

# Financial market frictions and diversification

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## ABSTRACT

We document new facts, which relate the evolution of firm scope to the changing frictions in external capital markets over the last three decades. In the first part of the paper we study the scope of large, diversified publicly traded firms. We find that these firms increase their scope during times of high external capital market frictions, such as in the recent Great Recession. Moreover, during these times firms diversify their investment needs, and cash flows across industries. In the second part, we find similar phenomena outside diversified public firms. Examining the mergers and acquisitions activity of standalone and diversified private firms, we uncover similar patterns. In aggregate data, we find that the composition of mergers shifts from focused to diversifying and back with changes in external market conditions. Our evidence is broadly consistent with the notion that firms diversify their scope in response to tightening in external capital markets.

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## 1. Introduction

Most resource allocation in the economy takes place within firms, not within markets (Matvos and Seru, 2014). Allocation of capital within firms is not limited to one industry. Diversified firms spanning several industries represent a large share of firms within the United States, as well as the rest of the world. Changing the scope of these firms can therefore substantially alter the allocation of capital across industries. In the U.S., the scope of firms has undergone significant changes over time. The average number of segments in a diversified firm during the early 1980s was 2.4, so a typical conglomerate would reallocate capital across 2.4 two-digit SIC industries. By the early 1990s this number had decreased to 1.6, and again increased during the recent crisis. We argue that the scope of firms did not undergo these changes in isolation; changes in firm scope moved with changes in external capital market frictions. For example, the TED spread,<sup>1</sup> a popular measure of external market frictions, also fluctuated significantly over the same decades, exceeding 1.5% in the early 1980s, declining to below 0.5% by early 1990s, and again increasing during the recent crisis. This paper systematically documents this connection between evolution of firm scope and changes in frictions in external capital markets over the last three decades.

We find that firms increase their scope during times of high external capital market frictions, such as in the recent Great Recession. Moreover, during these times, firms diversify their investment needs and cash flows across industries. We find these patterns in the scope of large, publicly traded firms, as well as in the mergers and acquisitions activity of standalone and

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<sup>1</sup> The TED spread is the difference between the interest rates on interbank loans and short-term U.S. government T-bills. It is used as a conventional gauge of credit risk, which banks pass through to the real sector (Greenlaw, Hatzius, Kashyap, and Shin, 2008). Matvos and Seru (2014) show that capital allocation in diversified firms responds to the TED spread.

diversified, private as well as public firms. This evidence is consistent with the notion that firms diversify their scope in response to tightening in external capital markets.

We build on the recent literature, which has shown that diversified firms are better able to weather freezes in financial markets due to reallocation of capital inside these firms (Matvos and Seru, 2014; Kuppuswamy and Villalonga, 2015; Almeida, Kim and Kim, 2015). Our results suggest that firms respond to incentives to increase and diversify their scope during times of external market distress, further reducing the impact of financial market freezes. More broadly, our findings imply that capital intermediation activity shifts within firms as financial intermediation within markets breaks down, illustrating that transaction costs in markets determine firm boundaries in the spirit of Coase (1937) and Williamson (1975).

The framework guiding our empirical analysis is the idea that firm incentives to diversify increase with external capital market frictions. As external markets tighten, a standalone firm cannot take advantage of good investment opportunities if it lacks internal financing. A conglomerate, on the other hand, can more easily take advantage by reducing investment in other, less productive parts of the firm (Matvos and Seru, 2014; Kuppuswamy and Villalonga, 2015). As frictions in external capital markets increase, capital allocation in internal capital markets becomes more attractive, providing incentives for firms to increase their scope. Intuitively, increased diversification increases the likelihood that a good investment opportunity in one division is contemporaneous with a low investment opportunity another division. Therefore the benefits of diversification should be highest when conglomerates are more diversified, i.e. when the correlation of productivity shocks across segments is low. Finally, one would expect such benefits from diversification to increase with the persistence of shocks to the

financial markets.<sup>2</sup> In the rest of the paper we empirically explore whether firms respond to incentives to increase and diversify their scope during times of external market distress.

We find that conglomerates add segments as TED, our measure of external market frictions, increases. This result is robust to standard controls, as well as firm fixed effects, which significantly alleviates the concerns that it is the composition of firms in our sample which explains the changes in scope. Because more diversified conglomerates benefit more during times of external capital market stress, we expect firms to respond by becoming more diversified during such times. We confirm that as TED increases, conglomerates' assets and sales become more diversified across industries, even after we account for firm fixed effects.

To establish a tighter link with capital allocation, which is the driving force in our framework, we examine whether diversification across industries indeed leads to diversification of investment opportunities. As TED increases, conglomerates shift their assets to industries whose investment is less correlated. We also find that the cash flows and financing deficits produced by different divisions become more diversified. Jointly, the results suggest that conglomerates find diversification in times of external market dislocation valuable and adjust their structure to promote capital allocation across divisions.

In the second part of the paper, we study whether the patterns we find extend beyond conglomerates. Specifically, we study transactions that are used by firms to undertake large changes in scope, i.e. mergers and acquisitions (see Erel, Jang, and Weisbach, 2015, for the relationship between financial constraints and M&A). An additional advantage of studying mergers is that it exposes our tests to a different sample of firms, comprising standalone as well as diversified firms, both private as well as public.

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<sup>2</sup> These predictions are formalized in a simple model presented in the Appendix.

We first examine aggregate merger activity. Aggregate merger activity varies over time, giving rise to well documented merger waves (e.g. Harford, 2005). We document that the aggregate *composition* of mergers also significantly fluctuates over time: periods of diversifying mergers are followed by periods in which focused mergers dominate, and vice versa. Before 1990, the majority of deals (value weighted) were diversifying. The share of diversifying mergers dropped below 40% in 1990s, and again exceeded 50% during the Great Recession. If diversification is beneficial during times of external market distress, then we would expect diversifying mergers to be more appealing than focused mergers during these times. We find that the share of diversifying mergers is highly correlated with our measure of external capital market frictions, TED. In other words, diversification activity is closely correlated with fluctuations in external market frictions.

We observe similar aggregate patterns in diversification activity over time, if we measure diversification on dimensions linked to capital reallocation. We observe aggregate diversification patterns in correlation of cash flows, investments, and financing deficits between the industries of acquirers and targets. As financial market distortions increase, acquirers are more likely to acquire targets that are less correlated on each of these dimensions.

To show that these aggregate patterns in diversification activity over time are not driven by changes in firms' composition, we analyze individual merger deals. We first confirm that a given merger is more likely to be diversifying in times of high TED, even when we condition on the characteristics of the target and the acquirer, as well as acquirers and targets industries. Therefore, our results are not driven by the correlation of acquisition activity of different industries with aggregate conditions. These results are robust across several different samples

and specifically outside of large diversified public firms whose choices of scope we examine in the first part of the paper.

We next examine whether changes in firms' scope from diversifying mergers are related to capital reallocation, which drives diversification in our framework. We use deal-level data to confirm that diversifying mergers result in more diversified investment opportunities, cash flows, and financing deficits for the merged firm. As TED increases, so does the likelihood that the target is from an industry whose investment, cash flows, or financing deficits are less correlated with the industry of the acquirer, even after conditioning on the acquirer and target industries. These results mirror those we find in conglomerates despite being estimated on a substantially different sample.

Changing organizational structure is likely costly. A focused firm does not become extremely diversified one year, and switch back to being focused the next year. In light of such slow adjustments of organizational structure, how do we interpret the effect of dislocations in external capital markets on firms' organizational structure? Our framework suggests that the benefit of diversifying is proportional to the persistence of external capital market conditions. We use several tests to show that dislocations in external capital markets are somewhat persistent, which increases organizations' incentives to adjust their scope. We show that a component of TED, which is more long lived, leads to adjustment in the organizational structure rather than extreme spikes in the TED spread, which are very short lived. We then use a VAR approach, we estimate substantial levels of persistence in TED and organizational structure, with a shock to TED affecting firms' scope with a half-life of about ten years.

Last, we study the type of compensation used in merger or acquisition. In cash mergers, the acquirer buys target shares from target shareholders with cash. A stock merger, on the other hand, does not require cash outlays. If outside funds are scarce, then decreasing the amount of cash would not be appealing and we should expect more stock mergers. Our results confirm the conjecture, finding that cash mergers are less likely during times of high TED.

Our findings are robust to several alternative choices of sample and specifications. In particular, we find similar results if we exclude the recent financial crisis, NBER recessions, and periods of extreme values of TED. We find similar results if we measure external market frictions using BAA-AAA and EBP spread instead of the TED spread. Consistent with our framework, the sensitivity of firm scope to TED is also higher in more volatile industries. Finally, we also conduct an additional test using bank deregulation as a shock to external supply of credit to help identify the effects more cleanly. The results from this analysis provide additional support for our main findings.

Overall, we provide broad evidence suggesting that firms adjust their organizational structure in response to changes in external capital markets. The benefits of capital reallocation are highest when one firm has excess funds, which it does not need for investment, while another firm needs external funds to finance its internal shortfall. Standalone firms achieve reallocation through financial markets. One firm saves excess funds, for example in a bank, while another firm borrows these funds from the same bank. When external markets tighten, capital reallocation within a firm becomes more valuable, especially among divisions whose investment opportunities, cash flows, and financing deficits are less correlated. Our evidence is consistent with firms adjusting their scope in order to take better advantage of internal capital markets, implying that capital intermediation activity shifts within firms when intermediation in financial

markets becomes difficult. While the evidence in the paper is consistent with this interpretation, there may be other alternative interpretations that may also be consistent with these patterns.

Our results imply that firms' choice of scope can partially offset financial intermediation shocks. Capital reallocation within diversified firms provides an (imperfect) substitute for intermediation activity in markets. Our evidence suggests that as financial markets freeze, firms respond by expanding their scope to facilitate intermediation within the firm. Creating internal capital markets more capable of reallocation additionally dampens the negative consequences of frictions in external capital markets.

Our findings suggest that agency problems may not be the only driving force behind diversifying mergers, which has been the leading hypothesis heretofore. The simple fact that external financial market frictions are correlated with bad times suggests that the patterns in diversification that we identify are not likely driven by agency problems. For example, if diversifying mergers are a symptom of empire building (Jensen, 1989), then one would expect them to dominate in good times, when firms are flush with cash and external capital markets are loose. Instead, we find that times of high external market distress are periods of expanding firm scope.

The basic idea that firms increase their scope when transactions in markets are more costly goes back to Coase (1937) and Williamson (1975). Our predictions extend beyond this basic insight that changes in transaction costs bring more activity into the firm. We link the benefit of internal capital markets -- when external markets are stressed -- to the benefits of capital reallocation, and link these to dispersion in investment opportunities and cash flows in the firm. We then confirm our predictions in the data.

Our paper is most closely related to the recent literature, which has shown that diversified firms are better able to weather freezes in financial markets due to reallocation of capital inside these firms (Matvos and Seru, 2014; Kuppuswamy and Villalonga, 2015; Almeida, Kim and Kim, 2015). This literature holds organizational form fixed. Instead, we explore how firms respond to these incentives by increasing and diversifying their scope to facilitate reallocation of capital in internal capital markets. We also find that the scope of the phenomenon extends beyond publicly traded conglomerates to mergers and acquisitions among a different set of firms.

More broadly, our results contribute to the literature on internal capital markets and diversified firms. This literature has shown that firm boundaries matter for capital and R&D allocation (Seru, 2014; Giroud and Mueller, 2015). A large body of work has presented evidence that is consistent with a cross-subsidization pattern in investment and labor (Shin and Stulz, 1998; Rajan, Servaes and Zingales, 2000; Stein, 1997; Ozbas and Scharfstein, 2009; Silva, 2016), though several papers argue against such evidence (Chevalier, 1999; Maksimovic and Philips, 2001; Whited, 2001; Çolak and Whited, 2007; and Custódio, 2014). Our paper extends this literature by suggesting that organization structure may itself be designed to foster the ability of firms to use internal capital markets when these are most valuable.<sup>3</sup> In doing so our work also speaks to the literature on the formation of diversified conglomerates (e.g., Servaes 1996; Almeida et al, 2011; and Maksimovic and Philips, 2002). Servaes (1996) for example, studies how the market valuation of conglomerates changed over time, and the relationship with conglomerate structure. Our paper differs from the literature by studying how external market conditions interact with firm scope.

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<sup>3</sup> For example, Lins and Servaes (2002) found no evidence of diversification premium in emerging markets where external frictions are more severe.

Our paper is also directly related to two strands of the literature on mergers and acquisitions. We are closest to the literature which explores relaxing financial constraints as a reason for mergers and acquisitions.<sup>4</sup> Almeida, Campello, and Hackbarth (2011) present a model in which acquisitions alleviate financial constraints. Erel, Jang, and Weisbach (2015) show that, in a sample of European firms, targets' financial policies are less constrained after an acquisition. Within the M&A literature, our paper is also closely related to the literature on merger waves. Recent research analyzes several causes of merger waves: technological shocks (Harford, 2005), uncertainty (Garfinkel and Hankins, 2011), deregulation (Ovtchinnikov, 2013; and Harford, 2005), and valuation errors (Rhodes-Kropf, Robinson and Viswanathan, 2005). Another strand of the literature studies the selection of firms that participate in merger waves: public vs. private (Maksimovic, Phillips, and Yang, 2013) and well vs. badly governed firms (Duchin and Schmidt, 2013). Though it is well documented that merger waves occur within industries and are propagated through industry links (Mitchell and Mulherin, 1996; and Ahern and Harford, 2014), our paper is the first to uncover that changes in aggregate degree of diversification in the economy correlates with external market conditions.

## **2. Data and descriptive statistics**

We use several datasets that cover different sets of firms over the period 1980 to 2012. In the first part of the paper we construct a sample based on Compustat. We construct this sample using Compustat Segment files and applying the standard filters. In particular, we (i) keep only business segments; (ii) exclude segments with negative assets, investment, or sales; (iii) exclude all firm-years that have missing information on assets, investment, or sales for all divisions; and (iv) exclude financials (SIC code 6) and utilities (SIC code 9).

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<sup>4</sup> Other possible gains from mergers range from market power (Borenstein, 1990) to taxes and operational synergies (Devos, Kadapakkam, and Krishnamurthy, 2009).

We aggregate the divisions at the two-digit SIC level and define three measures of diversification: (a) *Number of divisions* is a count of the number of two-digit SIC business divisions the firm operates in a given year; (b) *HHI Assets*, the Herfindahl-Hirshman Concentration Index of division assets by firm-year and (c) *HHI Sales*, the Herfindahl-Hirshman Concentration Index of division sales by firm-year. For ease of interpretation, we use  $(1-HHI\ Assets)$  and  $(1-HHI\ Sales)$  as our second and third measures of diversification. This change makes all three measures of diversification increase with firm scope. We augment other firm level information using Compustat North America and construct other controls used in the regression (size, cash flow, Tobin's Q, leverage, and firm age). The definition and construction of all the variables is described in the Appendix.

Our sample contains a total of 14,700 unique firms and 120,142 firm-year observations with an average size (total assets in 2009 USD) of \$1.2 Billion and a median of \$67 Million. On average, over the sample period, each firm has 1.28 divisions (with a minimum of one and a maximum of ten divisions). There is, however, large variation in the average degree of diversification of firms over the period of 1980 and 2012. In 1980 the average firm had 1.72 divisions, while in 1997 the average number of divisions was only 1.17. That there are periods of increase in firm scope followed by periods of reduction in scope, is also apparent in the evolution of the HHI of assets and sales.

For the second part of the paper we focus on a completely different sample and analyze the evolution of firm scope by studying the M&A market. We collect data from Thomson SDC on all M&As where there is a change of control (acquirer has less than 50% of the target before the deal and more than 50% afterwards) between 1980 and 2012. We exclude all deals that do not have information on the announcement date and deals with missing data on the value of the

transaction. We then focus on completed deals between US firms (although we relax some of these filters in our robustness analysis). Our sample contains 38,979 observations comprising 18,795 acquirer firms and 37,983 targets. The vast majority of deals involve a public acquirer and a private target (20,327 observations), followed by 6,557 deals involving both public target and acquirer firms, and 3,369 involving private targets and acquirers. For 543 deals we are able to match our M&A sample to Compustat North America and use control variables based on the financial data of the acquirer and the target firms.

Finally, to measure the degree of financial frictions we use the TED spread. This measure is the difference between the interest rates on interbank loans and short-term U.S. government T-bills. Intuitively, it measures the frictions in obtaining funding for banks. A large literature shows that frictions in supply of capital to banks spill over to the funding of firms (for example, Ivashina and Scharfstein, 2010). Matvos and Seru (2014) show that variation in the TED spread induces changes in the capital allocation in diversified firms. Table 1, Panels A, B, and C present the summary statistics for all the variables used in our empirical analysis for the different samples.

### **3. Main empirical findings**

#### *3.1. Scope of diversified firms*

Recent evidence suggests that diversified firms perform better when external financial markets are constrained (Matvos and Seru, 2014; Kuppuswamy and Villalonga, 2015; Almeida, Kim and Kim, 2015). As external markets tighten, a standalone firm cannot take advantage of good investment opportunities if it lacks internal financing. A conglomerate, on the other hand, can take advantage of investment opportunities by reducing investment in other, less productive parts of the firm. More diversified conglomerates are more likely to encounter situations in which such reallocation is productive. Increased diversification increases the likelihood that a

good investment opportunity which lacks internal funding in one division is contemporaneous with a low investment opportunity and excess cash in another division.<sup>5</sup> We explore whether firms respond to incentives to increase and diversify their scope during times of external market distress.

### *3.1.1. Firm scope*

In conglomerates, one potential measure of scope is the number of segments. In our sample there is large variation in firm scope over time. The average number of segments in a diversified firm during the early 1980s was 2.4, so a typical conglomerate would reallocate capital across 2.4 two-digit SIC industries. By the early 1990s this number had decreased to 1.6. The scope of internal capital markets did not undergo these changes in isolation. The frictions in external capital markets, measured by TED, have fluctuated significantly over the same decades. Figure 1, Panel A shows that conglomerates have had more segments during times of high TED than during times of low TED. Conglomerates increase scope as frictions in external capital markets increase. This fact suggests that capital allocation in internal capital markets may become more attractive as external markets seize up, providing incentives for firms to increase their scope.

We formally measure whether an increase in external market stress is correlated with an increase in the number of segments of a conglomerate using the following specification:

$$y_{it} = \alpha + \beta_1 \zeta_t + \Gamma X_{it} + \varepsilon_{it} , \quad (9)$$

in which  $i$  indexes the firm and  $t$  indexes time. The dependent variable  $y_{it}$  measures the number of firm segments. The independent variable of interest is the extent of external capital market

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<sup>5</sup> We illustrate this mechanism more formally in a simple model in the Appendix.

frictions  $\zeta_t$ , which is proxied by the TED spread in the main specification. We control for standard firm characteristics, such as size, profitability, leverage, and others, in  $X_{it}$ .

The result is presented in Table 2, Panel A, column 1. In times of high external capital market frictions, firms add additional divisions. The coefficient of 0.29 implies that a two standard deviation change in TED ( $2*0.4$ ) is correlated with  $0.29*2*0.4=23\%$  of diversified firms adding a segment, which is 0.35 standard deviations in the number of segments in our sample.

