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Financial Structure, Liquidity, and Firm Locations*

Andres Almazan
University of Texas

Adolfo de Motta
McGill University

Sheridan Titman
University of Texas and the NBER

Vahap Uysal
University of Oklahoma

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Abstract

Firms that are located within industry clusters tend to make more acquisitions than their counterparts in the same industry that are not located within a cluster. As we show, if this increased tendency to acquire other firms arises because locating close to other industry participants facilitates acquisitions (e.g., by facilitating the acquisition of information), then firms located within clusters will have an incentive to (1) maintain more financial slack (2) the level of financial slack will be less influenced by the other determinants of the debt ratio and cash holdings previously discussed in the literature. Our empirical analysis of the capital structures and cash holdings of firms that are located within and away from industry clusters supports both hypotheses.

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Corresponding author: `andres.almazan@mccombs.utexas.edu`.

1 Introduction

In 1992 the Apache Corporation, which was then a small oil and gas firm located in Denver, Colorado, acquired MW Petroleum, a subsidiary of Amoco Corporation, a major integrated oil company. This acquisition, which more than doubled the size of its oil and gas reserves, was viewed by Apache's top management as a major success, and to a large extent defined its future strategy: to grow by acquiring mature oil and gas fields from the major integrated oil firms. To implement this strategy Apache moved from Denver to Houston, where most of the major oil firms had operations, and reduced its debt ratio to improve its credit rating. By moving to Houston, Apache's management believed that they would have better access and knowledge about potential deals. Maintaining an investment grade bond rating (Apache had a B rating when they acquired MW Petroleum and reached an A rating a few years later) was viewed by their management as essential, since their acquisition strategy required that they were able to raise capital on relatively short notice.[1]

In this paper we present a simple model that describes the relation between a firm's location, financial structure and acquisition activities. Consistent with Apache's experience, our model assumes that firms located in industrial clusters (close to other firms within the same industry) have more acquisition opportunities, and to take advantage of these opportunities, they maintain more financial slack. As we show, this need for financial slack is particularly important when firms are more likely to face competition from other bidders.[2] After presenting our descriptive model, we explore empirically the interaction between location, acquisition activity and financial structure.

Our analysis of the location choice is motivated by issues relating to industrial clustering that have been discussed by economists since Marshall (1890), and that have received substantial attention in the recent Economic Geography literature.[3] This literature explores the tendency of firms in some industries to locate within close proximity to each other and examines how location affects labor and other business choices. An often-cited advantage

[1]The above discussion is based on three Harvard Business Cases, MW Petroleum A and B and Risk Management at Apache, and extensive discussions with Tom Chambers, Apache's Executive Vice President.

[2]This aspect of the model is related to Clayton and Ravid (2002) and Morellec and Zhdanov (2006), which show that more levered bidders tend to bid less aggressively.

[3]For excellent reviews see Fujita, Krugman and Venables (1999), Fujita and Thisse (2002), Duranton and Puga (2003) and Rosenthal and Strange (2003).

of clusters relates to the free-flow of information that is associated with proximity.[4] Another advantage of industrial clusters has to do with what is generally referred to as labor pooling (Krugman 1991).[5] The general idea is that both firms and workers prefer to locate within clusters, since firms can more easily expand when they are located in a market with abundant trained labor, and workers can more easily find new jobs. This labor pooling argument can also be extended to capital, which can also be more efficiently reallocated when industry participants are geographically close. More specifically, locating in a cluster may make it easier for firms to acquire capital assets when they decide to expand, or more generally to acquire or combine with other firms to increase the scale and scope of their businesses.

As the Apache case illustrates, if geographical location influences the liquidity of asset markets it is also likely to influence how firms are financed. However, in contrast to the acquisition channel that we emphasize in this paper, the corporate finance literature suggests a "collateral" channel that generates the opposite prediction about the relation between location and financial structure. Specifically, firms in clusters may be better able to access debt markets when they are located within clusters, since their assets can more easily be sold. Using the terminology of Williamson (1986), assets in clusters are more likely to be redeployable, and should thus provide better collateral for loans.[6] By examining the relation between financial structure and location, we can indirectly explore the relative importance of these two channels.

Our analysis of the relation between financing choices and geography can help us understand the relation between acquisition opportunities and financing more generally. In this sense, our analysis is related to Harford (1999), who showed that firms with more cash do more acquisitions. His empirical tests are motivated by the theoretical literature that suggests that reduced financial slack can curb a firm's ability to fund new investments (Myers

[4]See Saxenian (1994) for a forceful discussion of these issues in the case of Silicon Valley.

[5]Better input sharing (e.g., Holmes 1999), labor market pooling (e.g., Diamond and Simon 1990, Costa and Kahn 1990 and Almazan et al. 2006), and higher knowledge spillovers (e.g., Jaffee et al. 1993) have been suggested as leading forces of agglomeration economies.

[6]The idea that a liquid asset market can increase the collateralizability of assets, which positively affects borrowing capacity, is also an important feature of Shleifer and Vishny (1992). Myers and Rajan (1998), however, suggest a negative effect of liquidity on borrowing capacity. Greater asset liquidity limits a firm's ability to commit to a specific course of action, and hence can also limits the firm's ability to raise external financing.

1977, Myers and Majluf 1984, Hart and Moore 1995, and Jensen 1986). However, as is also recognized in this literature, firms with good investment opportunities have an incentive to hold financial slack, which suggests that the observed relation between cash holdings and acquisition activity might arise because firms accumulate financial slack when they have acquisition opportunities.

As we later show, because location is related to acquisition opportunities, we can design tests that allow us to examine the extent to which firms maintain financial slack to exploit acquisition opportunities (rather than simply make more acquisitions when they have financial slack). In addition, as our analysis suggests, when opportunities to acquire assets are greater, firms will be more concerned about preserving their financial flexibility and hence will tend to be less sensitive to other determinants of capital structure. What this means is that firm characteristics like firm size and profitability, that are related to capital structure and cash in cross-sectional tests, will have less influence on these choices in locations with greater acquisition opportunities. In this sense our research extends the literature on the empirical determinants of capital structure, (e.g., Titman and Wessels 1988 and Rajan and Zingales 1995) and cash holdings (e.g., Opler et. al 1999).

Before testing these hypotheses we document that, after controlling for industry affiliation, firms located in clusters tend to make more acquisitions. We also provide suggestive evidence that financial slack positively influences the tendency of firms to make acquisitions, and that this effect is stronger in clusters. We then examine how location influences financing choices and find that firms in industry clusters tend to have more financial slack. In particular, we find that firms in clusters have lower debt ratios and higher cash holdings. Moreover, we find that these relations hold in fixed effects regressions that examine the time-series relation between a firm's financial structure and the number of firms within its industry located in its metropolitan area.

In addition to its contribution to the finance literature, this paper adds to the literature that examines how a firm's location affects its overall strategy. For instance, previous studies have shown that firms in urban clusters are more likely to outsource (Ono 2003), to vertically disintegrate (Holmes 1999) and to innovate (Glaeser et al. 1992).[7] Also, Landier

[7]Also, there is evidence that, after controlling for worker specific characteristics, professional workers

et al (2006) study how geographic dispersion within the firm affects its labor and divestiture policies. The two papers that are most closely related to ours is Kedia et. al (2006), which examines how physical proximity affects the ability of firms to complete acquisitions, and Loughran and Schultz (2006), which show that firms in rural areas wait longer to go public, conduct less SEOs and have more debt than otherwise similar urban firms. In contrast, we show, that after controlling for a firm's physical proximity to its competitors and other firm characteristics there is a relatively weak but positive relation between the size of the urban area and debt ratios. In addition, we find that, ceteris paribus, firms in high tech cities and growing cities tend to maintain more financial slack.

The rest of the paper is organized as follows. Section 2 presents a stylized model and describes the empirical research motivated by it. Section 3 describes the data and considers some descriptive evidence. Section 4 presents the main empirical results and Section 6 examines several robustness issues. Finally, Section 7 presents our conclusions.

2 Empirical Research Design

2.1 A simple model

We present a simple model to motivate some of the empirical tests that we perform below. The model examines a firm's leverage choice and takes into account the effects of leverage on it's ability to complete future acquisitions. The analysis formalizes the intuition that firms that locate in clusters want more financial slack since they are likely to encounter acquisition opportunities as well as more competition for these acquisitions.

