the case of the MNE, we can solve for the maximum willingness to get a PE firm's unconstrained valuation

$$v_p^u = p^H[\pi(p) - F_p - E]. \tag{20}$$

The IC constraint for PE-firms is binding. We once more need to check that the valuation v_p^u from (20) does not produce a too high temptation to choose low effort in restructuring in Stage 2 to get the benefits B. As in the case of anMNE, we can derive a minimum amount of access to capital from the PE-fund that PE-firms need to have in order not to be credit constrained from their IC condition

$$A_p > \tilde{A} = \frac{p^H}{p^H - p^L} B, \tag{21}$$

which is the same condition as for the MNEs in (16). If PE-firms are constrained, $A_p \leq \tilde{A}$, their valuation will also be determined from a binding IC constraint (9). Proceeding as with the MNEs, we obtain

$$v_p^c = p^H[\pi(p) - F_p - E] - \left[\tilde{A} - A_p\right] < v_p^u. \tag{22}$$

3.4.2 Solving the auction

To summarize from above, we can write an MNE's valuation as:

$$v_m = \begin{cases} p^H[\pi(m) - F_m - \pi(e)] & \text{if } A_m > \tilde{A}. \\ p^H[\pi(m) - F_m - \pi(e)] - \left[\tilde{A} - A_m\right] & \text{if } A_m \leq \tilde{A} \end{cases} \tag{23}$$

[10] This can be seen from (17). Since the MNE is credit constrained, the LHS is the maximum repayment the MNE can promise consistent with a binding IC condition, $\tilde{R}_m$. If the MNE obtains more capital from internal capital markets, A_m, the RHS (which shows the repayment investors require) declines. At a given acquisition price S, the MNE would reduce its borrowing, ($I_m = S - A_m$). Thus, S must increase to keep repayments at $\tilde{R}_m$, which implies that the borrowed amount remains unchanged.

and a PE-firm's valuation as:

$$v_p = \begin{cases} p^H[\pi(p) - F_p - E] & \text{if } A_p > \tilde{A}. \\ p^H[\pi(p) - F_p - E] - \left[\tilde{A} - A_p\right], & \text{if } A_p \leq \tilde{A}. \end{cases} \tag{24}$$

Given these valuations, we can now solve the auction for the target's assets and determine equilibrium ownership and the acquisition price. From the symmetry within firm types, we have the following Lemma:

Lemma 1 *An MNE obtains the target in equilibrium ($l^* = m$) at price $S^* = v_m$ if $v_m \geq v_p$. Otherwise, a PE-firm obtains the target ($l^* = p$) at price $S^* = v_p$.*

Proof. First, $b_i \geq \max\{v_p, v_m\}$ is a weakly dominated strategy. No owner wants to post a bid above its valuation of obtaining the assets, and the assets will always be sold. Second, suppose that $v_m > v_p$. An MNE will then always have an incentive to outbid PE-firms. The MNEs will then among themselves bid up the price to $S^* = v_m$. Finally, suppose that $v_m < v_p$. No MNEs will want to outbid the PE-firms. The PE-firms will then among themselves bid up the price to $S^* = v_p$ and a PE-firm will obtain the target firm. ■

4 Equilibrium Ownership: MNEs versus PE-firms

Having set up a model of bidding competitions between MNE firms and PE-firms, let us now turn to comparative statics on the determinants of when an MNE will acquire the target and when the target will be bought by a PE-firm.

The assumption that MNEs have better access to capital, $A_m > A_p$, implies that three cases regarding credit constraints can arise:

1. *Both firm types* face credit constraints from the IC condition, $A_l < \tilde{A}$,
2. *Only the PE-firms* are credit constrained, $A_p < \tilde{A} < A_m$, and
3. *Neither firm type* is credit constrained, $A_l > \tilde{A}$.

To compute the comparative statics, let us compute the difference in the valuation of MNEs and PE-firms, $v_m - v_p$. Using (23) and (24), we have

$$v_m - v_p = \begin{cases} p^H \left(\pi(m) - \pi(e) - (\pi(p) - E) - \underbrace{(F_m - F_p)}_{>0} \right) + \underbrace{[A_m - A_p]}_{>0}, & \text{if } A_l < \tilde{A}, \\ p^H \left(\pi(m) - \pi(e) - (\pi(p) - E) - \underbrace{(F_m - F_p)}_{>0} \right) + \underbrace{\left[\tilde{A} - A_p\right]}_{>0}, & \text{if } A_p < \tilde{A} < A_m, \\ p^H \left(\pi(m) - \pi(e) - (\pi(p) - E) - \underbrace{(F_m - F_p)}_{>0} \right), & \text{if } A_l > \tilde{A} \end{cases} \tag{25}$$

where we have used the assumptions of a fixed cost advantage of PE-firms and that MNEs have better access to capital internally.

