

Acquirers and Financial Constraints: Theory and Evidence from Emerging Markets*

Rahul Mukherjee[†]

Christian Proebsting[‡]

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Abstract

Motivated by a set of stylized facts about ownership stakes and divestiture rates for mergers and acquisitions in emerging market economies over the period 1990-2014, we develop a tractable model where acquirers and targets emerge endogenously due to differences in liquidity. Financial crises induce selection effects among acquirers, resulting in larger acquired stakes and more persistent ownership. We present robust empirical evidence consistent with the model's predictions using a large dataset of domestic and cross-border EME acquisitions. Domestic firms in crisis-hit countries acquire 11-15% more ownership during crises. Their divestiture rates are 19-24% lower. Our results demonstrate how financial crises can have both short- and long-term effects through the market for corporate control, by changing the set of acquirers, how much they acquire, and how long they keep ownership.

Keywords: domestic mergers and acquisitions; cross-border mergers and acquisitions; emerging markets; financial crisis; financial constraints; capital reallocation.

JEL Codes: F21, G01, G34.

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[†]Department of International Economics, Graduate Institute, Geneva, Switzerland. E-mail: rahul.mukherjee@graduateinstitute.ch.

[‡]Chair of International Finance, École Polytechnique Fédérale de Lausanne, Switzerland. E-mail: Christian.Probsting@epfl.ch.

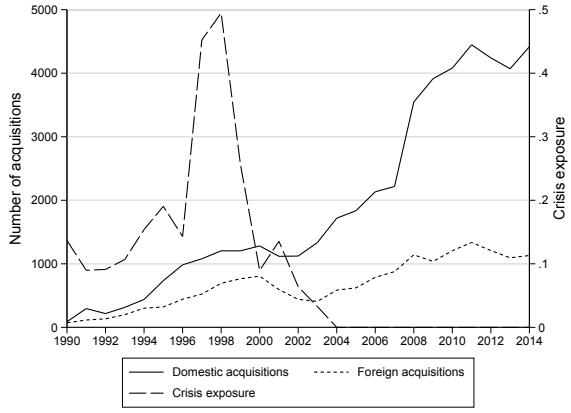
1 Introduction

The last two decades have witnessed unprecedented growth in the global market for mergers and acquisitions (M&As) both within countries and across borders. For emerging market economies (EMEs) in particular, annual growth rates of the numbers of domestic and cross-border acquisitions over 1990-2014 averaged about 23.5% and 14.5%, respectively. The growth of this global marketplace, in which firm boundaries are redrawn and the ownership of resources is reallocated among entities that face different degrees of financial constraints, has not been continuous but has typically varied with the occurrence of financial crises.

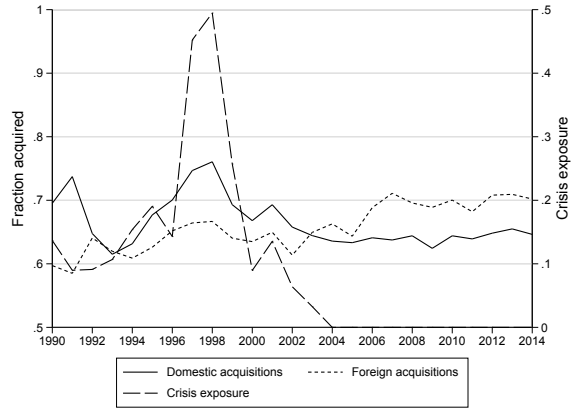
Panel (a) of Figure 1 shows this phenomenon succinctly by plotting the number of domestic and cross-border acquisitions in a sample of sixteen EMEs in each year from 1990-2014. It also shows for each year the proportion of those transactions that occurred during a national financial crisis, a rough measure of the degree to which target firms were exposed to financial shocks (the variable labelled “crisis exposure”). Domestic acquisitions in EMEs slowed down during the 1997-98 Asian Financial Crisis, only to experience a sharp increase in the later part of the sample, a period which coincided with an absence of financial crises in these countries. At the same time we see that cross-border M&As in those countries, conducted mostly by firms from developed markets, experienced a slowdown in relative terms during the Great Recession.

The prima facie evidence in Figure 1(a) suggesting that aggregate financial conditions play a significant role in M&As has been corroborated by a large literature at least since the work of Harford (2005). For EMEs in particular, while the surge in cross-border acquisitions — labelled by Krugman (2000) as “fire-sale FDI” — and the concurrent slowdown in domestic acquisitions during financial crises is well-documented (see Aguiar and Gopinath, 2005; Acharya, Shin and Yorulmazer, 2011*b*; Alquist, Mukherjee and Tesar, 2016), the underlying mechanisms by which the domestic market for corporate control in EMEs reacts to aggregate financial shocks remain relatively understudied. Our paper fills this gap in the literature, and also addresses a more general question: How do deep financial crises shape the aggregate market for corporate control by altering the set of target firms in need of liquidity, as well as impinging upon an *acquiring* firm’s acquisition decision? In particular, motivated by a set of stylized facts described shortly and an extensive prior literature that has shown ownership structure and its evolution over time as key determinants of a number of firm level variables, we focus on two metrics that describe ownership dynamics: the ownership structure chosen at the time of an acquisition and the subsequent rate of divestiture.¹ The main conclusion of our analysis is that, over the business cycle, finan-

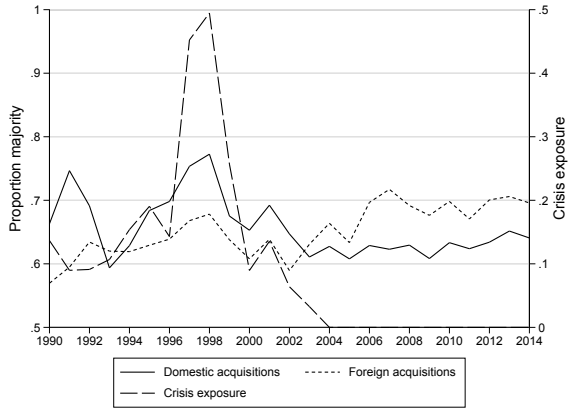
¹Examples include agency costs (Ang, Cole and Lin, 2000), the degree of technology transfer (Hanousek and Kočenda, 2017), value gains from an acquisition (Chari, Ouimet and Tesar, 2010) as well as their distribution between the target and acquirer shareholders (Asiedu and Esfahani, 2001), and the incentives of the firm’s owners to apply their technological or management resources (Asiedu and Esfahani, 2001). By extension, the dynamics of the



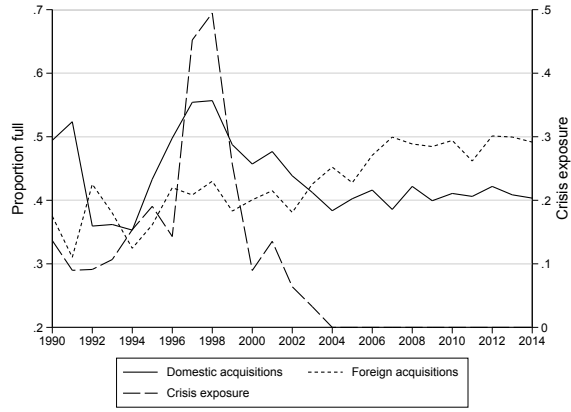
(a) Numbers of Domestic and Cross-Border M&As



(b) Average fraction acquired



(c) Proportion of majority acquisitions



(d) Proportion of full acquisitions

Figure 1: Trends in Ownership Patterns in Domestic and Cross-Border M&As

Notes: Figure displays: (a) the number of domestic and cross-border acquisitions; (b) average fraction acquired; (c) the proportion of majority acquisitions; and (d) the proportion of full acquisitions, in domestic and cross-border acquisitions in each year from 1990-2007 for the sample of EMEs in this paper. The variable measuring crisis exposure is the percentage of firms in our sample in a particular year that are exposed to a national financial crisis. A national financial crisis is defined as the occurrence of a banking crisis in a country in a particular year. To identify systemic banking crises, we use the dataset constructed by Laeven and Valencia (2010, 2012), covering the period 1970-2011. Since it only covers years up to 2011, we use “The Little Data Book on Financial Development” from the World Bank which updates Laeven and Valencia’s dataset until 2013, and for 2014, we use online searches of news reports to identify any banking crisis that occurred in a target country. From 2007 to 2014, none of the 16 countries in our sample experienced a systemic banking crisis. Data on number of acquisitions and fraction acquired are from the SDC Platinum database.

cial constraints induce *selection effects* among acquirers that fundamentally influence these two metrics.

Our paper has two main contributions, one empirical and one theoretical. Empirically, we use panel regressions and survival analysis techniques to show that both ownership structure chosen and subsequent divestiture decisions react strongly to financial crises in the case of domestic M&As in emerging markets. As a preview of our later econometric results, panels (b)-(d) of Figure 1 show the average ownership patterns in domestic and cross-border acquisitions over time using three different measures: (b) the average fraction acquired; (c) the proportion of majority acquisitions; and (d) the proportion of full acquisitions, along with the crisis exposure indicator. Figures 1(b)-1(d) show that while the ownership patterns in cross-border acquisitions are relatively stable over time, for domestic acquisitions all three ownership metrics increase during financial crises. In fact, the average size of domestic stakes has a significant positive correlation with the exposure of firms to crises (around 0.77 across all three metrics; insignificant or negative for cross-border acquisitions). In other words, domestic acquirers *on average* buy larger shares of firms by acquiring majority or full stakes during financial crises in their own countries; cross-border stakes, starting from about the same averages pre-crisis, appear to increase as well, but not by nearly as much. We show later that, on average, these crisis-time domestic acquisitions are also significantly more persistent, while this is not the case for cross-border acquisitions. Our empirical contribution is to thoroughly document these facts about domestic and cross-border acquisitions using a large panel of EME transactions. Our baseline estimates span the period 1990-2007, but we show that these patterns generalize to more recent years.

While neo-classical theories of merger waves in the tradition of Jovanovic and Rousseau (2002) coupled with the empirical importance of aggregate liquidity (Harford, 2005) can reconcile the patterns in Figure 1(a), the empirical facts about ownership structure and its dynamics that we document, taken together, present a puzzle for existing theories. In particular, why do ownership patterns in domestic and cross-border M&As in EMEs, which tend to look similar in normal times, diverge during times of aggregate financial stress, and why do these effects persist? Our second, novel contribution is to develop a simple analytical framework in which these empirical patterns arise as a consequence of selection effects in the market for corporate control. In our model, both financially constrained and financially unconstrained acquirers engage in M&As. All firms face borrowing constraints and some of them exit because they lack sufficient liquidity to operate. Other firms with more internal financial resources and sufficient borrowing capacities can step in to buy their assets and thus prevent inefficient liquidation. We label these

ownership structure of a firm exerts influence on the evolution over time of a number of the above variables, as well as being informative about the performance of the acquisition itself (Hoskisson, Johnson and Moesel, 1994; Lee and Madhavan, 2010). It is therefore important to understand if, and how, financial constraints and crises affect these metrics.

acquisitions “low-value” acquisitions because they take place even in the absence of synergies – either technological or management-related – between the two firms. “High-value” acquisitions, in contrast, involve those acquirer-target matches that are expected to be profitable due to synergies and independent of the target’s liquidity position. In this framework, we study the implications of an aggregate negative financial shock that tightens the borrowing constraints of all firms in the economy, including potential domestic acquirers, but excluding potential foreign acquirers.

The selection effect in response to the shock works as follows. From the targets’ side, an aggregate negative financial shock tends to raise the share of low-value, purely liquidity-driven acquisitions in the total number of acquisitions because a larger proportion of potential target firms face liquidity shortages. This channel drives the acquisition dynamics of foreign, financially unconstrained acquirers in our model. Similar mechanisms which operate through target firms’ financial constraints have been studied before (see e.g. Aguiar and Gopinath, 2005; Acharya, Shin and Yorulmazer, 2011*b*; Alquist, Mukherjee and Tesar, 2016). For domestic acquirers, who are also subject to the financial shock, our model highlights – in contrast to most of the theoretical literature – a counteracting channel based on financial frictions on the acquirer’s side: Since an acquisition with higher expected gains from synergies relieves the joint, forward-looking borrowing constraint of the acquirer-target pair, an aggregate financial shock that tightens financial constraints for both acquiring and target firms results in only the highest synergy acquisitions taking place. This leads to proportionally more acquisitions with real value gains (high-value acquisitions) undertaken by domestic acquirers in times of aggregate financial stress. This selection effect is our key theoretical result that helps explain the differential evolution of ownership patterns shown in Figure 1 (b)-(d), as well as divestiture rates.

First, to study the consequences of the selection effect on the share acquired, we augment our model with a feature that is consistent with recent evidence from emerging market acquisitions: Higher acquirer-target synergies are associated with larger, possibly controlling, or full stakes acquired in target firms. This could be due to: the presence of intangible assets in a setting of imperfect contract enforceability as in Chari, Ouimet and Tesar (2010); local inputs in the production process as in Alquist et al. (2018); the mitigation of agency problems as in Acharya, Shin and Yorulmazer (2011*b*); or simply due to the acquirer finding it easier to finance the acquisition of a larger stake externally when synergies are expected to be higher.² Coupled with the selection effect described earlier, the model predicts that domestic acquirers may – depending on the strength of the selection effect – acquire larger stakes and be more likely to complete majority

²Due to the range of mechanisms suggested by the existing literature, providing micro-foundations for this aspect of the model would be relatively straightforward. We make a deliberate choice not to do so since it would distract from our focus on selection effects.

or full acquisitions during financial crises. In contrast, average shares acquired by foreign firms are predicted to unambiguously decline.