There are two periods, $t = 0, 1$ and two potential bidders, i.e., firms 1 and 2. At $t = 0$ firm i $(i = 1, 2)$ sets its leverage ratio, $0 \leq d_i \leq 1$. At $t = 1$, with probability γ, firm i has the opportunity to make an acquisition. The value created by such an acquisition depends on the synergy s_i with the target, which is known to the firm at $t = 1$ but unknown at $t = 0$. We assume that the synergy s_i is uniformly distributed on the interval $[\bar{s} - 1/2, \bar{s} + 1/2]$, where $\bar{s} > 1/2$. Conditional on having an acquisition opportunity two alternative situations may occur: (1) with probability $(1 - \delta)$ firm i has no competition and makes a take it-or-leave-it offer for the target; and (2) with probability δ firm i faces competition from firm

work longer hours in urban clusters (Rosenthal and Strange 2003).

j; in this case both firms engage in a second-price sealed bid auction for the target. We assume the synergies of the two firms are independent and identically distributed.

We make two assumptions regarding the effects of firm leverage. First, we assume that debt creates some net benefits on firm value, τd_i, independently of its effect on acquisitions.[8] We refer to τ as the "non-M&A debt benefits" to distinguish them from other effects of debt on value due to the effect of debt on acquisitions considered next. Second, we assume that leverage affects the amount that a firm can raise to fund an acquisition. In particular, we assume that firm i can raise funds up to $(v + s_i - \rho d_i)$ to make the acquisition, where v is the value of the target as a stand alone, i.e., without the synergies and $\rho > 0$ is a measure of financial constraints created by debt. Intuitively, a firm's ability to raise funds increases in the value of the target with the synergy $(v + s_i)$ and decreases in its leverage ratio d_i.

In addition we make the following simplifying assumptions: (i) we assume that debt is risk-free which allows us to abstract from the effects related to transfers of wealth between debt-holders and equity-holders;[9] (ii) we solve the model under the assumption that $\bar{s} > 1/2 + \rho$, which ensures that $s_i - \rho d_i \geq 0$ for any potential synergy realization and choice of debt and implies that all targets are ultimately acquired;[10] and (iii) we normalize the pre-takeover value of the target v to zero.[11]

To solve the model, we proceed by backward induction and obtain the bidding strategy at $t = 1$, for the case where an acquisition opportunity arises. If firm i faces no competition (i.e., firm j is not present), it acquires the target by paying its outside value, $v = 0$, and captures the full value of synergies s_i. Alternatively, when both firms compete for the target in the second bid auction, each firm i bids $b_i = s_i - \rho d_i$ and acquires the target for b_j if $b_i > b_j$.

[8]For instance if $\tau_1 > 0$ is the savings on taxes per dollar of debt and $\tau_2 < 0$ is the increases on financial distress costs per dollar of debt, we are considering a case in which the net benefits of debt are positive i.e., $\tau_1 - \tau_2 = \tau > 0$.

[9]We have explored an alternative model in which debt is risky and hampers a firm's ability to undertake M&A transactions (e.g., because debt-holders capture some of the gains from such transactions) and have found similar results.

[10]Since the minimum realization of the synergy is $s_i = \bar{s} - 1/2$ and the maximum choice of debt is $d_i = 1$, assuming $\bar{s} > 1/2 + \rho$ implies $s_i - \rho d_i \geq 0$.

[11]As long as the amount of resources that the firm can mobilize, i.e., $(v + s_i - \rho d_i)$, includes the pre-takeover value of the target v normalizing $v = 0$ is without loss of generality.

At $t = 0$, firm i sets its leverage ratio d_i taking into account the effect that leverage will have on its ability to acquire the potential target at $t = 1$. In particular, firm i solves:

$$\max_{d_i} \quad \tau d_i + \gamma \left[(1-\delta)\bar{s} + \delta E(s_i - b_j | b_i > b_j) \Pr(b_i > b_j) \right]) \tag{1}$$

which can be written as

$$\max_{d_i} \quad \tau d_i + \gamma \left[(1-\delta)\bar{s} + \int_{\bar{s}-1/2}^{\bar{s}+1/2} \int_{s_2+\rho(d_i-d_j)}^{\bar{s}+1/2} (s_i - b_j)\, ds_i ds_j \right]$$

and whose solution, assuming it is interior, is:[12]

$$d_i^* = \frac{\tau}{\gamma\delta\rho^2}. \tag{2}$$

The following result follows directly from equation (2):

Result 1 *The optimal debt ratio, d_i^*, is higher when: (i) acquisition opportunities are less likely to arise (i.e., $\frac{\partial d_i^*}{\partial \gamma} < 0$); (ii) the firm is less likely to face a competitive bidder (i.e., $\frac{\partial d_i^*}{\partial \delta} < 0$); (iii) the extent to which debt impedes financing acquisitions is smaller (i.e., $\frac{\partial d_i^*}{\partial \rho} < 0$); and (iv) the non M&A debt benefits are larger (i.e., $\frac{\partial d_i^*}{\partial \tau} > 0$).*

In addition, the following predictions on the sensitivity of leverage to its determinants arise:

Result 2 *The sensitivity of debt to the non M&A debt benefits, τ, is larger, (i.e., $\frac{\partial d_i^*}{\partial \tau}$), is lower when (i) acquisition opportunities are more likely to arise (i.e., $\frac{\partial^2 d_i^*}{\partial \tau \partial \gamma} < 0$); (ii) the firm is more likely to face competitive bidders (i.e., $\frac{\partial d_i^*}{\partial \tau \partial \delta} < 0$); and (iii) the extent to which debt impedes financing acquisitions is larger, (i.e., $\frac{\partial^2 d_i^*}{\partial \tau \partial \rho} < 0$).*

To clarify these last comparative statics results it is illustrative to consider an example where the non M&A debt benefits are affected by two factors (e.g., taxes and costs of financial distress), i.e., $\tau = \tau_1 + \tau_2$, where $\tau_1 > 0 > \tau_2$. The previous result suggests that the empirical importance of τ_i is *ameliorated* in situations where debt has a greater influence on the ability to fund acquisitions, when the M&A market is particularly competitive and when acquisition opportunities are more likely to arise. Formally: $\left|\frac{\partial d_i^*}{\partial \tau_i}\right| = \left|\frac{1}{\gamma\delta\rho^2}\right|$ is decreasing in γ, δ and ρ. Intuitively, where a reduction in the cost of financial distress or an increase on the tax benefits of debt tend to increase leverage, these effects will be less intense when the benefits of financial flexibility to make acquisitions limit the magnitude of these effects.

[12] An interior solution requires $0 < \tau < \gamma\delta\rho^2$ so $0 < d_i^* < 1$.

2.2 Empirical Implementation

Following insights from the literature on Economic Geography we conjecture that firms in clusters have more opportunities to make acquisitions (a higher γ in the model above) and that they are exposed to more competition when they acquire other firms (a higher δ). Thus, in the empirical analysis, we will first examine the relation between a firm's location and its acquisition activity:[13]

Hypothesis 1 *Firms in clusters are more acquisitive than firms located outside clusters.*

Second, we will examine if the negative effect of leverage in the ability to acquire other firms is particularly strong for firms in clusters. Such evidence would be consistent with our conjecture that firms in clusters are likely to encounter more acquisitions opportunities and are exposed to more competition when they engage in acquisitions. In terms of the model, the probability that firm i makes an acquisition, P_i, is: $P_i = \gamma\left[(1-\delta) + \delta\Pr(b_i > b_j)\right]$ and therefore $\frac{\partial P_i}{\partial d_i} = -\gamma\delta\rho$, which is decreasing in γ, δ and ρ. Since γ and δ are conjectured as larger in clusters (and ρ is assumed to be independent of a firm's location) hypothesis 2 follows.[14]

Our last two hypotheses correspond to implications on the financial condition of firms as a function of their location. To develop these hypothesis, it is useful to take d_i^* from (2) as the starting point and incorporate the effects of clusters on the parameters defining the optimal amount of leverage stemming from our model. Specifically, for each firm i we make the following assumptions that allow us to derive a specific econometric formulation:

Hypothesis 2 *An exogenous change in leverage affects the probability of a takeover and the effect is paticularly strong in clusters.*

Our last two hypotheses consider how a firm's location within a cluster will affect its leverage. To develop these hypotheses, we take d_i^* from (2) as the starting point. Then,

[13] The lack of reliable data precludes the empirical examination of whether transactions in clusters are subject to different level of competition than transactions in which off-cluster firms are involved.