In order to derive comparative statics results, let us assume that the two firm types initially have the same valuation, $v_m = v_p$. We label this equality the *PE-condition.* In the Appendix, we show in detail that comparative statics on the PE-condition will uniquely determine the direction of ownership change. We then have the following proposition:

Proposition 1 *Suppose that PE-firms and MNEs initially have the same value for the target, $v_m = v_p$. PE ownership then arises if:*
(i) synergies between the target and MNE's assets (γ) decline.
(ii) the restructuring advantage for PE-firms ($F_m - F_p$) increases.
(iii) the exit costs for PE-firms (E) decline.
(iv) access to internal capital markets for MNEs becomes weaker (A_m is reduced).
(v) the risk premium ($r = 1/p^H$) declines.
(vi) the moral hazard problem becomes less severe (B is reduced).
(vii) trade costs (t) decline.

Naturally, MNE ownership arises if (i)-(vii) are reversed. Let us now discuss the intuition behind these results in more detail.

Synergies for MNEs. The impact of synergies arising from combining MNEs' global firm-specific assets with the target's assets increases MNEs' willingness to pay which makes MNE ownership more likely. This is true independently of financial frictions. From (25), we have

$$\left.\frac{d\left(v_m - v_p\right)}{d\gamma}\right|_{v_m = v_p} = p^H \cdot \frac{d\pi(m)}{d\gamma} > 0 \tag{26}$$

where (26) is simply the expected increase in profit for an MNE. It then immediately follows that lower synergies ($d\gamma < 0$) will reduce $v_m - v_p$ and promote PE ownership.

The restructuring advantage of PE-firms. Differentiating (25) in $F_m - F_p$, we obtain:

$$\left.\frac{d\left(v_m - v_p\right)}{d\left(F_m - F_p\right)}\right|_{v_m = v_p} = -p^H < 0. \tag{27}$$

Unsurprisingly, a greater restructuring advantage for PE-firms makes PE ownership more likely. From (27), when the fixed cost advantage of PE-firms increases, $v_m - v_p$ declines with the probability that firms succeed with their restructuring.

Exits costs for PE-firms. Differentiating (25) in E, we have

$$\left.\frac{d\left(v_m - v_p\right)}{dE}\right|_{v_m = v_p} = p^H > 0, \tag{28}$$

where (28) holds since PE-firms only pay the exits cost when they succeed. From (28), it follows that PE-firms will be willing to pay more for the target when exit costs decline ($dE < 0$). As $v_m - v_p$ declines, PE ownership becomes more likely.

Access to internal capital markets for MNEs. Access to internal capital markets for MNEs is the first of three predictions we make related to financial frictions. Improved access will make an MNE acquisition more likely. Conversely, weaker access to internal capital markets for MNEs will make PE ownership more likely.

Formally, differentiating (25) in A_m, we get:

$$\left.\frac{d\left(v_m - v_p\right)}{dA_m}\right|_{v_m=v_p} = \begin{cases} 1 > 0, & \text{if } A_l < \tilde{A} \\ 0 & \text{if } A_p < \tilde{A} < A_m \\ 0 & \text{if } A_l > \tilde{A}. \end{cases} \tag{29}$$

Two effects are at play. First, this expression clarifies that the access to internal capital markets for MNEs is only beneficial in the case that both bidders are financially constrained. Intuitively, when both bidders are constrained, an improvement in the access to internal capital for the MNE means that it can, all else equal, bid higher for the target. Second, improved access to internal capital markets for MNEs means that it is also more likely that the MNE moves from being constrained ($A_l < \tilde{A}$) to not being constrained ($A_p < \tilde{A} < A_m$). Both effects work in favor of MNEs relative to PE-firms.

The risk premium. The risk premium affects the cost of outside capital but, in our model, it is also directly related to the success probability of restructuring, i.e. $r = 1/p^H$. Consider a reduction in the risk premium generated by an increase in the probability of success at the restructuring stage. Differentiating (25) in p^H, we obtain

$$\left.\frac{d\left(v_m - v_p\right)}{dp^H}\right|_{v_m=v_p} = \begin{cases} \underbrace{\pi(m) - \pi(e) - (\pi(p) - E) - (F_m - F_p)}_{<0 \text{ at } v_m=v_p} < 0, & \text{if } A_l < \tilde{A}, \\ \underbrace{\pi(m) - \pi(e) - (\pi(p) - E) - (F_m - F_p)}_{<0 \text{ at } v_m=v_p} + \underbrace{\frac{d\tilde{A}}{dp^H}}_{<0} < 0, & \text{if } A_p < \tilde{A} < A_m, \\ \underbrace{\pi(m) - \pi(e) - (\pi(p) - E) - (F_m - F_p)}_{=0 \text{ at } v_m=v_p} = 0, & \text{if } A_l > \tilde{A}. \end{cases} \tag{30}$$

When both types of firms are credit constrained, $A_l < \tilde{A}$, a decrease in the risk premium benefits PE-firms more since they are more severely constrained, $A_p < A_m$. Facing harder credit constraints, the advantage of lower fixed costs for PE-firms must then dominate any difference in product market profits net of exit costs between the two firm types, i.e. $F_m - F_p > \pi(m) - \pi(e) - (\pi(p) - E)$. Otherwise, the PE-condition, $v_m = v_p$, cannot hold initially, as can be seen from (25). Hence, as indicated by the first line of (30), $v_m - v_p$ must decline in p^H, which implies that PE-ownership becomes more likely when the risk premium $r = 1/p^H$ declines.