Second, we further augment our model by an additional time period in which firms can resell assets acquired in the initial, financial-crisis period. We show that divestiture rates vary with aggregate conditions for two reasons. First, when the matches between acquirers and targets are low-value and liquidity-driven, they are reversed as soon as aggregate conditions improve. This leads to larger “flipping” rates in the aftermath of financial crises. This channel, which we call “normal” flipping, has been emphasized so far in the literature by papers such as Acharya, Shin and Yorulmazer (2011*b*) and Alquist, Mukherjee and Tesar (2016). The selection effect introduced in our model changes this prediction for domestic acquirers that face financial frictions: Acquirers may also divest acquisitions when they themselves run into liquidity problems at future dates, a channel that we call “forced” flipping. The selection effect implies that, among domestic acquirers, only the most liquid firms will be able to undertake acquisitions during financial crises. These firms — assuming some persistence in firm liquidity across periods — are less likely to run into liquidity problems at future dates and therefore be forced to divest. Thus, while flipping rates should go up in the aftermath of financial crises for foreign firms, they will increase less or might even go down for domestic firms. Note that this channel, once again, works exclusively through a selection effect of having relatively more liquid acquirers in the crisis cohort of constrained acquirers, rather than any changes in firm-level flipping decisions. In fact, a distinctive feature of our analysis is that the predicted aggregate effects on ownership structure and divestiture follow entirely from selection induced by financial constraints, and as such, are consistent with unchanged behavior at the level of individual acquiring and target firms.

The empirical literature on EME acquisitions so far has mostly focused on identifying the effects of financial frictions on the target side. In contrast, our interest lies in trying to distinguish between these and the effects of acquirer-side frictions that are likely to be present in EMEs. However, since an aggregate shock hits all firms, i.e., both acquirers and targets, a simple empirical comparison between crisis- and normal-time acquisitions will in general confound the effect of the crisis on acquirers with that of the effect of the crisis on targets. For example, the increase in the size of stakes acquired by domestic acquirers during crises in Figures 1(b)-1(d) could be driven by constrained acquiring firms seeking value-increasing majority stakes, or alternatively, by constrained targets being sold at fire-sale prices.

Hence, we explicitly adopt a difference-in-difference (DID) strategy in deriving predictions from the model. Since foreign acquirers from developed markets face the same pool of target firms as the domestic acquirers, yet do not face the effect of the crisis themselves, the *differential* effect of a financial crisis on the ownership structures chosen by foreign versus domestic acquiring firms, as well as any such double differentials in divestiture rates, should be informative about

the effect of the crisis on financially constrained acquirers. This idea forms the basis of our main theoretical predictions that: (i) the average share of equity acquired by constrained (domestic) acquirers, as compared to unconstrained (foreign) acquirers should rise during financial crises, driven by an increase in majority or full acquisitions; and (ii) the divestiture rates for domestic acquisitions should be relatively lower for the crisis cohort of domestic acquisitions (in relation to unconstrained foreign acquisitions). We implement the tests of these two hypothesis empirically by comparing domestic and cross-border acquisitions across normal and crisis times, the latter proxied by the plausibly exogenous occurrence of country-specific banking crises in EMEs. Using developed market acquiring firms as a benchmark group is also motivated by a practical consideration: While the argument above shows that a proper counterfactual is needed to isolate the effects of acquirer-side constraints, there does not exist firm-level measures of financial constraints for most of the EME acquirer or target firms in our sample, to the best of our knowledge.³

We use Thompson-Reuters SDC data for about 28,000 domestic and cross-border M&As in sixteen of the largest markets for corporate control in emerging economies, using the pre-2008 sample of deals. The choice of sample period is guided by the need to have a financially unconstrained group of foreign acquiring firms, which arguably is the case only for the period before the Great Recession. However, we show that including data till 2014 does not change our results. Using linear regressions and survival analysis techniques, we find strong evidence in favor of the two main predictions of the model. In particular, we find that financially constrained domestic firms in the crisis-hit country acquire between 11-15% more ownership and are 15-18% more likely to take majority stakes than their unconstrained foreign counterparts. Such ownership is also more likely to be persistent: The survival rate of a domestic acquisition is between 19-24% higher in the crisis cohort. These results are robust to a battery of checks that are listed later and described in detail in an appendix.

1.1 Related Literature

Our paper builds on a recent literature on the financial determinants of M&As, and in particular, the findings of Almeida, Campello and Hackbarth (2011) and Alquist, Mukherjee and Tesar (2016). Almeida, Campello and Hackbarth (2011) show that when a key motivation of mergers is to reallocate financial resources from liquid to illiquid firms, pledgability issues may make it optimal for high net worth firms to use discretionary credit lines to finance mergers. They also provide empirical evidence in favor of such a role using a sample of domestic deals from the United States. In contrast to Almeida, Campello and Hackbarth (2011) our theoretical focus is on the

³We acknowledge that large domestic firms in EMEs that face only very loose financing constraints could also be considered as unconstrained. However balance sheet data that would let us construct measures of financial constraints at the firm level are not available for the majority of domestic acquirer-target pairs in our sample.

implications of selection effects on ownership patterns and their evolution, while our empirical analysis uses domestic and cross-border deals from emerging markets. Our work also builds on Alquist, Mukherjee and Tesar (2016), who look at so-called fire-sale foreign direct investment in a model where *all* target firms are credit constrained and *all* acquiring firms are unconstrained.⁴ In contrast to their paper, we develop a more general, yet tractable framework in which all firms, acquirers or targets, may be financially constrained, with important consequences. In addition, our empirical emphasis is on the response of financially constrained domestic acquiring firms, and as such, we use foreign firms only as a benchmark group of unconstrained acquirers to isolate the effects of acquirer versus target financial constraints.⁵

In related work, Erel, Jang and Weisbach (2014) provide evidence that both foreign and domestic acquisitions ease financial frictions in target firms in a large sample of European acquisitions. They find that the investment levels of the target firms increase significantly following an acquisition. These findings are consistent with our assumption that part of the gains from acquisitions arise out of acquirers relaxing the borrowing constraints of the targets. Other recent papers such as Chari, Ouimet and Tesar (2010) and Wang and Wang (2015) also document similar financial gains from acquisitions. Turning to divestitures, while there are studies that focus on domestic divestitures using US data (Ravenscraft and Scherer, 1991; Kaplan and Weisbach, 1992; Bergh, 1997), few papers have studied divestitures for the large volume of domestic M&As in emerging markets, as we do.⁶

Our paper also contributes to the large theoretical literature on the drivers of M&As. Among neo-classical theories, where optimal reallocation of capital across firms takes centre stage, prominent examples include Jovanovic and Rousseau (2002) where the highest value gains from mergers result from matches between firms with the greatest disparity in Tobin's Q; Rhodes-Kropf and

⁴In Alquist, Mukherjee and Tesar (2016), horizontal FDI is more productive and financial crises lead to more vertical FDI. Our approach in this paper is more general in that we do not assume any particular industry patterns in the gains from acquisitions. Earlier research focused on the surge of foreign acquisitions and a concurrent decline in domestic acquisitions and portfolio investment during EME crises (Acharya, Shin and Yorulmazer, 2011*b*), and the relationship between acquisition prices or probability and target liquidity (Aguilar and Gopinath, 2005). Weitzel, Kling and Gerritsen (2014) investigate the relationship between aggregate conditions, and the number of cross-border transactions and asset prices in Europe and do not find evidence in favor of significant financial frictions at work during crises. Stoddard and Noy (2015), in a study using UNCTAD data on FDI volumes, also do not find evidence of fire-sale FDI.

⁵There is a large – mainly empirical – literature exploring the role in acquisitions played by idiosyncratic acquirer side liquidity and aggregate financial conditions in the case of developed markets such as the United States. For example, Harford (1999) empirically shows that cash-rich firms are more likely to attempt acquisitions, consistent with an agency-based free cash flow argument. Harford (2005), investigating the US merger waves of the 1980s and 1990s, shows that while economic, regulatory and technological shocks are important for mergers, whether these real shocks lead to a wave of mergers depends on measures of aggregate capital liquidity. In contrast to this literature, our theoretical focus is on the acquisitions that do take place in an environment of low liquidity, i.e., selection effects, while our empirical focus is on EMEs.

⁶Divestiture of cross-border acquisitions in EMEs has been studied by Acharya, Shin and Yorulmazer (2011*b*) and Alquist, Mukherjee and Tesar (2016).

Robinson (2008), who build and test a model of M&As where acquirers have higher Q than their targets, but assortative matching leads to clustering of matches between firms of similar Q ; and recent contributions to this literature such as David (2017) which, similar to our paper, studies the aggregate implications of domestic M&As, or Bircan (2017), who builds a dynamic model of ownership structure based on incomplete information about target productivity. Other theories have emphasized rational managers exploiting market misvaluation (Shleifer and Vishny, 2003); asymmetric information between bidders and targets about firm valuations (Rhodes-Kropf and Viswanathan, 2004); and managerial motives such as maintaining private benefits or earning takeover premia (Gorton, Kahl and Rosen, 2009). Behavioral explanations, such as the effects of stock price reference points on aggregate M&A activity, have also found empirical support (Baker, Pan and Wurgler, 2012). In contrast to much of these two streams of literature, our paper seeks to explain aggregate ownership structures and their dynamics, two features of M&As that have not received as much prominence. In addition, the mechanism we explore to explain these two features is a selection effect originating in financial constraints, which is novel, to the best of our knowledge.

Last but not least, the main mechanism in our paper is a selection effect based on firm-level liquidity and the value gains from an acquisition. The latter can take many forms, including an increase in productivity or wages in the acquired firm. Hence, our paper also speaks to a large literature in macroeconomics – dating back to Schumpeter (1934) – that deals with the cleansing effect of recessions, i.e. the process by which the least productive firms in the economy are forced to exit during a recession, leading to aggregate effects on productivity.⁷ This literature, however, has generally ignored the existence of the market for corporate control where distressed firms may be acquired. In the concluding section we therefore discuss some implications of our results for macroeconomic models that analyze the allocative effects of aggregate shocks.

2 A Model of Selection Effects in M&As

This section presents a simple model where financially constrained firms can become targets of acquisitions, and acquire other firms themselves if they have enough resources. This model is based on simplified versions of the models studied in Aguiar and Gopinath (2005) and Alquist, Mukherjee and Tesar (2016) that we extend to include domestic, constrained acquirers.

⁷Recent papers in this literature that are related to ours include Osotimehin and Pappadà (2015), who look at how credit constraints influence the cleansing effect of recessions in a theoretical model of firm dynamics. In a similar vein, our paper is also related to the literature that studies the reallocation of capital and other resources over the business cycle (for example, Eisfeldt and Rampini, 2006; Cui, 2014). Oberfield (2013) and Sandleris and Wright (2014) provide evidence from the 1982 Chilean economic crisis and the 2001 Argentine crisis, respectively, of a decline in the efficiency of resource allocation within and across sectors during these crises.

2.1 Two-Period Model Setup

The economy is populated by a continuum of firms. Firms in the baseline version of the model last for two periods 0 and 1, and differ in their expected gross profits in period 1. Firms borrow in period 0 to finance their production in period 1 and are able to pledge a certain fraction of their expected gross profits to take out loans.

2.1.1 A Firm's Problem Without Acquirers

To produce in period 1, all firms have to pay an upfront cost, b . Firms differ in their expected period 1 (gross) profits, y_i , which is i.i.d. across firms. Here, i indexes a particular firm and we think of this firm as a potential target of an acquisition. We assume that $y_i > b$ for all i so that all firms prefer production to non-production.

Firms' initial endowment is 0, so that firms have to take out a loan to pay for the upfront cost b . But the loan size cannot exceed a certain fraction τ of gross expected profits:⁸

$$b \leq \tau y_i. \tag{2.1}$$

So $\tau \in (0; 1]$ measures the degree of credit frictions in the economy common to all firms.⁹ In an economy without credit frictions, $\tau = 1$. One can interpret τ as a measure of the maximum 'debt-to-value' ratio because b corresponds to a firm's debt, and y_i is a firm's expected profits that is available to pay off the debt. When we later discuss the effect of financial crises on acquired shares and divestiture rates, we model financial crises through changes in τ .

If a firm lacks the capacity to pay for the upfront cost — that is if $y_i < \frac{b}{\tau}$ — it cannot produce in the second period and the value of the firm is 0. These firms either immediately exit the market or become targets of acquisitions. Market exit of this kind can be interpreted as inefficient liquidation of the firm since the firm would always prefer production to non-production. If a firm's expected profits are high enough, it can secure a loan and produce, which raises its value by the expected profit net of the upfront costs, $y_i - b$. These firms can stay in the market as stand-alone entities, can be targets of acquisitions or can be acquirers themselves. The total value of a

⁸The form of the borrowing constraint captures a common prediction from models of limited contract enforcement: The amount of credit is limited by the borrower's expected profits. That is, the debt limit is forward-looking, as e.g. in Albuquerque and Hopenhayn (2004) or Kehoe and Perri (2002). This forward-looking feature of the debt limit is a crucial element of our model. Brooks and DAVIS (2013) provide an empirical analysis of both forward- and backward-looking credit frictions and find evidence in favor of the forward-looking debt limit, which we adopt here.

⁹We choose a common τ across all firms to avoid introducing too many dimensions of heterogeneity because our interest lies in aggregate figures such as the average acquired share across all firms. In earlier versions of this paper, we considered differences in a firm's initial endowment and a firm's borrowing constraint. Adding these dimensions did not deliver any additional results and we therefore dropped them for the sake of a more parsimonious model.

(potential target) firm i can then be summarized as

$$V_i^{tar} = \begin{cases} 0 & \text{if } y_i < \frac{b}{\tau} \\ y_i - b & \text{if } y_i \geq \frac{b}{\tau}. \end{cases} \quad (2.2)$$

We now discuss the acquisition problem of potential acquirers, indexed by j .

2.1.2 Acquisition Decision and the Target's Financial Position

Any pair of firms, denoted by i for a target and j for an acquirer, from the population described above can potentially meet in the market for corporate control. We assume that i and j are randomly matched in this market.¹⁰ As soon as they are matched, they draw an i.i.d. *synergy* parameter net of acquisition costs, $\phi_{i,j} > 0$. When a firm acquires a target, the target firm produces next period and its expected net profits $y_i - b$ change by the factor $\phi_{i,j}$.¹¹ The value of an acquired target firm i to an acquirer j is then

$$V_{i,j}^{acq} = \phi_{i,j}(y_i - b). \quad (2.3)$$

An acquisition takes place under two conditions: i) its surplus is positive and ii) it is feasible. Note here that while we do not explicitly model the process by which acquiring firms search for targets, the matching process described is quite general in that it does not make any assumptions about which firms (say based on size, productivity, Tobin's Q etc.) end up in a match, except that they draw a stochastic match quality parameter.