One possible concern with this result is that the composition of firms in the sample is correlated with external market frictions. We therefore repeat the analysis including firm fixed effects  $\mu_i$ :

$$y_{it} = \alpha + \beta_1 \zeta_t + \mu_i + \Gamma X_{it} + \varepsilon_{it}. \quad (10)$$

The result is robust to the inclusion of firm fixed effects (column 2 of Table 2, Panel A) and is highly statistically significant, suggesting that our results are not driven by the changing composition of firms. Times of high TED are times during which firms add segments. The coefficient of 0.11 implies that a two standard deviation increase in external capital market frictions (TED) is correlated with a  $0.11*2*0.4=0.09$  (0.26 standard deviations) increase in the number of segments within a firm.<sup>6</sup>

To ensure these results apply across a wide array of firms, we perform the same analysis on several subsamples. In the full sample we include single segment firms, which can increase their scope by adding segments, but cannot decrease it. In Table 2, Panel B we focus only on

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<sup>6</sup> We use the within firm standard deviation of *Number Divisions* to perform this calculation. The difference between the estimates of column 1 and column 2 also allows us to assess how much of the change in the degree of diversification in the economy comes from the selection of firms during our sample period versus within-firm changes in scope.

firms which operate in at least two segments, and can therefore add or subtract segments. Columns 1 and 2 show that the results persist even when focusing on firms operating in multiple segments, with and without fixed effects. Last, we limit our sample to very diversified firms, which have at least three segments. These firms represent a third of all diversified firms. In columns 1 and 2 of Table 2, Panel C we present the results with and without firm fixed effects. The results confirm that firms with several segments are more likely to add an additional segment when external capital markets are distressed.<sup>7</sup>

The results presented above are consistent with the basic idea of Coase (1937) and Williamson (1975) that firms increase their scope when transactions in markets are more costly. Our predictions extend beyond this basic insight. If the payoffs to investment do not differ across divisions of a firm, then there is little economic motive for reallocating capital between divisions even when external markets are tight. Capital reallocation is more effective if returns to investments within the firm differ. Therefore, rather than simply adding segments, we would expect firms to become more diversified as external financial markets tighten.

We measure firms' assets diversification across industries by computing the Herfindahl-Hirshman index (HHI) of firms' assets across industries. A firm which operates in multiple segments is not well diversified if most of its assets are in one industry. Let  $\Omega_{it}$  denote the set of two-digit SIC industries,<sup>8</sup> in which firm  $i$  operates at time  $t$ , and  $A_{ijt}$  denotes the assets of that

firm in industry  $j$ . Then,  $HHI_{it} = \sum_{j \in \Omega_{it}} \left( A_{ijt} / \sum_{j \in \Omega_{it}} A_{ijt} \right)^2$ . Since a high HHI implies high

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<sup>7</sup> That the results with firm fixed effects are stronger for diversified and very diversified firms is consistent with the notion that it may be more costly for a stand-alone firm to become a conglomerate (going from 1 to 2 divisions) than it is for a conglomerate to add another division.

<sup>8</sup> In Appendix C we confirm that the results are robust to defining industries either using one or three digit SIC codes.

concentration, we define our dependent variable as  $1 - HHI_{it}$ . A higher value of the dependent variable therefore implies that a firm's assets are more diversified across industries.

To illustrate the relationship between firm diversity and external financial markets conditions, we first present a simple cut of the data. In Figure 1, Panel B, we plot the average diversity of firms' assets in a year against the TED spread. One can see that times of high TED spreads are times during which conglomerates' assets are more diversified. This simple fact suggests that firms respond to tightening external financial market conditions by diversifying their scope. To ensure that these patterns are not driven by firm composition, or changes in other firm characteristics, we estimate the following specification:

$$1 - HHI_{it} = \alpha + \beta_1 \zeta_t + \mu_i + \Gamma X_{it} + \varepsilon_{it} , \quad (11)$$

with and without firm fixed effects  $\mu_i$ . The result in column 3 of Table 2, Panel A confirms that in times of high external capital markets frictions firms increase the diversity of assets. The inclusion of firm fixed effects in column 4 shows that the results are not driven by changes in firm composition. The magnitudes are substantial: the coefficient of 0.027 implies that a two standard deviation increase in TED is correlated with a 0.23 standard deviation increase in asset diversification within a firm.

Instead of measuring a firm's assets diversification across industries, we measure its diversification of revenues. This measurement is based on the idea that cash flows measure the importance of a given segment to the firm better than physical capital. We repeat the exercise from above, but compute firms' revenue diversification across two-digit SIC industries. The results with and without firm fixed effects are presented in columns 5 and 6 and mirror those on asset diversification. As external financial markets tighten, firms increase the diversification of their revenue sources.

The increase in diversification of assets and revenues with TED is robust and occurs across different types of diversified firms. Because the diversification of single segment firms is hard-wired at 0 and cannot decrease, we exclude them in a robustness check in Table 2, Panel B. Columns 3 to 6 reveal that our findings are qualitatively and quantitatively similar. The results also hold for very diversified firms, those with more than two segments, which we show in Table 2, Panel C, columns 3 to 6. These results suggest that firms respond to tightening external financial market conditions by diversifying their scope.

### *3.1.2. Diversification of scope and capital reallocation*

Matvos and Seru (2014) show that the advantage of diversified firms in times of high external financial frictions arises from capital reallocation between divisions of the firm. Capital reallocation within a firm is productive if reducing investment in one division is less costly than the benefit of adding investment in another division, i.e. if the divisions' investment needs are not very correlated. Our hypothesis is that firms change their scope to take further advantage of this benefit of internal capital markets. We therefore predict that when financial markets are constrained, firms adjust their scope to reduce the correlation in investment needs across divisions.

The correlation of investment opportunities of divisions are difficult to observe directly. If two industries have highly correlated investment, then one would imagine that investment needs of two divisions of a firm, which operate in these two industries, would also be highly correlated. We compute how concentrated a firm's investment needs are by weighting correlation of different industry pairs by assets of the firm in these pairs.

We first compute the correlation of average investment across two-digit SIC industries for the period of our sample. For example, when firms in the Home Furniture, Furnishings, And Equipment Stores industry (SIC 57) invest a lot, firms in the Coal Mining industry (SIC 12)

invest little, and vice versa. On the other hand, investment in industry SIC 38 - Measuring, Analyzing, And Controlling Instruments; Photographic, Medical And Optical Goods; Watches And Clocks - is highly correlated to investment in industry SIC 50 - Wholesale Trade-durable Goods. We first compute pairwise correlations between the average investments<sup>9</sup> of single-segment firms of two-digit SIC industries for the period of our sample. Let  $c_{jk}^I$  denote the correlation of investments between industries  $j$  and  $k$ .

To compute the concentration of firms' investment needs, let  $\Omega_{it}$  be the set of two-digit SIC industries in which firm  $i$  operates at time  $t$ .  $[\Omega_{it}]^2$  is the set of all pairwise permutations of industries this firm operates in. For example, if firm  $i$  operates in industries 1, 2, and 3, then  $[\Omega_{it}]^2 = \{1,2;2,3;1,3\}$ .  $A_{ijt}$  denotes the assets of that firm in industry  $j$ . We compute investment

need diversification of firm  $i$  at time  $t$  as  $C_{it}^I = \sum_{jk \in [\Omega_{it}]^2} \left( (A_{ijt} + A_{ikt}) c_{jk}^I / \sum_{jk \in [\Omega_{it}]^2} (A_{ijt} + A_{ikt}) \right)$ . A

higher measure implies that the divisions are in industries whose investment commoves more.

Therefore a firm with a high  $C_{it}^I$  has less diversified investment needs.

We build on the specification from the previous section and estimate how a firm's diversification of investment needs evolves with external capital market frictions:

$$C_{it}^I = \alpha + \beta_1 \zeta_t + \mu_i + \Gamma X_{it} + \varepsilon_{it} , \quad (12)$$

with and without firm fixed effects  $\mu_i$ . Firm fixed effects ensure that these changes are identified from changes in industrial composition within a firm over time. Note that the correlation between a pair of industries is computed over the entirety of the sample and does not change

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<sup>9</sup> In unreported results, we show the results are robust to computing the correlation between median investment across industries

over time. Therefore our results are not driven by an increased correlation of investments or cash flows across industries as external financial markets tighten (TED increases). Rather, the industries that are added or expanded in high TED times have less correlated investment needs with the rest of the firm.

The results are presented in columns 1 and 2 Table 3, Panel A. The negative coefficients confirm that as external financial markets tighten, firms adjust their scope by decreasing the correlation of investment needs across divisions. The result is robust to the inclusion of firm fixed effects and is therefore not driven by differences in investment opportunities across firms. The within-firm coefficient of -0.012 implies that a two standard deviation increase in TED is correlated with a 0.2 standard deviation decrease in the correlation of investments within a firm.

Profitable capital reallocation across divisions also requires low correlation in divisions' cash flows. Consider a division with a high opportunity to invest. If its cash flow is high, reallocation is not necessary because the division can finance its own investment. If cash flows are low, then reallocation might be productive. However, if cash flows among divisions are highly correlated, then the cash flows of other divisions are low as well, providing little opportunity for reallocation. Therefore, if reallocation in internal capital markets becomes more valuable during times of high external capital market frictions, firms may want to reduce the correlation in the cash flows of their divisions.

To construct a firm level proxy for cash flow concentration across segments,  $C_{it}^{CF}$ , we follow the same approach as before but use the pairwise correlation of average cash flows across different industries,  $c_{jk}^{CF}$ , as an input. We estimate how a firm's concentration of cash flows evolves with external capital market frictions:

$$C_{it}^{CF} = \alpha + \beta_1 \zeta_t + \mu_i + \Gamma X_{it} + \varepsilon_{it} , \quad (13)$$

with and without firm fixed effects  $\mu_i$ , and present the results in columns 3 and 4 of Table 3, Panel A. The negative coefficient suggests that as external capital markets tighten, firms tilt their assets to industries whose cash flows are less correlated with the rest of the firm. The magnitudes are again substantial. A two standard deviation increase in TED decreases cash flow correlation of the firm by 0.23 standard deviations.

In fact, the logic above suggests that an important driver of reallocation prospects is a division's ability to use its cash flows to finance its own investment. If one division's cash flow exceeds its investment needs, then these excess funds can be allocated to divisions whose cash flows are below their investment needs. We compute a measure of investment self-sufficiency, i.e. excess cash flows as (cash flows – investment). We compute the correlation in excess cash flows between industries as above,  $c_{jk}^{CF-I}$ , and compute how diversified a firm's excess cash flows are,  $C_{it}^{CF-I}$ . We estimate the specification from above using this measure, and find that as external market conditions deteriorate, firms tilt their industrial composition to decrease the correlation in excess cash flows (columns 5 and 6 of Table 3, Panel A).

Similar to our measure of excess cash flows is a measure of financing deficit<sup>10</sup> used in the literature to measure the dependence of a firm on external funds, which accounts for other uses and sources of funds, such as acquisitions, sale of property, plant and equipment, and changes in net working capital. For robustness, we compute the correlation of average financial deficits of stand-alone firms across all pairs of two-digit SIC industries for the period of our sample, and compute the correlation of financial deficits of a firm,  $C_{it}^{FD}$ , following the approach outlined above. The results are presented in columns 7 and 8 of Panel A of Table 3. As financial markets

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<sup>10</sup> See Shyam-Sunder and Myers (1999), Frank and Goyal (2003), and Malmendier, Tate, and Yan (2011).

tighten, firms adjust their structure to decrease the correlation in financing deficits across divisions. A lower correlation implies that as one division experiences financing deficits, other divisions are more likely to experience financing surpluses, increasing the potential for reallocation within the firm.<sup>11</sup> To ensure that our results are robust, we re-estimate our results on different subsets of firms. The results hold if we exclude single segment firms from our sample (Table 3, Panel B). They also hold for firms which are already very diversified those with more than two segments, which we show in Panel C of Table 3.

Figure 2 (Panels A-D) visually confirm the strong correlation that was documented in Table 3. We also measure our results on different subsamples using a variety of different measures, all suggesting that as external markets tighten, firms diversify their scope. The results appear in several different measures related to capital reallocation, some devised by ourselves, and some taken from the literature, supporting the idea that capital reallocation is a part of the explanation of why firms diversify when external markets tighten. When external markets tighten, capital reallocation within a firm becomes more valuable, especially among divisions whose investment opportunities, cash flows, and financing deficits are less correlated. Firms respond to these incentives by adjusting their scope in order to take better advantage of internal capital markets. These results imply that as financial intermediation of financial markets breaks down, capital intermediation activity shifts within firms, illustrating that transaction costs in markets determine the boundaries of the firm in the spirit of Coase (1937).

#### *4.2. Mergers and acquisitions*

In the previous section we study how the firms' scope changes with conditions in external capital markets. The benefits of diversification in times of external financial market distress have

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<sup>11</sup> All the results in the paper that use Compustat Segments data are robust to including a dummy variable that captures the segment reporting change that occurred in 1998.

been documented for conglomerates in the previous literature (Matvos and Seru, 2014; Kuppuswamy and Villalonga, 2015; Almeida, Kim and Kim, 2015). We find that conglomerates' scope responds to these benefits. Next we look for similar phenomena in mergers and acquisitions, which are transactions directly aimed at changing firm boundaries. One way firms become more diversified is to undertake diversifying mergers and acquisitions.

An additional advantage of studying mergers and acquisitions is the access to a broader sample of firms. We can look beyond large publicly traded firms to other public as well as private firms. Only approximately 6,500 deals from a total of roughly 39,000 involve a public to public transaction. The firms in the Compustat Segments sample, which we use in the previous section, have an average size of about \$1.2 billion and a median of about \$67 million. Private acquirers, on the other hand, have average assets of \$4.3 billion with a median of \$143 million. Private targets have average assets of \$144 million with a median of \$12 million (all values in 2009 US dollars).

### *3.2.1. Aggregate diversifying-merger activity*

The aggregate level of merger and acquisition activity experiences aggregate booms and busts—merger waves—which have been well documented in the literature (e.g. Mitchell and Mulherin 1996). We document a similar phenomenon taking place in the composition of mergers and acquisitions. Periods in which diversifying mergers are the predominant form of mergers are followed by periods dominated by focused mergers. In our sample there is large time-series variation in the share of diversified mergers and acquisitions, in which firms acquire, or merge with, firms from a different two-digit SIC industry. Before 1990, the majority of deals (value weighted) were diversifying. This share dropped to about 40% in 1990s, and again exceeded 50% during the Great Recession.

Figure 3 shows that diversification activity is correlated with the conditions in external capital markets. Panel A shows that years of high TED are years during which diversifying mergers comprise a larger share of M&A transactions than years in which TED is low. Panel A presents results when deals are weighted by deal amount. Panel B shows that we obtain the same patterns if we weigh deals equally. These figures suggest that it is not only conglomerates who find it valuable to diversify their scope during times of external market stress. Diversification activity seems to be strongly correlated with our measure of external capital market frictions, TED.

We more formally study the relationship between TED and diversification activity within a regression framework. We explore how much variation in the share of diversifying mergers in a given year,  $s_t$ , can be explained with variation TED,  $\zeta_t$ , in a simple linear regression framework:

$$s_t = \alpha + \beta\zeta_t + \varepsilon_t . \quad (14)$$

We present the results in columns 1 and 2 of Table 4. As suggested by Figure 3, external market frictions are strongly correlated with the share of diversifying mergers in the economy. An increase in TED of 0.8 percentage points increases the share of the diversifying mergers by approximately 15 percentage points; or alternatively a two standard deviation in TED is correlated with a 1.45 standard deviation increase in the share of diversifying mergers. Moreover, an  $R^2$  of over 50% suggests that this relationship captures a significant amount of variance in the aggregate share of diversifying mergers even in a simple linear setting. In column 2 we equally weigh deals and confirm the results.

The strong positive relationship between external financial market frictions and the aggregate composition of mergers suggests that the same mechanism that drives the scope of

diversified firms is driving the aggregate composition of mergers. Agency problems have been a prominent explanation for diversifying mergers. If diversifying mergers are a symptom of empire building (Jensen, 1986), then one would expect them to predominate in good times, when firms are flush with cash and external capital markets are loose. Instead, times of high external financial distress are periods of low overall mergers and acquisitions activity, suggesting that empire building is not a likely source of diversification activity. These aggregate trends provide suggestive evidence that diversifying mergers are in part driven by firms' need to diversify to promote internal capital market reallocation in the face of frictions in external capital markets. We next explore this idea in more detail.

### 3.2.2. *Composition of deals in diversification*

Our aggregate data results could be driven by the changing composition of firms or merger opportunities, rather than the attractiveness of internal capital markets during times of financial market freezes. We therefore study the propensity of individual deals to be diversifying, trying to account for the changing composition of mergers over time using the following specification:

$$y_{ijt} = \alpha + \beta\zeta_t + \Gamma_i X_{it} + \Gamma_j X_{jt} + \varepsilon_{it} , \quad (15)$$

in which  $i$  indexes the acquirer,  $j$  indexes the target, and  $t$  the time of the deal.  $y_{ijt}$  is a dummy variable taking the value of 1 if the deal is diversifying and 0 if it is not. The independent variable of interest is the extent of external capital market frictions  $\zeta_t$ , which is proxied by the TED spread in the main specification. We control for standard acquirer and target characteristics, such as size, profitability, leverage, and others in  $X_{it}$ , and  $X_{jt}$ .

We present the results in Table 5, Panel A. We first estimate the relationship without controls, which gives us the largest sample. Then we restrict ourselves to mergers for which we

could find controls in Thomson data. In the last, narrowest sample we analyze, we match the acquirer and target with Compustat, which allows us to control for a wider set of characteristics, but a much smaller sample. The Compustat sample consists of 357 acquiring firms and 533 targets. As we restrict our sample we increase the percentage of deals involving public firms. The share of public to public transactions increases from less than 17% in the full sample to 69% when Thomson controls are used and 94% with Compustat target and acquirer data. The value of the deal is also increasing: the average deal value is \$133 million for the whole sample, \$450 million with Thomson controls, and \$641 million in the deals involving Compustat firms. These different samples allow us to ensure our results are robust across a wide range of firms.

In all specifications we find that as external market frictions increase, the probability that a deal will be diversifying increases. The coefficient of 0.37 suggests that a two standard deviation increase in TED is correlated with a 30 percentage point increase in probability that a given deal is diversifying. The magnitudes are larger in the smallest sample with better controls. Last, we confirm that the results hold in the sample of firms that are not in Compustat (Table 5, Panel B). This last subsample has a small share of deals classified by Thomson as public to public transactions and the average deal value is only \$112 million as opposed to \$641 million for the deals involving Compustat firms. Therefore variation in diversification activity over time is present across a wide range of firms.

If merger activity is concentrated in industries, then a correlation between TED and industry merger waves could be driving our results. The share of diversifying mergers could increase because targets in a particular industry are being bought by a wide array of firms or, conversely, because acquirers in a given industry are on an acquisition spree, which is correlated with TED. In columns 5, 6, 9, and 10 we control for the industry of the acquirer, the target

separately, and, in columns 2, 4 and 8, for the industries of the acquirer and the target simultaneously, and find that the effect is robust. Conditional on the industry of the acquirer and target, the probability that a firm's acquisitions are outside of its industry increases with TED. Jointly, these results confirm that the increase in the share of diversifying mergers around increases in TED is a broad-based phenomenon, not limited to a particular set of firms. We confirm the robustness of these results to alternative definitions of industries and external capital market frictions in the Appendices.

### *3.2.3. Mechanism: diversifying investment needs and cash flows*

Our hypothesis is that firms change their scope to generate the potential for internal capital reallocation in times of external capital market frictions. In the previous section we find that large diversified firms adjust their scope to reduce the correlation in investment needs, cash flows, and financing deficits across divisions when external financial markets are constrained. Here we examine whether we can observe the same phenomenon in mergers and acquisitions.

We want to understand whether targets' industries' investment, cash flows, and financial deficits are less correlated with acquirers' industry cash flows during times of high external market frictions. As in Section 3.1.2, we denote the correlation of investment between the industries of the acquirer and the target as  $c_{jk}^I$ , the correlation in industries' cash flows as  $c_{jk}^{CF}$ , the cash flows in excess of investment as  $c_{jk}^{CF-I}$ , and financial dependence as  $c_{jk}^{FD}$ .

We first explore aggregate data to see if patterns in diversification activity over time are related to internal capital markets reallocation. We determine whether a merger diversifies investment opportunities or cash flows by computing our measures of correlation between the industries of the target and the acquirer. We then compute the annual average (value weighted) degree of diversification according to each measure and show its correlation with TED in Figure

4. For example, in Figure 4, Panel A we show the average correlation in investment between the industries of the target and the acquirer, and plot it against TED. The two measures are strongly negatively correlated: as external market frictions increase, firms acquire targets in industries with lower average correlation in investment.

Panel B, Panel C, and Panel D show the same pattern in the correlation of cash flows, cash flows- investment, and financial deficits between the industries of the acquirer and the target. All these measures exhibit substantial correlation with TED: as TED increases, the acquirers choose targets in industries with a lower correlation in cash flows, and financing deficits with the industry of the acquirer. These figures suggest that the correlation between patterns in diversification activity and conditions in capital markets is related to aggregate movements in measures related to internal capital markets reallocation.