[14] This is subject to the caveat that debt is an endogenous variable in our model. Therefore, one must interpret this implication in terms of a exogenous shock to the level of firm leverage.

we consider how the effects of cluster location on optimal leverage can be reflected on the parameters considered in the model above. Proceeding this way allow us to derive a specific econometric formulation that guides our tests below:

1. We assume that in clusters firms have better opportunities to redeploy ther assets. Consistent with the idea that firms can borrow more if their assets are easily redeployable (e.g., Williamson 1988, Shleifer and Vishny 1992), we model the greater opportunities to redeploy assets as a positive shift in the non M&A benefits of debt (i.e., in τ). More specifically, we postulate the following linear formulation to consider the redeployability effects:

$$\tau_i = \alpha + \beta_c Cluster_i + \sum_j \beta_j K_i^j \tag{3}$$

   where $\{K_i^j\}$ are the determinants of the non-M&A net benefits of debt, $\{\beta_j\}$ are the coefficients of these determinants of leverage, $Cluster_i$ is a dummy variable that takes a value of 1 if the firm is located within an industry cluster and $\beta_c > 0$ represents the positive shift in τ for clustered firms.[15]

2. Consistent with our conjecture that firms in clusters encounter more acquisitions and more competition in the acquisition process, we assume that:

$$(\delta \cdot \gamma)_i = \mu + \mu_c Cluster_i \tag{4}$$

   where $\mu_c > 0$.

Substituting (3) and (4) in d_i^* and adding a random term ε_i we obtain the following econometric specification:

$$d_i = \frac{\alpha + \beta_c Cluster_i}{(\mu + \mu_c Cluster_i)\rho^2} + \sum_j \frac{\beta_j}{(\mu + \mu_c Cluster_i)\rho^2} K_i^j + \varepsilon_i. \tag{5}$$

Since $Cluster_i$ is a dummy variable, the previous specification can be re-written as:

$$d_i = \phi_0 + \phi_c Cluster_i + \sum_j \phi_j K_i^j - \sum_j \phi_j \cdot (1-\lambda)(K_i^j \times Cluster_i) + \varepsilon_i, \tag{6}$$

[15] As described below, $Cluster_i$ takes a value of 1 when a firm's headquarters is located in a MSA with nine or more firms in the same three-digit SIC and 0 otherwise.

where the correspondence between ϕ's and the parameters in equation (5) follows from a simple comparison of expressions (5) and (6).[16] Notice that, while a priori the net effect of clusters on leverage is ambiguous, the higher likelihood of acquisitions in clusters $\mu_c > 0$ is a necessary condition for firms in clusters to have lower leverage. This condition, however, is not sufficient since in clusters firms may choose to have more leverage due to the higher redeployability of their assets (i.e., ϕ_c is positive only when $\mu_c > \frac{\gamma\beta_c}{\alpha}$).

Hypothesis 3 *Firms in clusters can either have higher or lower leverage than firms outside clusters. Ceteris paribus when the additional demand for financial slack in clusters is sufficiently large (i.e., $\mu_c > \frac{\gamma\beta_c}{\alpha}$) firms in clusters will have lower leverage (i.e., $\phi_c < 0$).*

Our fourth and last hypothesis which refers to the determinants of leverage inside and outside clusters. As shown in equation (6), for each determinant of leverage K_j, the ratio of the coefficients for firms inside and outside clusters is constant and equal to λ. Notice that $\lambda < 1$ (i.e., $\lambda \equiv \frac{\mu}{\mu+\mu_c}$) captures the amelioration effect previously described in Result 2.

Hypothesis 4 *The ratio of estimates of the determinants of leverage for firms inside versus outside clusters is constant and smaller that 1, (i.e., $\lambda < 1$).*

3 Data and Sample Characteristics

We examine firms covered in COMPUSTAT from 1990 to 2005. Since we are interested in considering firms with distinct locations our main focus is on manufacturing firms, i.e., those with primary two digit SIC between 20 to 39. In addition, we include SIC 737 (Computer Programming, and Data Processing), since most of these firms essentially manufacture a product (e.g., Microsoft Windows) rather than provide a service.[17] Approximately 80% of our sample belongs to firms classified in Manufacturing and the rest to firms in SIC 737.

From the previous set, we exclude: 1) Firms in Hawaii and Puerto Rico; 2) firms with sales less than \$50 million (in 1990 dollars); and 3) industries (*i.e.*, three-digit SIC codes)

[16] Specifically: $\phi_0 \equiv \frac{\alpha}{\gamma\delta\rho^2}$, $\phi_c \equiv \frac{\alpha+\beta_c}{(\mu+\mu_c)\rho^2} - \phi_0$, $\phi_j \equiv \frac{\beta_j}{\gamma\delta\rho^2}$ and $\lambda \equiv \frac{\mu}{\mu+\mu_c}$.

[17] Since we are assuming that a high percentage of a firm's assets and employees are located at the firm's corporate headquarters, we exclude industries like hotels and restaurants which have capital assets and employees spread throughout the country.

that have less than 10 firms in any of the sample years. The final sample includes 21 industries, 16 years, 1,910 firms and 13,342 firm-years.[18]

We focus on the geographical location of a firm's headquarters. Specifically, we consider the Metropolitan Statistical Area (MSA) as defined by the Census Bureau in 1990 as the firm location. When the headquarters are not located in an MSA we consider the county of location instead. With this information, we construct two measures of industry clustering based on the geographical proximity of firms' headquarters. For each firm-year we construct two alternative measures of clustering. The first is the logarithm of the number firms with the same SIC that are located in a given MSA, *Log(Number of firms)*. The second is a dummy variable *Cluster* that takes a value of 1 for firm-years in which a firm's headquarters is located within an MSA that has *ten or more* firms with the same three-digit SIC and 0 otherwise. According to this second definition, 41% of the observations correspond to firms located inside an industry cluster and 59%, outside a cluster. The median number of firms in the same industry in our sample is nine.[19]

On average, there are 1.93 clusters per industry (*i.e.*, MSAs with at least ten firms in that industry). There is, however, substantial variation across industries. For instance, *Computer Related Services Industry* (SIC 737) has seven clusters in 1990, 19 clusters in 1999, and 11 clusters in 2005. For this industry, in 1999, 80% of all firms are located in an industry cluster. In contrast, *Bottled Drinks* (SIC 208) does not have any cluster during our sample period. On average, each MSA has 0.71 industry clusters. There is also significant variation across MSAs. For example, *New York City* hosts eight industry clusters in 1990, seven in 1994 and five in 2005. In contrast, *Albuquerque* did not have any industry cluster during our sample period.

Table I provides descriptive statistics of the firms in the sample for a number of variables of interest. We report both firm mean values (*i.e.*, *Mean Values*) and firm mean values after subtracting industry means (*i.e.*, *Industry Adjusted Mean Values*) for firms inside and outside clusters. According to these figures, while firms in clusters do not show higher

[18] Variables are windsorized at the bottom and top 1% to limit the effect of outliers.

[19] While we require that the firm has at least $50 million in sales to be part of our sample, both cluster measures consider all the firms that are included in COMPUSTAT in a given year even if their sales are less than $50 million.

profitability than firms outside clusters, they do have lower book and market leverage, hold more cash, have higher debt ratings, and pay dividends less often than firms outside clusters.[20] Firms in clusters also have greater R&D and capital expenditures and higher *Market to Book* ratios. In addition, firms in clusters have less tangible assets, and are slightly smaller (as measured by their volume of sales). With the exception of size, these differences between clustered and non-clustered firms remain after subtracting the industry means, which suggests that they cannot be fully explained by the fact that industries may exhibit different tendencies to cluster. Finally, the descriptive statistics show that clusters tend to be in larger MSAs, which suggest the need to control for the size of the MSA in our specifications.

4 Mergers, Acquisitions and Cluster Location

This section provides evidence that directly relates location to a firm's acquisition activity. Our analysis first includes descriptive statistics on the acquisition behavior of firms inside and outside clusters. Then, we present a multivariate analysis on all completed transactions on the Securities Data Corporation's (SDC) U.S. Mergers and Acquisitions Database from 1990 to 2005.