The surplus is the difference between the value of the acquired firm after and before the acquisition, i.e. $V_{i,j}^{acq} - V_i^{tar}$:

$$S_{i,j} = \begin{cases} S_{i,j}^{cons} = \phi_{i,j}(y_i - b) & \text{if } y_i < \frac{b}{\tau} \\ S_{i,j}^{uncons} = (\phi_{i,j} - 1)(y_i - b) & \text{if } y_i \geq \frac{b}{\tau} \end{cases} \quad (2.4)$$

¹⁰We believe that many mergers are the result of (directed) search processes, as e.g. emphasized in Rhodes-Kropf and Robinson (2008) among others. We chose, however, to keep differences between constrained (domestic) firms and unconstrained (foreign) firms to a minimum and therefore abstract from directed search. Our model emphasizes the relevance of (economy-wide) borrowing constraints in shaping the distribution of acquisitions. Unless search frictions are directly affected by changes in borrowing constraints, we believe that our model's results are very general and would still be present in a model with search frictions. In a similar vein, we also maintain the assumption that all firms have access to the same set of target firms. We have experimented with restricting the pool of target firms for foreign firms to only include large firms. Our results are not affected by this setup because they are based on a difference-in-difference approach that cancels out these long-term differences between acquirers.

¹¹Note that $\phi_{i,j}$ can potentially be less than unity, which implies that acquisitions can be value-destroying, net of the costs of acquiring (Moeller, Schlingemann and Stulz, 2005).

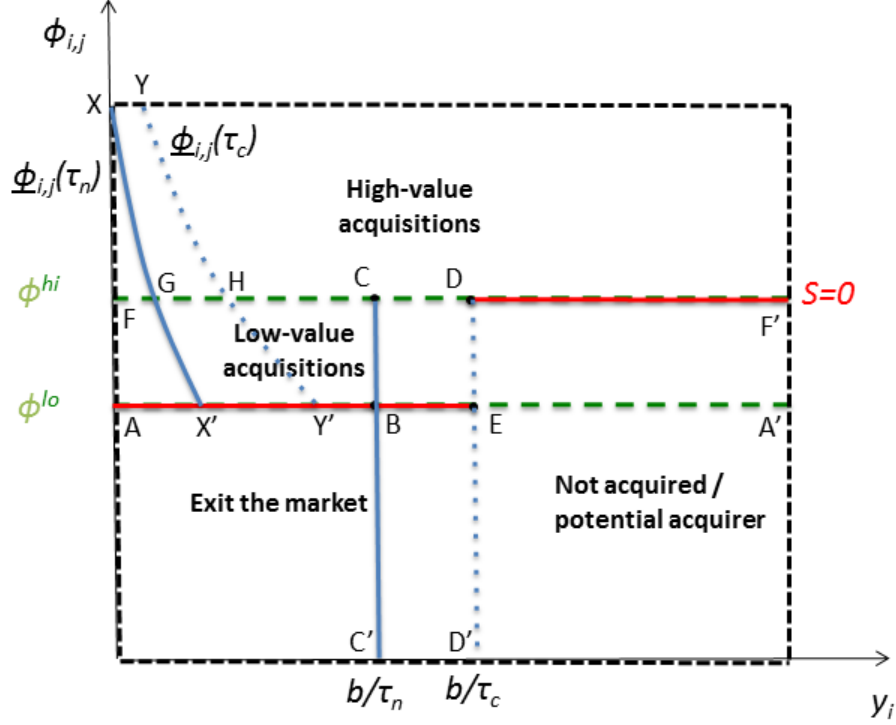


Figure 2: Acquisitions

Notes: Shows the range of values for the target's net profits, y_i , that define low- and high-value acquisitions for acquisitions during normal and crisis periods. These ranges are $\underline{\phi}_{i,j}^{-1} \leq y_i \leq \frac{b}{\tau}$ for low-value and $y_i \geq \underline{\phi}_{i,j}^{-1}$ for high-value acquisitions, with the subscript on the τ indicating (n)ormal or (c)risis periods, and $\underline{\phi}_{i,j}^{-1}$ being the inverse of the function defined in equation (2.5) solved for y_i .

Figure 2 shows the zero-surplus line $S = 0$ as a function of the synergy parameter $\phi_{i,j}$ and the target firm's expected profit y_i . We denote the levels of $\phi_{i,j}$ that solve $S^{cons} = 0$ and $S^{uncons} = 0$ by $\phi^{lo} = 0$ and $\phi^{hi} = 1$. For $\phi_{i,j} > \phi^{hi}$, an acquisition always generates positive surplus because the net benefits from the resulting technological synergies are positive. This is true irrespective of the target firm's profits y_i and the tightness of the borrowing constraint. These acquisitions occur in the region above the line FF' . We refer to them as "high-value" acquisitions. If the two firms draw a synergy parameter $\phi^{lo} \leq \phi_{i,j} < \phi^{hi}$, technological synergies are not sufficient to make an acquisition profitable. However, if the target firm is financially constrained (i.e. its expected profits are too low, $y_i < \frac{b}{\tau}$), so that the firms would be otherwise liquidated, an acquisition generates additional benefits from relaxing the borrowing constraint of the target and is therefore profitable. Firm pairings with $\phi^{lo} \leq \phi_{i,j} < \phi^{hi}$ and $y_i < \frac{b}{\tau}$ (within the rectangular area $ABCF$) are therefore profitable, and are referred to as "low-value" acquisitions.

Firms in the region to the bottom left of ABC' are forced to exit because they cannot pay

the fixed cost of operating in period 1, yet their realized $\phi_{i,j}$ with the acquirer they have been randomly paired with is too low for an acquisition to be profitable. The firms to the right of $C'CF'$ remain stand-alone entities or become acquirers themselves: Neither are they financially constrained, nor have they drawn a $\phi_{i,j}$ high enough (>1) for them to be acquired on the basis of technological synergies alone.

2.1.3 Acquisition Decision and the Acquirer's Financial Position

The previous section describes how the surplus generated from an acquisition depends both on the synergies it creates and on the financial position of the target firm. However, besides generating a positive surplus, an acquisition also has to be *feasible*. This depends on the *acquirer's* financial position.

Financially Constrained Acquirer. Acquirers with low realizations of y_j are potentially constrained. Like their targets, they face borrowing constraints, which reduces their ability to perform acquisitions. As a consequence, some acquisitions that would generate a positive surplus do not take place because the acquirer himself lacks the liquidity to finance the acquisition.

Since the acquirer as well as the target are financially constrained, we need to consider both of their borrowing constraints and keep track of both of their expected net profits post-acquisition, which are y_j and $\phi_{i,j}y_i$, respectively. Generally, the borrowing constraint for the post-acquisition entity states that total upfront costs, $2b$, cannot exceed some value $2\tau B(\phi_{i,j}y_i, y_j)$:

$$b \leq \tau B(\phi_{i,j}y_i, y_j). \quad (2.5)$$

Here, the function B , together with τ , determines this upper limit, which we assume to positively depend on both the acquirer's profits, y_j , and the target's post-acquisition profits, $\phi_{i,j}y_i$. Assuming that this function is invertible in $\phi_{i,j}y_i$, it is convenient to denote the minimum values for $\phi_{i,j}$ and y_i that satisfy this borrowing constraint as $\underline{\phi}_{i,j}(y_i, y_j)$ and $\underline{y}_i(\phi_{i,j}, y_j)$. We also refer to this joint borrowing constraint as a *feasibility constraint* in the context of an acquisition.

The impact of this feasibility constraint on acquisitions is illustrated in Figure 2. In addition to the synergy cut-offs that characterize the set of points where acquisitions are profitable (for a given y_j , the area bounded below by $ABCF'$ in Figure 2), there is now an additional downward sloping curve XX' describing the joint borrowing constraint of the target firm and the acquirer. XX' shows the minimum target's expected profits, \underline{y}_i , for each $\phi_{i,j}$ (or the minimum synergy level $\underline{\phi}_{i,j}$ at each level of y_i) that makes acquisitions feasible, given an acquirer's expected profits, y_j , and aggregate financial conditions, τ . For a given $\phi_{i,j}$ of a match, only acquisitions to the right of XX' can potentially take place, even if they are profitable, because the acquirer himself

faces financial constraints. The negative slope of the XX' can be understood as follows. Because low $\phi_{i,j}$ acquisitions have lower expected profits, the feasibility constraint is tighter for these acquisitions. These acquisitions therefore need larger target firm expected profits, y_i , to make them feasible. The acquirer's expected profits, y_j , and aggregate financial conditions, τ , act as "shifters" for the XX' curve. For acquirers with higher expected profits y_j , the curve XX' shifts down and lowers the cut-off value of the synergy parameter $\phi_{i,j}$. For high enough y_j the curve XX' crosses point A , so that the impact of the acquirer's financial constraint is no longer felt. A higher τ has an analogous effect on XX' .

Figure 2 illustrates that the feasibility constraint restricts the mass of both low- and high-value acquisitions that a constrained acquirer can actually complete upon being matched with a target. For an acquisition by a constrained firm to take place, the following two conditions have to be met: i) it generates positive surplus, i.e., $\phi_{i,j} \geq \phi^{hi}$ for productive targets ($y_i \geq \frac{\tau}{b}$), and $\phi^{lo} \leq \phi_{i,j} < \phi^{hi}$ for less productive targets ($y_i < \frac{\tau}{b}$) and ii) both firms together have enough resources to pay for their upfront costs, which can be expressed using the feasibility constraint as $y_i(\phi_{i,j}, y_j) \geq \underline{y}_i$. Based on these conditions, the mass of low- and high-value acquisitions are

$$n^{lo} \equiv \int_{\phi^{lo}}^{\phi^{hi}} \int \int_{\min(\frac{b}{\tau}, \underline{y}_i)}^{\frac{b}{\tau}} dG_i dG_j dF \quad \text{and} \quad n^{hi} \equiv \int_{\phi^{hi}} \int \int_{\underline{y}_i} dG_i dG_j dF, \quad (2.6)$$

where F , G_j and G_i denote the distributions of $\phi_{i,j}$, y_j and y_i .

Limiting Case: Unconstrained Acquirer. When an acquirer's profits tend towards infinity, $y_j \rightarrow \infty$, he does not face any borrowing constraints (as long as $\tau > 0$), so that acquisitions are always feasible and take place whenever they generate a positive surplus, i.e. whenever $S \geq 0$. For this set of unconstrained acquirers, denoted by an asterisk, the mass of low- and high-value acquisitions are

$$n^{lo*} \equiv \int_{\phi^{lo}}^{\phi^{hi}} \int_{\frac{b}{\tau}}^{\frac{b}{\tau}} dG_i dF \quad \text{and} \quad n^{hi*} \equiv \int_{\phi^{hi}} dF. \quad (2.7)$$

In Figure 2, these sets of acquisitions correspond to the area above $ABCF'$.

2.2 Financial Crises and the Average Acquired Share

In this section, we ask whether an aggregate financial shock to the economy, modeled as a decrease in τ from τ_n to τ_c , affects the *average* ownership structures observed in the market for corporate control. We start by defining these average acquired shares. For constrained firms, it is denoted by $\hat{\alpha}$ and can be expressed as the weighted sum of the average shares of low- and

high-value acquisitions, $\hat{\alpha}^{lo} = \frac{\alpha^{lo}}{n^{lo}}$ and $\hat{\alpha}^{hi} = \frac{\alpha^{hi}}{n^{hi}}$, with the weights being the share of these two types of acquisitions in the total number of unconstrained acquisitions:

$$\hat{\alpha} = \omega \hat{\alpha}^{lo} + (1 - \omega) \hat{\alpha}^{hi} \quad (2.8)$$

where $\omega = \frac{n^{lo}}{n^{lo} + n^{hi}}$, and equivalently for the average share $\hat{\alpha}^*$ acquired by unconstrained firms.¹²

Before proceeding further, we make an assumption about the relationship between ownership structures and the synergies parameter. In particular we assume that the share acquired $\alpha_{i,j}$ is increasing in the synergy parameter $\phi_{i,j}$ associated with the acquirer-target pair (i, j) , i.e., $\alpha'(\phi_{i,j}) > 0$. We remain agnostic about the reasons for this positive relationship. It could be that firms acquire larger shares of targets in expectation of stronger technological synergies, or that larger acquisition shares lead to strong synergies, or both. Both of these forces would arise in contracting models of joint ventures (Asiedu and Esfahani, 2001) or acquisitions (Alquist et al., 2018) when owners co-invest in inputs. Such a relationship could also arise due to majority control facilitating the transfer of intangible assets as in the large literature in international trade on firm boundaries (see Antràs, 2003; Antràs, Desai and Foley, 2009), or due to non-technological reasons when controlling stakes resolve agency issues in target firms as in Acharya, Shin and Yorulmazer (2011b). Thus, while synergies arising endogenously in the model could be an interesting extension, it would dilute the focus of the analysis, which is on selection effects. The assumption is also natural in the context of EMEs, where Chari, Ouimet and Tesar (2010) find that acquisitions of majority ($\geq 50\%$) stakes are associated with positive abnormal returns of 1.16%, on average. Our assumption implies that low-value acquisitions ($\phi^{lo} \leq \phi_{i,j} < \phi^{hi}$) feature lower acquired shares than high-value acquisitions ($\phi_{i,j} \geq \phi^{hi}$).

We now ask how an aggregate financial shock *differentially* affects the share acquired by constrained firms. α , compared to the share acquired by unconstrained firms, α^* . Focusing on the differential lets us capture how financial constraints of the *acquiring* firms shape the aggregate effect of the shock. Since the shock affects both acquirers and targets in reality, the differencing cancels out the component of the shock that works through the financial constraints of targets alone. Specifically, we look at the derivative $\frac{\partial(\hat{\alpha} - \hat{\alpha}^*)}{\partial \tau}$, where τ is the parameter governing aggregate financial conditions. Our later empirical test of the model follows this analysis closely, using a difference-in-difference strategy.