We more formally explore how much of the annual average correlation between target and acquirer industries,  $c_t$ , can be explained with variation in TED,  $\zeta_t$ , in a simple linear regression framework:

$$c_t = \alpha + \beta\zeta_t + \varepsilon_t . \quad (16)$$

We present the results in Table 6, Panel A. As suggested in Figure 4, external market frictions are strongly associated with a decrease in the correlation between the acquirer's and the target's industries for all our measures. The variation in TED explains a substantial part of the aggregate variation in the correlation of investment ( $R^2$  of 52%), cash flows ( $R^2$  of 55%), cash flows in excess of investment ( $R^2$  of 55%), and financing deficits ( $R^2$  of 74%). The aggregate data certainly suggests that patterns in diversification activity, which are correlated in TED, are undertaken to promote internal capital markets reallocation.

To ensure that the results are not driven by the changing composition of firms or merger opportunities, we now turn to transactions data and estimate the following specification, illustrated on the example of correlation of investment between the industries of the acquirer and the target:

$$c_{ij}^I = \alpha + \beta \zeta_t + \Gamma_i X_{it} + \Gamma_j X_{jt} + \varepsilon_{it} . \quad (17)$$

The independent variable of interest is the extent of external capital market frictions  $\zeta_t$ , which is proxied by the TED spread in the main specification. We again control for standard acquirer and target characteristics in  $X_{it}$ , and  $X_{jt}$ .

The results are presented in Table 6, Panel B. Columns 1 and 2 present the results on the larger sample, only controlling for industry (column 2); columns 3 to 6 present mergers and acquisitions with controls from Thompson. The last columns (7 to 10) present the results for the subset of Compustat firms, which allow us to control for a wider set of characteristics. The negative coefficients in all specifications suggest that as TED increases, firms increasingly acquire targets from industries which have a lower correlation in investment with their own. A two standard deviation increase in TED decreases the correlation of investment between industries by 0.53 standard deviations in the Compustat sample with more controls.

As we state above, the correlation in investment between industries is not the only way to measure the potential for capital reallocation between the acquirer and a target. We replace the correlation in investments with the correlation in cash flows,  $c_{ij}^{CF}$ , in Table 6, Panel C. We find that as external capital market frictions increase, acquirers choose targets from industries whose cash flows are less correlated with the industry of the acquirer. The magnitudes are substantial: a two standard deviation increase in TED is correlated with a 0.41 standard deviation decline in the cash flow correlation between the industries of the target and the acquirer. We obtain similar

results when we measure the potential for capital reallocation between the acquirer and the target as the correlation in the cash flows excess of investment  $c_{jk}^{CF-I}$ , and financial dependence  $c_{jk}^{FD}$ , presented in Panels D and E respectively. As financial market frictions increase, acquirers choose targets from industries less correlated with their own.

Next, we again confirm that our results are not driven by the industry of the acquirer and the target by including acquirer and target industry fixed effects. Conditional on the industry, acquirers are more likely to find targets from industries with less correlated cash flow, investment, the cash flows excess of investment, and financial dependence in times of external market dislocation. These results are again robust to different samples of firms. As we move from including all deals to restricting the sample to include more controls, we also include a larger share of public to public deals and larger average transaction size, which reveals the different nature of the samples.

These results strongly mirror those we find for conglomerates, even though the sample of firms we analyze is significantly different, with the merged sample encompassing a wide sample of smaller and private firms. Moreover, in conglomerates, we consider the changes in scope within a firm. In mergers and acquisitions, we study the change in scope conditional on a large expansion of firm scope. The robust results strongly suggest that firms respond to external capital market stress by expanding and diversifying the scope of internal capital markets to facilitate capital reallocation.

## **4. Extensions and robustness**

### *4.1. Choice of deal compensation*

We next examine the type of compensation used in the merger or acquisition. In cash mergers, acquirers purchase shares from target shareholders with cash. A stock merger, on the

other hand, does not require cash outlays. If outside funds are scarce, then decreasing the amount of cash would not be appealing and we should expect more stock mergers. We examine whether and how much cash was used in the deal by estimating the following specification:

$$y_{ijt} = \alpha + \beta\zeta_t + \Gamma_i X_{it} + \Gamma_j X_{jt} + \varepsilon_{it} , \quad (18)$$

in which the dependent variable  $y_{ijt}$  measures the means of payment when acquirer  $i$  acquires target  $j$  at time  $t$ . For example, in the baseline specification  $y_{ijt}$  measures the percentage of compensation paid in cash. Building on previous specifications, the independent variable of interest is the extent of external capital market frictions  $\zeta_t$  measured using the TED spread, and  $X_{it}$ , and  $X_{jt}$  control for standard acquirer and target characteristics.

The results are presented in Table 7. We use several measures of whether and how much cash was used in the deal. In columns 1, 2, and 3 we start by showing that, in aggregate terms, when TED increases, the use of cash in the M&A market decreases. We then explore individual deals in Panel B. In columns 3 and 4 we measure the percentage of compensation that was paid for in cash. A coefficient of -0.3 implies that a two standard deviation increase in TED decreases the share of acquisition which was paid for in cash by approximately 24 percentage points, or equivalently, by 0.53 standard deviations. As external financial market conditions tighten, firms are significantly more reluctant to use cash to complete an acquisition. The share of transactions that use some cash declines precipitously with TED, as we show in columns 5 and 6. Similarly, transactions in which cash is the only means of payment decline as TED increases (columns 7 and 8). Jointly, these results suggest that as external financial constraints tighten, firms are more reluctant to use cash for acquisitions. While this result is not exclusive to our hypothesis, it

provides one additional piece of evidence that is consistent with our preferred interpretation of the overall evidence.

#### 4.2. Persistence

Firms change their scope slowly. A focused firm does not become extremely diversified one year, and switch back to being focused the next year, suggesting there are costs to changing organizational structure. In light of such slow adjustments of organizational structure, how do we interpret the effect of dislocations in external capital markets on firms' organizational structure?

We first document that capital market distortions also have a persistent component. Enormous spikes in TED, such as the 4.58 on October 10, 2008, quickly decline; by the end of October, the spread had declined to 2.59. If spikes in external capital market conditions are short-lived, on the order of a month, and then capital markets revert back to steady state; it would be difficult to expect large changes in firm scope. Previous literature suggests that credit market dislocations are persistent and large enough to induce substantial changes in investment as well as GDP (see Gilchrist and Zakrajsek, 2012). For example, Matvos and Seru (2014) show that capital allocation in diversified firms responds to the TED spread. Therefore these dislocations may also be persistent and large enough to also affect firms' organizational structure.

One way to evaluate how quickly external market measures revert is to estimate the following specification:

$$\zeta_t = \alpha + \beta\zeta_{t-1} + \varepsilon_t \quad (19)$$

The estimate of 0.86 confirms the high degree of autocorrelation in external capital market conditions.<sup>12</sup> This result does not arise because TED hovers close to the mean with small deviations. Recall that the standard deviation is 0.4, around the mean of 0.5, suggesting

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<sup>12</sup> Other measures of external capital market conditions, such as the BAA-AAA spread, or the Excess Bond Premium (EBP) also exhibit similar levels of persistence.

substantial departures. Another way to see the same fact is to consider the probability that that TED switches from high (above median) to low (below median). There is a 13% probability of transitioning from a low to high TED year and a 19% probability of going from high TED to low TED next year. These estimates suggest that external capital market conditions are quite persistent. Therefore, firms adjust their structure not only because external market conditions are poor, but because they expect that external capital market conditions will persist.

To evaluate how organizational structure and financial market dislocation jointly evolve over time, we first estimate the following specification:

$$y_{it} = \alpha + \phi y_{it-1} + \beta_1 \zeta_t + \Gamma X_{it} + \varepsilon_{it} , \quad (20)$$

in which  $y_{it}$  measures the scope of firm  $i$  at time  $t$ , and  $y_{it-1}$  the scope of the same firm from the previous year. The first coefficient of interest is  $\phi$ , which measures the persistence of changes in firms' scope. The second coefficient of interest is  $\beta$ , which measures the initial impact of external financial frictions. This specification allows us to account for slow organizational change. Finding  $\phi$  close to 1 implies that organizational structure today is very closely related to the organizational structure a year ago, which would be the result of the cumulative external market experience by the firm in the past. A  $\phi$  close to 0 would imply that the organizational structure today is independent of the organizational form one year ago, and as such, would imply a small level of persistence and path dependence. The latter would happen if costs of adjusting organizational structure were negligible. In Table 8, Panel A we find that firms increase their scope as TED increases. Moreover, the organizational structure contains a large persistent component, suggesting that the costs of changing the organizational are not negligible. An increase in in external financial conditions therefore affects organizational structure with a half-life of about 4 years.

In the previous specification of this section, we assume that TED shocks are independent over time. However the degree of external financial conditions could itself be persistent. To account for the persistence in the organizational structure as well as external market conditions, we estimate a panel VAR system of the type:

$$\begin{aligned} y_{it} &= \alpha_1 + \phi_1 y_{it-1} + \beta_2 \zeta_{it-1} \\ \zeta_{it} &= \alpha_2 + \beta_1 \zeta_{it-1} + \phi_2 y_{it-1} \end{aligned} \quad (21)$$

Here,  $y$  is *Number Divisions* and  $\zeta$  is the TED spread. The implied assumptions under this approach are that the organizational structure of firm  $i$  at time  $t$  depends on the organizational structure of the firm at time  $t-1$  and also on the TED spread at time  $t-1$ . Moreover, the level of TED spread evolves according to an autoregressive process where the level of TED spread at time  $t$  depends on the level of TED spread at  $t-1$  and also on the organizational structure at  $t-1$ . This methodology is similar to that employed by Love and Zicchino (2006).

Under this approach, we estimate higher levels of persistence, with a shock to TED affecting firms' scope with a half-life of about 10 years, as can be observed in Table 8, Panel B and the Impulse Response Function presented in Figure 5. Overall, we confirm our results from the previous sections and show that firms adjust their organizational structure in response to changes in the external financial environment. The results in this section also suggest that the organizational structure of firms may be determined by the accumulation of external financial frictions experienced in the past.

#### 4.3. Evidence from US bank branch deregulation

Our analysis so far mainly exploits time series variation in external market conditions to identify our results. In this section we use the staggered nature of bank branch deregulation across U.S. states during the 1980s and 1990s as a source of variation in external financial market

frictions (Jayaratne and Strahan, 1996). Because the timing of deregulation was staggered across states, we move away from time series variation, and instead explore our hypothesis in a difference-in-differences setting. As bank branching became less regulated the degree of frictions in financial markets decreased. This reduction in frictions should allow firms in deregulated states to narrow their scope and become less diversified.

To measure banking (de)regulation across states over time, we follow Black and Strahan (2001) and more recently Hombert and Matray (2016).<sup>13</sup> We construct a deregulation index as the sum of the ways in which banks can expand their operations. For example, a state that does not allow multibank holding companies, does not allow branching by means of mergers and acquisitions and does not allow de novo branching will have a deregulation index of zero. On the other extreme, a state that allows banks to expand their activity in all three ways will have an index with a value of three.

We first test whether bank branch deregulation in the states in which firms are located<sup>14</sup> affects their scope using the following specification:

$$y_{its} = \alpha + \beta_1 Deregulation Index_{st} + \delta_s + \mu_t + \mu_i + \Gamma X_{it} + \varepsilon_{its} \quad (22)$$

in which  $y_{it}$  measures the scope of firm  $i$  at time  $t$  in state  $s$ . We include state  $\delta_s$  to control for state level differences in firm scope, and time fixed effects for aggregate changes that might affect firm scope. In specifications we also include firm fixed effects,  $\mu_i$ . Therefore we identify the effect of bank deregulation from within state differences in firm scope, and how these change with bank deregulation. Changes in states that have not experienced deregulation serve as a control group.

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<sup>13</sup> During this period, states deregulated bank expansion in three main ways: (i) by permitting the formation of multibank holding companies; (ii) by permitting branching by means of merger and acquisitions (M&As) only, and (iii) by permitting unrestricted (de novo) branching.

<sup>14</sup> We assign firms to states using the information on the location of headquarters available in Compustat.

We present the results in Table 9, and mirror the ones we find when we use variation in the TED spread to measure the extent of financial frictions. When a state deregulates banking, firms, which are headquartered in the state, decrease their scope relative to firms in states, which have not deregulated their banking industry. Similarly, bank deregulation leads to less diversified firms. We find similar, although noisier, results when we repeat the analysis with firm fixed effects. In Table 10 we use the correlation of investment, cash flows, cash flows minus investments and financing deficit across the different divisions of the conglomerate as our measures of corporate diversification. The results again reflect the ones we find when we use variation in the TED spread to measure the extent of financial frictions. When we repeat the analysis including firm fixed effects, we find similar results in terms of economic and statistical significance.

Next, we turn to the M&A sample and test whether firms become less prone to making diversifying acquisitions as their state deregulates branching using a similar difference-in-differences specification as above:

$$y_{ijst} = \alpha + \beta_1 \text{Deregulation Index Acq.}_{st} + \delta_s + \mu_t + \Gamma_i X_{it} + \Gamma_j X_{jt} + \varepsilon_{ijst} \quad (22)$$

in which  $i$  indexes the acquirer,  $j$  indexes the target,  $s$  indexes the state in which the acquirer is headquartered, and  $t$  the time of the deal.  $y_{ijst}$  is a dummy variable taking the value of 1 if the deal is diversifying and 0 if it is not.  $\text{Deregulation Index Acq.}_{st}$  measures the banking deregulation index in the state of the acquirer at time  $t$ . Unlike in the rest of the paper, the variation in the condition of external financial markets is absorbed by time fixed effects, which also absorb any other aggregate variation in that might induce diversification. Further, state fixed effects control for differences between states, which might lead to diversifying acquisitions, such as the composition of firms within a state.

We present the results in Table 11. The probability that a firm makes a diversifying acquisition decreases as its local banking market is deregulated, with estimates being negative across all specifications. As before, economic magnitudes tend to be larger in the sample with better controls. Table 12 shows that banking deregulation results in more diversifying mergers when we use other measures of diversification: after deregulation targets are chosen from industries with more correlated, investment, cash flows, as well as financing deficits. Overall, these results suggest that our results are not an artifact of time series variation in external financial market conditions, but that firms respond to external capital market stress by expanding and diversifying the scope of internal capital markets to facilitate capital reallocation.

#### *4.4. Heterogeneity of effects*

Disruptions in external markets should hamper some industries more than others. In particular, more volatile industries should be ones where the sensitivity of firm scope to TED should be higher. We now assess if this conjecture is borne out in the data.

In order to measure industry sensitivity to TED, we start by taking the average sales of undiversified firms by 2-digit SIC industry-year. We then calculate the correlation between average industry sales and TED for all 2 digit SIC industries during our sample period. Table 13, Panel A and Panel B shows that Compustat Segments firms that operate in industries more sensitive to TED – i.e., have a higher correlation between sales and TED -- adjust their organizational structure more in response to changes in TED than those firms that operate in industries that are less sensitive to external financial frictions.

The model we developed suggests that the benefits of diversified firms increase with volatility, and more so during times of high external market frictions. Next, we test whether our results are stronger for firms that operate in more volatile industries. We construct a 2-digit SIC industry level measure of volatility by taking the standard deviation of the yearly average sales

by stand-alone firms in the industry and dividing by the mean of the yearly average sales by stand-alone firms in the industry. Panel C and D of Table 13 show that organizational change in Compustat Segments firms that operate in more volatile industries is more responsive to TED.

We also test whether the sensitivity of the industry to TED and the industry volatility of the acquiring and target firms in M&A deals influence the degree to which TED affects the probability of engaging in a diversifying M&A. We find that the results have the expected coefficients, but are statistically weaker. These results are reported in Appendix I to conserve space.

Taken as a whole, these results support the view that firms that operate in more volatile industries and firms that operate in industries that are more sensitive to TED adjust their scope more in response to changes in the degree of external market frictions. Both of these predictions are consistent with the predictions of the simple model of internal capital markets we derive in the Appendix.

#### *4.5. Empire building*

Our results suggest that the organizational structure of firms partially evolves as an optimal response to exogenous variation in external financial conditions. We test the idea that diversifying scope may not be simply motivated by empire building motives further using the Entrenchment Index of Bebchuk, Cohen, and Ferrell (2009). We find that firms with a higher level of entrenchment are, on average, more diversified, as one would expect if diversification was driven by empire building motives. However, the scope of entrenched organizations is also less responsive to the evolution of external financial conditions. These results, presented in Table 14, reinforce the view that the value of being diversified is time varying and that it may be optimal to increase the degree of diversification of the firm in times when external financial frictions are large, as a way to promote capital reallocation within the firm.

#### *4.6. Robustness*

In Appendices A to I we further establish the robustness of our main findings by using the BAA-AAA spread as a measure of external financial frictions (Appendix A), using contemporaneous TED spread as a measure of external financial frictions (Appendix B), defining diversification at the one- and three-digit SIC levels (Appendix C), analyzing all M&A deals instead of focusing on completed deals only (Appendix D), analyzing only large firms and large M&A deals (Appendix E), excluding the recent financial crisis, NBER recessions, and periods of extreme values of TED (Appendix F), clustering standard errors by industry-year (Appendix G), controlling for the 1998 change in Compustat Segments reporting (Appendix H) and showing the heterogeneity of effects in M&As (Appendix I). Overall these appendices confirm the general nature of our findings.

### **5. Conclusion**

We document new facts which relate the evolution of firm scope to the changing frictions in external capital markets over the last three decades. In the first part of the paper, we study the scope of large, publicly traded firms. We find that firms increase their scope during times of high external capital market frictions, such as in the recent Great Recession. Moreover, during these times, firms diversify their investment needs and cash flows across industries. In the second part, we find similar phenomena outside diversified public firms. Examining the mergers and acquisitions activity of standalone and diversified private as well as public firms we uncover similar patterns. In aggregate data we find shifts in the composition of mergers from focused to diversifying and back, which are correlated with external market conditions. This body of evidence suggests that the reason for that relationship lies in the firms' propensity to create an internal capital market in times when external capital markets operate poorly. Our results suggest

that the organizational structure of firms partially evolves as an optimal response to exogenous variation in external financial conditions.

## References

- Ahern, K. R., and Harford, J., 2014. The importance of industry links in merger waves. *The Journal of Finance* 69, 527-576.
- Almeida, H., Campello, M., Hackbarth, D., 2011. Liquidity mergers. *Journal of Financial Economics* 102, 526-558.
- Almeida, H., Kim, C. S., Kim, H. B., 2015. Internal capital markets in business groups: Evidence from the Asian financial crisis. *The Journal of Finance* 70, 2539-2586.
- Almeida, H., Park, S. Y., Subrahmanyam M. G., Wolfenzon, D., 2011. The structure and formation of business groups: Evidence from Korean chaebols. *Journal of Financial Economics* 99, 447-475.
- Bebchuk, L., Cohen, A., Ferrell, A., 2009. What matters in corporate governance?. *Review of Financial Studies* 22, 783-827.
- Black, S.E. and Strahan, P.E., 2001. The division of spoils: rent-sharing and discrimination in a regulated industry. *American Economic Review*, 814-831.
- Borenstein, S., 1990. Airline mergers, airport dominance, and market power. *The American Economic Review* 80, 400-404.
- Chevalier, J., 1999. Why do firms undertake diversifying mergers? An examination of the investment policies of merging firms. Unpublished working paper, University of Chicago.
- Coase, R. H., 1937. The nature of the firm. *Economica* 4, 386-405.
- Çolak, G., Whited, T. M., 2007. Spin-offs, divestitures, and conglomerate investment. *Review of Financial Studies* 20, 557-595.
- Custódio, C., 2014. Mergers and acquisitions accounting and the diversification discount. *The Journal of Finance* 69, 219-240.
- Devos, E., Kadapakkam, P. R., Krishnamurthy, S., 2009. How do mergers create value? A comparison of taxes, market power, and efficiency improvements as explanations for synergies. *Review of Financial Studies* 22, 1179-1211.
- Duchin, R., Schmidt, B., 2013. Riding the merger wave: Uncertainty, reduced monitoring, and bad acquisitions. *Journal of Financial Economics* 107, 69-88.
- Erel, I., Jang, Y., Weisbach, M. S., 2015. Do acquisitions relieve target firms' financial constraints?. *The Journal of Finance*, 70, 289-328.