We consider all acquisitions during this time period where: (1) the acquirer is covered by Compustat and belongs to a manufacturing or computer services industry (SIC 20-39 and 737), (2) data on the county and state of the acquirer is available, and (3) the transaction is classified as a merger or an acquisition of majority interest by SDC. We exclude transactions valued at less than 10 million dollars or less than 1% of the acquirer's total assets. Based on this M&A sample, we identify a firm as a bidder if it acquires a target during a given year and as a non-bidder otherwise; we also record the dollar volume of transactions made by each firm in every year.

Table II displays descriptive statistics on the acquisition activity by firms located in and outside of clusters. We present evidence both for all acquisitions (Panel A) and for acquisitions of public targets only (Panel B). While the implications of the analysis correspond more closely to the total acquisition activity of a firm, documenting the effects

[20] Details on the definition and construction of the variables are reported in the Data Appendix.

on public targets is of interest since the more stringent disclosure rules affecting public acquisitions is likely to translate into better quality data.[21] In fact, both panels of Table II confirm that firms in clusters vis-a-vis out of clusters are more likely to acquire another firm (*i.e.*, 19.2% vs. 14.4%) and more likely to acquire public firms (i.e., 6.3% vs. 3.4%) and make more acquisitions per firm (*i.e.*, 0.251 vs. 0.175 acquisition per year) and also more public acquisitions (i.e., 0.071 vs. 0.036). This effect is more pronounced for local transactions, suggesting that having targets in the same geographical area facilitates the acquisition process. Furthermore, the relative value of the acquisitions relative to total assets is also larger for all targets (*i.e.,* 7.3% vs. 4.4%) and also for public targets (2.5% vs. 1.1%).[22]

In Table III we report the results of the multivariate analysis that contains eight regressions: four regressions on the probability of being an acquirer and four on the volume of acquisitions. For regressions (1) to (4), the dependent variable takes a value of 1 when a firm makes at least one acquisition in a year and zero otherwise.[23] Columns (1) and (2) consider whether the effect of location on all acquisitions firms and on acquisitions of public firms respectively remains, once indutry and year dummies are taken into account. Including industry dummies may be necessary to account for the fact that different industries may exhibit different propensities to cluster, and that it is precisely in those industries where the level of acquisitions may be more intense. Indeed, the analysis shows the importance of including industry dummies: the proxy for clustering, i.e., *Log(Number of firms),* retains its significance only in the case of public targets but not when the dependent variable is the probability of making any acquisition.[24]

In Columns (3) and (4), we include a measure of the firm's financial slack (i.e., *Net*

[21] A number of papers have raised some doubts on the comprehensiveness and accuracy of the SDC database. See for instance Boone and Mulherin (2007) and references therein.

[22] The finding that clustering facilitates M&A transactions is also consistent with existing evidence that geographic proximity facilitates input sharing (e.g., Holmes, 1999), labor market pooling (e.g., Diamond and Simon, 1990, and Costa and Kahn, 1990) and knowledge spillovers (e.g., Jaffee et al., 1993, and Audretsch and Feldman, 1996).

[23] For brevity, we report the results by using *Log(Number of firms).* Qualitatively similar results are obtained in the alternative proxy for location *Cluster* is consider instead.

[24] The reported regressions in columns (1) to (4) correspond to linear probability models. We also run a probit analysis and obtain similar results. Since the presence of cross-effects in regressions (3) and (4) requires further adjustments to our probit estimates, we choose to report the results in terms of linear probability models to facilitate the presentation of the results.

Market Leverage) and an interaction term with the proxy for cluster.[25] Furthermore, in addition to year and industry dummies, we also included several additional controls: firm size (*Sales* in logs), profitability (*EBITDA/TA*), the average of the firm's past stock returns (*Av. Stock Return*), firm age (*Age*), and city size (*Population* in logs). Regressions (3) and (4) produce three main results: (i) the inclusion of controls confirms that firms in clusters are more likely to acquire public targets, (ii) both regressions documents the negative effect of leverage on acquisitions and (iii) more importantly, both regressions document that this effect is particularly more intense in clusters (negative and significant estimate on the interaction term).[26]

Regressions (5) to (8) are Tobit regressions parallel to the probability model specification just discussed, i.e., columns (1) to (4). The results are consistent with the earlier results and can be summarized as follows: there is evidence that the volume of public acquisitions is larger in clusters and leverage reduces the volume of transactions more in clusters than outside of clusters. Overall, the multivariate results are consistent with the implication discussed in hypothesis 2 above, that the negative effects of leverage on acquisitions are stronger in clusters.

5 Financial Structure and Cluster Location

In this section we investigate the relation between a firm's location and its capital structure. As we discussed earlier, location can affect a firm's capital structure choice through two channels. The first channel, is related to arguments in Williamson (1986) and Shleifer and Vishny (1992), which suggest that firms will have greater debt capacity if their assets are more easily redeployed. Hence, if we assume that firms in clusters can more easily sell their assets, they should have higher debt ratios. The second channel, which we illustrate in our model, is that firms located in industry clusters have more acquisition opportunities, and may thus want to maintain more financial slack to take advantage of these opportunities. The first channel suggests that firms in clusters will be more highly levered while the second

[25] We lagged *Net Market Leverage* in order to ameliorate endogeneity concerns. We also considered instrumental variables but because of weak instruments the results were inconclusive.

[26] We also run separate regressions of firms in and out of clusters and found that net market leverage had a larger effect on acquisitions in clusters.

channel suggests that firms in clusters maintain more financial slack.

5.1 Leverage Regressions

Table IV presents multivariate regressions that examine the relation between capital structure and location after controlling for other determinants of capital structure. In particular, we regress four measures of leverage (*i.e.*, book, market, net book and net market leverage) on the following variables: (*i*) a measure of clustering; (*ii*) firm size (*Sales* in logs); (*iii*) profitability (*EBITDA/TA*); *(vi) Market to Book*, (*v*) asset tangibility (*Tangible Assets/TA*); (*vi*) R&D expenses[27] (*R&D/TA*); (*vii*) the firm's average stock returns in the last three years (*Av. Stock Return*);[28] (*viii*) a control for the size of the MSA in which the firm is located (*Population* in logs); and (*ix*) year and industry dummies.[29] We consider two different measures of clustering: the number of firms with the same SIC code within the MSA (*Log(Number of Firms)*) and a dummy variable that takes a value of 1 if there are ten or more firms with the same SIC code within the MSA and of 0 otherwise (*Cluster*).[30]

The results in Table IV show that even after controlling for other factors previously identified as determinants of leverage, firms in clusters tend to have *lower* debt ratios than firms outside clusters. In particular, the market leverage ratio of firms in clusters are 2.0% less than firms outside of clusters and net market leverage (which accounts for cash differences) is 4.9% less. These results are quite robust across different measures of clustering and leverage, and the coefficients of other determinants of leverage previously identified are all significant and have the expected sign.

Table V presents a second set of regressions that estimate the leverage equation in the model proposed in (5). These regressions estimate a constant λ that multiplies the estimates of the determinants of leverage inside and outside of industry clusters. Our hypothesis is that there is an amelioration effect (*i.e.*, $\lambda < 1$), in clusters, which means that the other

[27] We also include a dummy variable, *R&D Dummy*, that takes a value of 1 for firm-year observations in which R&D is not reported.

[28] In controlling for past stock returns we follow Welch (2005) who shows that a firm's past stock return can be an important determinant of its leverage ratio.

[29] The following control variables are lagged for one fiscal year: *Sales*, *EBITDA/TA, Market to Book*, *Tangible Assets/TA*, and *R&D/TA* .

[30] Notice that our specification is similar to Rajan and Zingales' (1995) except that we also include *Cluster* and two additional controls: *R&D/TA* and *Population.* In separate regressions we have also included *Selling expenses/Sales* and got almost identical results.

determinants of capital structure are less important in clusters. Specifically, Table V shows the estimation of (5) where d_i corresponds to each of the measures of leverage described before and K_i^j are the above described control variables (*i.e.*, (*i*) through (*viii*)). Notice that if $\lambda = 1$ is imposed this non-linear specification is equivalent to the regression reported in Table IV. However, the regressions reported in Table V indicate that for the market leverage regressions that λ is reliably less than one with a p-value less than 5%, which is consistent with other determinants of capital structure having less influence on debt ratios in clusters.[31]

Finally, it should be noted that *Population* enters positively in each regression of Tables IV and V specification but is generally not significant. This result is inconsistent with Loughran and Schultz (2006) who finds that firms in major urban areas have less financial leverage.