¹²The average shares for low- and high-value acquisitions by constrained acquirers are given by:

$$\hat{\alpha}^{lo} = \frac{\alpha^{lo}}{n^{lo}} = \frac{\int_{\phi^{lo}}^{\phi^{hi}} \int_{\min(\frac{b}{\tau}, \underline{y}_i)}^{\frac{b}{\tau}} \alpha_{i,j} dG_i dG_j dF}{\int_{\phi^{lo}}^{\phi^{hi}} \int_{\min(\frac{b}{\tau}, \underline{y}_i)}^{\frac{b}{\tau}} dG_i dG_j dF} \quad \text{and} \quad \hat{\alpha}^{hi} = \frac{\alpha^{hi}}{n^{hi}} = \frac{\int_{\phi^{hi}} \int_{\min(\frac{b}{\tau}, \underline{y}_i)} \alpha_{i,j} dG_i dG_j dF}{\int_{\phi^{hi}} \int_{\min(\frac{b}{\tau}, \underline{y}_i)} dG_i dG_j dF}.$$

To gain insight into the derivative $\frac{\partial(\hat{\alpha} - \hat{\alpha}^*)}{\partial\tau}$, it is useful to decompose the above derivative using the expressions for $\hat{\alpha}$ and $\hat{\alpha}^*$ as follows:

$$\begin{aligned} \frac{\partial(\hat{\alpha} - \hat{\alpha}^*)}{\partial\tau} = & \left[(\hat{\alpha}^{hi*} - \hat{\alpha}^{lo*}) - (\hat{\alpha}^{hi} - \hat{\alpha}^{lo}) \right] \underbrace{\frac{\partial\omega}{\partial\tau}}_{=?} + \underbrace{(\hat{\alpha}^{hi*} - \hat{\alpha}^{lo*})}_{>0} \left(\underbrace{\frac{\partial\omega^*}{\partial\tau}}_{<0} - \underbrace{\frac{\partial\omega}{\partial\tau}}_{=?} \right) \\ & + \underbrace{\left[\omega \frac{\partial\hat{\alpha}^{lo}}{\partial\tau} + (1 - \omega) \frac{\partial\hat{\alpha}^{hi}}{\partial\tau} \right]}_{=?} - \underbrace{\left[\omega^* \frac{\partial\hat{\alpha}^{lo*}}{\partial\tau} + (1 - \omega^*) \frac{\partial\hat{\alpha}^{hi*}}{\partial\tau} \right]}_{=0}. \end{aligned} \quad (2.9)$$

While the signs of some of the individual components depend on specific assumptions regarding the distribution of expected profits, G , and the joint borrowing constraint, $B_{i,j}$, the decomposition above is quite general. The first row refers to changes in the share of low-value acquisitions, $\partial\omega/\partial\tau$ and $\partial\omega^*/\partial\tau$, also called the *extensive* margin. The second row, the *intensive* margin, refers to the changes in the average acquired share for each subgroup of low- and high-value acquisitions.

The extensive margin differs substantively for constrained and unconstrained acquirers: For unconstrained acquirers, the negative financial shock increases the share ω^* of low-value acquisitions (region \overline{BCDE} in Figure 2, that is $\partial\omega^*/\partial\tau < 0$) as a larger proportion of potential target firms find themselves unable to raise enough external debt financing to cover the upfront cost of operating in the second period, and thus face liquidation. Coupled with our assumption that $\alpha'(\phi_{i,j}) > 0$, this implies a decline in the average share coming from this channel. For constrained acquirers, this effect is counterbalanced by a second effect: A financial shock also tightens the joint borrowing constraint, shifting the $\phi_{i,j} = \underline{\phi}(y_i, y_j, \tau)$ line up from XX' to YY' (see Figure 2) and making it harder for firms to acquire targets. This dampens the increase in the share of low-value acquisitions because some low-value acquisitions cannot take place as acquirers find themselves unable to raise sufficient funds. Importantly, this shift in the joint-borrowing constraint can, under certain conditions, *disproportionately* affect low-value acquisitions. Borrowing constraints skew the distribution of acquired firms further towards acquisitions with higher synergies. Some low-synergy acquisitions that might still be profitable, suddenly become *infeasible* if neither the target nor the acquirer has enough liquidity. This aggregate extensive margin for constrained acquirers depends on the distribution of expected profits in the economy, G , as well as the precise form of the joint borrowing constraint, $B_{i,j}$.

The intensive margin does not react to the aggregate shock in the case of unconstrained acquirers. Since the mass and composition of their high-value acquisitions are unaffected by the financial crisis, the average acquired share within that group does not change, i.e., $\frac{\partial\hat{\alpha}^{hi*}}{\partial\tau} = 0$. The crisis leads to an increase in the mass of low-value acquisitions, but this increase is independent of

$\phi_{i,j}$, so that the average acquired share of low-value acquisitions remains constant, i.e., $\frac{\partial \hat{\alpha}^{lo*}}{\partial \tau} = 0$. For constrained acquirers, the sign and magnitude of the intensive margin depends on which firms are affected more by the shift of the borrowing constraint, i.e., on G and $B_{i,j}$.

Hence to pin down the extensive and intensive margins for constrained acquirers, we make further assumptions regarding G and $B_{i,j}$. We assume that G is Pareto, and that $B_{i,j}$ is multiplicative in the expected profits of both acquirer and target. We specify and discuss these assumptions extensively in the appendix. In the following proposition we analytically prove that under these assumptions the acquired share of constrained firms, relative to that of unconstrained firms, should *rise* in response to an aggregate tightening of financial constraints.

Proposition 1 *Increase in relative acquired shares of constrained firms during crises*

Under Assumptions 1 through 3 (listed in the appendix), the shares acquired by constrained firms relative to the shares acquired by unconstrained firms become larger during financial crises, i.e. if $\tau_c < \tau_n$ then $\hat{\alpha}_c - \hat{\alpha}_c^ > \hat{\alpha}_n - \hat{\alpha}_n^*$.*

Proof: See Technical Appendix.

Under our assumptions for G and $B_{i,j}$, the magnitude of the two counteracting extensive margin effects for constrained acquirers described earlier — the increase in the potential pool of low-value acquisitions and the decrease in the feasibility to complete low-value acquisitions — perfectly cancel each other out, so that the share of low-value acquisitions, ω , remains unaffected by the change in the constraint parameter τ . Similarly, the intensive margin for constrained acquirers does not move, due again to the Pareto distribution assumption: Even though the lowest-value acquisitions are hit hardest among low-value acquisitions by the shift of the borrowing constraint, their relative mass does not go down, keeping the average acquired share of low-value acquisitions constant. Thus under our particular assumptions, the decrease in the average acquired share comes purely from a change in the composition of acquisitions (extensive margin) for unconstrained acquirers rather than any changes in the average acquired share of low-value acquisitions and high-value acquisitions (intensive margin).

As we emphasized, whether the share acquired by constrained firms remains exactly constant eventually depends on the firm profit distribution G and the joint-borrowing constraint $B_{i,j}$. The key of this section was to provide intuition about the two counteracting forces that determine the observable average ownership structure chosen for constrained acquirers, and to delineate the assumptions under which we can assign an unambiguous sign to their net effect. In a later section we simulate the model numerically under alternative assumptions on G and $B_{i,j}$ and find that the decrease in the feasibility to complete low-value acquisitions might even dominate the increase in the low-value target pool, and as a result, the average share by constrained acquiring firms even

goes up in the aftermath of an aggregate financial shock. Thus, we will use the decomposition provided by equation (2.9) and Proposition 1 as a simple benchmark case to guide and interpret our empirical implementation later.

2.3 Three-Period Model Setup

The analysis so far has been static. To study the effect of a financial shock on the *dynamics* of ownership, we now allow for the possible resale of firms after an acquisition. We show that the selection effects based on technological synergies and liquidity that influenced average ownership structures might also influence post-acquisition ownership dynamics. In particular, we show that in the presence of asset sales driven by idiosyncratic liquidity shocks to the owner of the asset, an aggregate financial shock leads to the selection of liquid acquirers into the market for corporate control, thereby lowering asset ownership turnover. In this section we briefly outline the steps used to solve the dynamic (three-period) version of the model and provide intuition behind the main results. Detailed statements and proofs of the underlying propositions are relegated to the appendix.

We extend the model in the previous section by an additional period, period 2. When we later analyze the effects of financial crises on divestiture rates, we model period 1 as a crisis period with tighter borrowing constraints and period 2 as a “normal” period, where financial conditions have returned to their previous state. At the end of period 1 the acquirer j receives an all-or-nothing offer for her entire share of the firm that was purchased in period 0. We make two main assumptions to simplify the analysis substantially: (i) every prospective seller in period 1 can find a new acquirer to buy back his initial period 0 acquisition, and similarly, every target firm that was not acquired in period 0 can find a new acquirer in period 1; and (ii) the new acquirer making the buy-back offer operates the firm using the same technology as the original owner of the firm (i.e. $\phi_{i,j} = 1$). These two assumptions together allow for a simple diagrammatic analysis of the resale decision.¹³ In the static model, acquisitions occurred simply on the basis of profitability and feasibility. However, since resale of the asset involves comparing the payoff from the resale to the payoff from retaining ownership of the asset, we need additional assumptions on the division of

¹³The assumption that every target firm that was not acquired in period 0 can find a new acquirer implies that the outside options for target firm and acquirer at the end of period 1 are the same and therefore do not affect the surplus of the initial acquisition. This assumption together with the assumption that the new acquirer has $\phi_{i,j} = 1$ keeps the relevant acquisition cutoffs ϕ^{lo} and ϕ^{hi} the same as in the static model. One can relax the assumption that sellers find a buyer with certainty. Reducing this probability is similar to introducing a discount factor. This being said, it is true that these assumptions are less innocuous if we believe that parameters are changing over the business cycle. For example, the probability of finding a buyer or the potential outside offer can change over the business cycle. These extensions might give use additional insights on flipping behavior, but we believe that they are orthogonal to the mechanism discussed in this section. Note that we no longer require the assumption that the acquired share α positively depends on the synergy parameter $\phi_{i,j}$.

the surplus from an acquisition as well as the stochastic process of profitability in periods 1 and 2. These latter assumptions – Nash bargaining between acquirers and targets over surplus and an autoregressive process for profits – are relatively standard and are discussed in the appendix.

In period 1, it is optimal for the initial acquirer j to resell the firm i whenever the value of reselling exceeds the value of holding onto the firm. The resale value depends on the expected net profits from production in period 2 for the new acquirer who makes the offer to buy. The value of holding onto the firm depends on the expected liquidity position of the post-acquisition entity (i.e. the acquirer-target entity resulting from the period 0 acquisition), since this entity will become financially constrained at the end of period 1 with some probability, and thus be unable to produce.

Combining the period 1 resale decision with the initial period 0 acquisition decision, we obtain five cases, illustrated in Figure 3. As discussed in Section 2.1.2, no initial acquisition takes place in cases 1 and 3 because synergies are too low.¹⁴ Initial acquisitions – some of which will be resold – take place in the remaining cases. Resales happen under two circumstances. First, all initial acquisitions that were driven by pure liquidity provision (low-value acquisitions) get resold because the target firm no longer requires liquidity for production in period 2. These “normal flips” happen if $\phi_{i,j} < \phi^{hi}$ (case 2 in Figure 3).

Second, even some high-synergy acquisitions with $\phi_{i,j} \geq \phi^{hi}$ might get flipped (cases 4 and 5). This happens whenever the post-acquisition entity becomes liquidity-constrained at the end of period 1. The probability of this “forced flipping” coincides with the probability of the post-acquisition entity not having enough liquidity, conditional on having had enough liquidity in the first period. Since unconstrained acquirers have enough liquidity by definition, forced flipping is only relevant for constrained acquirers.

We define flipping, or divestiture, rates as the number of acquisitions flipped at the end of period 1, n^{flip} , over the number of total acquisitions made at the end of period 0, n . Unconstrained acquirers only flip low-value acquisitions (normal flips), so that their flipping rate is simply

$$\frac{n^{flip*}}{n^*} = \frac{n^{lo*}}{n^{lo*} + n^{hi*}} = \underbrace{\omega^*}_{\text{normal}},$$

where ω^* is the share of low-value acquisitions. Constrained acquirers might, in addition, be forced to flip some of their high-value acquisitions:

$$\frac{n^{flip}}{n} = \frac{n^{lo} + (1-p)n^{hi}}{n^{lo} + n^{hi}} = \frac{n^{lo}}{n^{lo} + n^{hi}} + \frac{(1-p)n^{hi}}{n^{lo} + n^{hi}} = \underbrace{\omega}_{\text{normal}} + \underbrace{(1-p)(1-\omega)}_{\text{forced}}, \quad (2.10)$$

¹⁴In case 1, the target firm exits the market because it lacks liquidity to pay for the upfront cost of production; in case 3, the target firm has enough liquidity to produce by itself, but the synergies are too low to justify an acquisition.

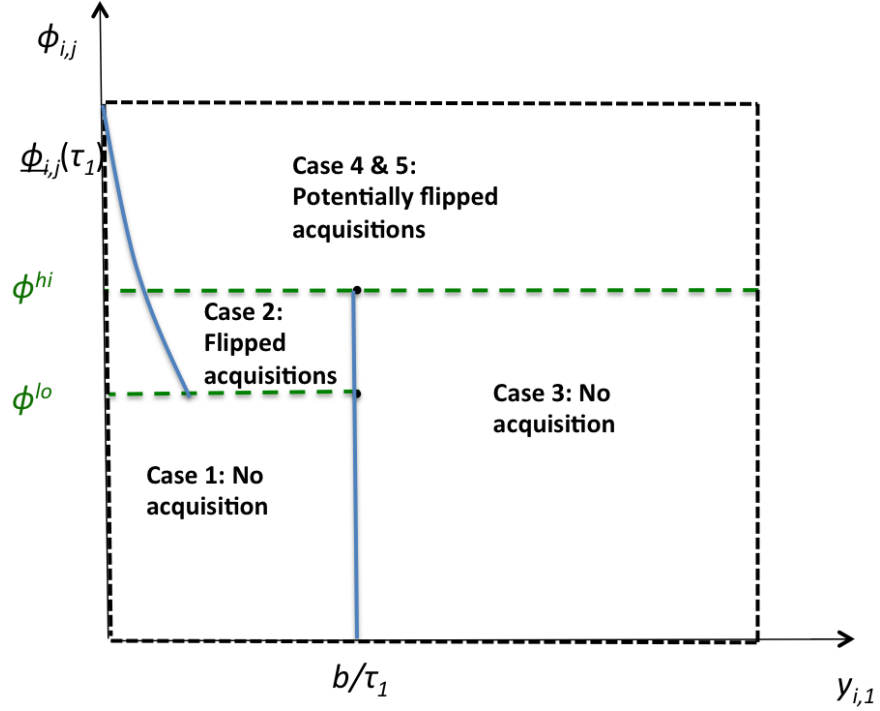


Figure 3: Resale of Acquired Firms

Notes: Figure displays combinations of the synergy parameter $\phi_{i,j}$ and the expected profits $y_{i,1}$ of a target firm, which can be initially acquired and then resold ('flipping'). The joint borrowing constraint $\phi_{i,j}$ is drawn for a constrained acquirer with a given liquidity level $y_{j,1}$. See text and appendix for further details on the different cases.

where p is the share of high-value post-acquisition entities that have enough liquidity at the end of period 1 (out of the total mass of high-value post-acquisition entities). The mass of asset resales for constrained acquirers is thus made up of a mass ω of normal flips and a mass $(1 - p)(1 - \omega)$ of forced flips.