- Frank, M. Z., Goyal, V. K., 2003. Testing the pecking order theory of capital structure. *Journal of Financial Economics* 67, 217-248.
- Garfinkel, J. A., Hankins, K. W., 2011. The role of risk management in mergers and merger waves. *Journal of Financial Economics* 101, 515-532.
- Giroud, X., Mueller, H. M., 2015 Capital and labor reallocation within firms. *The Journal of Finance* 70, 1767-1804.
- Gomes J, Livdan D., 2004. Optimal diversification: Reconciling theory and evidence. *The Journal of Finance*. 59, 507-35.
- Greenlaw, D., Hatzius, J., Kashyap, A. K., Shin, H. S., 2008. Leveraged losses: lessons from the mortgage market meltdown. In *Proceedings of the US monetary policy forum*, pp. 7-59.
- Harford, J., 2005. What drives merger waves?. *Journal of Financial Economics* 77, 529-560.
- Hombert, J. and Matray, A., 2016. The Real Effects of Lending Relationships on Innovative Firms and Inventor Mobility. *Review of Financial Studies*, forthcoming.
- Ivashina, V., Scharfstein, D. S., 2010. Bank Lending During the Financial Crisis of 2008. *Journal of Financial Economics* 97, 319–338.
- Jayarathne, J. and Strahan, P.E., 1996. The finance-growth nexus: Evidence from bank branch deregulation. *The Quarterly Journal of Economics*, 639-670.
- Jensen, M. C., 1986. Agency costs of free cash flow, corporate finance, and takeovers. *The American Economic Review* 76, 323-329.
- Kuppuswamy, V., Villalonga, B., 2015. Does diversification create value in the presence of external financing constraints? Evidence from the 2007–2009 financial crisis. *Management Science*, 62, 905-923.
- Lins, K. V., Servaes, H., 2002. Is corporate diversification beneficial in emerging markets?. *Financial Management*, 5-31.
- Maksimovic, V., Phillips, G., 2001. The market for corporate assets: Who engages in mergers and asset sales and are there efficiency gains?. *The Journal of Finance* 56, 2019-2065.
- Maksimovic, V., Phillips, G., 2002. Do conglomerate firms allocate resources inefficiently across industries? Theory and evidence. *The Journal of Finance* 57, 721-767.
- Maksimovic, V., Phillips, G., Yang, L., 2013. Private and public merger waves. *The Journal of Finance* 68, 2177-2217.

- Malmendier, U., Tate, G., Yan, J., 2011. Overconfidence and early-life experiences: the effect of managerial traits on corporate financial policies. *The Journal of Finance* 66, 1687-1733.
- Matvos G, Seru A., 2014. Resource allocation within firms and financial market dislocation: Evidence from diversified conglomerates. *Review of Financial Studies*. 27,1143-89.
- Mitchell, M. L., Mulherin, J. H., 1996. The impact of industry shocks on takeover and restructuring activity. *Journal of Financial Economics* 41, 193-229.
- Ovtchinnikov, A. V., 2013. Merger waves following industry deregulation. *Journal of Corporate Finance* 21, 51-76.
- Ozbas, O, Scharfstein, D. S., 2009. Evidence on the dark side of internal capital markets. *Review of Financial Studies*, hhp071.
- Rajan, R., Servaes, H., Zingales, L., 2000. The cost of diversity: The diversification discount and inefficient investment. *The Journal of Finance* 55, 35-80.
- Rhodes-Kropf, M., Robinson, D. T., Viswanathan, S., 2005. Valuation waves and merger activity: The empirical evidence. *Journal of Financial Economics* 77, 561-603.
- Seru, A., 2014. Firm boundaries matter: Evidence from conglomerates and R&D activity. *Journal of Financial Economics* 111, 381-405.
- Servaes, H., 1996. The value of diversification during the conglomerate merger wave. *Journal of Finance* 51, 1201-1225.
- Shin, H. H., Stulz, R. M., 1998. Are internal capital markets efficient?. *Quarterly Journal of Economics*, 531-552.
- Shyam-Sunder, L., Myers, S. C., 1999. Testing static tradeoff against pecking order models of capital structure. *Journal of Financial Economics* 51, 219-244.
- Silva, R. C., 2016. Internal labor markets, wage convergence and investment. Unpublished working paper, London Business School.
- Stein, J. C., 1997. Internal capital markets and the competition for corporate resources. *The Journal of Finance* 52, 111-133.
- Whited, T. M., 2001. Is it inefficient investment that causes the diversification discount?. *The Journal of Finance* 56, 1667-1691.
- Williamson, O. E., 1975. *Markets and hierarchies*. New York, 26-30.

## Appendix: Framework to Generate Empirical Predictions

We present a stylized framework, which illustrates how the benefits of a diversified firm change with external market conditions. To keep the model streamlined, we omit any costs of diversified firms. The setup is as follows. There are two industries, 1 and 2. Firms can be diversified across both industries, or produce as stand-alones. After observing productivity  $\alpha_i$ , a firm in industry  $i$  invests  $I_i$  resulting in a gross return of  $\alpha_i I_i$ , and adjustment costs  $\frac{I_i^2}{2}$ . To simplify the analysis, the firm has no internal funds for investment. Accessing external financing in the amount of  $e$  has a deadweight cost  $\zeta \frac{e^2}{n}$ ,  $0.5 > \zeta \geq 0$ <sup>15</sup>.  $\zeta$  measures the degree of frictions in external capital markets; a high  $\zeta$  captures times during which the costs of accessing external capital markets are high, such as the financial crisis.  $n$  measures the number of divisions, so  $n=1$  for stand-alone firms and  $n=2$  for diversified firms. Our set up implies that a firm, which is a collection of identical divisions, has no (dis)advantage over an equivalent collection of stand-alone firms in the costs of accessing external markets.

To capture the idea that a firm cannot quickly change from stand-alone to diversified and vice versa (Gomes and Livdan, 2004), we analyze the effect of diversification before industry productivities are known. Industries 1 and 2 are ex ante identical: their expected productivity as well as the variance of productivity shocks are equal, i.e.,  $E[\alpha_1] = E[\alpha_2] = \mu$  and  $Var(\alpha_1) = Var(\alpha_2) = \sigma^2$ . As we see later, the correlation of productivity shocks across industries play a central role; we denote it by  $Cov(\alpha_1, \alpha_2) = \sigma_{12}$ . We relax the assumption that external

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<sup>15</sup> Bounding  $0.5 > \zeta$  ensures the problem is well behaved.

capital market conditions are known before the organizational structure is chosen in the last part of this section.

### *A.1. Stand-alone benchmark*

We first analyze stand-alone firms (indexed by  $s$ ), which serve as a benchmark for a conglomerate. After it observes productivity, the stand-alone firm in industry  $i$  decides to maximize its value by choosing external market financed investment:

$$\begin{aligned} \max_{I_i} \alpha_i I_{is} - \frac{I_{is}^2}{2} - \zeta e_s^2 \\ \text{s.t. } e_s \geq I_{is} \end{aligned}$$

First order conditions imply optimal investment is:

$$I_{is} = \frac{1}{1+2\zeta} \alpha_i, \quad (1)$$

The expression is intuitive. Investment increases in the productivity of the firm,  $\alpha_i$ , and decreases in the costs of external funds, captured by the shadow cost of capital  $\frac{1}{1+2\zeta}$ . The corresponding stand-alone value of firm for a given productivity realization is:

$$V_{is} = \frac{1}{1+2\zeta} \frac{\alpha_i^2}{2} \quad (2)$$

### *A.2. Diversified firm*

The diversified firm (indexed by  $d$ ) maximizes the joint value of both divisions:

$$\begin{aligned} \max_{I_{1d}, I_{2d}} \alpha_1 I_{1d} + \alpha_2 I_{2d} - \frac{I_{1d}^2}{2} - \frac{I_{2d}^2}{2} - \zeta \frac{e_d^2}{2} \\ \text{s.t. } e_d \geq I_{1d} + I_{2d} \end{aligned}$$

Resulting in the following investment for each division:

$$I_{id} = \frac{1}{1+2\zeta} (\alpha_i + \zeta (\alpha_i - \alpha_{-i})) \quad (3)$$

First, note that if there are no financial constraints,  $\zeta = 0$ , the investment of the conglomerate equals that of stand-alone firms in the corresponding industries. Investment in the diversified firm departs from that of stand-alone firms if external financing is costly. Financial constraints have two effects on the investment of the diversified firm.

First, as in stand-alone firms, higher costs of external finance imply that a division obtains less financing, because the shadow cost of capital is higher, which is captured in the term  $\frac{1}{1+2\zeta}$ . Second, as financial constraints increase, the internal capital markets reallocate capital.

The difference between the investments in the division of a conglomerate,  $I_{id}$ , and the stand-alone firm,  $I_{is}$ , in the same industry is:

$$I_{id} - I_{is} = \frac{1}{1+2\zeta} \zeta (\alpha_i - \alpha_{-i}) \quad (4)$$

This expression illustrates that internal capital markets divert capital to the more productive divisions, which invests more than a stand-alone firm in that industry. Conversely, the less productive division invests less than its stand-alone counterpart.

This reallocation in internal capital markets is valuable. The value of the diversified firm given a realization of productivity is:

$$V_d = \frac{1}{(1+2\zeta)} \zeta \left( \frac{(\alpha_1 - \alpha_2)^2}{2} + \frac{\alpha_1^2 + \alpha_2^2}{2} \right). \quad (5)$$

Because we omit any costs of diversification, the value of the diversified firm is larger than the combined value of stand-alone firms.<sup>16</sup> Denote the diversified firm premium as  $\Delta V = V_d - (V_{1s} + V_{2s})$ . Then:

$$\Delta V = \frac{\zeta}{(1+2\zeta)} \frac{(\alpha_1 - \alpha_2)^2}{2} \quad (6)$$

The realized reallocation benefits are increasing in the dispersion of productivity across divisions,  $(\alpha_i - \alpha_{-i})^2$ , and are higher when it is more difficult to access capital in external capital markets, i.e., when  $\zeta$  is higher,  $\frac{\partial \Delta V}{\partial \zeta} \geq 0$ .

### A.3. Incentives to Diversify

One does not expect firms to adjust their structure instantaneously upon observing productivity. We therefore analyze the expected benefits of diversified firms before productivity is known, capturing the adjustment lag. With a little algebra, one can show that the expected diversification premium reduces to the following expression:<sup>17</sup>

$$E[\Delta V] = \frac{\zeta}{(1+2\zeta)} (\sigma - \sigma_{12}) \quad (7)$$

The expected diversification premium provides the firm incentives to diversify.

We next examine how these incentives change with external market conditions. We first examine the advantage of conglomerates relative to stand-alone firms. The realized advantage of

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<sup>16</sup> In a more general setting with costs of diversification (e.g., socialism as in Matvos and Seru, 2014), the benefits of diversification would be lower by such costs.

<sup>17</sup>  $E\left(\frac{(\alpha_1 - \alpha_2)^2}{2}\right) = \frac{\mu^2 + \sigma^2}{2} + \frac{\mu^2 + \sigma^2}{2} - \mu^2 - \sigma_{12} = (\sigma - \sigma_{12})$

diversified firm increases with the cost of external funding, so it is not surprising, that the expected value does as well, i.e.  $\frac{\partial E[\Delta V]}{\partial \zeta} \geq 0$ .<sup>18</sup> This result suggests that stand-alone firms should add divisions when external capital markets tighten, and vice versa.

Next we examine how the structure of a diversified firm affects its value. As we show above, the realized value of diversification is increasing in the value of reallocation in internal capital markets. If the productivity shocks across divisions are highly correlated, then there is little benefit of moving resources from one division to the next,  $\frac{\partial E[\Delta V]}{\partial \sigma_{12}} < 0$ . The gains from reallocation are larger when productivity differences are larger, i.e. when shocks are large. Therefore, the expected benefits of a diversified firm decrease with the correlation of productivity across divisions and increase with the variance of productivity shocks:  $\frac{\partial E[\Delta V]}{\partial \sigma} > 0$ .

Our primary interest is to understand how the incentives to structure a diversified firm change with external market conditions. Because the benefits of reallocation are higher when external financial markets are constrained, the benefit of having uncorrelated productivity across divisions is particularly pronounced in tight markets:  $\frac{\partial^2 E[\Delta V]}{\partial \zeta \partial \sigma_{12}} < 0$ . Moreover, integrating the

firm is more profitable if productivity is more volatile, since that leads to larger benefits of reallocation:  $\frac{\partial^2 E[\Delta V]}{\partial \zeta \partial \sigma} < 0$ .

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<sup>18</sup> Recall that  $\text{cov}(x, y) \leq \sqrt{\text{var}(x) \text{var}(y)} \Rightarrow \sigma_{12} \leq \sigma$

Overall, our framework predicts that as external capital markets tighten the incentives to conglomerate increase, particularly across industries with less correlated productivity and industries with larger productivity shocks.

#### *A.4. Time varying external market conditions*

By modeling  $\zeta$  as a parameter, we de facto assume that external capital market conditions are permanent. Suppose instead, that external market conditions change over time, and by the time firms choose whether to diversify, the conditions have changed. Then diversifying would be less valuable. To capture this intuition, consider the following extension. When the firm chooses organizational structure, the state of external markets is  $\zeta_0$ . After the firm chooses organizational structure, the new state of capital markets  $\zeta$  is realized. Suppose the firm observes productivity only after  $\zeta$  is realized and invests. Intuitively, as long as external market conditions are not completely temporary, the qualitative results from above should remain intact, because the benefits of diversification should at least partially be preserved.

Suppose external market conditions follow an AR1 process, we can assess how the permanence of conditions affects diversification gains more directly. Denote the expected value of diversification observe  $\zeta_0$  at the time firms choose organizational structure and as  $E_{\zeta_0} E[\Delta V]$ , and denote the autoregressive coefficient as  $\beta$ .<sup>19</sup> Then:

$$\frac{\partial E_{\zeta_0} E[\Delta V]}{\partial \zeta_0} \square \beta \frac{\partial E[\Delta V]}{\partial \zeta} \quad (8)$$

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<sup>19</sup> To obtain the result, first order Taylor expand  $\zeta_0$  around the benchmark of frictionless external capital market (i.e.,  $\zeta_0 = 0$ ).

If shocks to external market conditions are not permanent, then the change in value from diversification is approximately proportional to the autoregressive coefficient relative to the case under which the shocks are permanent.

**Table 1**

Summary statistics.

This table presents the summary statistics for the different samples used in the analysis. For each variable we report the number of observations, mean and standard deviation. Panel A presents the summary statistics for the sample of Compustat Segments firms, Panel B presents the summary statistics for the sample of Individual M&A deals and Panel C presents the summary statistics for the Aggregate M&A sample. All three samples span the period 1980 to 2012. The sample construction is detailed in the data section of the paper and all variables are defined in the Appendix.

Panel A: Summary statistics for the Compustat Segments sample			
Variable	Obs.	Mean	Std. Dev.
TED	33	.504	.399
Number Divisions	120,142	1.281	.662
1-HHI Assets	120,142	.067	.168
1-HHI Sales	120,142	.091	.222
Firm Investment Correlation	111,328	.954	.116
Firm CF Correlation	111,328	.935	.145
Firm (CF - Investment) Correlation	111,328	.935	.145
Firm Financing Deficit Correlation	111,328	.960	.102
Lag Size	120,142	4.563	2.507
Lag CF/A	120,142	-.196	1.366
Lag Q	120,142	3.646	13.555
Lag Leverage	120,142	.365	.257
Age	120,142	16.234	12.434
Panel B: Summary statistics for the individual M&A sample			
Variable	Obs.	Mean	Std. Dev.
Diversified M&A	38,979	.483	.500
Investment Correlation Acquirer – Target	38,918	.708	.378
CF Correlation Acquirer – Target	38,918	.578	.470
(CF - Investment) Correlation Acquirer – Target	38,918	.589	.464
Financing Deficit Correlation Acquirer – Target	38,918	.761	.304
% Cash	29,182	.436	.452
Use Cash	29,182	.550	.498
All Cash	29,182	.320	.467
Panel C: Summary statistics for the aggregate M&A sample			
Variable	Obs.	Mean	Std. Dev.
Share Diversified Deals	33	.498	.066
Share Diversified Value	33	.470	.102
Aggregate Investment Correlation in M&As	33	.702	.071
Aggregate CF Correlation in M&As	33	.581	.098
Aggregate (CF - Investment) Correlation in M&As	33	.593	.101
Aggregate Financing Deficit Correlation in M&As	33	.750	.070
Aggregate % Cash	33	.407	.235
Aggregate Use Cash	33	.524	.279
Aggregate All Cash	33	.277	.177

**Table 2**

Evolution of firm diversification and external market conditions.

This table shows the relationship between firm scope and external financial frictions. We report coefficients from estimating the following OLS regression on the sample of Compustat Segments firms:  $Y_{it} = \alpha + \beta_1 \cdot TED_t + X'_{it}\gamma + \epsilon_{it}$ . Where  $Y$  is *Number Divisions* in columns 1 and 2, *1-HHI Assets* in columns 3 and 4 and *1-HHI Sales* in columns 5 and 6. The matrix of controls  $X$  includes *Lag Size*, *Lag CF/A*, *Lag Q*, *Lag Leverage*, and *Age*. The sample used to perform the estimation in Panel A contains all firms in the Compustat Segments sample. Panel B contains diversified firms (firms with at least two 2 digit SIC divisions) and Panel C contains very diversified firms (firms with at least three 2 digit SIC divisions). All variables are defined in the Appendix. The sample covers the period 1980 to 2012, and its construction is detailed in the data section of the paper. The standard errors in parenthesis are clustered by year. Statistical significance at 1%, 5% and 10% is marked with \*\*\*, \*\* and \* respectively.

Panel A: All firms in Compustat Segments sample						
	(1)	(2)	(3)	(4)	(5)	(6)
	Number Divisions		1-HHI Assets		1-HHI Sales	
TED	0.290*** (0.033)	0.112*** (0.029)	0.067*** (0.006)	0.027*** (0.004)	0.046*** (0.006)	0.022*** (0.005)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	Yes	No	Yes
N	120,142	120,142	120,142	120,142	120,142	120,142
$R^2$	0.104	0.676	0.094	0.652	0.055	0.666
Panel B: Only diversified firms in Compustat Segments sample						
	(1)	(2)	(3)	(4)	(5)	(6)
	Number Divisions		1-HHI Assets		1-HHI Sales	
TED	0.339*** (0.035)	0.178*** (0.045)	0.093*** (0.013)	0.028*** (0.008)	0.068*** (0.010)	0.024*** (0.009)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	Yes	No	Yes
N	22,951	22,951	22,951	22,951	22,951	22,951
$R^2$	0.098	0.586	0.119	0.650	0.056	0.610
Panel C: Only very diversified firms in Compustat Segments sample						
	(1)	(2)	(3)	(4)	(5)	(6)
	Number Divisions		1-HHI Assets		1-HHI Sales	
TED	0.323*** (0.046)	0.348*** (0.070)	0.057*** (0.009)	0.045*** (0.012)	0.041*** (0.007)	0.038*** (0.011)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	Yes	No	Yes
N	7,079	7,079	7,079	7,079	7,079	7,079
$R^2$	0.053	0.463	0.049	0.570	0.046	0.584

**Table 3**

Diversification using cashflows & investment correlations and external market conditions.

This table estimates the relationship between the degree of diversification of firms measured by the correlation among divisions of conglomerates and the TED spread. We report coefficients from estimating the following OLS regression on the sample of Compustat Segments firms:  $Y_{it} = \alpha + \beta_1 \cdot TED_t + X'_{it}\gamma + \epsilon_{it}$ . Where  $Y$  is *Firm Investment Correlation* in columns 1 and 2, *Firm CF Correlation* in columns 3 and 4, *Firm (CF - Investment) Correlation* in columns 5 and 6 and *Firm Financing Deficit Correlation* in columns 7 and 8. The matrix of controls  $X$  includes *Lag Size*, *Lag CF/A*, *Lag Q*, *Lag Leverage*, and *Age*. The sample in Panel A contains all firms in the Compustat Segments sample. Panel B contains diversified firms (firms with at least two 2 digit SIC divisions) and Panel C contains very diversified firms (firms with at least three 2 digit SIC divisions). All variables are defined in the Appendix. The sample covers the period 1980 to 2012, and its construction is detailed in the data section of the paper. The standard errors in parenthesis are clustered by year. Statistical significance at 1%, 5% and 10% is marked with \*\*\*, \*\* and \* respectively.