5.2 Cash Regressions

One can infer from a comparison of the leverage regressions and the net leverage regressions that firms in clusters tend to hold more cash. In this section we explore the effect of firm location on cash holdings in more detail.[32] Similar to our analysis of location and leverage, we estimate two types of regressions. First, we estimate simple OLS regressions that examine how location affects a firm's cash holdings after controlling for the usual determinants of cash. Specifically, we regress *Cash/TA* and the ratio of cash and marketable securities to total assets (*log(Cash/TA)*) on a measure of clustering (*i.e.*, *Log (Number of Firms)* or *Cluster*) and on the following controls:[33] (*i*) *Sales* (in logs, a control for firm size); (*ii*) *Market to Book* (a proxy for investment opportunities); *(iii) R&D/TA* (a proxy for expected costs of financial distress); (*iv*) *Capital Exp/TA* (a proxy for the importance of the investment needs); (*v*) *Debt Rating,* a dummy that takes a value of 1 if the firm has long term debt rated by S&P and of 0 otherwise, (a proxy for the costs of accessing financial markets); (*vi*)

[31] In addition to the amelioration effect, Table V also confirms the negative effect of cluster on leverage; for three of the four regressions *Cluster* is negatively related to firm leverage.

[32] See Opler et al., (1999), Dittmar et al., (2003), Acharya et al., (2005), Foley et al., (2007), Dittmar et al. (2003) and Harford et al. (2005) for papers that examine firms' decisions to hold cash.

[33] Both cash variables i.e., *Cash/TA* and *log(Cash/TA)* are constructed by substracting cash balances from total assets. This is for consistency with the literature e.g., Foley et. al (2007). Similar results are obtained when cash balances are not substracted from total assets.

Dividend, a dummy that takes a value of 1 if the firm pays dividends in that year and 0 otherwise, to account for ability to raise funds by reducing dividends; (*vii*) *Cash Flow Std. Dev.* (a measure of cash flow volatility); (*viii*) *Av. Stock Return,* the firm's average stock returns in the last three years; and (*ix*) *Population* in logs, a control for the size of the MSA in which the firm is located.[34]

The OLS regressions reported in Table VI (models (1)-(4)) indicate that after controlling for other variables previously identified as determinants of cash holdings, firms in clusters hold 13.7% more *Cash/TA* than firms outside clusters.[35] Since firms in the sample have, on average, 32.3% *Cash/TA*, the cluster effect represents 42% of the average firm cash holdings. The effect is statistically significant at the 1% level, and robust across the different measures of clustering and of cash balances. Among the controls, *Sales* and *Capital Exp/TA* decrease cash holdings while *Market to Book*, *R&D/TA* and *Cash Flow Std. Dev.* increase cash balances.

We also estimate a non-linear model similar to the one proposed by (6):

$$\log(Cash/TA)_i = \phi_0 + \phi_c Cluster_i + \sum_j \phi_j K_i^j - \sum_j \phi_j \cdot (1-\lambda)(K_i^j \times Cluster_i) + \varepsilon_i \quad (7)$$

where K_i^j are the above described control variables (*i.e.*, (*i*) through (*viii*)) and, as in the leverage regressions, we estimate λ in order to test for the presence of the amelioration effect (*i.e.*, $\lambda < 1$). The estimation of (7) confirms that firms in clusters tend to have larger cash holdings in clusters. In addition, it shows that there is a significant *amelioration* effect in the determinants of cash holdings in clusters. The amelioration, which is statistically significant at the 1% level, represents a reduction of 26.2% (i.e., $\lambda = 0.738$) in the coefficients of the determinants of cash holdings in clusters.

[34]Controls (*i*) through (*vii*) are those considered in Foley et al. (2007) and, as in their analysis, they are lagged for one fiscal year. As in the leverage regressions, we set *R&D* equal to zero if the *R&D* value is not reported and include a dummy variable for these observations, i.e., *R&D Dummy.* We also use year and industry dummies.

[35]This value is obtained from model (3) the specification where *Cash/TA* is used as the dependent variable and Cluster is used as the clustering measure.

6 Robustness

This section examines the robustness of our results to including additional controls and alternative measures of clustering. In addition, we consider whether the effect of clustering holds after controlling for firm-specific factors by estimating fixed effects regressions that examine whether changes in metropolitan areas are associated with changes in the financial structures of firms.

6.1 Region Specific Controls

In this section we examine various geographical characteristics that may influence the regional business climate, and may thus effect the growth opportunities and demand for financial slack of the firms in the MSAs in our sample. First, we consider the R&D expenditures within the MSA, which we measure by aggregating the R&D expenditures in the MSA and dividing by the aggregate total assets of the firms. Our motivation for this control comes from the urban economics literature that suggests that innovation may have spillover effects, which in turn suggests that firms in high-tech cities may have better growth opportunities beyond what one might expect given their firm specific characteristics, e.g., their own R&D expenditures. This hypothesis suggests that firms may choose to have more financial slack in high tech cities. Similarly, there may be more opportunities in growing cities, which would suggest a relation between financial slack and MSA growth.[36]

The results in Table VII indicate that regional characteristics have a significant effect on capital structure choices. We find that firms in high tech and growing MSAs tend to have lower debt ratios and hold more cash, which is consistent with the idea that these urban characteristics are associated with greater growth opportunities. However, after controlling for these effects, the effect of cluster on financial slack continues to be significant.

6.2 Fixed-Effect Analysis

The previous regressions show that firms in clusters maintain more financial slack after controlling for observable firm characteristics (e.g., size, profitability, asset tangibility etc.).

[36] We also test a specification with *State Dummies* to account for differences in taxation and regulation across states. When we include State Dummies the results are weakened for market everage but remain statistically very significant for net market leverage and cash-holdings.

However, it is possible that there are unobservable characteristics that are associated with both the firm's location choice as well as its financial structure. In order to address this possibility we estimate fixed-effect regressions that control for unobservable firm characteristics.

Table VIII report fixed-effect regressions for leverage and cash holdings respectively.[37] In these regressions, the cluster effect is statistically very significant for *Market Leverage, Net Market Leverage* and *Log(Cash/TA)*, as reported in columns (1), (5) and (9). Table VIII also reports fixed effect regressions for market and net market leverage (columns 2 and 5) and cash (colums 10) using an alternative measure of clustering (i.e., *Ratio Number of Firms*). To create this alternative measure, for each industry and MSA we calculate the ratio of the number of firms in that industry and MSA relative to the total number of firms in the industry included in Compustat. This variable, in addition to providing an alternative measure of clustering, has the advantage that changes over time in the number of firms in an industry do not mechanically affect the level of clustering in that industry.[38]

The *Log (Number of Firms)* variable continues to be very significant in the fixed effects regression. However, the alternative measure of clustering is not reliably related to any of our financial slack measures in the fixed effects regression, which suggest that the time series relation between *Log (Number of Firms)* and financial slack may be partly driven by a mechanical relation between the number of firms in the industry and the level of clustering.[39] We also estimate this regression on a sample restricted to firms older than 20 years, which ensures that the results are not driven by new firms entering the sample (see columns 3, 4, 7, 8, 11 and 12). The evidence shows that the coefficient of *Log(Number of Firms)*, retains its significance for net market leverage and cash, which suggest that self-selection in location is relatively unimportant in explaining the results.

Finally, to check whether the main source of variation in our sample comes from the time-series or from the cross-section, Table IX provides regressions that use time-averages of the

[37] For brevity we do not report fixed effects results for the dummy Cluster, which are very similar to those found with the continuous variable Log(NumberofFirms).

[38] See below for the results of using, the *Ratio Number of Firms* in cross-sectional regressions.

[39] To see how this might occur, suppose that an industry experiences a positive productivity shock that increases the number of firms in the sample (for example due to previously excluded firms that grow beyond the $50 million threshold). This positive shock could reduce leverage and increase cash holdings while simultaneously increasing *Log (Number of Firms)* creating a time series correlation.

observations, i.e., between estimator. In these regressions the coefficient of *Log(Number of Firms)* is statistically significant indicating that both the time-series and the cross-sectional variation are important in explaining the cluster effect.[40]

7 Concluding remarks

As we mentioned in the introduction, there is a growing urban economics literature that describes how the actions of firms can be influenced by where they are located. This paper contributes to that literature by documenting that firms that are located in industry clusters are involved in more acquistions, do more R&D and maintain more financial slack than their industry peers that are located away from clusters.