PE-ownership also becomes more likely when the risk premium declines in the case where only the PE-firms are credit constrained, $A_p < \tilde{A} < A_m$. As shown by the second line in (30), this is due

to two distinct effects: Since the PE-condition, $v_m = v_p$, holds initially, the first term in the middle line of (30) must once more be negative. The second effect is more subtle and arises as a higher probability of success p^H reduces the threshold $\tilde{A}$ from (21). Intuitively, as investors perceive the incentive to misbehave as being lower, they supply more funds to PE-firms. As PE-firms' ability to pay increases, while the ability to pay for MNEs is unchanged (as they are not credit constrained), PE-firms' willingness to pay increases relative to MNEs and PE-ownership becomes more likely. In sum, PE-ownership is also more likely when the risk premium $r = 1/p^H$ declines when only PE-firms are credit constrained.

In the final scenario, where neither firm type is credit constrained, $A_l > \tilde{A}$, the risk premium plays no role for the equilibrium ownership structure. This follows from the last line in (30).

Moral hazard problems, B. Moral hazard problems in the form of higher private benefits in case of choosing low effort affect the credit constraints of firms, and thus also the equilibrium ownership structure. Differentiating (25) in B, we have

$$\left.\frac{d\left(v_m - v_p\right)}{dB}\right|_{v_m = v_p} = \begin{cases} 0 & \text{if } A_l < \tilde{A}, \\ \underbrace{\dfrac{d\tilde{A}}{dB}}_{>0} > 0 & \text{if } A_p < \tilde{A} < A_m, \\ 0 & \text{if } A_l > \tilde{A}. \end{cases} \tag{31}$$

Thus, increasing the temptation to supply low effort in restructuring by increasing private benefits has no effect on the ownership structure when financial constraints either affect both types of firms or when neither firm type is affected. When only the PE firm is constrained, an increase in the private benefits from low effort makes the IC constraint of PE-firms less likely to hold. This means that the agency rent required to make the IC constraint hold must increase. Thus, the PE firm cannot borrow as much as before because the maximum repayment is now lower. This gives a relative advantage to MNEs over PE-firms. Conversely, PE ownership is thus more likley when private benefits are low.

Trade costs, t The equilibrium ownership structure is finally affected by the trade regime. Higher import tariffs or other trade impediments (t) reduce the export profit $\pi(e)$ for MNEs which increases an MNE's valuation v_m from (23). Since trade costs do not affect PE-firms (as they cannot supply the market by exporting), differentiating (25) in t gives

$$\frac{d\left(v_m - v_p\right)}{dt} = \frac{d\pi(e)}{dt} < 0. \tag{32}$$

Noting that trade liberalization reduces trade cost ($dt < 0$), PE-ownership is more likely when the host country becomes more open to trade.

Financial frictions and the acquisition price, S Let us end with some noteworthy observations on how the acquisition price depends on the exogenous variables in the model when the bidders are financially constrained, $\tilde{A} > A_l$. First, note that according to Lemma 1, the equilibrium acquisition price S^* will equal the valuation of the firm type with the highest constrained valuation. From (18)

and (22), we have

$$S^* = \begin{cases} v_m^c = p^H[\pi(m) - F_m - \pi(e)] - \left[\tilde{A} - A_m\right], \text{ if } \ v_m^c > v_p^c \\ v_p^c = p^H[\pi(p) - F_p - E] - \left[\tilde{A} - A_p\right], \text{ if } \ v_p^c > v_m^c. \end{cases} \tag{33}$$

We can then state the following corollary:

Corollary *Suppose that PE-firms and MNEs are financially constrained, $\tilde{A} > A_l$. The equilibrium sales price S^* will then increase if:*
(i) access to internal capital markets for the equilibrium buyer increases (A_l increases).
(ii) the risk premium ($r = 1/p^H$) decreases.
(iii) the moral hazard problem becomes less severe (B decreases).

As shown for MNEs in (17), we know that when firms are credit constrained, the amount of borrowing is tied down from the maximum repayment a firm can promise to investors without violating the IC constraint, $\tilde{R}_m$. From this condition, we know that if a firm's access to internal capital A_l increases, this leads to a one to one increase in its maximum valuation. Bidding competition then ensures a one to one increase in the acquisition price, i.e. $\frac{dS^*}{dA_l} = 1 > 0$ from (33).