2.4 Financial Crises and Asset Resales

We now ask how financial crises affect these flipping rates by considering two scenarios. In scenario 1, all periods are normal periods with $\tau_1 = \tau_2 = \tau_n$. In scenario 2, the financial crisis occurs at the end of period 0, but is over by the end of period 1, i.e. $\tau_1 = \tau_c < \tau_2 = \tau_n$. As with the acquired share, we focus on the differential effect on constrained acquirers relative to unconstrained acquirers to capture any change in divestiture rates that work through the financial constraints of the acquiring firm alone.

Proposition 2 *Decrease in relative flipping rates for acquisitions made by constrained acquirers during crises*

Under Assumptions 2 through 4 (listed in the appendix), flipping rates of acquisitions made by constrained firms relative to those made by unconstrained firms become smaller for acquisitions made during financial crises, i.e. if $\tau_c < \tau_n$ then $\frac{n_c^{flip}}{n_c} - \frac{n_c^{flip*}}{n_c^*} < \frac{n_n^{flip}}{n_n} - \frac{n_n^{flip*}}{n_n^*}$.

To understand the intuition behind this result, it is instructive to look at the derivative, with respect to τ_1 , of the differential flipping rate:

$$\frac{\partial \left(\frac{n^{flip}}{n} - \frac{n^{flip*}}{n^*} \right)}{\partial \tau_1} = \underbrace{\frac{\partial \omega}{\partial \tau_1}}_{=0} + \underbrace{\frac{\partial}{\partial \tau_1} (1-p)(1-\omega)}_{>0} - \underbrace{\frac{\partial \omega^*}{\partial \tau_1}}_{<0} > 0. \quad (2.11)$$

We examine each of the terms on the right hand side of the expression above in turn. The last term is the response of the divestiture rate of unconstrained firms to a negative financial shock in the economy. Since unconstrained firms only flip low-value acquisitions, the change in the proportion of flipped unconstrained acquisitions is simply equal to the change in the share of low-value acquisitions in all acquisitions by unconstrained acquirers. This, as shown earlier, increases (i.e. $\frac{\partial \omega^*}{\partial \tau_1} < 0$) when there is an adverse aggregate financial shock (i.e. decline in τ_1) due to more potential target firms requiring liquidity.

The first two terms show the response of constrained firms and suggest two differences relative to the case with unconstrained acquirers: The first term shows the changes in the share of low-value acquisitions that get flipped. A main insight from Proposition 1 in Section 2.2 was that this share of low-value acquisitions does not change for constrained acquirers during crises due to two counterbalancing effects. This keeps flipping rates low.¹⁵

The second term refers to changes in the number of “forced” resales caused by acquirers running into liquidity problems. As emphasized in Section 2.2, only firms with large expected profits can raise sufficient funds to undertake acquisitions during financial crises. To the extent that firms’ expected profits are somewhat persistent, it is less likely that these firms will face liquidity problems in the aftermath of the financial crisis, which will reduce the flipping rates for acquisitions made by constrained acquirers during financial crises.¹⁶

The lower flipping rates observed for crisis-cohort acquisitions are therefore the result of a double “selection effect” stemming from the acquirer’s side: Only the highest-synergy acquisitions (i.e. large $\phi_{i,j}$) take place, and only the most-liquid firms (i.e. large $y_{j,1}$) acquire targets. In the following empirical section, we directly test Proposition 2 using a difference-in-difference ap-

¹⁵As before, this is a knife-edge result that rests on the distributional assumptions we made. In the next section we will attempt an empirical assessment of the size of this effect.

¹⁶More formally, $\partial p / \partial \tau_1 |_{\tau_2} < 0$: Given a borrowing constraint level in the second period, τ_2 , a tighter borrowing constraint in the first period ($\tau_1 \downarrow$) raises the probability that the post-acquisition entity has enough liquidity at the end of the second period, p . Importantly, it is the *increase* of τ from a low crisis value $\tau_1 = \tau_c$ to a high value $\tau_2 = \tau_n$ that raises this probability p .

proach. In addition, since the proposition holds only under particular distributional assumptions, we also attempt to empirically determine the signs and magnitudes of the three terms discussed above.

3 Model Versus Data

In this section we compare the predictions of the model with the data by simulating the model in Section 3.2 to obtain shares acquired and divestiture rates, and then comparing these to their empirical counterpart in Section 3.3.

3.1 Data Description

We take the model to the data using transaction level data for domestic and cross-border M&As from the Thompson-Reuters Securities Data Company Platinum database, as well as control variables from a number of sources. SDC contains information on the universe of M&A transactions in a large set of EMEs. We only include sixteen of the largest markets for corporate control in EMEs that had significant activity in the M&A market over the entire sample period: Argentina, Brazil, Chile, China, India, Indonesia, Malaysia, Mexico, Peru, Philippines, Singapore, South Africa, South Korea, Taiwan, Thailand, and Vietnam. Even though our full sample (for which we displayed some key patterns in the introduction) goes from 1990-2014, we exclude the post-2007 period since the Great Recession because foreign firms from developed markets might have been financially constrained post-2007. Robustness checks with the longer series, reported in an appendix, leave our main conclusions unchanged.¹⁷ For each transaction, we utilize a few key variables: the share of a firm acquired in an acquisition and owned after an acquisition, the names of the firms involved, both their primary two-digit SIC industry classifications, the country of the acquirer and target firm, and the date on which the transaction was completed.

We also use macroeconomic controls in all our regressions. Real GDP growth (annual) is used to proxy for normal business cycle variation in M&A activity (Brown and Dinc, 2011) and real GDP per capita (annual) to control for the level of development of the target country (Erel, Liao and Weisbach, 2012). Nominal exchange rate depreciation (quarterly) is included to control for the effect of exchange rates on the value of collateral (Froot, 1991) and the use of IMF credit and

¹⁷We further limit our sample in a few ways. We only use transactions in which 10% or more of a firm is acquired. This is done to keep our results comparable to the literature on FDI, since, as explained below we use foreign acquisitions as a comparison group. Since we rely on cross-border acquisitions in EMEs as a comparison group of unconstrained acquirers, we exclude cross-border acquisitions made by firms from our target countries in other EME target countries, for example, a Malaysian cross-border acquisition in Thailand. Our results are not sensitive to including these transactions partly since the vast majority of foreign acquiring firms in our sample are from developed markets. These selection procedure leaves us with a sample of 28,109 transactions.

loans as a percentage of a country’s quota (quarterly) to account for stress factors in the balance of payments.¹⁸ Summary statistics are provided in the appendix (Table B.1).

3.2 Simulating the Model

We simulate the model to analyze the reaction of the average acquired share and flipping rates to a tightening of the borrowing constraint. We first have to choose functional forms and parameters. Some of these parameters are chosen to match certain features of the data on emerging market acquisitions described above. Here, we only briefly discuss some key parameters and refer the reader to the appendix for a more detailed discussion.

For the joint borrowing constraint, we assume that banks consider acquirer’s and target’s expected profits as perfect substitutes:

$$2b \leq \tau (\phi_{i,j}y_i + y_j).$$

We choose $\tau_n = 0.75$ during normal times and $\tau_c = 0.6$, translating into a 25 percent decline in the maximum debt-to-value ratio. As we will see, the simulation results hold for a wide range of values for τ_n and τ_c , at least qualitatively. For the distribution of expected profits, y_i and y_j , we choose a log-normal distribution (instead of the Pareto distribution assumed earlier). We assume that the distribution of synergies, $\phi_{i,j}$, is normally distributed with mean 1, meaning that half the firm pairs draw synergy parameters that *lower* the net productivity of the target firm. We assume a constant elasticity between the synergy parameter and the acquired share, α , in the range where $\alpha \in [0; 1]$. This elasticity, together with the standard deviation of the distribution of $\phi_{i,j}$ are calibrated to roughly match the share of acquisitions below 50%, the fraction of full acquisitions, and the average acquired share that we observe in the data.

3.2.1 Simulated Average Acquired Shares

Figure 4(a) shows how the average acquired share of both unconstrained and constrained acquirers adjusts to a steady decline of the maximum debt-to-value ratio, τ , in our 2-period model from Section 2.2. During normal times the average acquired share is somewhat higher among constrained firms (0.76 vs. 0.68). As credit constraints tighten, we observe that this gap widens by almost 7 percentage points, in line with Proposition 1. This widening is driven both by a decrease of the average acquired share for unconstrained acquisitions (by 4 percentage points) and an increase for constrained acquirers (by almost 3 percentage points). Recall that under the spe-

¹⁸These variables are introduced in single-period lags, following Brown and Dinc (2011). The sources of these data are the Penn World Tables, the IMF’s *International Financial Statistics*, Taiwan’s National Statistical Office, and the Central Bank of the Republic of China.

cific assumptions underlying Proposition 1, the average acquired share for constrained acquirers stays constant instead of going up. Its precise movement particularly depends on the range of τ and the form of the joint borrowing constraint, and even though the share might even go down for constrained acquirers, we never found a combination of parameters for which it went down more than it did for unconstrained acquirers.

Figure 4(b) decomposes this overall change in the difference of the average acquired shares across acquirers into the extensive and intensive margins, following equation (2.9). It shows the result of this decomposition for a change in τ from 0.75 to 0.6, both for the net effect (constrained less unconstrained), and for unconstrained and constrained acquirers individually. The net increase in the gap of 7% stems to two thirds from the extensive margin. This strong extensive margin is mainly driven by unconstrained acquirers. For acquisitions undertaken by constrained acquirers, this composition effect actually flips. Most of the increase in the average acquired share stems for an increase within each type of acquisitions.

3.2.2 Simulated Flipping Rates

An additional parameter of our three-period model, that we did not need in the two-period calibration discussed in Section 3.2, is the persistence of the temporary productivity, ρ . There is little guidance in the literature on this parameter, but it is probably uncontroversial to assume some persistence. We set $\rho = 0.5$, which, if we think of one period in our model corresponding to roughly four years, is in line with an annual persistence of about 0.85. Note that our results remain robust even for $\rho = 0$.

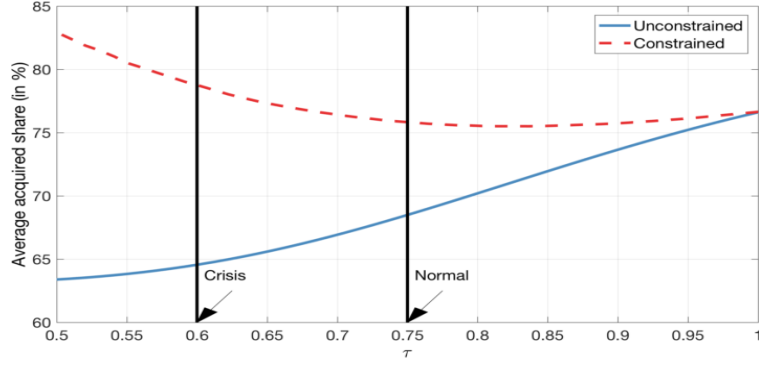
Figure 4(c) displays flipping rates for both constrained and unconstrained acquirers as a function of the borrowing constraint parameter in the crisis, τ_1 . After the crisis, τ returns to its normal value of $\tau_2 = 0.75$. For the chosen parameters, flipping rates increase for unconstrained acquirers by 6 percentage points from 11.5 to 17.2 percent, but decrease for constrained acquirers from 18.5 to 16.3 percent.

3.3 Regression Analysis of Average Acquired Share and Flipping Rates

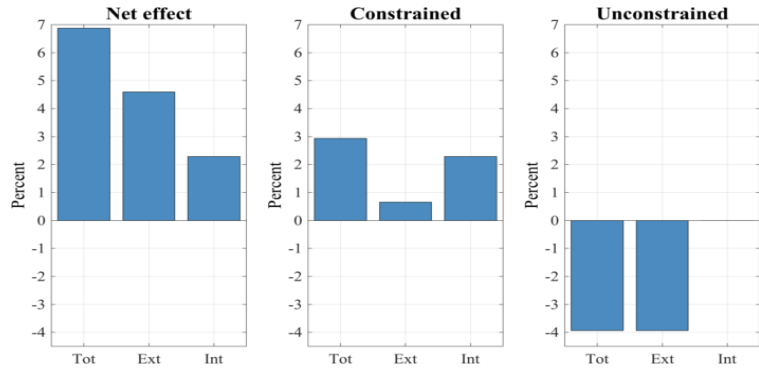
To provide empirical evidence on the acquirer financial constraint channel, we now adopt the same difference-in-difference (DID) strategy that formed the basis of Propositions 1 and 2 in the model section.