This paper also contributes to the corporate finance literature that examines the determinants of corporate debt ratios and cash holdings. Up to now, the focus of this literature has been on the characteristics of firms, and the extent to which these characteristics correlate with how they are financed. In this paper we show that the proximity of firms to their industry counterparts is also related to their capital structure choices, and argue that this relation arises in part because of increased opportunities for acquisitions in industry clusters. The research in this paper also introduces the idea that cities also have unique characteristics, and that these characteristics are associated with how firms operate as well as how they are financed. Although our main focus has been on industry clusters, like Silicon Valley, we have also considered other urban characteristics, such as the size of the metropolitan area, the growth rate of the area and the R&D intensity of the metropolitan area. In contrast with the findings of Loughran and Schultz (2006), we find a positive relation between the size of the metropolitan area and debt ratios. However, this effect is much weaker than the negative effect that urban growth rates have on the firm's debt ratio. In addition, we find that firms in high tech cities, i.e., those urban areas where firms have greater R&D expenditures, tend to have less debt after controlling for other determinants of capital structure.

[40]Noice that the between estimator for Ratio of Number of Firms is also statistically significant, which confirms that our cross-sectional results are not particularly sensitive to our cluster measure.

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Table I
Descriptive Statistics

	Mean Values				Industry Adjusted Mean Values		
	Whole Sample	Cluster	Off-Cluster	t stat	Cluster	Off-Cluster	t stat
Sales	1385.610	1281.136	1459.429	-0.77	243.632	-172.145	2.72
EBITDA / TA	0.159	0.155	0.162	-1.42	-0.004	0.003	-1.84
Market to Book	2.201	2.741	1.820	14.5	0.181	-0.128	6.74
Tangible Assets / TA	0.227	0.170	0.268	-14.12	-0.011	0.008	-4.08
R&D / TA	0.065	0.098	0.042	18.83	0.010	-0.007	7.70
Capital Exp. / TA	0.067	0.069	0.066	1.53	0.001	-0.001	0.80
Stock Return	0.254	0.317	0.209	9.19	0.023	-0.016	4.19
Firm Age	18.264	14.562	20.884	-8.71	-0.702	0.497	-2.32
Book Leverage	0.476	0.436	0.504	-7.33	-0.008	0.006	-1.95
Market Leverage	0.322	0.247	0.374	-13.08	-0.018	0.013	-4.57
Net Book Leverage	0.285	0.152	0.379	-14.98	-0.044	0.031	-6.65
Net Market Leverage	0.227	0.118	0.305	-16.72	-0.032	0.023	-6.84
Cash / TA	0.323	0.526	0.180	17.41	0.085	-0.060	9.83
Log(Cash / TA)	-2.246	-1.381	-2.860	21.62	0.302	-0.214	10.39
Rating	0.035	0.041	0.030	0.91	0.009	-0.006	1.78
Dividend	0.340	0.187	0.447	-11.13	-0.032	0.023	-3.39
Cash Flow Std. Dev.	0.032	0.041	0.026	12.5	0.003	-0.002	5.72
Population	15.085	15.849	14.545	21.98			

NOTES

a. Details on the definition and construction of the variables reported in the table are available in the Data Appendix.

Table II Mergers & Acquisitions
Descriptive Statistics (Mean Values)

Panel A.	**Whole Sample**			
	All-Firms	In-Cluster	Off-Cluster	t stat
Ratio of bidders	0.164	0.192	0.144	7.30
Ratio of local bidders	0.026	0.050	0.009	14.80
Acquisitions per firm	0.207	0.251	0.175	8.14
Local acquisitions per firm	0.027	0.053	0.009	14.57
Total Transaction Value/TA	0.056	0.073	0.044	8.71
Total local Transaction Value/TA	0.005	0.009	0.001	13.41

Panel B.	**Public Targets**			
	All-Firms	In-Cluster	Off-Cluster	t stat
Ratio of bidders	0.046	0.063	0.034	7.93
Ratio of local bidder	0.008	0.019	0.001	10.76
Acquisitions per firm	0.051	0.071	0.036	8.17
Local acquisitions per firm	0.009	0.019	0.001	10.68
Total Transaction Value/TA	0.017	0.025	0.011	8.34
Total local Transaction Value/TA	0.002	0.004	0.000	10.73

NOTES

a. Details on the definition and construction of the variables reported in the table are available in the Data Appendix.

b. Cluster is a dummy variable that takes a value of 1 if there are 10 or more firms from the same industry within the Metropolitan Statistical Area (MSA) as identified by the U.S. Census Bureau in 1990 and of 0 otherwise.

Table III
Mergers & Acquisitions Regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log (Number of firms)	0.003	0.008	-0.005	0.009	0.010	0.066	-0.016	0.056
	(0.66)	(3.78)	(-0.86)	(3.24)	(-0.99)	(3.76)	(-1.25)	(2.73)
Net Market Leverage			-0.113	-0.025			-0.454	-0.638
			(-4.42)	(-2.31)			(-5.59)	(-4.49)
Log (Number of Acquisitions) X Net Market Leverage			-0.032	-0.018			-0.069	-0.069
			(-2.83)	(-3.31)			(-2.04)	(-1.25)
Sales			0.040	0.024			0.080	0.187
			(9.35)	(10.99)			(7.97)	(12.43)
EBITDA/TA			0.081	0.024			0.257	0.091
			(2.47)	(1.29)			(3.17)	(0.67)
Av. Stock Return			0.065	0.019			0.208	0.168
			(6.97)	(3.86)			(-9.64)	(4.77)
Age			-0.002	-0.001			-0.005	-0.005
			(-4.4)	(-2.43)			(-3.95)	(-2.71)
Population			0.002	-0.004			0.007	-0.048
			(0.61)	(-2.6)			(0.58)	(-3.06)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	13342	13342	13342	13342	13342	13342	13342	13342
R2	0.03	0.01	0.06	0.04	0.04	0.05	0.08	0.11

NOTES

a. Details on the definition and construction of the variables reported in the table are available in the Data Appendix.
b. Each column corresponds to a different regression. Reported are the estimated coefficients (with their t-statistics in parenthesis).
c. For (1) and (3), dummy variable indicating an acquisition is the dependent variable. For (2) and (4), dummy variable indicating acquisition of a public target is the dependent variable. For (5) and (7) Total Transaction Value/TA is the dependent variable. For (6) and (8), Total Public Transaction Value/TA is the dependent variable. These variables are windsorized at the top 1% level.
d. Cluster is a dummy variable that takes a value of 1 if there are 10 or more firms from the same industry within the Metropolitan Statistical Area (MSA) as identified by the U.S. Census Bureau in 1990 and of 0 otherwise.

Table IV
Leverage Regressions (OLS)

	Book Leverage	Market Leverage	Net Book Leverage	Net Market Leverage	Book Leverage	Market Leverage	Net Book Leverage	Net Market Leverage
log (Number of Firms)	-0.018	-0.012	-0.043	-0.027				
	(-4.23)	(-3.30)	(-7.40)	(-6.00)				
Cluster					-0.027	-0.020	-0.080	-0.049
					(-2.61)	(-2.20)	(-5.48)	(-4.35)
Sales	0.036	0.013	0.058	0.022	0.035	0.013	0.058	0.022
	(12.61)	(4.97)	(15.12)	(7.42)	(12.50)	(4.94)	(15.01)	(7.35)
EBITDA/TA	-0.446	-0.397	-0.457	-0.360	-0.442	-0.394	-0.451	-0.356
	(-16.22)	(-18.62)	(-12.03)	(-14.72)	(-16.05)	(-18.56)	(-11.77)	(-14.52)
Market to Book	-0.007	-0.031	-0.039	-0.026	-0.007	-0.031	-0.041	-0.027
	(-2.63)	(-17.39)	(-11.38)	(-12.38)	(-2.96)	(-17.85)	(-11.97)	(-13.08)
Tang. Assets/TA	0.077	0.069	0.364	0.202	0.082	0.072	0.374	0.208
	(2.02)	(1.97)	(7.58)	(5.17)	(2.15)	(2.05)	(7.76)	(5.31)
R&D/TA	-0.268	-0.501	-0.720	-0.676	-0.289	-0.514	-0.759	-0.700
	(-4.04)	(-9.99)	(-7.69)	(-10.78)	(-4.32)	(-10.18)	(-8.02)	(-11.1)
R&D Dummy	-0.005	0.020	0.017	0.025	-0.004	0.021	0.020	0.026
	(-0.40)	(1.58)	(0.96)	(1.62)	(-0.31)	(1.64)	(1.13)	(1.74)
Av. Stock Return	-0.008	-0.092	-0.031	-0.072	-0.008	-0.092	-0.031	-0.072
	(-1.24)	(-18.58)	(-3.46)	(-12.06)	(-1.22)	(-18.50)	(-3.38)	(-11.93)
Population	0.011	0.006	0.013	0.008	0.006	0.003	0.004	0.002
	(2.71)	(1.55)	(2.38)	(1.66)	(1.62)	(0.84)	(0.71)	(0.45)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind. Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13342	13342	13342	13342	13342	13342	13342	13342
R^2	0.22	0.47	0.42	0.46	0.22	0.47	0.42	0.46

NOTES

a. Details on the definition and construction of the variables reported in the table are available in the Data Appendix.
b. Each column corresponds to a different regression. Reported are the estimated coefficients (with their t-statistics in parenthesis).
c. Cluster is a dummy variable that takes a value of 1 if there are 10 or more firms from the same industry within the Metropolitan Statistical Area (MSA) as identified by the U.S. Census Bureau in 1990 and of 0 otherwise.