Panel A: All firms in Compustat Segments sample								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Firm Investment Correlation		Firm CF Correlation		Firm (CF - Investment) Correlation		Firm Financing Deficit Correlation	
TED	-0.050*** (0.004)	-0.012*** (0.003)	-0.066*** (0.006)	-0.017*** (0.004)	-0.066*** (0.006)	-0.016*** (0.004)	-0.040*** (0.003)	-0.010*** (0.002)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	Yes	No	Yes	No	Yes
N	111,328	111,328	111,328	111,328	111,328	111,328	111,328	111,328
$R^2$	0.125	0.770	0.147	0.766	0.148	0.765	0.115	0.766
Panel B: Only diversified firms in Compustat Segments sample								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Firm Investment Correlation		Firm CF Correlation		Firm (CF - Investment) Correlation		Firm Financing Deficit Correlation	
TED	-0.065*** (0.007)	-0.019*** (0.005)	-0.078*** (0.008)	-0.028*** (0.006)	-0.079*** (0.008)	-0.026*** (0.006)	-0.047*** (0.005)	-0.015*** (0.004)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	Yes	No	Yes	No	Yes
N	21,842	21,842	21,842	21,842	21,842	21,842	21,842	21,842
$R^2$	0.159	0.795	0.225	0.733	0.231	0.734	0.155	0.814
Panel C: Only very diversified firms in Compustat Segments sample								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Firm Investment Correlation		Firm CF Correlation		Firm (CF - Investment) Correlation		Firm Financing Deficit Correlation	
TED	-0.043*** (0.004)	-0.020** (0.008)	-0.049*** (0.004)	-0.031*** (0.008)	-0.052*** (0.004)	-0.030*** (0.009)	-0.034*** (0.003)	-0.016** (0.006)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	Yes	No	Yes	No	Yes
N	6,734	6,734	6,734	6,734	6,734	6,734	6,734	6,734
$R^2$	0.092	0.804	0.097	0.653	0.107	0.661	0.110	0.845

**Table 4**

Diversifying Mergers & Acquisitions and external market conditions.

This table estimates the relationship between aggregate M&A activity and the TED spread. We report coefficients from estimating the following OLS regression on the Aggregate M&A sample:  $\hat{Y}_{it} = \alpha + \beta_1 \cdot TED_t + \epsilon_{it}$ . Where  $Y$  is *Share Diversified Value* in column 1 and *Share Diversified Deals* in column 2. All variables are defined in the Appendix. The sample covers the period 1980 to 2012, and its construction is detailed in the data section of the paper. Standard errors are reported in parenthesis. Statistical significance at 1%, 5% and 10% is marked with \*\*\*, \*\* and \* respectively.

	(1)	(2)
	Share Diversified Value	Share Diversified Deals
TED	0.185*** (0.032)	0.119*** (0.020)
Constant	0.376*** (0.020)	0.438*** (0.013)
N	33	33
$R^2$	0.524	0.526

**Table 5**

Diversifying Mergers & Acquisitions - deal composition - and external market conditions.

This table estimates the relationship between the probability of engaging in a diversifying M&A and TED spread. Panel A contains the coefficients from estimating the following logit regression on the sample of Individual M&A deals:  $Diversified\ M\&A_{it} = \alpha + \beta_1 \cdot TED_t + X'_{it}\gamma + \epsilon_{it}$ . Where *Diversified M&A* is a dummy variable that takes the value of 1 if the Acquirer's main 2 digit SIC industry is different from the Target's main 2 digit SIC industry, and zero otherwise. The matrix of controls *X* includes control for *Deal Value* and Acquirer and Target Thomson firm controls in columns 3 to 6, while it includes *Deal Value* and Acquirer and Target Compustat controls on columns 7 to 10. The Thomson controls are *Sales*, *Profitability*, *Leverage* and *Cash* for both the target and the acquirer. The Compustat controls are *Lag Size*, *Lag CF/A*, *Lag Q*, *Lag Leverage* and *Age* for both the target and the acquirer. Panel B estimates the same logit regression in a sample that excludes all deals where the target or acquirer is present in Compustat. All variables are defined in the Appendix. The sample covers the period 1980 to 2012, and its construction is detailed in the data section of the paper. The standard errors in parenthesis are clustered by year. Statistical significance at 1%, 5% and 10% is marked with \*\*\*, \*\* and \* respectively.

Panel A: All M&A Deals										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Diversified M&A									
TED	0.369*** (0.084)	0.529*** (0.091)	0.618*** (0.190)	0.382** (0.192)	0.509*** (0.186)	0.470** (0.191)	1.408*** (0.297)	1.112** (0.476)	1.096*** (0.363)	1.162*** (0.345)
Acq. Industry FE	No	Yes	No	Yes	Yes	No	No	Yes	Yes	No
Tgt. Industry FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Thomson Controls	No	No	Yes	Yes	Yes	Yes	No	No	No	No
Compustat Controls	No	No	No	No	No	No	Yes	Yes	Yes	Yes
N	38,979	38,926	4,777	4,757	4,767	4,768	543	457	510	505
Pseudo $R^2$	0.002	0.265	0.019	0.168	0.099	0.107	0.072	0.413	0.232	0.216

Panel B: M&A deals excluding Compustat targets and acquirers							
	(1)	(2)	(3)	(4)	(5)	(6)	
	Diversified M&A						
TED		0.165** (0.083)	0.375*** (0.103)	0.870*** (0.305)	0.734*** (0.280)	0.766*** (0.230)	0.835** (0.337)
Acq. Industry FE		No	Yes	No	Yes	Yes	No
Tgt. Industry FE		No	Yes	No	Yes	No	Yes
Thomson Controls		No	No	Yes	Yes	Yes	Yes
N		21,207	21,207	1565	1514	1548	1544
Pseudo $R^2$		0.000	0.259	0.014	0.176	0.088	0.115

**Table 6**

Correlations between acquirer and target cashflows & investment in diversifying M&As and external market conditions.

This table estimates the relationship between the correlation of investment, cash flows, cash flows minus investment and net financing deficit and TED spread. Panel A contains the coefficients from estimating the following OLS regression on the Aggregate M&A sample:  $Y_{it} = \alpha + \beta_1 \cdot TED_t + \epsilon_{it}$ . Where  $Y$  is *Aggregate Investment Correlation in M&As* in column 1, *Aggregate CF Correlation in M&As* in column 2, *Aggregate (CF - Investment) Correlation in M&As* in column 3 and *Aggregate Financing Deficit Correlation in M&As* in column 4. Panels B, C, D and E contain the coefficients from estimating the following OLS regression on the sample of Individual M&A deals:  $Y_{it} = \alpha + \beta_1 \cdot TED_t + X'_{it}\gamma + \epsilon_{it}$ . Where  $Y$  is *Investment Correlation Acquirer - Target* in Panel B, *CF Correlation Acquirer - Target* in Panel C, *(CF - Investment) Correlation Acquirer - Target* in Panel D and *Financing Deficit Correlation Acquirer - Target* in Panel E. The Thomson controls include *Deal Value* and *Sales, Profitability, Leverage* and *Cash* for both the target and the acquirer. The Compustat controls include *Deal Value* and *Lag Size, Lag CF/A, Lag Q, Lag Leverage* and *Age* for both the target and the acquirer. All variables are defined in the Appendix. The sample covers the period 1980 to 2012, and its construction is detailed in the data section of the paper. The standard errors in parenthesis are clustered by year. Statistical significance at 1%, 5% and 10% is market with \*\*\*, \*\* and \* respectively.

Panel A: Aggregate correlations between acquirer and target				
	(1)	(2)	(3)	(4)
	Aggregate Investment Correlation in M&As	Aggregate CF Correlation in M&As	Aggregate (CF - Investment) Correlation in M&As	Aggregate Financing Deficit Correlation in M&As
TED	-0.127*** (0.022)	-0.183*** (0.029)	-0.189*** (0.031)	-0.150*** (0.016)
Constant	0.767*** (0.014)	0.673*** (0.019)	0.689*** (0.020)	0.825*** (0.010)
N	33	33	33	33
$R^2$	0.516	0.554	0.552	0.737

**Table 6**  
Continued.

Panel B: Correlation of investment between acquirer and target

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Investment Correlation Acquirer – Target									
TED	-0.050*** (0.016)	-0.055*** (0.012)	-0.111*** (0.031)	-0.049* (0.027)	-0.076** (0.030)	-0.070*** (0.025)	-0.163*** (0.044)	-0.121* (0.066)	-0.131** (0.053)	-0.103** (0.043)
Acq. Industry FE	No	Yes	No	Yes	Yes	No	No	Yes	Yes	No
Tgt. Industry FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Thomson Controls	No	No	Yes	Yes	Yes	Yes	No	No	No	No
Compustat Controls	No	No	No	No	No	No	Yes	Yes	Yes	Yes
N	38,918	38,918	4,769	4,769	4,769	4,769	542	542	542	542
R <sup>2</sup>	0.001	0.426	0.022	0.303	0.219	0.179	0.058	0.480	0.325	0.292

Panel C: Correlation of cash flows between acquirer and target

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	CF Correlation Acquirer – Target									
TED	-0.107*** (0.022)	-0.098*** (0.017)	-0.167*** (0.047)	-0.111*** (0.034)	-0.146*** (0.041)	-0.126*** (0.038)	-0.280*** (0.073)	-0.115* (0.067)	-0.167** (0.070)	-0.154** (0.058)
Acq. Industry FE	No	Yes	No	Yes	Yes	No	No	Yes	Yes	No
Tgt. Industry FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Thomson Controls	No	No	Yes	Yes	Yes	Yes	No	No	No	No
Compustat Controls	No	No	No	No	No	No	Yes	Yes	Yes	Yes
N	38,918	38,918	4,769	4,769	4,769	4,769	542	542	542	542
R <sup>2</sup>	0.004	0.343	0.031	0.219	0.131	0.151	0.067	0.609	0.328	0.339

**Table 6**

Continued.

Panel D: Correlation of cash flows minus investment between acquirer and target										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	(CF - Investment) Correlation Acquirer – Target									
TED	-0.098*** (0.020)	-0.096*** (0.016)	-0.168*** (0.049)	-0.111*** (0.035)	-0.146*** (0.041)	-0.128*** (0.040)	-0.274*** (0.065)	-0.094 (0.069)	-0.132* (0.067)	-0.142** (0.062)
Acq. Industry FE	No	Yes	No	Yes	Yes	No	No	Yes	Yes	No
Tgt. Industry FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Thomson Controls	No	No	Yes	Yes	Yes	Yes	No	No	No	No
Compustat Controls	No	No	No	No	No	No	Yes	Yes	Yes	Yes
N	38,918	38,918	4,769	4,769	4,769	4,769	542	542	542	542
R <sup>2</sup>	0.004	0.346	0.033	0.233	0.142	0.159	0.072	0.611	0.335	0.327
Panel E: Correlation of financing deficit between acquirer and target										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Financing Deficit Correlation Acquirer – Target									
TED	-0.074*** (0.013)	-0.065*** (0.012)	-0.071** (0.028)	-0.053** (0.021)	-0.073*** (0.024)	-0.062** (0.025)	-0.179*** (0.030)	-0.088* (0.045)	-0.101** (0.038)	-0.114*** (0.029)
Acq. Industry FE	No	Yes	No	Yes	Yes	No	No	Yes	Yes	No
Tgt. Industry FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Thomson Controls	No	No	Yes	Yes	Yes	Yes	No	No	No	No
Compustat Controls	No	No	No	No	No	No	Yes	Yes	Yes	Yes
N	38,918	38,918	4,769	4,769	4,769	4,769	542	542	542	542
R <sup>2</sup>	0.005	0.263	0.020	0.229	0.126	0.157	0.056	0.655	0.304	0.388

**Table 7**

Choice of deal compensation in diversifying M&As & external market conditions.

This table estimates the relationship between means of payment in M&A deals and external financial frictions. Panel A contains the coefficients from the following OLS regression on the aggregate M&A sample:  $Y_{it} = \alpha + \beta_1 \cdot TED_t + \epsilon_{it}$ . Where  $Y$  is *Aggregate % Cash* in column 1, *Aggregate Use Cash* in column 2 and *Aggregate All Cash* in column 3. The first two columns of Panel B (columns 4 and 5) contains the coefficients from estimating the following OLS regression on the sample of Individual M&A deals:  $\% Cash_{it} = \alpha + \beta_1 \cdot TED_t + X'_{it}\gamma + \epsilon_{it}$ . Columns 6 to 9 of the table contain the coefficients from estimating the following logit regression on the sample of Individual M&A deals:  $Y_{it} = \alpha + \beta_1 \cdot TED_t + X'_{it}\gamma + \epsilon_{it}$ . Where  $Y$  is *Use Cash* in columns 6 and 7 and *All Cash* dummy in columns 8 and 9. For the regressions in Panel B, the matrix of controls  $X$  includes control for Deal Value and Acquirer and Target firm controls constructed using Compustat. These controls are *Lag Size*, *Lag CF/A*, *Lag Q*, *Lag Leverage*, and *Age* and are included in columns 5, 7 and 9. All variables are defined in the Appendix. The sample covers the period 1980 to 2012, and its construction is detailed in the data section of the paper. The standard errors in parenthesis are clustered by year. Statistical significance at 1%, 5% and 10% is marked with \*\*\*, \*\* and \* respectively.

	Panel A: Aggregate M&A Deals			Panel B: Individual M&A Deals					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Aggregate % Cash	Aggregate Use Cash	Aggregate All Cash	% Cash		Use Cash		All Cash	
TED	-0.241** (0.097)	-0.354*** (0.108)	-0.158** (0.074)	-0.325*** (0.074)	-0.261*** (0.063)	-2.019*** (0.565)	-1.788*** (0.617)	-1.289*** (0.484)	-1.815*** (0.662)
Constant	0.528*** (0.062)	0.703*** (0.069)	0.357*** (0.048)	0.568*** (0.038)	0.669*** (0.094)	1.009*** (0.213)	1.436** (0.592)	-0.257 (0.173)	0.523 (0.656)
Compustat Controls	No	No	No	No	Yes	No	Yes	No	Yes
N	33	33	33	29,182	523	29,182	523	29,182	523
$R^2$	0.167	0.257	0.128	0.048	0.157				
Pseudo $R^2$						0.055	0.101	0.020	0.172

**Table 8**

Persistence in firm diversification decisions.

This table estimates the regressions that assess the persistence of organizational form. Panel A contains the coefficients from estimating the following OLS regression on the sample of Compustat Segments firms:  $Y_{it} = \alpha + \beta_1 \cdot TED_t + \beta_2 \cdot Y_{i(t-1)} + X'_{it}\gamma + \epsilon_{it}$ . Where  $Y$  is *Number Divisions* for columns 1, *1-HHI Assets* for columns 2 and *1-HHI Sales* in columns 3. The matrix of controls  $X$  includes *Lag Size*, *Lag CF/A*, *Lag Q*, *Lag Leverage*, and *Age*. Panel B contains the coefficients obtained by estimating the following panel VAR model on the sample of Compustat Segments firms:

$$Y_{it} = \alpha_1 + \beta_1 \cdot Y_{i,t-1} + \beta_2 \cdot TED_{i,t-1} + \epsilon_{it}$$

$$TED_{it} = \alpha_2 + \beta_3 \cdot Y_{i,t-1} + \beta_4 \cdot TED_{i,t-1} + \epsilon_{it}$$

Where  $Y$  is *Number Divisions* in columns 1 and 2, *1-HHI Assets* in columns 3 and 4 and *1-HHI Sales* in columns 5 and 6. All variables are defined in the Appendix. The sample covers the period 1980 to 2012, and its construction is detailed in the data section of the paper. The standard errors are in parenthesis and are clustered by year in Panel A. Statistical significance at 1%, 5% and 10% is market with \*\*\*, \*\* and \* respectively.

Panel A: Firm scope and external market conditions

	(1)	(2)	(3)
	Number Divisions	1-HHI Assets	1-HHI Sales
TED	0.064*** (0.010)	0.014*** (0.002)	0.013*** (0.002)
Lag Number Divisions	0.831*** (0.009)		
Lag 1-HHI Assets		0.834*** (0.009)	
Lag 1-HHI Sales			0.774*** (0.009)
Controls	Yes	Yes	Yes
N	120,142	120,142	120,142
$R^2$	0.720	0.681	0.615

Panel B: Panel VAR

	(1)	(2)	(3)	(4)	(5)	(6)
	Number Divisions	TED	1-HHI Assets	TED	1-HHI Sales	TED
Lag TED	0.0272*** (0.004)	0.818*** (0.0023)	0.0071*** (0.001)	0.8114*** (0.0023)	0.0077*** (0.0013)	0.811*** (0.0023)
Lag Number Divisions	0.6918*** (.0117)	-0.0296*** (0.00198)				
Lag 1-HHI Assets			0.6756*** (0.0096)	-0.018*** (0.0066)		
Lag 1-HHI Sales					0.558*** (0.0109)	-0.0146*** (0.0046)
N	91,867	91,867	91,867	91,867	91,867	91,867

**Table 9**

Evolution of firm diversification and external market conditions - evidence from bank branch deregulation.

This table shows the relationship between firm scope and external financial frictions. We report coefficients from estimating the following OLS regression on the sample of Compustat Segments firms:  $Y_{it} = \alpha + \beta_1 \cdot Deregulation\ Index_{ts} + X'_{it}\gamma + \epsilon_{it}$ . Where  $Y$  is *Number Divisions* in columns 1 and 2, *1-HHI Assets* in columns 3 and 4 and *1-HHI Sales* in columns 5 and 6. *Deregulation Index* is an index that takes into account whether the state of the firm is deregulated in terms of within state banking M&A, unrestricted de novo branching and allowing multibank holding companies. The matrix of controls  $X$  includes *Lag Size*, *Lag CF/A*, *Lag Q*, *Lag Leverage*, and *Age*. The sample used to perform the estimation covers the period 1980 to 1999. All variables are defined in the Appendix. The sample construction is detailed in the data section of the paper. The standard errors in parenthesis are clustered by state $\times$ year. Statistical significance at 1%, 5% and 10% is marked with \*\*\*, \*\* and \* respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Number Divisions		1-HHI Assets		1-HHI Sales	
Deregulation Index	-0.016*** (0.006)	-0.011** (0.006)	-0.004*** (0.001)	-0.001 (0.001)	-0.003** (0.001)	-0.002 (0.001)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	Yes	No	Yes
N	60,000	60,000	60,000	60,000	60,000	60,000
$R^2$	0.141	0.718	0.128	0.733	0.078	0.714

**Table 10**

Diversification using cashflows & investment correlations and external market conditions - evidence from bank branch deregulation.

This table estimates the relationship between the degree of diversification of firms measured by the correlation among divisions of conglomerates and external financial frictions. We report coefficients from estimating the following OLS regression on the sample of Compustat Segments' firms:  $Y_{it} = \alpha + \beta_1 \cdot Deregulation\ Index_{ts} + X'_{it}\gamma + \epsilon_{it}$ . Where  $Y$  is *Firm Investment Correlation* for columns 1 and 2, *Firm CF Correlation* for columns 3 and 4, *Firm (CF - Investment) Correlation* for columns 5 and 6 and *Firm Financing Deficit Correlation* in columns 7 and 8. *Deregulation Index* is an index that takes into account whether the state of the firm is deregulated in terms of within state banking M&A, unrestricted de novo branching and allowing multibank holding companies. The matrix of controls  $X$  includes *Lag Size*, *Lag CF/A*, *Lag Q*, *Lag Leverage*, and *Age*. The sample used to perform the estimation covers the period 1980 to 1999. All variables are defined in the Appendix. The sample construction is detailed in the data section of the paper. The standard errors in parenthesis are clustered by state×year. Statistical significance at 1%, 5% and 10% is marked with \*\*\*, \*\* and \* respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Firm Investment Correlation		Firm CF Correlation		Firm (CF - Investment) Correlation		Firm Financing Deficit Correlation	
Deregulation Index	0.005*** (0.001)	0.003*** (0.001)	0.003** (0.001)	0.002** (0.001)	0.003** (0.001)	0.002** (0.001)	0.003*** (0.001)	0.002** (0.001)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	Yes	No	Yes	No	Yes
N	55,885	55,885	55,885	55,885	55,885	55,885	55,885	55,885
$R^2$	0.149	0.799	0.169	0.797	0.171	0.796	0.147	0.791

**Table 11**

Diversifying Mergers & Acquisitions - deal composition - and external market conditions - evidence from bank branch deregulation.