We can also study the impact of a lower risk premium, noting that this occurs when the probability of a successful restructuring p^H increases. Using (33)

$$\frac{dS^*}{dp^H} = \begin{cases} \frac{dv_m^c}{dp^H} = [\pi(m) - F_m - \pi(e)] - \underbrace{\frac{d\tilde{A}}{dp^H}}_{<0} > 0, \text{ if } \ v_m^c > v_p^c, \\ \\ \frac{dv_p^c}{dp^H} = [\pi(p) - F_p - E] - \underbrace{\frac{d\tilde{A}}{dp^H}}_{<0} > 0, \text{ if } \ v_p^c > v_m^c. \end{cases} \tag{34}$$

Note how an increase in the probability of successful restructuring of the target firm has a double positive effect on the equilibrium sales price, S^*.

As noted in Section 3.4.1, there is a direct effect on the sales price from a higher probability of success in restructuring ($\pi(m) - F_m - \pi(e) > 0$ and $\pi(p) - F_p - E > 0$). But there is also an indirect effect. Since successful restructuring is now more likely, there is a decrease in the assets in place that the firm needs in order to secure full financing, i.e. $\frac{d\tilde{A}}{dp^H} < 0$ from (16) or (21). The reason is that a higher probability of success (in case of high effort) relaxes the IC constraint. Consequently, firms' willingness (ability) to pay for the target firm increases which, through bidding competition, leads to a higher price for the target in the auction.

Finally, we can also derive the impact of private benefits on the acquisition price. From (33), (16) or (21), it follows that

$$\frac{dS^*}{dB} = -\underbrace{\frac{d\tilde{A}}{dB}}_{>0} < 0.$$

Thus, if private benefits decline ($dB < 0$), firms are less credit constrained and hence their willingness (ability) to pay for the target increases. The bidding competition in the acquisition auction

once more ensures that the acquisition price increases.

5 A Look at the Data

In this section, we take a preliminary look at the data by correlating the cross-border PE-share with a set of proxies for central variables of interest in our model. We start with Table 1, which reports correlation coefficients with stars for statistical significance at the country-year level between the share of all cross-border M&As that are undertaken by PE-firms relative to MNEs (the "PE cross-border share") and various institutional details of the host country in which targets are located. We want to emphasize that while the correlations in Table 1 are broadly consistent with our predictions, they should not be interpreted as *causal* relationships.

The restructuring advantage of PE-firms. PE-firms make up for the lack of synergies by having an inherited advantage in restructuring the target's assets. Proposition 1 establishes that higher such advantages will naturally work in favor of PE-firms, so we should expect a positive correlation between the PE cross-border share and proxies for the restructuring advantage of PE-firms. As emphasized in Section 2, PE-firms excel at reorganizing target firms to improve their productivity and profitability and this partly takes place through cost cutting and negotiations with workers.[11] For instance, Olsson and Tåg (2017) show that workers performing routine and offshorable job tasks tend to experience a greater risk of layoffs if the target firms are lagging their peers in productivity before the buyout. This suggests that a possible proxy for the *relative* advantage that PE-firms might have over MNEs in the restructuring stage is the flexibility in dealing with the labor force in the firm. Stated differently, synergies are likely to be relatively more important in acquisitions for MNEs as compared to flexibility in reorganizing the labor force.[12] Panel A of Table 1 shows how two institutional measures of flexibility in dealing with workers are correlated with the PE cross-border share. As expected, government intervention in wage bargaining is negatively correlated and wage flexibility is positively correlated with the PE cross-border share. The correlations between wage flexibility and the PE cross-border share are not statistically significant at the 10% level, however.

Exit costs. Proposition 1 shows that higher exit costs should favor MNEs over PE-firms. As more developed financial markets should be correlated with lower costs of buying and reselling firms, we turn to standard measures of financial market development and investigate how they correlate with the PE cross-border share. Following King and Levine (1993), Lane and Milesi-Feretti (2007) and Čihák et al. (2012), Panel B in Table 1 shows the correlation coefficients between the PE cross-border share and the log of liquid liabilities in the country. As an alternative measure of the costs of buying and selling firms, we also report the correlation between the PE cross-border share and the stock turnover in a country, which is a measure inspired by Bekaert et al. (2005). In line with the predictions of the theory,

[11] See Kaplan and Strömberg (2009) or Tåg (2012) for surveys of the literature.

[12] Another possibility is that MNEs lack the ability to reorganize the workforce and thus flexibility in dealing with the workforce is a relative benefit for PE-firms. Our proposed link from a relative advantage in restructuring to wage flexibility would not work if PE-firms were better at circumventing laws relating to wage flexibility. In this case, a reduction in wage flexibility could provide a relative benefit to MNEs. If this effect is at play, the correlations reported in Panel A are biased against our predictions.