Table V
Leverage Regressions (NLLS)

	Book Leverage	Market Leverage	Net Book Leverage	Net Market Leverage
Cluster	-0.010	-0.062	-0.083	-0.069
	(-0.62)	(-3.05)	(-4.23)	(-2.88)
Sales	0.037	0.014	0.057	0.024
	(11.81)	(4.62)	(14.1)	(6.93)
Market to Book	-0.008	-0.044	-0.040	-0.040
	(-2.96)	(-16.15)	(-10.29)	(-13.17)
Tang. Assets/TA	0.082	0.068	0.373	0.202
	(2.04)	(1.73)	(7.56)	(4.54)
R&D/TA	-0.317	-0.659	-0.749	-0.905
	(-4.41)	(-10.11)	(-7.88)	(-11.00)
R&D Dummy	-0.005	0.015	0.020	0.020
	(-0.39)	(1.08)	(1.14)	(1.16)
EBITDA/TA	-0.465	-0.475	-0.448	-0.433
	(-13.69)	(-17.14)	(-11.21)	(-13.71)
Av. Stock Return	-0.008	-0.109	-0.031	-0.088
	(-1.20)	(-16.89)	(-3.39)	(-11.86)
Population	0.006	0.003	0.004	0.001
	(1.57)	(0.82)	(0.72)	(0.34)
Year Dummies	Yes	Yes	Yes	Yes
Ind. Dummies	Yes	Yes	Yes	Yes
λ	0.910	0.652	1.016	0.636
	(-1.30)	(-11.10)	(0.27)	(-9.57)
Observations	13342	13342	13342	13342
R^2	0.22	0.49	0.42	0.47

NOTES

a. Details on the definition and construction of the variables reported in the table are available in the Data Appendix.
b. Each column corresponds to a different regression. Reported are the estimated coefficients (with their t-statistics in parenthesis). For λ, the reported t statistic corresponds to the test of hypothesis $\lambda \neq 1$.
c. Cluster is a dummy variable that takes a value of 1 if there are 10 or more firms from the same industry within the Metropolitan Statistical Area (MSA) as identified by the U.S. Census Bureau in 1990 and of 0 otherwise.

Table VI
Cash Regressions

	OLS Regressions				NLLS
	(1)	(2)	(3)	(4)	(5)
Cluster	0.137	0.460			0.805
	(7.10)	(6.49)			(5.76)
Log(Number of Firms)			0.073	0.219	
			(9.56)	(7.66)	
Sales	-0.043	-0.067	-0.044	-0.069	-0.079
	(-7.82)	(-3.04)	(-7.94)	(-3.16)	(-3.09)
Market to Book	0.081	0.220	0.078	0.214	0.274
	(12.77)	(16.38)	(12.54)	(15.82)	(13.50)
R&D/TA	1.381	4.902	1.321	4.766	5.899
	(10.22)	(12.49)	(9.78)	(12.04)	(11.24)
R&D Dummy	-0.013	-0.248	-0.008	-0.231	-0.246
	(-0.80)	(-2.58)	(-0.47)	(-2.40)	(-2.33)
Capital Exp/TA	-0.780	-1.555	-0.790	-1.590	-1.837
	(-8.05)	(-4.23)	(-8.23)	(-4.42)	(-4.35)
Debt Rating	-0.094	0.015	-0.083	0.050	0.046
	(-2.85)	(0.08)	(-2.37)	(0.26)	(0.20)
Dividend	0.005	0.019	0.005	0.018	0.068
	(0.28)	(0.27)	(0.32)	(0.25)	(0.86)
Cash Flow Std. Dev.	0.637	2.276	0.540	2.030	2.922
	(1.73)	(2.41)	(1.47)	(2.14)	(2.6)
Av. Stock Return	0.050	0.252	0.051	0.257	0.286
	(3.76)	(6.69)	(3.9)	(6.85)	(6.54)
Population	0.005	0.037	-0.010	-0.002	0.041
	(1.24)	(1.34)	(-1.99)	(-0.05)	(1.47)
Year Dummies	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes
λ					0.738
					(-5.11)
N	13342	13277	13342	13277	13342
R^2	0.37	0.43	0.38	0.43	0.43

NOTES

a. Details on the definition and construction of the variables reported in the table are available in the Data Appendix.
b. Each column corresponds to a different regression. Reported are the estimated coefficients (with their t-statistics in parenthesis). For (1) and (3), Cash/TA is the dependent variable. For (2), (4) and (5), log(Cash/TA) is the dependent variable. For λ, the reported t statistic corresponds to the test of hypothesis $\lambda \neq 1$.
c. Cluster is a dummy variable that takes a value of 1 if there are 10 or more firms from the same industry within the Metropolitan Statistical Area (MSA) as identified by the U.S. Census Bureau in 1990 and of 0 otherwise.

Table VII
Robustness Analysis (1)

	Market Leverage		Net Market Leverage		log(Cash/TA)	
	(1)	(2)	(3)	(4)	(5)	(6)
Log (Number of firms)	-0.015	-0.010	-0.029	-0.023	0.233	0.198
	(-3.87)	(-2.72)	(-6.55)	(-5.15)	(7.89)	(6.78)
Sales	0.013	0.013	0.022	0.022	-0.069	-0.070
	(4.98)	(4.91)	(7.49)	(7.33)	(-3.13)	(-3.21)
EBITDA/TA	-0.383	-0.395	-0.344	-0.357		
	(-18.01)	(-18.62)	(-14.07)	(-14.71)		
Market to Book	-0.031	-0.030	-0.026	-0.025	0.210	0.211
	(-17.73)	(-17.2)	(-12.6)	(-12.14)	(15.53)	(15.63)
Tang. Assets/TA	0.070	0.070	0.202	0.205		
	(2.03)	(2.02)	(5.19)	(5.28)		
R&D/TA	-0.473	-0.473	-0.640	-0.627	4.629	4.455
	(-9.57)	(-9.37)	(-10.31)	(-9.92)	(11.69)	(11.08)
R&D Dummy	0.022	0.018	0.027	0.021	-0.250	-0.205
	(1.73)	(1.43)	(1.77)	(1.4)	(-2.55)	(-2.13)
Av. Stock Return	-0.088	-0.092	-0.067	-0.072	0.240	0.259
	(-17.63)	(-18.66)	(-11.12)	(-12.17)	(6.32)	(6.98)
Capital Exp/TA					-1.664	-1.657
					(-4.56)	(-4.62)
Debt Rating					0.040	0.050
					(0.21)	(0.27)
Dividend					0.013	0.043
					(0.18)	(0.6)
Cash Flow Std. Dev.					2.149	1.998
					(2.28)	(2.11)
Total RD in MSA/ Total Asset in MSA		-0.307		-0.544		3.755
		(-2.64)		(-3.9)		(4.05)
Population	0.007	0.007	0.009	0.009	-0.004	-0.009
	(1.86)	(1.72)	(1.89)	(1.9)	(-0.14)	(-0.29)
Population Growth	-0.865		-1.010		5.169	
	(-2.54)		(-2.49)		(1.8)	
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Ind. Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12703	13342	12703	13342	12640	13277
R2	0.47	0.48	0.46	0.46	0.44	0.44

NOTES

a. Details on the definition and construction of the variables reported in the table are available in the Data Appendix.