This table estimates the relationship between the probability of engaging in a diversifying M&A and external financial frictions. We report the coefficients from estimating the following logit regression on the sample of Individual M&A deals:  $Diversified\ M\&A_{it} = \alpha + \beta_1 \cdot Deregulation\ Index\ Acq_{it} + X'_{it}\gamma + \epsilon_{it}$ . Where *Diversified M&A* is a dummy variable that takes the value of 1 if the Acquirer's main 2 digit SIC industry is different from the Target's main 2 digit SIC industry, and zero otherwise. The matrix of controls *X* includes control for *Deal Value* and Acquirer and Target Thomson firm controls in columns 4 to 6, while it includes *Deal Value* and acquirer and target Compustat controls on columns 7 and 8. The Thomson controls are *Sales*, *Profitability*, *Leverage* and *Cash* for both the target and the acquirer. The Compustat controls are *Lag Size*, *Lag CF/A*, *Lag Q*, *Lag Leverage* and *Age* for both the target and the acquirer. *Deregulation Index Acq.* is an index that takes into account whether the state of the acquiring firm is deregulated in terms of within state banking M&A, unrestricted de novo branching and allowing multibank holding companies. The sample used to perform the estimation covers the period 1980 to 1999. All variables are defined in the Appendix. The sample construction is detailed in the data section of the paper. The standard errors in parenthesis are clustered by acquirer's state×year. Statistical significance at 1%, 5% and 10% is marked with \*\*\*, \*\* and \* respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Diversified M&A							
Deregulation Index Acq.	-0.047 (0.047)	-0.118** (0.053)	-0.113** (0.050)	-0.484*** (0.181)	-0.482** (0.201)	-0.500** (0.219)	-0.026 (0.350)	-1.168** (0.588)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acquirer State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acq. Industry FE	No	Yes	Yes	No	Yes	Yes	No	Yes
Tgt. Industry FE	No	No	Yes	No	No	Yes	No	No
Thomson Controls	No	No	No	Yes	Yes	Yes	No	No
Compustat Controls	No	No	No	No	No	No	Yes	Yes
N	21,594	21,580	21,543	2,310	2,299	2,259	290	251
Pseudo $R^2$	0.048	0.201	0.279	0.056	0.121	0.224	0.212	0.330

**Table 12**

Correlations between acquirer and target cashflows & investment in diversifying M&As and external market conditions - evidence from bank branch deregulation.

This table estimates the relationship between the correlation of investment, cash flows, cash flows minus investment and net financing deficit and external financial frictions. Panels A, B, C and D contain the coefficients from estimating the following OLS regression on the sample of Individual M&A deals:  $Y_{it} = \alpha + \beta_1 \cdot Deregulation\ Index\ Acq._{it} + X'_{it}\gamma + \epsilon_{it}$ . Where  $Y$  is *Investment Correlation Acquirer – Target* in Panel A, *CF Correlation Acquirer – Target* in Panel B, *(CF - Investment) Correlation Acquirer – Target* in Panel C and *Financing Deficit Correlation Acquirer – Target* in Panel D. The Thomson controls are *Deal Value* and *Sales, Profitability, Leverage* and *Cash* for both the target and the acquirer. The Compustat controls are *Deal Value* and *Lag Size, Lag CF/A, Lag Q, Lag Leverage* and *Age* for both the target and the acquirer. *Deregulation Index Acq.* is an index that takes into account whether the state of the acquiring firm is deregulated in terms of within state banking M&A, unrestricted de novo branching and allowing multibank holding companies. The sample used to perform the estimation covers the period 1980 to 1999. All variables are defined in the Appendix. The sample construction is detailed in the data section of the paper. The standard errors in parenthesis are clustered by acquirer's state×year. Statistical significance at 1%, 5% and 10% is marked with \*\*\*, \*\* and \* respectively.

Panel A: Correlation of investment between acquirer and target								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Investment Correlation Acquirer – Target							
Deregulation Index Acq.	0.004 (0.008)	0.012* (0.007)	0.047 (0.029)	0.079** (0.032)	0.066** (0.031)	0.047 (0.029)	0.042 (0.060)	0.092 (0.068)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acq State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acq. Industry FE	No	Yes	Yes	No	Yes	Yes	No	Yes
Tgt. Industry FE	No	No	Yes	No	No	Yes	No	No
Thomson Controls	No	No	Yes	Yes	Yes	Yes	No	No
Compustat Controls	No	No	No	No	No	No	Yes	Yes
N	21,576	21,576	2,338	2,338	2,338	2,338	337	337
$R^2$	0.043	0.303	0.342	0.069	0.221	0.342	0.298	0.528
Panel B: Correlation of cash flows between acquirer and target								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	CF Correlation Acquirer – Target							
Deregulation Index Acq.	0.007 (0.010)	0.015 (0.009)	0.045 (0.036)	0.072* (0.038)	0.060 (0.039)	0.045 (0.036)	-0.026 (0.071)	0.117 (0.087)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acq State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acq. Industry FE	No	Yes	Yes	No	Yes	Yes	No	Yes
Tgt. Industry FE	No	No	Yes	No	No	Yes	No	No
Thomson Controls	No	No	Yes	Yes	Yes	Yes	No	No
Compustat Controls	No	No	No	No	No	No	Yes	Yes
N	21,576	21,576	2,338	2,338	2,338	2,338	337	337
$R^2$	0.058	0.255	0.310	0.086	0.172	0.310	0.309	0.511

**Table 12**  
Continued.

Panel C: Correlation of cash flows minus investment between acquirer and target								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(CF - Investment) Correlation Acquirer – Target							
Deregulation Index Acq.	0.003 (0.010)	0.011 (0.009)	0.048 (0.036)	0.073* (0.039)	0.061 (0.039)	0.048 (0.036)	-0.052 (0.076)	0.107 (0.093)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acq State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acq. Industry FE	No	Yes	Yes	No	Yes	Yes	No	Yes
Tgt. Industry FE	No	No	Yes	No	No	Yes	No	No
Thomson Controls	No	No	Yes	Yes	Yes	Yes	No	No
Compustat Controls	No	No	No	No	No	No	Yes	Yes
N	21,576	21,576	2,338	2,338	2,338	2,338	337	337
$R^2$	0.055	0.256	0.315	0.089	0.178	0.315	0.300	0.522
Panel D: Correlation of financing deficit between acquirer and Target								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Financing Deficit Correlation Acquirer – Target							
Deregulation Index Acq.	0.004 (0.007)	0.009 (0.007)	0.052** (0.022)	0.057** (0.025)	0.049** (0.024)	0.052** (0.022)	0.019 (0.046)	0.074 (0.048)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acq State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acq. Industry FE	No	Yes	Yes	No	Yes	Yes	No	Yes
Tgt. Industry FE	No	No	Yes	No	No	Yes	No	No
Thomson Controls	No	No	Yes	Yes	Yes	Yes	No	No
Compustat Controls	No	No	No	No	No	No	Yes	Yes
N	21,576	21,576	2,338	2,338	2,338	2,338	337	337
$R^2$	0.049	0.179	0.324	0.070	0.165	0.324	0.270	0.520

**Table 13**

Evolution of firm diversification and external market conditions - heterogeneity of effects.

This table estimates how the sensitivity of organizational form to external financial conditions depends on industry sensitivity to TED and industry volatility. In Panels A and B we report coefficients from estimating the following OLS regression on the sample of Compustat Segments firms:  $Y_{it} = \alpha + \beta_1 \cdot TED_t + \beta_2 \cdot TED_t \times Sensitivity\ to\ TED_{it} + \beta_3 \cdot Sensitivity\ to\ TED_{it} + X'_{it}\gamma + \epsilon_{it}$ . In Panels C and D we report coefficients from estimating the following OLS regression on the sample of Compustat Segments firms:  $Y_{it} = \alpha + \beta_1 \cdot TED_t + \beta_2 \cdot TED_t \times Firm\ Volatility_{it} + \beta_3 \cdot Firm\ Volatility_{it} + X'_{it}\gamma + \epsilon_{it}$ . In Panels A and C  $Y$  is *Number Divisions* in columns 1 and 2, *1-HHI Assets* in columns 3 and 4 and *1-HHI Sales* in columns 5 and 6. In Panels B and D  $Y$  is *Firm Investment Correlation* in columns 1 and 2, *Firm CF Correlation* in columns 3 and 4, *Firm (CF - Investment) Correlation* in columns 5 and 6 and *Firm Financing Deficit Correlation* in columns 7 and 8. The matrix of controls  $X$  includes *Lag Size*, *Lag CF/A*, *Lag Q*, *Lag Leverage*, and *Age*. All variables are defined in the Appendix. The sample covers the period 1980 to 2012, and its construction is detailed in the data section of the paper. The standard errors in parenthesis are clustered by year. Statistical significance at 1%, 5% and 10% is marked with \*\*\*, \*\* and \* respectively.

Panel A: firm diversification and external market conditions - sensitivity to TED						
	(1)	(2)	(3)	(4)	(5)	(6)
	Number Divisions		1-HHI Assets		1-HHI Sales	
Sensitivity to TED×TED	1.444*** (0.363)	0.848*** (0.166)	0.293*** (0.088)	0.110*** (0.032)	0.414*** (0.106)	0.147*** (0.035)
TED	0.942*** (0.165)	0.491*** (0.081)	0.201*** (0.041)	0.077*** (0.015)	0.233*** (0.048)	0.088*** (0.016)
Sensitivity to TED	-0.381*** (0.126)	-0.322** (0.133)	-0.063** (0.030)	0.015 (0.032)	-0.259*** (0.047)	-0.057 (0.036)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	Yes	No	Yes
N	119,088	119,088	119,088	119,088	119,088	119,088
$R^2$	0.120	0.680	0.105	0.653	0.062	0.667

Panel B: Diversification using cashflows & investment correlations and external market conditions - sensitivity to TED

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Firm Investment Correlation		Firm CF Correlation		Firm (CF - Investment) Correlation		Firm Financing Deficit Correlation	
Sensitivity to TED×TED	-0.207*** (0.050)	-0.100*** (0.015)	-0.306*** (0.083)	-0.136*** (0.024)	-0.303*** (0.081)	-0.134*** (0.024)	-0.160*** (0.008)	-0.104*** (0.013)
TED	-0.145*** (0.023)	-0.058*** (0.008)	-0.205*** (0.038)	-0.078*** (0.012)	-0.205*** (0.037)	-0.077*** (0.012)	-0.113*** (0.005)	-0.057*** (0.007)
Sensitivity to TED	0.050*** (0.018)	0.045** (0.017)	0.103*** (0.029)	0.047** (0.022)	0.096*** (0.028)	0.044** (0.021)	-0.025*** (0.008)	0.062*** (0.017)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	Yes	No	Yes	No	Yes
N	110,274	110,274	110,274	110,274	110,274	110,274	110,274	110,274
$R^2$	0.138	0.773	0.163	0.769	0.164	0.768	0.134	0.769

**Table 13**  
Continued.

Panel C: Firm diversification and external market conditions - industry volatility						
	(1)	(2)	(3)	(4)	(5)	(6)
	Number Divisions		1-HHI Assets		1-HHI Sales	
Firm Volatility×TED	0.140*** (0.050)	0.229*** (0.041)	0.022* (0.012)	0.037*** (0.008)	0.071*** (0.018)	0.036*** (0.008)
TED	0.175*** (0.054)	-0.066 (0.042)	0.049*** (0.012)	-0.001 (0.008)	-0.009 (0.016)	-0.006 (0.007)
Firm Volatility	0.076*** (0.021)	0.256*** (0.078)	0.024*** (0.006)	0.045*** (0.015)	-0.067*** (0.013)	0.054*** (0.019)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	Yes	No	Yes
N	120,142	120,142	120,142	120,142	120,142	120,142
R <sup>2</sup>	0.105	0.677	0.095	0.652	0.056	0.666

Panel D: Diversification using cashflows & investment correlations and external market conditions - industry volatility

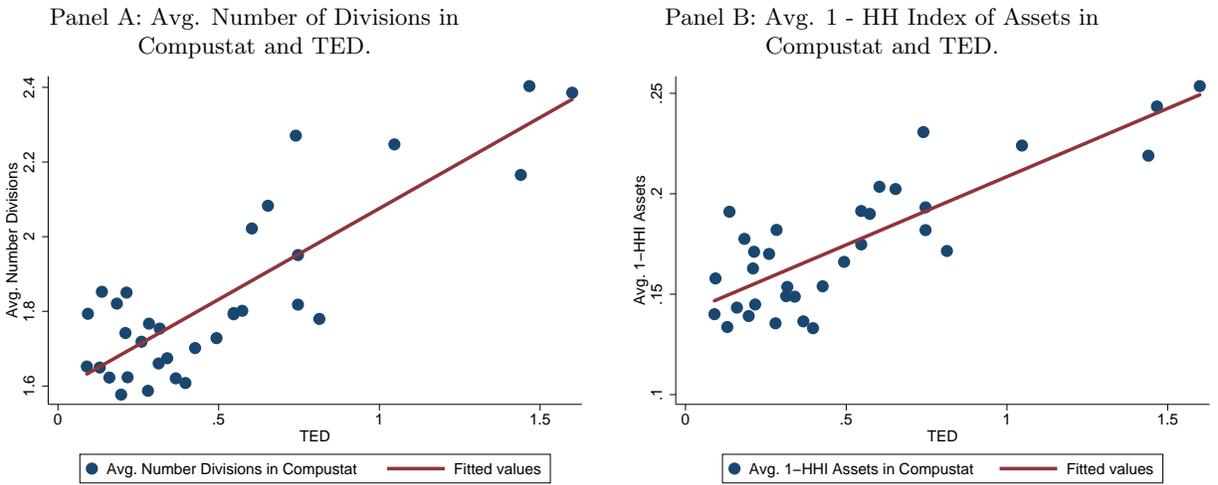
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Firm Investment Correlation		Firm CF Correlation		Firm (CF - Investment) Correlation		Firm Financing Deficit Correlation	
Firm Volatility×TED	-0.049*** (0.007)	-0.041*** (0.005)	-0.033*** (0.010)	-0.047*** (0.008)	-0.036*** (0.010)	-0.051*** (0.008)	-0.045*** (0.007)	-0.034*** (0.004)
TED	-0.010 (0.007)	0.020*** (0.003)	-0.039*** (0.010)	0.020*** (0.006)	-0.036*** (0.010)	0.024*** (0.007)	-0.003 (0.006)	0.017*** (0.003)
Firm Volatility	-0.028*** (0.004)	-0.014 (0.009)	-0.022*** (0.005)	-0.007 (0.011)	-0.025*** (0.004)	-0.011 (0.011)	-0.024*** (0.004)	-0.009 (0.011)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	Yes	No	Yes	No	Yes
N	111,328	111,328	111,328	111,328	111,328	111,328	111,328	111,328
R <sup>2</sup>	0.130	0.770	0.149	0.766	0.150	0.765	0.120	0.767

**Table 14**

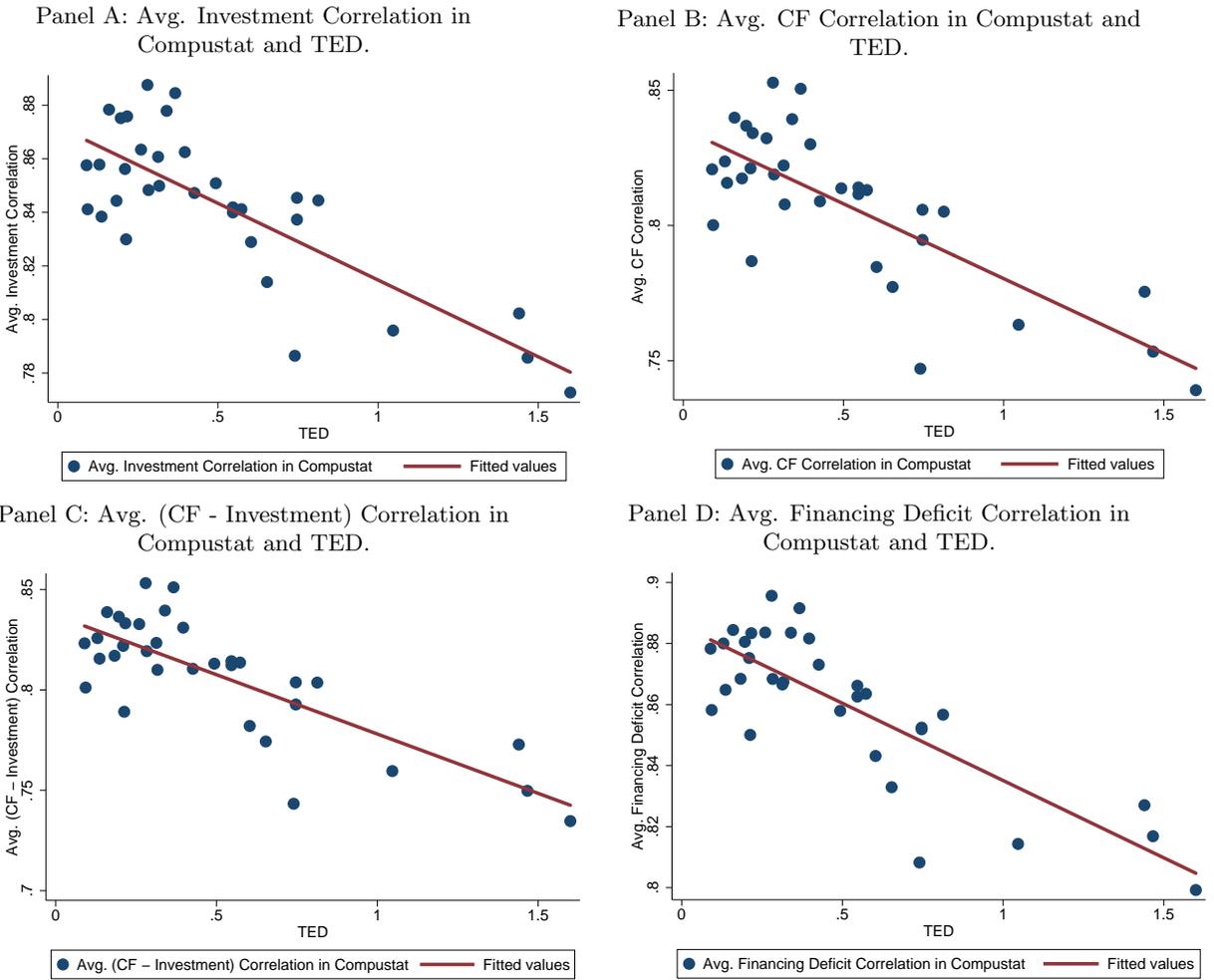
Firm diversification and external market conditions: interaction with corporate governance.