Table 1: Correlations with the PE cross-border share

	Predicted sign	Correlation coefficient	Observations
Panel A: The restructuring advantage of PE-firms, $F_m - F_p$.			
Government intervention in wage bargaining	(-)	-0.0689*	588
Wage flexibility	(+)	0.0314	642
Panel B: Exit costs, E.			
Liquid liabilities (log)	(+)	0.1059***	1432
Stock turnover	(+)	0.2246***	1105
Panel C: The risk premium, $r = 1/p^H$.			
Risk premium on lending	(-)	-0.0967***	729
Panel D: Moral hazard problems, B.			
Minority investor protection	(+)	0.056	526
Rule of law	(+)	0.1417***	1255
Panel E: Trade costs, t.			
Freedom to trade internationally	(+)	0.1397***	1022
Taxes on international trade and transactions	(-)	-0.0621**	1132

Notes. This table reports correlation coefficients with stars for statistical significance at the country-year level between the share of all cross-border M&As that are undertaken by PE-firms relative to all cross-border M&As (the "PE cross-border share") and various institutional details of the host country in which targets are located. The notes to Figure 1 describe the CapitalIQ data. *Government intervention in wage bargaining* is taken from the Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts database (Visser 2015) and measures to what degree the government leaves wage bargaining to individual firms relative to intervening in the process. *Wage Flexibility* is from the World Economic Forum Global Competitiveness Index, where higher grades correspond to better flexibility in the wage setting process. *Liquid liabilities (log)* is in log dollars and comes from the World Bank Financial Development and Structure Dataset (Beck et al. 2000 and 2009, and Čihák et al. 2012). Both *Stock turnover* is from the World Bank Global Financial Development Dataset and is the value of shares scaled by market capitalization. *Risk premium on lending* is from the World Bank World Development Indicators and is the difference between the interest rates of private sector loans and the risk free short-term treasury bills. *Minority investor protection* is sourced from the World Bank's Doing Business database, and the *Rule of law* index comes from the Worldwide Governance Indicators at the World Bank. *Minority investor protection* captures the level of shareholders' rights and access to documents and information, while *Rule of law* measures the quality of enforcement and courts discounted by the presence of crime and violence. *Freedom to trade internationally* is a chain-linked composite indicator from the Fraser Institute (Gwartney et al. 2014) that combines measures of international trade taxes, trade barriers such as the speed of trade processes, the size of trading sectors, restrictions on exchange rates and the difference to the rates on the black market. *Taxes on international trade and transactions* comes from the International Centre for Tax and Development (Prichard et al. 2014). Both these variables are sourced from the Quality of Governance Institute. Significance levels are denoted by stars: *** p<0.01, ** p<0.05, and * p< 0.1.

both these measures are positively correlated with the PE cross-border share. The positive correlation between these two variables could be a reason for the cross-country variance in the percentage of all cross-border acquisitions that are undertaken by PE-firms reported in the bottom left figure in Figure 1. Countries with high shares of all cross-border transactions undertaken by private equity firms are all countries with well developed financial markets (e.g. France, Italy, Germany, Spain, Switzerland, Sweden) while countries with low shares include China, Russia, Brazil, and Mexico.

The risk premium. Our theory suggests that a higher risk premium weakly benefits MNEs relative to PE-firms. Consistent with this prediction, Panel C in Table 1 reveals that the correlation between the risk premium on lending and the PE cross-border share is negative in the data. This negative correlation could explain the time series variation in the percent of all cross-border acquisitions that are undertaken by PE-firms in the top part of Figure 1. The PE cross-border share was low when the economic conditions were more uncertain, i.e. the probability of success was lower and the risk premium was higher, around 2001 and also in connection with the financial crisis of 2008-2009. Conversely, the share was high when the conditions were more stable.

Moral hazard problems. According to Proposition 1, the extent of moral hazard problems should correlate positively with the PE cross-border share. In our model, B refers to the amount of resources that owners of firms are able to divert when exerting low effort in the restructuring stage. Inspired by, among others, Antràs et al. (2009), we posit that stronger minority investor protections reduce the ability of owners to extract private benefits from the firm. The rule of law in the country should also correlate negatively with B as a weaker rule of law makes it easier to divert resources. Panel D of Table 1 shows that the correlation between both these measures and the PE cross-border share is in the direction suggested by our model. However, the correlation between minority investor protections and the PE cross-border share is not statistically significant.

Trade costs. Proposition 1 states that trade costs should correlate negatively with the PE cross-border share. As trade costs increase, MNEs have a stronger incentive to outbid PE-firms to be able to produce locally instead of exporting to the target country. Conversely, lower trade costs will increase the PE cross-border share. Panel E of Table 1 reports the correlation between two proxies for trade costs that are likely to affect MNEs. As predicted by the model, freedom to trade internationally is positively correlated with the PE cross-border share while taxes on international trade and transactions are negatively correlated with the PE cross-border share.