b. Each column corresponds to a different regression. Reported are the estimated coefficients (with their t-statistics in parenthesis)

Table VIII

Fixed Effects

	Market Leverage				Net Market Leverage				Log(Cash/TA)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Log (Number of Firms)	-0.026		-0.007		-0.035		-0.017		0.076		0.142	
	(-5.76)		(-1.03)		(-6.67)		(-2.12)		(1.96)		(2.15)	
Ratio of Local Firms		0.003		0.039		-0.009		0.029		-0.111		-0.118
		(0.14)		(1.39)		(-0.41)		(0.87)		(-0.7)		(-0.44)
Sales	0.025	0.023	0.040	0.041	0.033	0.030	0.046	0.047	-0.157	-0.152	-0.128	-0.128
	(9.62)	(8.91)	(8.35)	(8.41)	(10.7)	(9.88)	(8.21)	(8.19)	(-6.93)	(-6.75)	(-2.75)	(-2.74)
EBITDA/TA	-0.176	-0.170	-0.139	-0.138	-0.164	-0.158	-0.099	-0.095				
	(-15.5)	(-15.02)	(-5.49)	(-5.45)	(-12.51)	(-12)	(-3.33)	(-3.2)				
Market to Book	-0.009	-0.009	-0.025	-0.025	-0.005	-0.006	-0.025	-0.025	0.077	0.078	0.135	0.135
	(-8.34)	(-8.76)	(-10.87)	(-10.79)	(-4.31)	(-4.76)	(-9.27)	(-9.28)	(9.09)	(9.22)	(6.46)	(6.46)
Tang. Assets/TA	0.092	0.095	0.199	0.200	0.213	0.218	0.321	0.324				
	(5.07)	(5.26)	(7.18)	(7.24)	(10.19)	(10.38)	(9.92)	(10.02)				
R&D/TA	-0.165	-0.163	-0.166	-0.159	-0.002	-0.001	0.075	0.080	-0.364	-0.365	-1.955	-1.983
	(-4.82)	(-4.78)	(-1.89)	(-1.82)	(-0.05)	(-0.01)	(0.73)	(0.78)	(-1.26)	(-1.27)	(-2.33)	(-2.36)
R&D Dummy	-0.007	-0.007	-0.001	0.000	0.016	0.016	0.018	0.019	-0.314	-0.315	-0.322	-0.329
	(-0.96)	(-0.94)	(-0.06)	(0.01)	(1.88)	(1.89)	(1.46)	(1.54)	(-4.96)	(-4.98)	(-3.15)	(-3.22)
Av. Stock Return	-0.125	-0.125	-0.174	-0.175	-0.095	-0.096	-0.158	-0.159	0.283	0.285	0.340	0.345
	(-43.93)	(-43.99)	(-30.41)	(-30.49)	(-28.99)	(-29.06)	(-23.59)	(-23.67)	(11.69)	(11.75)	(6.34)	(6.42)
Capital Exp/TA									-1.536	-1.550	-2.402	-2.411
									(-7.53)	(-7.59)	(-5.57)	(-5.59)
Dividend									0.084	0.084	0.316	0.315
									(1.94)	(1.93)	(4.5)	(4.49)
Population	-0.180	-0.188	-0.236	-0.242	-0.207	-0.216	-0.316	-0.322	0.631	0.670	0.418	0.461
	(-5.56)	(-5.79)	(-5.2)	(-5.32)	(-5.54)	(-5.76)	(-5.94)	(-6.04)	(2.25)	(2.38)	(0.95)	(1.05)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind. Dummies	No	No	No	No	No	No	No	No	No	No	No	No
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No
Observations	13342	13342	4718	4718	13342	13342	4718	4718	13277	13277	4700	4700
R2	0.32	0.31	0.37	0.37	0.19	0.19	0.28	0.28	0.07	0.07	0.09	0.09

NOTES

a. Details on the definition and construction of the variables reported in the table are available in the Data Appendix.

b. Each column corresponds to a different regression. Reported are the estimated coefficients (with their t-statistics in parenthesis). For (3), (4), (7), (8), (11) and (12), the analysis is restricted to the sub-sample of firms older than 20 years of age.

Table IX
Between Effects

	Market Leverage		Net Market Leverage		Log(Cash/TA)	
	(1)	(2)	(3)	(4)	(5)	(6)
Log (Number of Firms)	-0.010		-0.023		0.178	
	(-2.75)		(-4.91)		(6.12)	
Ratio of Local Firms		-0.055		-0.118		0.933
		(-2.88)		(-4.88)		(6.15)
Sales	0.017	0.017	0.026	0.027	-0.080	-0.087
	(5.75)	(5.87)	(7.13)	(7.32)	(-3.1)	(-3.34)
EBITDA/TA	-0.497	-0.497	-0.446	-0.444		
	(-15.75)	(-15.75)	(-11.23)	(-11.18)		
Market to Book	-0.035	-0.035	-0.028	-0.027	0.274	0.271
	(-11.39)	(-11.33)	(-7.1)	(-7.04)	(11.47)	(11.33)
Tang. Assets/TA	0.151	0.153	0.293	0.299		
	(4.67)	(4.75)	(7.21)	(7.36)		
R&D/TA	-0.441	-0.439	-0.642	-0.640	4.899	4.884
	(-6.98)	(-6.95)	(-8.08)	(-8.05)	(10)	(9.97)
R&D Dummy	0.053	0.052	0.060	0.059	-0.272	-0.267
	(4.69)	(4.66)	(4.21)	(4.16)	(-3.01)	(-2.96)
Av. Stock Return	-0.054	-0.055	-0.042	-0.043	0.182	0.190
	(-5.29)	(-5.34)	(-3.23)	(-3.32)	(2.23)	(2.33)
Capital Exp/TA					-1.722	-1.706
					(-2.78)	(-2.76)
Rating					0.064	0.045
					(0.29)	(0.2)
Dividend					0.067	0.073
					(0.74)	(0.81)
Cash Flow Std. Dev.					0.610	0.765
					(0.67)	(0.84)
Population	0.003	0.002	0.005	0.002	0.012	0.037
	(0.93)	(0.59)	(1.2)	(0.45)	(0.45)	(1.56)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Ind. Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effect	No	No	No	No	No	No
Observations	1910	1910	1910	1910	1907	1907
R2	0.58	0.58	0.55	0.55	0.55	0.55

NOTES

a. Details on the definition and construction of the variables reported in the table are available in the Data Appendix.

b. Each column corresponds to a different regression. Reported are the estimated coefficients (with their t-statistics in parenthesis).

Data Appendix

Total Assets (TA) is measured as the book value of assets (Item 6).

Market Equity (ME) is common shares outstanding (Item 25) times the stock price (Item 199).

Preferred Stock (PS) is equal to liquidating value (Item 10) if available, else redemption value (Item 56) if available, else carrying value (Item 130).

Market Value (MV) is defined as liabilities (Item181) minus balance sheet deferred taxes and investment tax credit (Item 35) plus PS plus ME.

Book Equity (BE) is defined as TA minus liabilities (Item 181) plus balance sheet deferred taxes and investment tax credit (Item35) minus PS.

Market-to-Book ratio is defined as MV over TA.

Book Debt (BD) is TA minus BE.

Book Leverage is BD over TA.

Market Leverage is BD over MV.

Net Book Leverage is BD minus cash and marketable securities (Item 1) over TA.

Net Market Leverage is BD minus cash and marketable securities (Item 1) over MV.

Sales is the natural logarithm of sales (Item 12) in 1990 dollars.

EBITDA/TA is EBITDA (Item13) over lagged TA.

Tangible Assets/ TA is net property, plant and equipment (Item 8) over TA.

R&D/ TA is defined as R&D expenses (Item 46) over TA.

R&D Dummy takes the value of one if COMPUSTAT reports R&D expense as missing.

Capital Exp. / TA is capital expenditures (Item 128) over TA.

Selling Exp. /TA is selling and administrative expenses (Item 189) over TA.

Cash/ TA is cash and marketable securities (Item 1) over TA.

Net Cash/ TA is cash and marketable securities (Item 1) minus short-term debt (Item 34) over TA.

Dividend takes the value of one if the firm pays dividend (Item 26).

Cash Flow Std Dev. is the standard deviation of EBITDA/TA during the sample period.

Population is the natural logarithm of population estimate of MSA.

Rating takes the value of one if the firm has an S&P investment grade long-term debt rating.