3.3.1 Average Acquired Share: Empirical Strategy, Hypotheses and Results

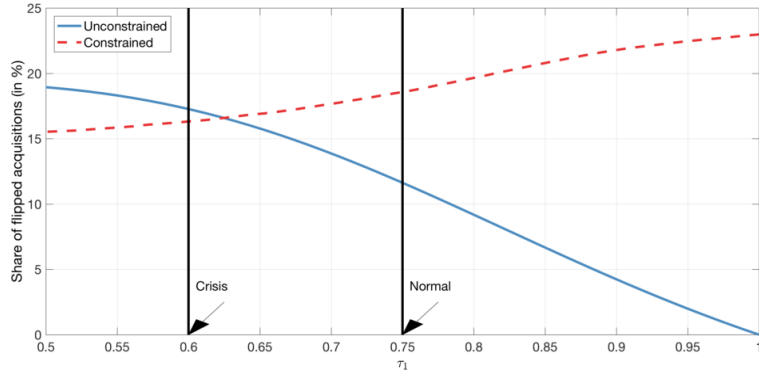
Following Proposition 1 we first estimate the magnitude of the differential effect of the crisis on ownership shares acquired by domestic and foreign acquiring firms. For easy interpretability of



(a) Average Acquired Share



(b) Decomposition of a Change in the Average Acquired Share



(c) Share of Flipped Acquisitions

Figure 4: Simulation Results

Note: Panel (a) shows the simulated average acquired share of firms as a function of the borrowing constraint parameter τ . A financial crisis is modeled as a decrease of τ . Panel (b) decomposes the percentage change from $\tau = 0.75$ to $\tau = 0.6$ into a composition change, the extensive margin, and a change in the average acquired share of both low-value acquisitions and technology acquisitions using the following equation:

$$\Delta \hat{\alpha}^* = \underbrace{(\hat{\alpha}^{lo} - \hat{\alpha}^{hi}) \Delta \omega - (\hat{\alpha}^{lo*} - \hat{\alpha}^{hi*}) \Delta \omega^*}_{Ext} + \underbrace{\omega' \Delta \hat{\alpha}^{lo} + (1 - \omega') \Delta \hat{\alpha}^{hi} - (\omega^{*'} \Delta \hat{\alpha}^{lo*} + (1 - \omega^{*'}) \Delta \hat{\alpha}^{hi*})}_{Int},$$

where a prime $'$ denotes the value after the change. Panel (c) shows the simulated share of flipped acquisitions as a function of the borrowing constraint parameter τ .

the coefficients we use a simple OLS specification as our baseline specification. Results using a Generalized Linear Model (to take into account the bounded nature of our dependent variables) are similar and can be found in the appendix. We first estimate the parameters of the following equation to find the overall or total effect of the crisis on ownership shares:

$$fracacq_{kjct} = \beta_0^{Tot.} + \beta_C^{Tot.} D_C^{ct} + \beta_F^{Tot.} D_F^{kjct} + \beta_{C,F}^{Tot.} D_C^{ct} \times D_F^{kjct} + \mathbf{con}' \beta_{con} + \epsilon_{kjct}. \quad (3.1)$$

The dependent variable in this regression, $fracacq_{kjct}$, is the fraction of the target firm acquired in a transaction (“fraction acquired”). The subscripts k , j , c , and t stand for transaction, single-digit SIC industry of the target firm, target country, and time, respectively. The two main independent variables are D_C^{ct} , which indicates whether an acquisition took place during a period when there was an aggregate adverse financial shock in the target country (“Crisis”), and D_F^{kjct} , which indicates whether the acquirer involved in a particular transaction is from a developed market (“Foreign”), which proxies for unconstrained acquirers in our theoretical model. Our crisis dummy D_C^{ct} is defined using the (annual) systemic banking crises dates from Laeven and Valencia (2010). The vector \mathbf{con} of independent variables used as controls includes fixed effects (at the country \times target-industry level in our baseline specifications) and a set of lagged country-level macroeconomic variables, varying at the country \times year level. The motivation behind these control variables are discussed at length later. Briefly, the fixed effects control for time invariant factors at the country \times target-industry level (for example, that particular industries in particular countries might have unique ownership structures due to regulations), while the macroeconomic variables correct for normal business cycle variation in M&A activity. Since our main explanatory variables are binary, the baseline group in the above regression, as well as all subsequent ones, is identified by setting $D_C^{ct} = 0$ and $D_F^{kjct} = 0$, simultaneously, which is the subset of domestic acquisitions during normal times.

Next, we decompose the total effect into an extensive and an intensive margin, as in the theoretical model. For identifying the extensive margin empirically, we estimate the following regression:

$$D_{maj.}^{kjct} = \beta_0^{Ext.} + \beta_C^{Ext.} D_C^{ct} + \beta_F^{Ext.} D_F^{kjct} + \beta_{C,F}^{Ext.} D_C^{ct} \times D_F^{kjct} + \mathbf{con}' \beta_{con} + \epsilon_{kjct}, \quad (3.2)$$

where the dependent variable is a dummy $D_{maj.}^{kjct}$ that takes a value of 1 above some threshold of ownership (“majority”). Recall that the extensive margin in the model (see Proposition 1) refers to changes in the shares of low-value acquisitions ($\partial\omega/\partial\tau$ and $\partial\omega^*/\partial\tau$ for constrained and unconstrained acquirers, respectively). Furthermore, we argued earlier – based on the empirical findings of Chari, Ouimet and Tesar (2010) and Alquist et al. (2018) – that changes in ω and ω^*

should translate into changes in average ownership structures. Thus the empirical counterpart of extensive margin changes in ownership structure is a compositional shift towards majority (Chari, Ouimet and Tesar, 2010) or full acquisitions (Alquist et al., 2018). In our baseline estimations, we set the threshold of ownership beyond which acquisitions are high-value in EMEs to be 50% based on Chari, Ouimet and Tesar (2010).

To estimate the intensive margin, we use a specification identical to equation 3.1 in all respects, except that we include a dummy independent variable identifying a majority acquisition:

$$\begin{aligned} fracacq_{kjct} = & \beta_0^{Int.} + \beta_C^{Int.} D_C^{ct} + \beta_F^{Int.} D_F^{kjct} + \beta_{C,F}^{Int.} D_C^{ct} \times D_F^{kjct} \\ & + \beta_{maj.} D_{maj.}^{kjct} + \mathbf{con}' \beta_{con} + \epsilon_{kjct}. \end{aligned} \quad (3.3)$$

The idea behind this specification is that part of the marginal effects on acquired shares captured in the parameter estimates of equation 3.1 might be driven by changes in the prevalence of majority acquisitions (i.e. the extensive margin) during crises. This part of the effect is captured by the “majority” dummy $D_{maj.}$. The coefficient $\beta_{C,F}^{Int.}$ then captures the remaining effect, that is the effect driven by changes *within* the group of non-majority (1%-49%) acquisitions and *within* the group of majority acquisitions (50%-100%).

Based on Proposition 1 and the earlier discussion, we frame a key empirical hypothesis regarding the coefficients associated with the dummy variable interactions $D_C^{ct} \times D_F^{kjct}$ in equations 3.1, 3.2, and 3.3.

Hypothesis 1 *Financial crises have differential effects on ownership structures chosen by domestic and foreign acquirers. Specifically, crises should have a larger effect on domestic stakes in comparison to foreign stakes during crisis times, i.e., $\beta_{C,F}^{Tot.} < 0$. This is driven by both extensive and intensive margins, i.e., $\beta_{C,F}^{Ext.} < 0$ and $\beta_{C,F}^{Int.} < 0$.*

The crisis effect for domestic acquisitions is β_C and those for foreign acquisition is $\beta_C + \beta_{C,F}$. We expect the crisis effect to differ for domestic and foreign acquisitions, since the latter are presumably unaffected by local credit conditions. In particular, we expect the crisis effect to be larger for domestic acquisitions, i.e., $\beta_C + \beta_{C,F} - \beta_C = \beta_{C,F} < 0$. This, in turn, is driven by changes along an extensive margin (*relative decline in the share of high-value acquisitions for foreign acquirers*), and an intensive margin (*relative decline in stakes acquired within the category of low and high value acquisitions for foreign acquirers*).

We estimate the three regressions (equations 3.1, 3.2, and 3.3) by OLS, using our EME data (Panel A of Table 1) and using simulated data from the theoretical model (Panel B of Table 1). Columns (1)-(3) of both panels of Table 1 correspond, respectively, to equations 3.1 - 3.3, and form our baseline results. The column headings indicate which of the margins described above (“Tot.” for Total, “Ext.” for Extensive and “Int.” for Intensive) the coefficients correspond to.

Table 1: Decomposition of Ownership Stake Changes During Crises

	Baseline Results (Majority Acquisitions)			Robustness Check (Full Acquisitions)	
Panel A: SDC Data					
	Tot.	Ext. (50%)	Int. (50%)	Ext. (100%)	Int. (100%)
Crisis (β_C)	0.05 ^a (0.01)	0.06 ^a (0.01)	0.01 ^c (0.00)	0.05 ^a (0.01)	0.02 ^a (0.00)
Foreign (β_F)	-0.01 (0.01)	0.00 (0.01)	-0.01 ^a (0.00)	-0.00 (0.01)	-0.00 (0.00)
Crisis \times Foreign ($\beta_{C,F}$)	-0.07 ^a (0.01)	-0.09 ^a (0.02)	-0.02 ^b (0.01)	-0.10 ^a (0.02)	-0.02 ^b (0.01)
Majority ($\beta_{50\%}$)			0.62 ^a (0.00)		
Full ($\beta_{100\%}$)					0.59 ^a (0.00)
No. obs.	28,019	28,019	28,019	28,019	28,019
R^2	0.08	0.06	0.76	0.08	0.73
Panel B: Simulated Data					
	Tot.	Ext. (50%)	Int. (50%)	Ext. (100%)	Int. (100%)
Crisis (β_C)	0.03 ^a (0.00)	0.01 ^a (0.00)	0.02 ^a (0.00)	0.02 ^a (0.00)	0.02 ^a (0.00)
Foreign (β_F)	-0.11 ^a (0.00)	-0.14 ^a (0.00)	-0.01 ^a (0.00)	-0.08 ^a (0.00)	-0.07 ^a (0.00)
Crisis \times Foreign ($\beta_{C,F}$)	-0.07 ^a (0.00)	-0.06 ^a (0.00)	-0.03 ^a (0.00)	-0.06 ^a (0.00)	-0.04 ^a (0.00)
Majority ($\beta_{50\%}$)			0.69 ^a (0.00)		
Full ($\beta_{100\%}$)					0.51 ^a (0.00)
No. obs.	300,000	300,000	300,000	300,000	300,000
R^2	0.04	0.11	0.31	0.01	0.66

Notes: The table reports the point estimate of the coefficient associated with the banking crisis dummy β_C , foreign acquisition dummy β_F and their interaction $\beta_{C,F}$ obtained from an OLS estimation on the SDC dataset (Panel A) and simulated data (Panel B). For both panels, the precise specifications in columns 1-3 are as follows. Column (1) corresponds to equation 3.1; column (2) corresponds to equation 3.2; column (3) corresponds to equation 3.3. Column (4) is an alternative of the specification in column (2) with the dependent variable defined on the basis of a dummy variable that is 1 when 100% of a firm is acquired in an acquisition. Column (5) estimates the specification in column (1) on the subset of acquisitions in which less than 100% of a firm is acquired. Conceptually, it is a counterpart of the specification in column (3). See the text of the paper for detailed explanations. *a*, *b* and *c* indicate statistical significance at the 1%, 5% and 10% levels, respectively. Robust standard errors reported in parentheses. All columns in Panel A have macroeconomic controls and country \times target-industry fixed effects, the coefficients of which are omitted from the table to conserve space.

First, in qualitative terms, note from Panel A that we find strong empirical support for our key hypothesis: We find in column 1 that the crisis effect is larger for domestic acquisitions than foreign ones ($\beta_{C,F}^{Tot.} < 0$, Hypothesis 1). We find in columns 2 and 3 that the estimates for the extensive margin (-0.09) and the intensive margin (-0.02) are both of the correct sign and statistically significant (at the 1% and 5% level, respectively).

The estimated effects are also large quantitatively. During normal times, both domestic and foreign firms acquire on average about a 65% share in their targets, while roughly 65% of their acquisitions comprise majority acquisitions in which at least 50% of a target is acquired. Starting from no statistically significant differences during normal times (as indicated by the zero coefficients on D_F in column 1 of Panel A) there is a divergence in the share acquired by 7 percentage points (pp.), driven by an increase of about 5 pp. (significant at 1%) for domestic acquirers and a 2 pp. decline (significant at 5%, calculation not shown) for foreign acquirers. Stated differently, domestic and foreign firms acquire roughly similar shares during normal times, while domestic firms acquire about 11% more ownership during banking crises. The divergence in the likelihood of completing majority acquisitions is even larger, about 15%.¹⁹ Columns 1-3 together suggest that the mechanisms highlighted by our theoretical analysis — that of an extensive margin compositional shift towards high-value majority acquisitions ($\beta_{C,F}^{Ext.}$ in column 2) and a selection effect along the intensive margin ($\beta_{C,F}^{Int.}$ in column 3) — are significant determinants of the divergence in ownership between constrained domestic acquiring firms and unconstrained foreign firms captured by $\beta_{C,F}^{Tot.}$ in column 1.

Note that in Table 1, the DID crisis effects, which compares the crisis effect on constrained (domestic) acquirers to the crisis effect on unconstrained (foreign) acquirers, are 7 pp., 9 pp. and 2 pp. for the total effect, the extensive margin and the intensive margin, respectively. In comparison, the coefficients $\beta_C^{Tot.} = 0.05$, $\beta_C^{Ext.} = 0.06$ and $\beta_C^{Int.} = 0.01$ in Panel A of Table 1, which only compare domestic firms between crisis and normal times, are smaller in magnitude. Thus, not taking into account the effects of the change in the pool of target firms during financial crises — which in our estimates is captured by the comparison to a baseline of unconstrained foreign acquirers — underestimates the effect that acquirer-side financial constraints have on ownership shares.

To compare the model’s predictions to the empirical results in quantitative terms, we present in Panel B of Table 1 the coefficients from identical estimations performed on a data set with a total of 300,000 observations simulated using the procedure outlined in the previous section. For

¹⁹It should be noted that these baseline estimates form a lower bound in that they control for macroeconomic conditions and fixed effects. Table B.2 in the appendix, which is discussed later, shows the results without these controls. According to these estimates, while domestic and foreign firms acquire roughly similar shares during normal times, domestic firms acquire about 15% more ownership during banking crises and are about 18% more likely to complete majority acquisitions.

completeness we report the same set of statistics in Panels A and B, such as the number of observations and standard errors. However we focus only on the point estimates of the coefficients from the simulated data.²⁰ Looking at column 1, Panel B, we see that the simulated crisis leads to an increase of the share acquired by domestic acquisitions of 3 percentage points, but a decrease for foreign acquisitions by 4 percentage points, implying again a gap of 7 pp., as in the data. Note that these numbers are consistent with the simulation results conveyed in Figure 4. The predicted signs and magnitudes of the coefficients are remarkably similar in the simulated and actual data for such a parsimonious model.²¹ Decomposing the effect into an extensive and intensive margin (columns 2 and 3), we find that the intensive margin plays a somewhat more important role in the simulated data than the actual data.²²

A cut-off ownership of 50% defines high-value acquisitions in our baseline regression results reported in columns 1-3, based on the results of Chari, Ouimet and Tesar (2010). We also report results for an alternative where the cut-off ownership for high-value acquisitions is 100%, that takes into account the industry-level positive correlation between target productivity and the likelihood of 100% acquisitions reported in Alquist et al. (2018). Accordingly, we re-estimate an alternative of the specification in column 2 with the dependent variable being an indicator that is 1 when 100% of a firm is acquired in an acquisition (column 4 of Panels A and B). Corresponding intensive margins are shown in column 5 using the specification in column 3, but using an indicator variable for 100% acquisitions (instead of $\geq 50\%$ acquisitions as in column 3). Overall, both definitions of high-value acquisitions yield similar results. Our empirical analysis of divestiture decisions utilizes this alternative definition of a high-value acquisition for reasons that are clarified in the following section.