Next, we provide some robustness checks on these correlations by running OLS regressions of the following form:

$$PEshare_{i,t} = \alpha_0 + \alpha_1 IndepVar_{i,t} + \mathbf{X}'_{i,t}\beta + \gamma_t + \varepsilon_{i,t}, \tag{35}$$

where $PEshare$ is the PE cross-border share for country i and year t, $\mathbf{X}'_{i,t}$ contains the log of GDP and GDP per capita, γ_t represents year fixed effects, and $IndepVar_{i,t}$ represents the independent variable of interest. Table 2 presents the results. For brevity, here we only test one variable for each prediction in our model (we pick the variable with the highest unconditional correlation in Table 1). All these variables are statistically significant and the sign remains the same as for the unconditional

Table 2: OLS regressions

	(1)	(2)	(3)	(4)	(5)	(6)
Stock turnover	0.000467***					-3.00e-06
	(6.03e-05)					(0.000248)
Risk premium		-0.00276***				-0.00161***
		(0.000987)				(0.000600)
Government intervention			-0.0359***			-0.0341**
			(0.0122)			(0.0168)
Rule of law				0.0155**		-0.00335
				(0.00739)		(0.0249)
Freedom to trade					0.00649*	-0.0115
					(0.00375)	(0.0129)
Log GDP	-0.00616	-0.000503	-0.00427	0.00115	0.00372	-0.000974
	(0.00397)	(0.00458)	(0.00387)	(0.00316)	(0.00250)	(0.00746)
GDP per capita	5.67e-07*	3.36e-07	9.29e-07***	8.91e-08	7.52e-07***	7.31e-07
	(3.03e-07)	(4.34e-07)	(2.00e-07)	(2.02e-07)	(2.46e-07)	(7.93e-07)
Constant	0.254**	0.161	0.255**	0.0986	-0.0714	0.276**
	(0.111)	(0.139)	(0.113)	(0.0887)	(0.0538)	(0.139)
Observations	1,012	675	588	1,236	1,002	243
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of countries	101	85	47	168	112	30
Number of years	12	12	11	10	10	8
R^2	0.0912	0.0501	0.102	0.0418	0.0623	0.0868

Notes. This table presents OLS regressions explaining the PE cross-border share with selected measures from Table 1, which also contains descriptions of the variables. Robust standard errors are clustered at the country level. Significance levels are denoted by stars: *** p<0.01, ** p<0.05, and * p< 0.1.

correlations in Table 1. The final column in Table 2 simultaneously includes all measures in the regression as many of them are likely to be correlated with each other. Here, we find that a higher risk premium and tighter business regulations as captured by higher levels of government intervention in wage bargaining negatively correlate with the PE cross-border share. However, the sample size in this regression is substantially lower than in columns (1)-(5) as a result of the coverage of the variables.

6 Concluding Remarks

The globalization process implies that new business models spread wider and faster over the world than ever before. More than 8 percent of all cross-border acquisitions that took place during 1998-2010 were cross-border acquisitions undertaken by PE-firms. Moreover, there was a substantial variation over time, across countries and across sectors in the share of cross-border acquisitions that were acquisitions by PE-firms as opposed to those acquired by MNEs.

In this paper, we have developed a model of competition for domestic assets between MNEs and PE-firms to better understand possible causes for this variation. Our model incorporates endogenous financial frictions into a model of cross-border M&As. The MNE advantage lies in firm-specific synergies and access to internal markets, whereas PE-firms have expertise in reorganizing target firms. We have showed that strengthened restructuring advantages for PE-firms, lower exit costs for PE-firms, a lower risk premium on lending, reduced possibilities to exert private benefits in the

restructuring phase, and lower trade costs increase the share of PE-firm acquisitions. We have also presented cross-country correlations that are consistent with these predictions.

While it is well established that cross-border mergers and acquisitions play a key role in the global industrial development and restructuring process, our model is, to the best of our knowledge, the first to incorporate PE-firms that compete with MNEs for domestic firms that are up for sale in a setting with endogenous credit frictions. A prediction from the model, which looks counterintuitive at first sight, is that improved financial conditions and institutions in a country might not necessarily spur cross-border M&A activity by MNEs, but rather increase the share of cross-border M&A activity by PE-firms. The reason is that all firms benefit from these improved conditions but PE-firms benefit the most.

We have shown that PE-firms are an important part of the international restructuring process. From our analysis, it also follows that the domestic owners of the target firms reap a large share of the rents created due to the bidding competition over the targets. This suggests that policies improving the market for corporate control and financial markets in developing countries, which have a low level of cross-border PE activity, may be preferred to policies restricting cross-border acquisitions by PE-firms.