This table estimates how the sensitivity of organizational form to external financial conditions depends on firm's corporate governance quality. We report coefficients from estimating the following OLS regression on the sample of Compustat Segments' firms:  $Y_{it} = \alpha + \beta_1 \cdot TED_t + \beta_2 E Index_{it} + \beta_3 E Index_{it} \times TED_t + X'_{it}\gamma + \epsilon_{it}$ . Where  $Y$  is *Number Divisions* in columns 1 and 2, *1-HHI Assets* in columns 3 and 4 and *1-HHI Sales* in columns 5 and 6. The matrix of controls  $X$  includes *Lag Size*, *Lag CF/A*, *Lag Q*, *Lag Leverage*, and *Age*. All variables are defined in the Appendix. The sample construction is detailed in the data section of the paper. The sample includes data from 1990, 1993, 1995, 1998, 2000, 2002, 2004, 2006, 2007, 2008, when the variable *E Index* is available. The standard errors in parenthesis are clustered by year. Statistical significance at 1%, 5% and 10% is marked with \*\*\*, \*\* and \* respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Number Divisions		1-HHI Assets		1-HHI Sales	
E Index $\times$ TED	-0.154** (0.059)	-0.127** (0.048)	-0.038** (0.014)	-0.037** (0.014)	-0.045*** (0.013)	-0.036** (0.013)
TED	0.255*** (0.078)	0.205** (0.071)	0.075*** (0.017)	0.077** (0.027)	0.090*** (0.019)	0.066** (0.022)
E Index	0.078*** (0.013)	0.062** (0.021)	0.018*** (0.004)	0.012*** (0.003)	0.021*** (0.003)	0.011*** (0.003)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	Yes	No	Yes
N	5,243	5,243	5,243	5,243	5,243	5,243
$R^2$	0.122	0.737	0.105	0.732	0.102	0.763



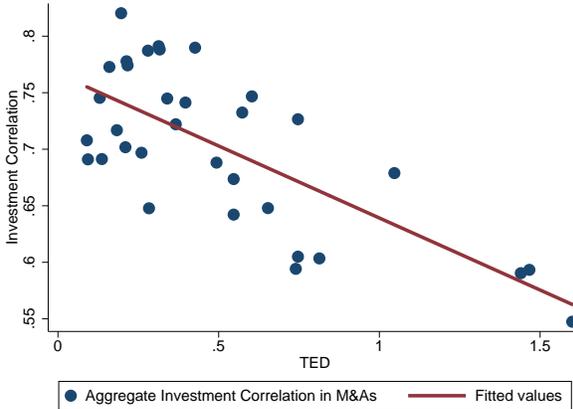
**Fig. 1.** Corporate diversification and external market conditions. This figure presents the relationship between the *Avg. Number of Divisions in Compustat* and *Avg. 1-HHI Assets in Compustat* of Compustat Segments firms and the degree of external financial frictions measured by TED. Panel A of the figure shows the evolution of TED and the asset weighted average of *Number Divisions* of Compustat Segments firms. Panel B presents the evolution of TED and the assets weighted average of *1-HHI Assets* of Compustat Segments firms. The figure is constructed using the Compustat Segments sample as described in the data section of the paper. The sample covers the period 1980 to 2012. The variables construction and definitions are detailed in the Appendix.



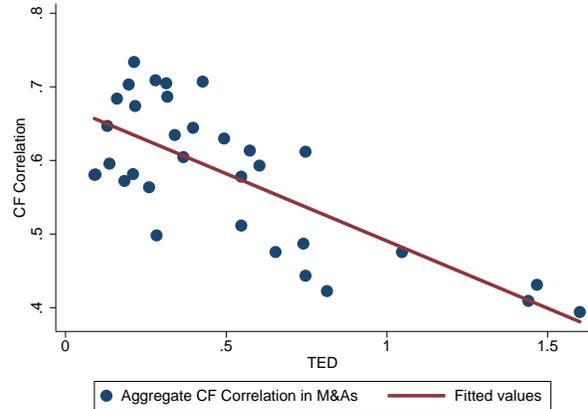
**Fig. 2.** Cashflows & investment correlation across divisions and external market conditions. This figure presents the relationship between *Avg. Investment Correlation in Compustat*, *Avg. CF Correlation in Compustat*, *Avg. (CF - Investment) Correlation in Compustat* and *Avg. Financing Deficit Correlation in Compustat* of the different divisions of Compustat Segments firms and the degree of external financial frictions. Panel A depicts the scatter plot of TED and *Avg. Investment Correlation in Compustat*. Panel B depicts the scatter plot of TED and *Avg. CF Correlation in Compustat*. Panel C depicts the scatter plot of TED and *Avg. (CF - Investment) Correlation in Compustat*. Panel D depicts the scatter plot of TED and *Avg. Financing Deficit Correlation in Compustat*. The figure is constructed using the Compustat Segments sample as described in the data section of the paper. The sample covers the period 1980 to 2012. The variables construction and definitions are detailed in the Appendix.



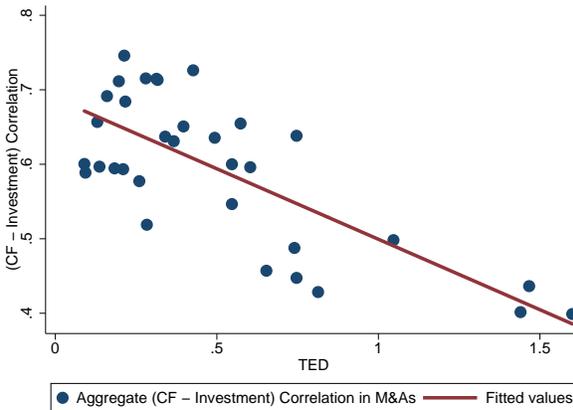
Panel A: Aggregate Investment Correlation in M&As and TED



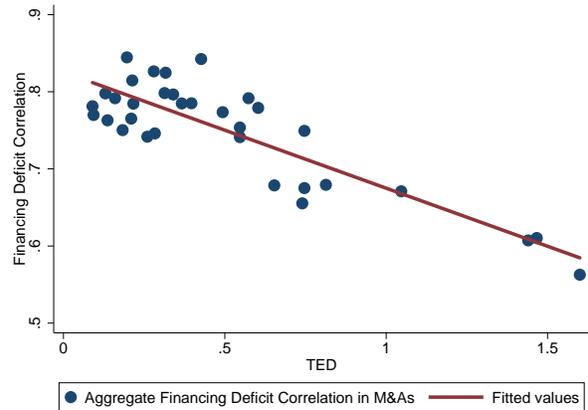
Panel B: Aggregate CF Correlation in M&As and TED



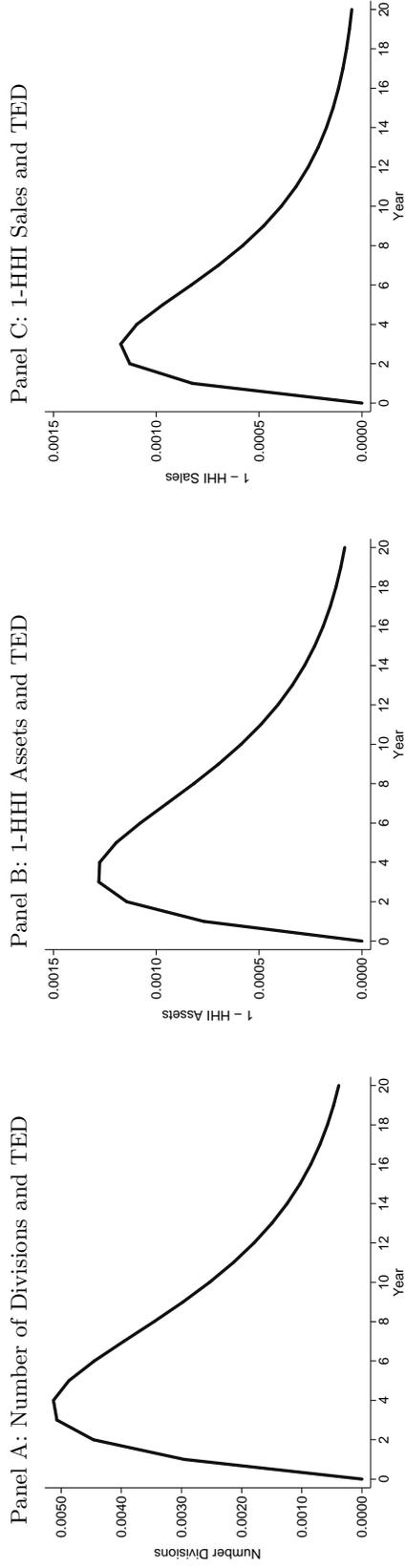
Panel C: Aggregate (CF - Investment) Correlation in M&As and TED



Panel D: Aggregate Financing Deficit Correlation in M&As and TED



**Fig. 4.** Correlation of cashflows & investments between M&A target and acquirer and external market conditions. This figure presents the relationship between *Aggregate Investment Correlation in M&As*, *Aggregate CF Correlation in M&As*, *Aggregate (CF - Investment) Correlation in M&As* and *Aggregate Financing Deficit Correlation in M&As* of Acquirer and Target and external market conditions. Panel A depicts the scatter plot of TED and *Aggregate Investment Correlation in M&As*. Panel B depicts the scatter plot of TED and *Aggregate CF Correlation in M&As*. Panel C depicts the scatter plot of TED and *Aggregate (CF - Investment) Correlation in M&As*. Panel D depicts the scatter plot of TED and *Aggregate Financing Deficit Correlation in M&As*. The figure is constructed using the Aggregate M&A sample as described in the data section of the paper. The sample covers the period 1980 to 2012. The variables construction and definitions are detailed in the Appendix.



**Fig. 5.** Persistence of organizational form. This figure shows the Impulse Response Function of different measures of firm scope for a 1 unit increase in lagged TED. The underlying coefficients were obtained by estimating the following panel VAR model on the sample of Compustat Segments firms:

$$Y_{it} = \alpha_1 + \beta_1 \cdot Y_{i,t-1} + \beta_2 \cdot TED_{i,t-1} + \epsilon_{it}$$

$$TED_{it} = \alpha_2 + \beta_3 \cdot Y_{i,t-1} + \beta_4 \cdot TED_{i,t-1} + \epsilon_{it}$$

Where  $Y$  is *Number Divisions* in Panel A, *1-HHI Assets* in Panel B and *1-HHI Sales* in Panel C. The sample covers the period 1980 to 2012. The variables construction and definitions are detailed in the Appendix.

## Variable Definitions Appendix

### Independent Variables of Interest

**TED Spread** – The difference between the interest rates on interbank loans and short-term U.S. government T-bills.

**TED** – The 3 year moving average of TED Spread. It is constructed as:  $TED_t = \frac{TED\ Spread_{t-1} + TED\ Spread_t + TED\ Spread_{t+1}}{3}$ .

**Deregulation Index** – This variable captures the evolution of the intrastate bank branch deregulation as a measure of external financial frictions. It is defined as the sum of the ways in which banks can expand their operations in terms of: (i) permitting the formation of multibank holding companies; (ii) permitting branching by means of merger and acquisitions (M&As) only, and (iii) permitting unrestricted (de novo) branching. The index varies by state–year and can range from 0 to 3. This variable is used in the Compustat Segments sample where state is assigned using the location of firms’ headquarters.

**Deregulation Index Acq.** – This variable captures the evolution of the intrastate bank branch deregulation as a measure of external financial frictions faced by acquiring firms in M&A transactions. It is defined as the sum of the ways in which banks can expand their operations in the state of the acquiring firm in terms of: (i) permitting the formation of multibank holding companies; (ii) permitting branching by means of merger and acquisitions (M&As) only, and (iii) permitting unrestricted (de novo) branching. The index varies by state–year and can range from 0 to 3.

### Variables Used in Both Compustat Segments and M&A Analysis

**Investment Correlation** – This variable measures the correlation in Investment between every pair of two digit SIC industries over the period 1980-2012. To construct this variable we first calculate the average Investment of stand alone firms by year and two digit SIC industry. A firm is classified as stand alone if operates in a single 2 digit SIC industry. Investment is defined as Capital Expenditures/Total Assets (Compustat items capx and at). We then use the

full sample period (1980-2012) to calculate the correlation of the average industry Investment for every pair of 2 digit SIC industries. This variable is not used directly in the analysis, we use it as an intermediate step to construct measures of investment correlation for both Compustat Segments firms and M&A deals. Data sources: Compustat Historical Segments and Compustat North America.

**CF Correlation** – This variable measures the correlation in Cash Flows between every pair of two digit SIC industries over the period 1980-2012. To construct this variable we first calculate the average Cash Flow of stand alone firms by year and two digit SIC industry. A firm is classified as stand alone if operates in a single 2 digit SIC industry. Cash Flow is defined as Common Shares Used to Calculate Earnings Per Share (Compustat item cshpri) times Earnings Per Share (Basic) - Excluding Extraordinary Items (Compustat item epspx) plus Depreciation and Amortization (Compustat item dp) divided by total assets (Compustat item at). We then use the full sample period (1980-2012) to calculate the correlation of the average industry Cash Flows for every pair of 2 digit SIC industries. This variable is not used directly in the analysis, we use it as an intermediate step to construct measures of cash flow correlation for both Compustat Segments firms and M&A deals. Data sources: Compustat Historical Segments and Compustat North America.

**(CF - Investment) Correlation** – This variable measures the correlation in Cash Flows minus Investment between every pair of two digit SIC industries over the period 1980-2012. To construct this variable we first calculate the average Cash Flow minus Investment of stand alone firms by year and two digit SIC industry. A firm is classified as stand alone if operates in a single 2 digit SIC industry. Cash Flows are defined as Common Shares Used to Calculate Earnings Per Share (Compustat item cshpri) times Earnings Per Share (Basic) - Excluding Extraordinary Items (Compustat item epspx) plus Depreciation and Amortization (Compustat item dp) divided by total assets (Compustat item at). Investment is defined as Capital Expenditures/Total Assets (Compustat items capx at). We then use the full sample period (1980-2012) to calculate the correlation of the average industry Cash Flow minus Investment for every pair of 2 digit SIC industries. This variable is not used directly in the analysis, we use it as an intermediate step to construct measures of cash flow minus investment correlation for both Compustat Segments firms and M&A deals. Data sources: Compustat Historical

Segments and Compustat North America.

**Financing Deficit Correlation** – This variable measures the correlation in net financing deficit between every pair of two digit SIC industries over the period 1980-2012. To construct this variable we first calculate the average net financing deficit of stand alone firms by year and two digit SIC industry. A firm is classified as stand alone if operates in a single 2 digit SIC industry. Net financing deficit is defined as in Malmendier, Tate and Yan (2011). We then use the full sample period (1980-2012) to calculate the correlation of the average industry net financing deficit for every pair of 2 digit SIC industries. This variable is not used directly in the analysis, we use it as an intermediate step to construct measures of financing deficit correlation for both Compustat Segments firms and M&A deals. Data sources: Compustat Historical Segments and Compustat North America.

**Industry Sensitivity to TED** – This variable measures the sensitivity of each 2 digit SIC industry to TED. To construct this variable we first calculate the average sales of stand alone firms by year and two digit SIC industry. A firm is classified as stand alone if operates in a single 2 digit SIC industry. We then calculate the correlation between average industry sales and TED for our sample period (1980-2012) by 2 digit SIC industry. This variable is not used directly in the analysis, we use it as an intermediate step to construct variables used in the analysis of Compustat Segments firms and M&A deals.

**Industry Volatility** – This variable measures the volatility of each 2 digit SIC industry. To construct this variable we first calculate the average sales of stand alone firms by year and two digit SIC industry. A firm is classified as stand alone if operates in a single 2 digit SIC industry. We then calculate the standard deviation of average sales over our sample period (1980-2012) by 2 digit SIC industry. This variable is not used directly in the analysis, we use it as an intermediate step to construct variables used in the analysis of Compustat Segments firms and M&A deals.

## Compustat Segments Variables

### Compustat Segments Dependent Variables

**Number Divisions** – The number of 2 digit SIC divisions the firm operates in. Data sources: Compustat Historical Segments.

**1-HHI Assets** – This variable is defined as one minus the Herfindhal-Hirshman Index of division assets defined as:  $HHI\ Assets_{ft} = \sum_{j \in J_{ft}} \left( \frac{A_{jft}}{\sum_{j \in J_{ft}} A_{jft}} \right)^2$ . Where  $A_{jft}$  represents the assets of division  $j$  of firm  $f$  at time  $t$  and  $J_{ft}$  is the set of divisions of firm  $f$  at time  $t$ . Data sources: Compustat Historical Segments.

**1-HHI Sales** – This variable is defined as one minus the Herfindhal-Hirshman Index of division sales of the firm defined as:  $HHI\ Sales_{ft} = \sum_{j \in J_{ft}} \left( \frac{Sales_{jft}}{\sum_{j \in J_{ft}} Sales_{jft}} \right)^2$ . Where  $Sales_{jft}$  represents the sales of division  $j$  of firm  $f$  at time  $t$  and  $J_{ft}$  is the set of divisions of firm  $f$  at time  $t$ . Data sources: Compustat Historical Segments.

**Firm Investment Correlation** – Defined for firm  $f$  with multiple 2 digit SIC divisions  $j \in J_{ft}$  at time  $t$  as:  $Firm\ Investment\ Correlation_{ft} = \frac{\sum_{j,l \in [\Omega]_{ft}^2} (A_{jft} + A_{lft}) \times Investment\ Correlation_{lj}}{\sum_{j,l \in [\Omega]_{ft}^2} (A_{jft} + A_{lft})}$ , where  $A_{jft}$  denotes the assets of division  $j$  of firm  $f$  at time  $t$  and  $A_{lft}$  are the assets of division  $l$  of firm  $f$  at time  $t$ .  $Investment\ Correlation_{lj}$  is the Investment Correlation between divisions  $l$  and  $j$  as defined above, and  $[\Omega]_{ft}^2$  is the set that contains all possible pairs of divisions  $lj$  of firm  $f$  at time  $t$  (for example if the firm operates in 4 divisions there are 6 division pairs). This variable takes the value of 1 for firms with only one 2 digit SIC division. Data sources: Compustat Historical Segments and Compustat North America.

**Firm CF Correlation** – Defined for firm  $f$  with multiple 2 digit SIC divisions  $j \in J_{ft}$  at time  $t$  as:  $Firm\ CF\ Correlation_{ft} = \frac{\sum_{j,l \in [\Omega]_{ft}^2} (A_{jft} + A_{lft}) \times CF\ Correlation_{jl}}{\sum_{j,l \in [\Omega]_{ft}^2} (A_{jft} + A_{lft})}$ , where  $A_{jft}$  denotes the assets of division  $j$  of firm  $f$  at time  $t$  and  $A_{lft}$  are the assets of division  $l$  of firm  $f$  at time  $t$ .  $CF\ Correlation_{lj}$  is the  $CF\ Correlation$  between divisions  $l$  and  $j$  as defined above, and  $[\Omega]_{ft}^2$  is the set that contains all possible pairs of divisions  $lj$  of firm  $f$  at time  $t$ . Data sources: Compustat Historical Segments and Compustat North America.

**Firm (CF - Investment) Correlation** – Defined for firm  $f$  with multiple 2 digit SIC divisions  $j \in J_{ft}$  at time  $t$  as:

$$Firm\ CF - Investment\ Correlation_{ft} = \frac{\sum_{j,l \in [\Omega]_{ft}^2} (A_{jft} + A_{lft}) \times (CF - Investment)\ Correlation_{lj}}{\sum_{j,l \in [\Omega]_{ft}^2} (A_{jft} + A_{lft})},$$

where  $A_{jft}$  denotes the assets of division  $j$  of firm  $f$  at time  $t$  and  $A_{lft}$  are the assets of division  $l$  of firm  $f$  at time  $t$ .  $(CF - Investment)\ Correlation_{lj}$  is the  $(CF - Investment)\ Correlation$

between divisions  $l$  and  $j$  as defined above, and  $[\Omega]_{ft}^2$  is the set that contains all possible pairs of divisions  $lj$  of firm  $f$  at time  $t$ . Data sources: Compustat Historical Segments and Compustat North America.

**Firm Financing Deficit Correlation** – Defined for firm  $f$  with multiple 2 digit SIC divisions  $j \in J_{ft}$  at time  $t$  as:

$$Firm\ Financing\ Deficit\ Correlation_{ft} = \frac{\sum_{jl \in [\Omega]_{ft}^2} (A_{jft} + A_{lft}) \times Financing\ Deficit\ Correlation_{lj}}{\sum_{jl \in [\Omega]_{ft}^2} (A_{jft} + A_{lft})},$$

where  $A_{jft}$  denotes the assets of division  $j$  of firm  $f$  at time  $t$  and  $A_{lft}$  are the assets of division  $l$  of firm  $f$  at time  $t$ . *Financing Deficit Correlation* $_{lj}$  is the *Financing Deficit Correlation* between divisions  $l$  and  $j$  as defined above, and  $[\Omega]_{ft}^2$  is the set that contains all possible pairs of divisions  $lj$  of firm  $f$  at time  $t$ . Data sources: Compustat Historical Segments and Compustat North America.