²⁰The point estimates are effectively the coefficients from a linear approximation of the data generating process implied by the theoretical model, and are meant to provide a sense of the quantitative performance of the model. We do not have data that would let us precisely calibrate all the stochastic processes used in the simulations, for example, the variance of firm-specific idiosyncratic shocks. Since these influence all the objects estimated in the regression with the simulated data, we do not compare all the estimated statistics, e.g. standard errors, to the corresponding statistics from the SDC regressions.

²¹One caveat to this particular comparison between the model and the data is that we do not calibrate our financial friction parameter τ , but simply model the aggregate financial shock as a decline in τ from 0.75 to 0.6, resulting in a 25 percent decline in the maximum debt-to-value ratio of all firms. Both the initial value of τ and its drop determine the DID coefficient $\beta_{C,F}$, as can be seen in Figure 4a. It is, however, remarkable that both the data and the model suggest that this DID effect is driven to roughly the same extent by an increase in the share acquired by domestic firms and a decrease in the share acquired by foreign firms.

²²The reader might notice that the magnitude of the coefficient associated with the foreign dummy β_F is clearly negative, in contrast to a near zero coefficient in the data. Our model therefore implies that foreign acquisitions are somewhat smaller than domestic acquisitions during normal times. This is not too surprising because our model assumes that foreign and domestic acquirers only differ in their access to finance. Low-synergy (and hence, small-share) acquisitions are not feasible for domestic, constrained acquirers in our model, even in normal times. One could easily align the model's predicted β_F with that found in the data by assuming that foreign and domestic acquirers also vary along other dimensions, such as in the distribution of synergy parameters. This modification, however, would have little effect on the model's predictions about our main coefficient of interest, $\beta_{C,F}$.

3.3.2 Divestiture Rates: Empirical Strategy, Hypotheses and Results

Our model also has predictions on the subsequent resale of acquisitions. To remind the reader, Proposition 2 looked at the differential effect of a financial shock on the divestiture rates of constrained domestic and unconstrained foreign acquisitions. The motivation for focussing on the differential is the same as that for the acquired share, which is that a DID procedure is better able to isolate the effects of acquirer financial constraints. In particular, Proposition 2 predicted that the differential flip rate (“constrained” minus “unconstrained”) would decline. To test Proposition 2 empirically, we estimate a Cox proportional hazards model of the following form:

$$\ln[h_{kjc}(\tau|\cdot)] = \ln[h_{jc}(\tau)] + \beta_C D_C^{ct} + \beta_F D_F^{kjct} + \beta_{C,F} D_C^{ct} \times D_F^{kjct} + \mathbf{controls}'_{c,t-4} \beta_{mc} + \epsilon_{kjct}. \quad (3.4)$$

where D_C^{ct} , D_F^{kjct} and the controls are defined as in the previous section. The estimated hazard function, $h_{jc}(\tau)$, is the probability density that the average firm experiences an acquisition event in a small interval of time $\Delta\tau$, conditional on it not having been the target of an acquisition for τ units of time since the last acquisition event (see Kalbfleisch and Prentice, 1980, for details of the notation). We stratify this baseline hazard $h_{jc}(\tau)$ at the country \times target-industry level (i.e., allowed to be different across countries indexed c and industries indexed j), to be consistent with the country \times target-industry fixed effects in the regression analysis of acquired shares. The purpose of the stratification is to take into account divestiture patterns that might be unique to certain countries and industries, say due to regulations.

For our baseline estimations, the duration τ of an acquisition is measured as follows. We identify target firms that appear at least twice in our data. Let such a target firm be indexed by k . The first transaction involving k identifies the beginning of the relationship between the first acquirer and the target. The second transaction involving k is assumed to mark the end of the immediately preceding ownership relationship, and so on for subsequent appearances by the same target k in the data.²³ The duration of acquisitions involving target k is then defined as the distance in time between each transaction involving k . While this scheme has the serious limitation that an acquisition event involving k always assumes the seller of the stake to be the previous acquiring firm (which may not be the case due to partial ownership), it has two advantages. First, it lets us keep the same sample of firms for which we estimated our ownership regressions. Second, it makes the performance of the theoretical model easier to compare to the data for reasons that are explained later. However, we show in the appendix that an alternative way of defining duration that is immune to the issue described above leaves our conclusions unchanged.

In the model above, the *hazard ratio* $\frac{h_{kjc}(\tau|X)}{h_{jc}(\tau)}$ is the ratio between the hazard rate when the

²³Our data does not allow us to identify the direct seller of a share in a transaction.

covariates take values summarized by the vector X , and the baseline hazard. Our main hypothesis from Proposition 2 is that the crisis effect should lead to a relative decline of flipping rates of the crisis cohort of domestic acquisitions, or a relative *increase* in the flipping rates of foreign cohort. That is, the coefficient $\beta_{C,F}$ in 3.4 should be positive.

Hypothesis 2 *Financial crises have differential effects on flip rates of the crisis cohort of domestic and foreign acquisitions. Specifically, the differential flip rate for the crisis cohort of domestic acquisitions will decline, i.e., $\beta_{C,F} > 0$. Equivalently, the exponentiated coefficient, which shows the differential effect in percentage terms should be greater than unity, i.e., $e^{\beta_{C,F}} > 1$.*

The results of estimating equation 3.4 are shown in column 1 of Table 2. For ease of exposition the table displays the exponent of the coefficient, e.g. $e^{\beta_{C,F}}$ instead of $\beta_{C,F}$.²⁴ Values above one then indicate an increase in the hazard rate, and values below one indicate a decrease in the hazard.

We find evidence in favor of Hypothesis 2: The point estimate of the hazard ratio corresponding to the coefficient $e^{\beta_{C,F}}$ is 1.31, significant at 5%. This implies that the effect of the crisis on the flipping rates of the crisis cohorts of domestic and foreign acquisitions are statistically different, in the direction predicted by the theory. The subsequent flip rate for foreign acquisitions undertaken during crises goes up by $(e^{\beta_{C,F}} - 1) \times 100 = 31\%$ compared to the flip rate for domestic acquisitions.

To better understand this empirical result we turn again to Proposition 2, which decomposed the differential effect of the crisis in flipping rates as follows,

$$\Delta \left(\frac{n^{flip}}{n} - \frac{n^{flip*}}{n^*} \right) = \underbrace{\Delta \omega}_{\Delta \text{ normal flip } (=0)} + \underbrace{\Delta(1-p)(1-\omega)}_{\Delta \text{ forced flip } (<0)} - \underbrace{\Delta \omega^*}_{\Delta \text{ normal flip } (>0)} < 0, \quad (3.5)$$

into changes of the “normal” and “forced” flip rates for domestic acquirers, and the change in the “normal” flip rate for foreign acquirers. Proposition 2 predicted that there is no change in the proportion of normal flips for domestic acquirers (since there is no change in the proportion of low-value domestic acquisitions) under particular assumptions about the distribution of synergies and financial liquidity. At the same time it predicted that the differential (foreign - domestic) flip rate would increase, driven by the decline of domestic forced flips and the increase of foreign normal flips. Note that the signs assigned above to the terms are based on $\Delta \tau_1 < 0$.

First, we establish whether the behavior of domestic or foreign flips drives the empirical evidence in favor of Proposition 2. In terms of the Cox regression hazard ratios in Table 2, a decline

²⁴See Table B.10 in the appendix that displays the regression coefficients associated with the hazard ratios in Table 2.

Table 2: Hazard Ratios From Cox Model

	Baseline Results ¹		Robustness Checks (Majority Acquisitions) ²		
	(1)	(2)	(3)	(4)	
Crisis (e^{β_C})	0.81 ^b (0.08)	0.84 ^c (0.08)	Crisis (e^{β_C})	0.76 ^c (0.11)	0.78 ^b (0.09)
Foreign (e^{β_F})	0.90 (0.07)	0.85 ^b (0.06)	Foreign (e^{β_F})	0.82 ^b (0.07)	0.86 ^c (0.07)
Crisis×Foreign ($e^{\beta_{C,F}}$)	1.31 ^b (0.16)	1.19 (0.14)	Crisis×Foreign ($e^{\beta_{C,F}}$)	1.12 (0.22)	1.06 (0.19)
Majority ($e^{\beta_{50\%}}$)		0.23 ^a (0.01)	Full ($e^{\beta_{100\%}}$)		0.17 ^a (0.01)
No. obs.	28,019	28,019	No. obs.	19,329	19,329
Log L	-20,336.8	-19,414.8	Log L	-7,117.0	-6,630.9

Notes: ¹ Baseline results for the estimated hazard ratios associated with the banking crisis dummy D_C , foreign acquisition dummy D_F , a dummy for 50% acquisitions $D_{50\%}$, and their interaction terms obtained from a Cox duration model.

² Robustness results replacing $D_{50\%}$ with dummy for 100% acquisitions $D_{100\%}$. Columns (3) and (4) are based on the sample of acquisitions by domestic and foreign acquirers in which at least 51% is acquired. Columns (1) and (3) correspond to regression equation 3.4, and columns (2) and (4) to equation 3.6, exponentiated to express them in terms of hazard ratios. The baseline hazards are stratified by country×target-industry. The dates for the domestic banking crises are from Laeven and Valencia (2010). *a*, *b* and *c* indicate statistical significance at the 1%, 5% and 10% levels, respectively. Standard errors clustered at the level of country×target-industry are reported in parentheses. All columns include macroeconomic controls whose coefficient estimates are omitted from the table to conserve space.

in the flip rate of the crisis cohort of domestic acquisitions would imply a corresponding hazard ratio of $e^{\beta_C} < 1$, and an increase in the flip rate of the crisis cohort of foreign acquisitions would imply $e^{\beta_C + \beta_{C,F}} > 1$. Column 1 of Table 2 shows that $e^{\beta_C} = 0.81$, statistically significant at the 5% level, meaning that the subsequent flip rates of domestic acquisitions are lower by $(1 - e^{\beta_C}) \times 100 = 19\%$ when conducted during crises. At the same time $e^{\beta_C + \beta_{C,F}} = 1.06$, which suggests that the flip rate for foreign acquisitions do increase as predicted by the theory. But the change is small, about $(1 - e^{\beta_C + \beta_{C,F}}) \times 100 = 6\%$, and not statistically significant.²⁵ Hence, we conclude that the empirical evidence in favor of Proposition 2 is driven mostly by a decline in the average flip rates of the crisis cohort of domestic acquisitions.

²⁵To test statistically whether $e^{\beta_C + \beta_{C,F}}$ is different from 1, we conduct a test of significance for the linear combination of coefficients in the Cox regression. We find that the point estimate of $\beta_C + \beta_{C,F}$ is 0.06 with a standard error of 0.09, so that $e^{\beta_C + \beta_{C,F}} \approx 1.06$.

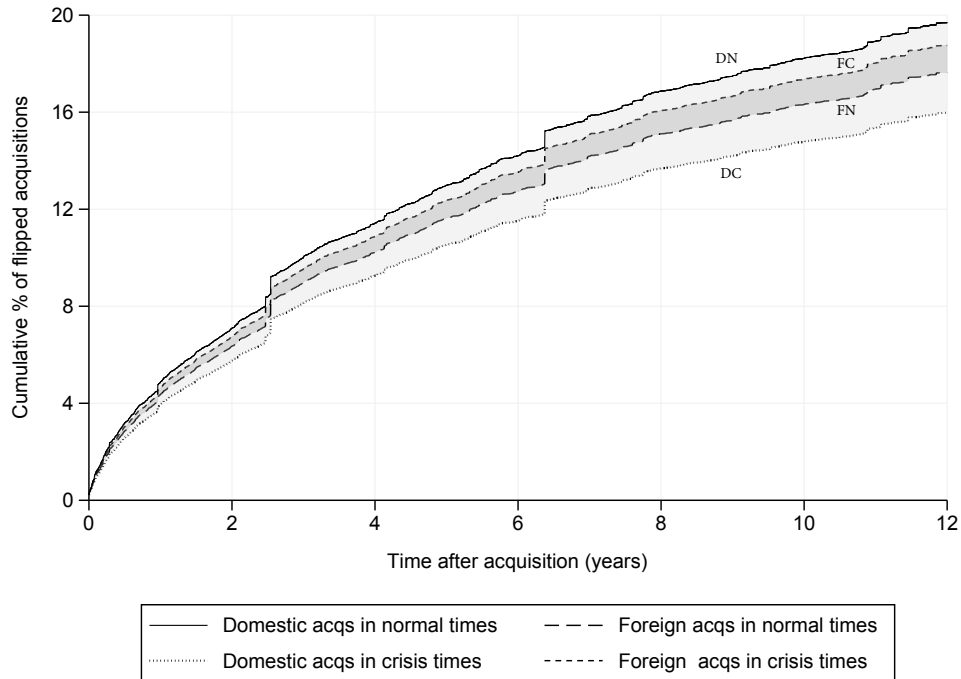


Figure 5: Estimated share of flipped acquisitions from Cox regression

Notes: The figure displays the cumulative proportion of flipped acquisitions with respect to the time after acquisition based on the estimated coefficients of the stratified Cox proportional hazards model in Column (1) of Table 2. The adjusted baseline cumulative hazard function, corresponding to the curve for domestic acquisitions in normal times, is obtained from a weighted average of the baseline hazard functions across target country \times industry strata, with the weights proportional to the number of flipped acquisitions at the given level of stratum.