Our study has several limitations. We do not model the restructuring process in detail. It would be interesting to open this black-box of restructuring and explore what type of workers gain and lose (this could be insiders versus outsiders, productive versus productive workers, high skill workers versus low skill workers). We have also omitted the issue of how the political system may affect the distribution of the rents created by restructuring. These are great areas for future research, as is a more careful empirical exercise to test the predictions of our model.

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Appendix A

In this section, we show how the comparative statics in Proposition 1 give unambiguous predictions. To this end, let us solve for the exit cost from the PE-condition, $v_m = v_p$. Setting (25) to zero, dividing each line through with p^H and then solving for $\tilde{E} = E_{v_m=v_p}$, we have

$$\tilde{E} = \begin{cases} \pi(p) - [\pi(m) - \pi(e)] + [F_m - F_p] - \left(\frac{A_m - A_p}{p^H}\right) & \text{if } A_l \leq \tilde{A} \\ \pi(p) - [\pi(m) - \pi(e)] + [F_m - F_p] - \frac{1}{p^H}\left(\tilde{A} - A_p\right) & \text{if } A_p \leq \tilde{A} < A_m \\ \pi(p) - [\pi(m) - \pi(e)] + [F_m - F_p] & \text{if } A_l > \tilde{A}. \end{cases} \tag{36}$$

$\tilde{E}$ is simply the exit cost consistent with the PE-condition $v_m = v_p$ being satisfied. $\tilde{E}$ is illustrated in Figure 2, where three panels are shown. The vertical axis in each panel depicts exit cost E for PE-firms while the horizontal axis depicts the level of synergies γ. Panel (i) depicts the locus of the PE-condition (36) when neither firm type is credit constrained, $A_l > \tilde{A}$. Panel (ii) depicts the PE-condition when both firms are credit constrained, $A_l \leq \tilde{A}$. Panel (iii), finally, shows the PE-condition when only PE-firms are credit constrained, $A_p \leq \tilde{A} < A_m$. Note that each locus is downward-sloping, reflecting the fact that when MNE ownership becomes more profitable through stronger synergies, the exit cost for PE-firms needs to be reduced to have equality of valuations between firm types. This follows directly from (36) since:

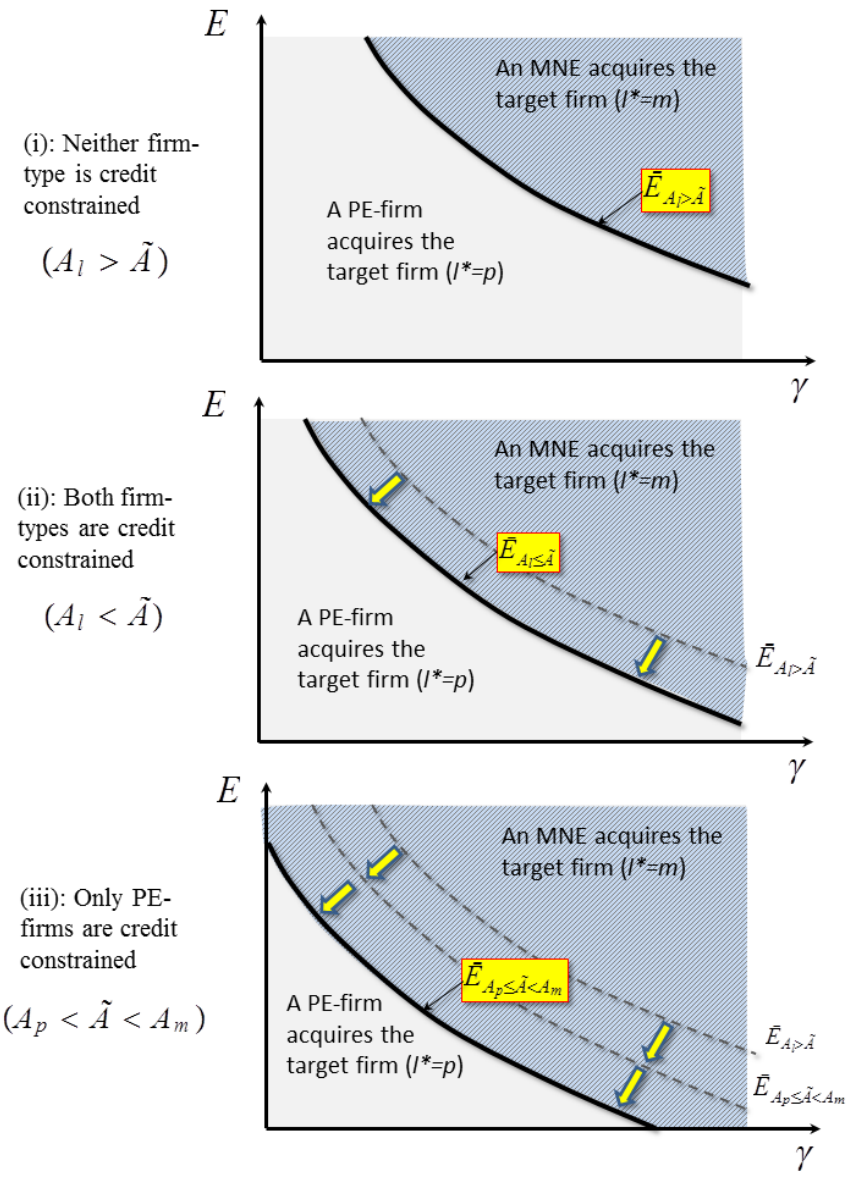
$$\frac{d\tilde{E}}{d\gamma} = -\frac{d\pi(m)}{d\gamma} < 0. \tag{37}$$