**Avg. Number Divisions in Compustat** – The asset weighted average of *Number Divisions* by year. Data sources: Compustat Historical Segments and Compustat North America.

**Avg. 1-HHI Assets in Compustat** – The asset weighted average of *1-HHI Assets* by year. Data sources: Compustat Historical Segments and Compustat North America.

**Avg. 1-HHI Sales in Compustat** – The asset weighted average of *1-HHI Sales* by year. Data sources: Compustat Historical Segments and Compustat North America.

**Avg. Investment Correlation in Compustat** – The asset weighted average of *Firm Investment Correlation* by year. Data sources: Compustat Historical Segments and Compustat North America.

**Avg. CF Correlation in Compustat** – The asset weighted average of *Firm CF Correlation* by year. Data sources: Compustat Historical Segments and Compustat North America.

**Avg. (CF - Investment) Correlation in Compustat** – The asset weighted average of *Firm (CF - Investment) Correlation* by year. Data sources: Compustat Historical Segments and Compustat North America.

**Avg. Financing Deficit Correlation in Compustat** – The asset weighted average of *Firm Financing Deficit Correlation* by year. Data sources: Compustat Historical Segments and Compustat North America.

## Compustat Segments Control Variables

**Lag Size** – Lagged log of total assets (Compustat item at). Winsorized at the 1% and 99% level. Data source: Compustat North America.

**Lag CF/A** – This variable is defined as Common Shares Used to Calculate Earnings Per Share (Compustat item cshpri) times Earnings Per Share (Basic) - Excluding Extraordinary Items (Compustat item epspx) plus Depreciation and Amortization (Compustat item dp) divided by total assets (Compustat item at). Winsorized at the 1% and 99% level. Data source: Compustat North America.

**Lag Q** – Market Value of Assets / Book Value of Assets. Market Value of Assets is defined as Book Value of Assets (Compustat item at) plus Market Value of Equity minus Book Value of Equity. Market Value of Equity is total shares outstanding times Price per Share (Compustat items csho and prcc\_f). Book Value of Equity is the Total Stockholders Equity minus Liquidating Value of Preferred Stock (Compustat items teq and pstkl). If Total Stockholders Equity is not available we use Total Common/Ordinary Equity plus Preferred Stock at Carrying Value (Compustat items ceq and upstk). If the sum of Total Common/Ordinary Equity and Preferred Stock at Carrying Value is also unavailable we use Total Assets minus Total Liabilities (Compustat items at and lt). If Deferred Taxes and Investment Tax Credit (Compustat item txdite) is available we add it to Book Value of Equity and if Core Post Retirement Adjustment (Compustat item prca) is available we subtract it from Book Value of Equity. Winsorized at the 1% and 99% level. Data source: Compustat North America.

**Lag Leverage** – Leverage is defined as Book Value of Debt divided by Market Value of Assets. Book Value of Debt is defined as Book Value of Assets minus Book Value of Equity. Book Value of Assets, Book Value of Equity and Market Value of Assets are defined as described in the definition of Lag Q. Winsorized at the 1% and 99% level. Data source: Compustat North America.

**Age** – This variable is defined as current year minus the first year in which the firm appeared in Compustat North America. Data source: Compustat North America.

**Sensitivity to TED** – Defined for firm  $f$  with multiple 2 digit SIC divisions  $j \in J_{ft}$  at time  $t$  as:  $Sensitivity\ to\ TED_{ft} = \frac{\sum_{j \in J_{ft}} A_{jft} \times Industry\ Sensitivity\ to\ TED_j}{\sum_{j \in J_{ft}} A_{jft}}$ , where  $A_{jft}$  denotes

the assets of division  $j$  of firm  $f$  at time  $t$ . *Industry Sensitivity to TED<sub>j</sub>* is the *Industry Sensitivity to TED* of industry  $j$  as defined above, and  $J_{ft}$  is the set that contains all divisions  $j$  of firm  $f$  at time  $t$ . For firms with a single division  $j$  at time  $t$  this variable is defined as *Sensitivity to TED<sub>ft</sub>* = *Industry Sensitivity to TED<sub>j</sub>*. Data sources: Compustat Historical Segments and Compustat North America.

**Firm Volatility** – Defined for firm  $f$  with multiple 2 digit SIC divisions  $j \in J_{ft}$  at time  $t$  as: *Firm Volatility<sub>ft</sub>* =  $\frac{\sum_{j \in J_{ft}} A_{jft} \times \text{Industry Volatility}_j}{\sum_{j \in J_{ft}} A_{jft}}$ , where  $A_{jft}$  denotes the assets of division  $j$  of firm  $f$  at time  $t$ . *Industry Volatility<sub>j</sub>* is the *Industry Volatility* of industry  $j$  as defined above, and  $J_{ft}$  is the set that contains all divisions  $j$  of firm  $f$  at time  $t$ . For firms with a single division  $j$  at time  $t$  this variable is defined as *Firm Volatility<sub>ft</sub>* = *Industry Volatility<sub>j</sub>*. Data sources: Compustat Historical Segments and Compustat North America.

**E Index** – This variable is the entrenchment index as defined in Bebchuk, Cohen, and Ferrell (2009). Source: Lucian Bebchuk’s website ([www.law.harvard.edu/faculty/bebchuk](http://www.law.harvard.edu/faculty/bebchuk)).

## M&A Variables

### M&A Dependent Variables

**Diversified M&A** – Dummy variable that takes the value of 1 if the acquirer’s main 2 digit SIC is different from the target’s main 2 digit SIC. Data source: Thomson ONE.

**Investment Correlation Acquirer – Target** – This variable is defined as the *Investment Correlation* between the main 2-digit SIC industries of the Acquirer and Target firms involved in the M&A transaction.

**CF Correlation Acquirer – Target** – This variable is defined as the *CF Correlation* between the main 2-digit SIC industries of the Acquirer and Target firms involved in the M&A transaction.

**(CF - Investment) Correlation Acquirer – Target** – This variable is defined as the *(CF - Investment) Correlation* between the main 2-digit SIC industries of the Acquirer and Target firms involved in the M&A transaction.

**Financing Deficit Correlation Acquirer – Target** – This variable is defined as the *Financing Deficit Correlation* between the main 2-digit SIC industries of the Acquirer and Target firms involved in the M&A transaction.

**Share Diversified Value** – Share of all M&A deals that are diversifying weighted by deal value. It is defined as  $Share\ Diversified\ Value_t = \frac{\sum_i Diversified\ M\&A_{it} \times Deal\ Value_{it}}{\sum_i Deal\ Value_{it}}$ . A diversifying deal is defined as the target and the acquirer having different main 2 digit SIC codes. Data source: Thomson ONE.

**Share Diversified Deals** – Share of all M&A deals that are diversifying. It is defined as  $Share\ Diversified\ Deals_t = \frac{\sum_i Diversified\ M\&A_{it}}{Total\ Number\ of\ Deals_t}$ . A diversifying deal is defined as the target and the acquirer having different main 2 digit SIC codes. The numerator, *Total Number of Deals* is the total number of M&A deals in year t. Data source: Thomson ONE.

**Aggregate Investment Correlation in M&As** – Deal value weighted average of *Investment Correlation Acquirer – Target* by year.

$$Aggregate\ Investment\ Correlation\ in\ M\&A_s_t = \frac{\sum_i Investment\ Correlation\ Acquirer - Target_{it} \times Deal\ Value_{it}}{\sum_i Deal\ Value_{it}},$$

where the sum is over all deals  $i$  at time  $t$ . Data sources: Compustat Historical Segments, Compustat North America and Thomson ONE

**Aggregate CF Correlation in M&As** – Deal value weighted average of *CF Correlation Acquirer – Target* by year.

$$Aggregate\ CF\ Correlation\ in\ M\&A_s_t = \frac{\sum_i CF\ Correlation\ Acquirer - Target_{it} \times Deal\ Value_{it}}{\sum_i Deal\ Value_{it}},$$

where the sum is over all deals  $i$  at time  $t$ . Data sources: Compustat Historical Segments, Compustat North America and Thomson ONE.

**Aggregate (CF - Investment) Correlation in M&As** – Defined as the deal value weighted average of *(CF – Investment) Correlation Acquirer – Target* by year.

$$Aggregate\ CF - Investment\ Correlation\ in\ M\&A_s_t = \frac{\sum_i (CF - Investment)\ Correlation\ Acquirer - Target_{it} \times Deal\ Value_{it}}{\sum_i Deal\ Value_{it}},$$

where the sum is over all deals  $i$  at time  $t$ . Data sources: Compustat Historical Segments, Compustat North America and Thomson ONE

**Aggregate Financing Deficit Correlation in M&As** – Defined as the deal value weighted average of *Financing Deficit Correlation Acquirer – Target* by year.

$$\begin{aligned} \text{Aggregate Financing Deficit Correlation in M\&As}_t &= \\ &= \frac{\sum_i \text{Financing Deficit Correlation Acquirer} - \text{Target}_{it} \times \text{Deal Value}_{it}}{\sum_i \text{Deal Value}_{it}}, \end{aligned}$$

where the sum is over all deals  $i$  at time  $t$ . Data sources: Compustat Historical Segments, Compustat North America and Thomson ONE

**% Cash** – Percentage of the deal that is paid for with cash. Data sources: Thomson ONE.

**Use Cash** – Dummy variable that takes the value of 1 if the acquirer uses cash to finance the deal and zero otherwise. Data source: Thomson ONE.

**All Cash** – Dummy variable that takes the value of 1 if the acquirer uses only cash to finance the deal and zero otherwise. Data source: Thomson ONE.

**Aggregate % Cash** – The value weighted percent of cash used as a means of payment for deals.  $\text{Aggregate \% Cash}_t = \frac{\sum_i \% \text{Cash}_{it} \times \text{Deal Value}_{it}}{\sum_i \text{Deal Value}_{it}}$ , where the sum is over all deals  $i$ . Data source: Thomson ONE.

**Aggregate Use Cash** – The value weighted share of deals that use cash as a means of payment.  $\text{Aggregate Use Cash}_t = \frac{\sum_i \text{Use Cash}_{it} \times \text{Deal Value}_{it}}{\sum_i \text{Deal Value}_{it}}$ , where the sum is over all deals  $i$ . Data source: Thomson ONE.

**Aggregate All Cash** – The value weighted share of deals that use all cash as a means of payment.  $\text{Aggregate All Cash}_t = \frac{\sum_i \text{All Cash}_{it} \times \text{Deal Value}_{it}}{\sum_i \text{Deal Value}_{it}}$ , where the sum is over all deals  $i$ . Data source: Thomson ONE.

### M&A Control Variables

**Deal Value** – The value of the transaction in 2009 \$Millions. Data source: Thomson ONE.

**Sales Acq.** – Log of Acquirer Net Sales (in \$Millions). Acquirer Net Sales are defined as: Primary source of revenue after taking into account returned goods and allowances for price reductions for the last 12 months ending on the date of the most recent financial information prior to the announcement of the transaction (\$mil). If not available, total revenues are used.

Winsorized at the 1% and 99% level. Data source: Thomson ONE.

**Profitability Acq.** – Acquirer EBITDA/ Acquirer Net Sales. Where Acquirer Net Sales are defined as: Primary source of revenue after taking into account returned goods and allowances for price reductions for the last 12 months ending on the date of the most recent financial information prior to the announcement of the transaction (\$mil). If not available, total revenues are used. Winsorized at the 1% and 99% level. Data source: Thomson ONE.

**Leverage Acq.** – Acquirer Net Debt/Acquirer Total Assets, where Acquirer Net Debt is calculated by adding the acquiror's straight debt, short-term debt, and preferred equity and subtracting cash and marketable securities as of the date of the most recent financial information prior to the announcement of the transaction (\$mil). Acquirer Total Assets includes current assets, long-term investments and funds, net fixed assets, tangible assets, and deferred charges (\$mil). Acquirer Total Assets equals total liabilities plus shareholders' equity plus minority interest. Winsorized at the 1% and 99% level. Data source: Thomson ONE.

**Cash Acq.** – Acquirer Cash and Marketable Securities/Acquirer Total Assets, where Acquirer Cash and Marketable Securities is defined as cash and the temporary investment vehicles for cash, including commercial paper and short-term government securities, as of the date of the most current financial information prior to the announcement of the transaction (\$mil). Acquirer Total Assets includes current assets, long-term investments and funds, net fixed assets, tangible assets, and deferred charges (\$mil). Acquirer Total Assets equals total liabilities plus shareholders' equity plus minority interest. Winsorized at the 1% and 99% level. Data source: Thomson ONE.

**Sales Tgt.** – Log of Target Net Sales (in \$Millions). Target Net Sales are defined as: Primary source of revenue after taking into account returned goods and allowances for price reductions for the last 12 months ending on the date of the most recent financial information prior to the announcement of the transaction (\$mil). If not available, total revenues are used. Winsorized at the 1% and 99% level. Data source: Thomson ONE.

**Profitability Tgt.** – Target EBITDA/ Target Net Sales, where Target Net Sales are defined as: Primary source of revenue after taking into account returned goods and allowances for price reductions for the last 12 months ending on the date of the most recent financial

information prior to the announcement of the transaction (\$mil). If not available, total revenues are used. Winsorized at the 1% and 99% level. Data source: Thomson ONE.

**Leverage Tgt.** – Target Net Debt/Target Total Assets, where Target Net Debt is calculated by adding the target’s straight debt, short-term debt, and preferred equity and subtracting cash and marketable securities as of the date of the most recent financial information prior to the announcement of the transaction (\$mil). Target Total Assets is defined as total balance sheet assets including, current assets, long-term investments and funds, net fixed assets, intangible assets, and deferred charges, as of the date of the most current financial information prior to the announcement of the transaction (\$mil). Target Total Assets equals total liabilities plus shareholders’ equity plus minority interest. Winsorized at the 1% and 99% level. Data source: Thomson ONE.

**Cash Tgt.** – Target Cash and Marketable Securities/Target Total Assets, where Target Cash and Marketable Securities is defined as cash and the temporary investment vehicles for cash, including commercial paper and short-term government securities, as of the date of the most current financial information prior to the announcement of the transaction (\$mil). For banks, Cash does not include loans, but does include federal funds sold. Target Total Assets is defined as total balance sheet assets including, current assets, long-term investments and funds, net fixed assets, intangible assets, and deferred charges, as of the date of the most current financial information prior to the announcement of the transaction (\$mil). Target Total Assets equals total liabilities plus shareholders’ equity plus minority interest. Winsorized at the 1% and 99% level. Data source: Thomson ONE.

**Lag Size Acq.** – Lagged log of acquirer’s total assets (Compustat item at). Winsorized at the 1% and 99% level. Data source: Compustat North America.

**Lag CF/A Acq.** – Acquirer’s Common Shares Used to Calculate Earnings Per Share (Compustat item cshpri) times Earnings Per Share (Basic) - Excluding Extraordinary Items (Compustat item epspx) plus Depreciation and Amortization (Compustat item dp) divided by total assets (Compustat item at). Winsorized at the 1% and 99% level. Data source: Compustat North America.

**Lag Q Acq.** – Acquirer Market Value of Assets / Acquirer Book Value of Assets. Acquirer

Market Value of Assets is Book Value of Assets (Compustat item at) plus Market Value of Equity minus Book Value of Equity. Market Value of Equity is the total shares outstanding times the Price per Share (Compustat items csho and prcc.f). Book Value of Equity is Total Stockholders Equity minus Liquidating Value of Preferred Stock (Compustat items teq and pstkl). If Total Stockholders Equity is not available we use Total Common/Ordinary Equity plus Preferred Stock at Carrying Value (Compustat items ceq and upstk). If the sum of Total Common/Ordinary Equity and Preferred Stock at Carrying Value is also unavailable we use Total Assets minus Total Liabilities (Compustat items at and lt). If Deferred Taxes and Investment Tax Credit (Compustat item txditc) is available we add it to Book Value of Equity and if Core Post Retirement Adjustment (Compustat item prca) is available we subtract it from Book Value of Equity. Winsorized at the 1% and 99% level. Data source: Compustat North America.

**Lag Leverage Acq.** – Acquirer’s Book Value of Debt/Market Value of Assets. Book Value of Debt is defined as Book Value of Assets minus Book Value of Equity. Book Value of Assets, Book Value of Equity and Market Value of Assets are defined in the definition of Lag Q Acq. Winsorized at the 1% and 99% level. Data source: Compustat North America.

**Age Acq.** – Current year minus the first year in which the firm appeared in Compustat. Data source: Compustat North America.

**Lag Size Tgt.** – Lagged log of target’s total assets (Compustat item at). Winsorized at the 1% and 99% level. Data source: Compustat North America.

**Lag CF/A Tgt.** – Target’s Common Shares Used to Calculate Earnings Per Share (Compustat item cshpri) times Earnings Per Share (Basic) - Excluding Extraordinary Items (Compustat item epspx) plus Depreciation and Amortization (Compustat item dp) divided by total assets (Compustat item at). Winsorized at the 1% and 99% level. Data source: Compustat North America.

**Lag Q Tgt.** – Target Market Value of Assets / Target Book Value of Assets. Target Market Value of Assets is Book Value of Assets (Compustat item at) plus Market Value of Equity minus Book Value of Equity. Market Value of Equity is the product of total shares outstanding and Price per Share (Compustat items csho and prcc.f). Book Value of Equity is defined as Total

Stockholders Equity minus Liquidating Value of Preferred Stock (Compustat items teq and pstkl). If Total Stockholders Equity is not available we use Total Common/Ordinary Equity plus Preferred Stock at Carrying Value (Compustat items ceq and upstk). If the sum of Total Common/Ordinary Equity and Preferred Stock at Carrying Value is also unavailable we use Total Assets minus Total Liabilities (Compustat items at and lt). If Deferred Taxes and Investment Tax Credit (Compustat item txditc) is available we add it to Book Value of Equity and if Core Post Retirement Adjustment (Compustat item prca) is available we subtract it from Book Value of Equity. Winsorized at the 1% and 99% level. Data source: Compustat North America.

**Lag Leverage Tgt.** – Target’s Book Value of Debt/Market Value of Assets. Book Value of Debt is defined as Book Value of Assets minus Book Value of Equity. Book Value of Assets, Book Value of Equity and Market Value of Assets are defined as described in the definition of Lag Q Tgt. Winsorized at the 1% and 99% level. Data source: Compustat North America.

**Age Tgt.** – Current year minus the first year in which the firm appeared in Compustat. Data source: Compustat North America.

**Acq. Sensitivity to TED** – Defined for M&A acquiring firm  $f$  with main 2 digit SIC industry  $j$  at time  $t$  as:  $Acq. Sensitivity to TED_{ft} = Industry Sensitivity to TED_j$ , where  $Industry Sensitivity to TED_j$  is the  $Industry Sensitivity to TED$  of industry  $j$  as defined above. Data sources: Compustat Historical Segments, Compustat North America and Thomson ONE.

**Acq. Industry Volatility** – Defined for M&A acquiring firm  $f$  with main 2 digit SIC industry  $j$  at time  $t$  as:  $Acq. Industry Volatility_{ft} = Industry Volatility_j$ , where  $Industry Volatility_j$  is the  $Industry Volatility$  of industry  $j$  as defined above. Data sources: Compustat Historical Segments, Compustat North America and Thomson ONE.

**Tgt. Sensitivity to TED** – Defined for M&A target firm  $f$  with main 2 digit SIC industry  $j$  at time  $t$  as:  $Tgt. Sensitivity to TED_{ft} = Industry Sensitivity to TED_j$ , where  $Industry Sensitivity to TED_j$  is the  $Industry Sensitivity to TED$  of industry  $j$  as defined above. Data sources: Compustat Historical Segments, Compustat North America and Thomson ONE.

**Tgt. Industry Volatility** – Defined for M&A target firm  $f$  with main 2 digit SIC industry  $j$  at time  $t$  as:  $Tgt. Industry Volatility_{ft} = Industry Volatility_j$ , where  $Industry Volatility_j$  is

the *Industry Volatility* of industry  $j$  as defined above. Data sources: Compustat Historical Segments, Compustat North America and Thomson ONE.