The estimated hazard ratios in Table 2 are informative about the magnitudes of the effects of the individual covariates in comparison to the baseline hazards, but do not tell us anything about the actual flip rates. For further comparison to the theoretical model, Figure 5 therefore plots the cumulative proportion of acquisitions flipped predicted from the Cox estimation above as a function of the number years since the acquisition. The four lines on the figure correspond to the four categories of acquisitions that are of interest: domestic-normal (DN), domestic-crisis (DC), foreign-normal (FN) and foreign-crisis (FC). The empirical estimates indicate that the flip rates of the crisis cohort of domestic acquisitions are lower at all horizons (the cumulative flip curve shifts down from DN to DC), while the flip rates of the crisis cohort of foreign acquisitions are higher at all horizons (the cumulative flip curve shifts up from FN to FC).

Recall that Figure 3 in the simulation section displayed flipping rates for constrained and

unconstrained acquirers as a function of the borrowing constraint parameter, τ . The crisis was modelled as a change in this parameter from 0.75 to 0.6, and then reversion to its normal value of 0.75 after the crisis. For the chosen parameters, the simulations of the model predicted an increase of the flipping rates for unconstrained acquirers by 6 percentage points from 11.5% to 17.2%, and a decrease for constrained acquirers from 18.5% to 16.3%, both over a period of roughly 4 years since the date of the acquisition. In contrast, the empirical results show that the percentage of foreign acquisitions flipped at the 4-year horizon increases from 10.2% to 10.9% for the normal versus the crisis cohort (16.3% to 17.4% for a 10-year horizon), while the same figure for domestic acquisitions declines from 11.4% to 9.3% for the normal versus the crisis cohort (18.2% to 14.8% for a 10-year horizon). Comparing the magnitudes of the cumulative fractions of acquisitions flipped in Figures 5 and 3, three points stand out. First, the theoretical model overestimates the *levels* of the flip rates at the 4-year horizon for which the model is calibrated. Second, the theory underestimates the change in the flip rates of domestic (constrained) acquisitions and overestimates the change in the flip rates of foreign (unconstrained) acquisitions. Third, the magnitude of the changes in the flip rates predicted by the model are more consistent with empirical flip rates at longer horizons.

Next, we ask whether it is changes in normal flips or changes in forced flips that drive the 19% decline in domestic divestiture rates found in column 1. From the decomposition in equation 3.5, it can be seen that lower flipping for constrained domestic acquirers can be in principle due to fewer normal flips driven by a compositional shift towards high-value acquisitions (though under the distributional assumptions in Proposition 2 this change is 0), as well as fewer liquidity-based forced flips. We attempt to disentangle these two channels by using a majority acquisition as the empirical counterpart for a high-value acquisition, as in our baseline estimates for ownership acquired.²⁶ The idea is to control in regression 3.4 for the compositional shift towards high-value acquisitions. If our estimate of the hazard ratio e^{β_C} remains unaffected by this control, we interpret this as evidence that part of the reducing flipping rate is driven by fewer forced flips. Accordingly, we add to the model of equation 3.4 a dummy independent variable $D_{50\%}^{kjct}$ indicating whether a transaction resulted in majority ownership:

$$\begin{aligned} \ln[h_{kjc}(\tau|\cdot)] = & \ln[h_{jc}(\tau)] + \beta_C D_C^{ct} + \beta_F D_F^{kjct} + \beta_{C,F} D_C^{ct} \times D_F^{kjct} \\ & + \beta_{50\%} D_{50\%}^{kjct} + \mathbf{controls}'_{c,t-4} \beta_{mc} + \epsilon_{kjct}. \end{aligned} \quad (3.6)$$

The results of estimating equation 3.6 are shown in column 2 of Table 2. We find evidence that the decline in the flipping rate for domestic acquirers is driven by both a decline in forced flips and a decline in normal flips. First, though the hazard ratio e^{β_C} in column 2 declines somewhat in magnitude (indicating a 16% decline in domestic flip rates, as opposed to 19% in column 1),

²⁶As explained earlier, this builds on the idea in Chari, Ouimet and Tesar (2010) that majority acquisitions create real value gains in emerging markets for both domestic and foreign acquirers.

it remains statistically significant at 10%. Thus, to the extent that the full ownership dummy proxies for high-value acquisitions, controlling for the compositional shift towards high value acquisition keeps our qualitative results unchanged. Through the lens of our theoretical model, we interpret this result as evidence that there are fewer liquidity-based forced flips for the crisis cohort of domestic acquisitions. Second, part of the decline in the flipping rates can be explained by a compositional shift. The highly statistically significant hazard ratio associated with $D_{50\%}^{kjct}$ in column 2 shows that majority acquisitions indeed have lower divestiture rates (77% lower on average), consistent with the behavior of high-value acquisitions in the model. This result, coupled with our earlier finding that there is an extensive margin shift towards full acquisitions for domestic acquirers (column 4 of Table 1), suggests that part of the lower divestiture rate identified in column 1 of Table 2 is driven by the first channel in the model, which is, a decline in normal flips due to a shift towards high-value acquisitions that are less likely to be divested. Thus, we find evidence that both channels in equation 3.5 lead to a decline in flips in the cohort of domestic crisis-time acquisitions.²⁷ Estimating equation 3.6 with additional interaction terms of the independent variables leaves our conclusions unchanged (see Table B.12 in the appendix).

The duration τ of an acquisition in the baseline regressions was measured by the distance in time between each transaction involving a particular target firm. However, this potentially overestimates change in the flipping rates because partial ownership stakes may be flipped by a different owner than the one involved in the initial transaction. Thus, as a robustness check, we only use the subsample of acquisitions in which the acquiring firm owned 51% or more of the target post-acquisition in the hazard estimation.²⁸ We proxy for high value acquisitions with full acquisitions instead of majority acquisitions in this case. The results of this alternative estimation are shown in columns 3 and 4 of Table 2. The results are consistent across the two definitions of duration. In fact the point estimates of the hazard ratios show a somewhat larger decline of 24% in the hazard rates of domestic flips.

To summarize our empirical results, we find strong empirical support for our predictions re-

²⁷The magnitudes of the hazard ratios e^{β_F} in the second row of Table 2, columns 1 and 2 (0.90 and 0.85, respectively), are also consistent with the predictions of our model. They indicate that foreign acquisitions completed in normal times have lower divestiture rates than domestic ones, as shown in Figure 3.

²⁸Along with the fraction of a target acquired in a transaction, our data source provides the fraction of the target that the acquiring firm owns after the transaction. These may be different when the acquirer had prior partial ownership in the target. For the purpose of the robustness check, we first limit our sample to acquisitions in which *post-acquisition*, the acquiring firm owned 51% or more of the target. We then identify target firms that appear at least twice in our data. Let such a target firm be indexed by k . In the second acquisition involving k , it has to be the first acquirer who sold a stake in the target since we limited the sample to acquisitions after which the acquirer owns at least 51% (since the sum of ownership shares cannot exceed 100%). The initial transaction thus identifies the beginning of the relationship between the first acquirer and the target. The second sale is assumed to mark the end of the immediately preceding ownership relationship, and so on for subsequent appearances by the same target in the data. The duration of acquisitions involving target k is thus the distance in time between each transaction involving k that resulted in a stake of at least 51%.

garding the fraction of a firm acquired. Specifically, we find that financially constrained domestic firms in the crisis-hit country acquire between 11-15% more ownership and are 15-18% more likely to take majority stakes than their unconstrained foreign counterparts (see our earlier calculations based on columns 1 and 2 in Panel A of Tables 1 and B.2). Such ownership is also more likely to be persistent: the survival rate of a domestic acquisition is between 19-24% higher in the crisis cohort (from the exponentiated coefficient $e^{\beta c}$ in columns 1 and 4 of Table 2). Thus the evidence on divestiture rates is also consistent with our theoretical predictions, though statistically weaker for certain specifications, and generally favors the mechanisms highlighted by the model.

3.3.3 Robustness Checks

We find that all our empirical results are robust to a large number of checks. In the interest of space these are simply listed here, while a detailed discussion can be found in the accompanying appendix. The robustness checks include: (i) extending the estimation sample up until 2014; (ii) alternative banking crisis dates from Reinhart and Rogoff (2009) instead of our baseline dates (Laeven and Valencia, 2010), or using only the sample of countries which had crises; (iii) the inclusion of macroeconomic variables to control for normal business cycle variation in acquisition activity; (iv) additional controls for alternative explanations that might drive differences between domestic and cross-border acquisitions (for example, those in Froot, 1991) or Zhu, Jog and Otchere (2011); (v) different fixed effects combinations to control for sector (see Acharya, Shin and Yorulmazer, 2008, for example, with respect to financial M&As) or country differences; (vi) changes in sectoral shares of M&A activity during crises; and (vii) non-linear estimation procedures such as the Generalized Linear Model.

4 Discussion and Conclusion

This paper provides a simple analytical framework for assessing the acquirer-side effects of adverse aggregate financial shocks on the market for corporate control. We model two kinds of acquiring firms: those operating under financial constraints similar to target firms, and those that are financially unconstrained. We derive two hypotheses stating that financial crises have opposite effects on the acquisition behavior of these two groups: Acquisitions undertaken during financial crises feature smaller shares and are shorter lived for unconstrained acquirers, but are characterized by larger shares and are more persistent for constrained acquirers. Intuitively, financial crises induce a selection effect among constrained acquirers with only the acquisitions with the highest synergies being successful, and the most liquid firms acquiring firms completing these acquisitions. Interpreting constrained and unconstrained acquiring firms as domestic and foreign acquirers in a large dataset of emerging market acquisitions spanning the years 1990-2007,

we provide robust evidence of an increase in the relative stakes acquired in domestic acquisitions, as well as a relatively lower divestiture rates domestic acquisitions in the crisis cohort, as predicted by the model.

Two elements of our theoretical analysis are worth highlighting. First, we focus entirely on selection effects based on synergies and financial liquidity. While simple and intuitively appealing, our analysis shows that the precise direction and magnitude of such effects depend on considerations such as the distributions of synergies and productivity. The selection effect identified in the model is a general point, which we then use to explain the specific differences between domestic and cross-border acquisitions that we note in the introduction, and then robustly establish in our empirical analysis. Selection based on financial liquidity of acquirers forms the basis of our flipping results. An additional assumption about the relationship between ownership structures and synergies, which would arise in many models of input provision (Asiedu and Esfahani, 2001; Alquist et al., 2018), intangible assets (Antràs, 2003; Antràs, Desai and Foley, 2009), or agency issues (Acharya, Shin and Yorulmazer, 2011*b*), and has strong empirical support in EMEs (Chari, Ouimet and Tesar, 2010), forms the logical bridge between selection effects based on transaction synergies and ownership structures. Our theoretical analysis thus points to one possible explanation for the empirical facts about emerging market M&As. We control for a number of competing hypotheses about differences between domestic and foreign acquirers in our robustness analysis, such as strategic market entry by foreign acquirers versus consolidation by domestic acquirers; particular sectoral characteristics such as for financial firms, or changes in sectoral composition of acquisitions during crises. Our results survive these checks.

We would like to emphasize in this context that mechanisms other than selection effects may also be at work, but would either have difficulty matching the observed differences between domestic and cross-border acquisitions on their own, or are silent about the evolution of ownership structures and divestiture rates. For example, neo-classical theories of M&As in the tradition of Jovanovic and Rousseau (2002) would suggest that optimal pairings would occur between firms that differ in terms of their Tobin's Q. Aguiar and Gopinath (2005) in fact find that offer price/book value of domestic target firms collapsed during the 1997 Asian Financial Crisis, suggesting a role for matches between relatively high Q foreign (or domestic) firms and undervalued targets.²⁹ However, it is not clear why in this case domestic acquirers would acquire relatively more ownership, and be less likely to divest these acquisitions later (controlling for these higher stakes). An appealing feature of our analysis is that it is based on a very general aggregate selection effect. In fact, a key implication of our results is that even if acquisition and divestiture decisions at the firm level remain unaffected by financial disruptions, we might see salient aggregate effects due to selection.

²⁹Offer price/market value remained stable. See Figure 5 in Aguiar and Gopinath (2005).

Second, our contrasting results for constrained (domestic) and unconstrained (foreign) acquisitions highlight the role of firm level borrowing constraints for firm acquisitions, which in our model comprise the *only* difference between firms, in determining which financially constrained firms remain active in the market for corporate control. It should be noted that this is a deliberate modelling choice, and done to demonstrate the effect we are after – the difference in the behavior of foreign and domestic firms when the latter are faced by financial shocks – most cleanly. Thus our results have mostly focussed on the comparative statics of a financial shock rather than the initial level differences in the variables of interest (such as shares acquired and divestiture rates), which could be due to differences in technology between foreign and domestic firms that are explicitly excluded in the model. It is therefore not surprising that our model empirically performs much better in explaining crisis-induced changes in acquired shares and divestiture rather than their levels.

Our model has important macro-economic implications that are worth exploring further. For example, the selection effects described in this paper have direct consequences for an economy's aggregate productivity. Since Joseph Schumpeter's classic work (Schumpeter, 1934), it is well understood that recessions or financial crises lead to higher average productivity through a so-called "cleansing" effect that forces the exit of the least productive firms. Our model suggests that such a cleansing effect might also be present in the market for corporate control, where it shifts resources towards the most productive M&As. Since these M&As are also shown to be longer lived, these effects are likely to endure beyond the financial crisis itself. A careful analysis of these effects requires a dynamic model and is beyond the scope of this paper, but we already point towards selection effects that are likely to be critical in such a model.

The model also has a rich set of firm-level predictions regarding the joint distribution of productivity and financial liquidity for acquirers and targets that we do not test partly because, to the best of our knowledge, high-quality balance sheet data for a large set of acquirers and target firms do not exist in the case of EMEs (since, for example, many transactions involve privately- or family-owned firms) for most years. Using firm level balance-sheet data from select EMEs, years and firms to explore these predictions is a fruitful direction for future work. Also, while applied to the data in the context of EMEs, the model in this paper is equally applicable to acquisitions in developed markets, for which better quality and more extensive firm-level data exist, and where financial liquidity has also been shown to be important for the M&A process (e.g., Harford, 1999; Almeida, Campello and Hackbarth, 2011; Erel, Jang and Weisbach, 2014). The model can thus help guide future empirical work on the role of productivity and financial constraints in the market for corporate control. These and other investigations are left for future work.

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