Now, consider panel (i) where neither firm type is credit constrained, $A_l > \tilde{A}$. Intuitively, in the region North-East of the PE-condition locus $\bar{E}_{A_l > \tilde{A}}$, strong MNE synergies combined with high exit costs for PE-firms induce acquisitions by MNEs. Conversely, South-West of the PE-condition where synergies are weaker and exit costs are low, a PE-firm will acquire the target.

Let us explore how the credit constraints from the IC condition affect the equilibrium ownership. The largest region of PE ownership appears in panel (i) where neither type is credit constrained such that both actors have sufficient access to internal capital. From (36), it then follows that when both types of firms are credit constrained, the PE-condition will shift inwards, as shown in panel (ii). This follows from (36) since $\tilde{E}_{A_l < \tilde{A}} - \tilde{E}_{A_l > \tilde{A}} = -(1/p^H)(A_m - A_p)$ and $A_m > A_p$. Intuitively, if MNEs have better access to capital than PE-firms, MNEs will be less constrained in borrowing from investors and can bid more for the target firm. To keep the valuations equal, this must be compensated for by a lower exit cost for PE-firms, reducing the region over which PE ownership arises. Finally, panel (iii) reveals that the area of PE ownership shrinks additionally when only PE-firms are credit constrained. To see this, use (36) to have

$$\begin{aligned} \tilde{E}_{A_l \leq \tilde{A}} - \tilde{E}_{A_p \leq \tilde{A} < A_m} &= \frac{A_p - A_m}{p^H} - \left(\frac{A_p}{p^H} - \frac{B}{p^H - p^L}\right), \\ &= \frac{1}{p^H} \cdot \left(\tilde{A} - A_m\right) > 0, \end{aligned} \tag{38}$$

Figure 2: Illustrating Proposition 1



Notes. This figure illustrates the results in Proposition 1. The vertical axis in each panel depicts exit cost E for PE-firms while the horizontal axis depicts the level of synergies γ. Panel (i) depicts the locus of the PE-condition (36) when neither firm type is credit constrained, $A_l > \tilde{A}$. Panel (ii) shows the PE condition when both firm types are credit constrained, $A_l \leq \tilde{A}$. Finally, Panel (iii) depicts the PE-condition when only PE-firms are credit constrained, $A_p \leq \tilde{A} < A_m$.

since $A_m < \tilde{A}$ in the first term of the first line of (38).[13]

Let us now turn to the comparative statics results in Proposition 1. The results on exit costs E and synergies γ in Proposition 1 are immediate from Figure 2. For the remaining results in Proposition 1, we differentiate the PE condition $v_m = v_p$ in an auxiliary variable α and exit costs E to get

$$\begin{aligned} \frac{d\tilde{E}}{d\alpha} &= \frac{v'_{m,\alpha} - v'_{p,\alpha}}{v'_{p,E} - v'_{m,E}}, \\ &= -\left[v'_{m,\alpha} - v'_{p,\alpha}\right], \end{aligned} \tag{39}$$

using the notation $v'_{l,\alpha} = \frac{dv_l}{d\alpha}$, and the fact that $v'_{m,E} = 0$ and $v'_{p,E} = -1$.

We can now combine the comparative statics result in (27), (29),(30), (31) and (32) with (39) to show how the three loci depicting the PE-condition will shift in Figure 2. For instance, an increase in trade costs ($\alpha = t$) reduces the export profit for an MNE, which gives $v'_{m,t} - v'_{p,t} < 0$ from (32). Using this result in (39), it follows that $\frac{d\tilde{E}}{dt} > 0$. In terms of Figure 2, this corresponds to the PE-condition shifting upwards in panels (i)-(iii), increasing the region over which a PE-firm acquires the target firm in all panels (not shown). Thus, PE-ownership unambiguously becomes more likely when the trade costs increase, as suggested in Proposition 1. This procedure can then be repeated for the remaining comparative statics results.

[13] $A_m > \tilde{A}$ in the second term in (38), but A_m does not appear in the latter term.