Intra-Industry Capital Structure Dispersion: How Do Capital Structures Differ Among Competitors?

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Abstract

This paper examines the dispersion of capital structures among firms within an industry, and then relates this dispersion to industry characteristics. This empirical analysis allows us to assess the main implications of some of the leading theories on the capital structures of competitors in an industry. We find that, all else equal, intra-industry capital structure dispersion is greater in industries (1) that are highly concentrated, (2) with looser corporate governance practices, (3) in which assets are easier to transfer, and (4) with a higher degree of product uniqueness among firms. The evidence supports the importance of agency effects on capital structure and suggests that liquidity provision by competitors can be relevant to a firm's capital structure choices.

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1 Introduction

Previous studies on capital structure have considered industry effects as central for understanding firms' capital structure choices.[1] However, if we examine how firms' capital structures are distributed within industries, we observe striking differences. Firms in some industries have very similar capital structures (e.g., computer software, food processing, and drug production), while in other industries, firms are financed very differently (e.g., trucking transportation, food wholesale, and drugstores).

Differences in the capital structures among firms in an industry are somewhat puzzling: If all firms in an industry are subject to economic forces that recommend a certain capital structure, why do such differences in capital structures exist? Furthermore, *differences* in capital structure *dispersion* across industries are also intriguing: Why do firms in some industries maintain the same leverage, while firms in other industries do not?

In this paper, we empirically analyze the dispersion of firms' capital structures within industries (i.e., intra-industry capital structure dispersion). This analysis constitutes a novel way of examining the evidence on capital structure that can shed some light on the determinants of these decisions. Indeed, previous studies on leverage fail to explain a substantial part of the cross-sectional variation in firms' leverage.[2] As we show, this unexplained variation is not totally random, but follows systematic industry patterns.

We follow a straightforward methodology. We proceed by first documenting how intra-industry capital structure dispersion differs across industries, and then, by relating this dispersion to industry characteristics, we investigate the determinants of such

[1] See Harris and Raviv (1991) and references therein.

[2] For instance Bradley, Jarrell and Kim (1984) explain 34% of leverage variation by using volatility, non-debt tax shields, selling expenses and industry dummies. Similar explanatory power is found in other studies, e.g. Rajan and Zingales (1995).

differences in dispersion. To do this, we develop several measures of intra-industry capital structure dispersion and regress them on proxies for relevant industry characteristics. We include proxies to capture both fundamental industry characteristics (e.g., risk, size, or profitability of the firms in the industry) and industry characteristics that, as described below, figure prominently in theories of intra-industry capital structure dispersion (e.g., industry concentration, measures of asset transferability, and measures of technological dispersion). Furthermore, instead of using the SIC industry classification, we use two grouping procedures to better capture competitive links among firms.[3] When we compare our results obtained with more careful grouping procedures with results obtained using a SIC grouping, we find that careful grouping reveals relevant industry effects that otherwise would remain unnoticed in the data.

A number of theories have implications with respect to intra-industry capital structure dispersion. Maksimovic and Zechner (1991) argue that a firm's capital structure is determined by the firm's choice of technology, implying that industries with multiple technologies will feature greater dispersion in their firms' capital structures. Shleifer and Vishny (1992) relate intra-industry dispersion in capital structures to the liquidity in the secondary market for firms' assets. A liquid secondary market, where productive assets are easily transferable among industry peers, implies that a firm's capital structure will be affected by the capital structure of its industry peers. When a firm's industry peers have less debt, they can provide liquidity to the firm by buying its assets when the firm is having financial difficulties. With greater asset liquidity, financial distress is less costly and the firm can optimally increase its leverage. Thus, some will use leverage aggressively and sell assets when distressed, and

[3]Other studies using alternative methods to SIC are Lamont (1997), Andrade and Kaplan (1998), and Scharfstein (1998). See Clark (1989) and Kahle and Walking (1996) for an account of the SIC drawbacks.

others will use leverage more conservatively and provide liquidity when competitors are distressed. In sum, greater capital structure dispersion will occur in industries with highly liquid markets for productive assets.

Intra-industry capital structure dispersion can also be affected by corporate agency conflicts. According to the agency view of the firm, without strong mechanisms of control, managerial preferences and objectives rather than value maximization determine a firm's policies. Since the preferences are likely to differ from manager to manager, in industries where managers enjoy high discretion, firms will fail to cluster around the capital structure that maximizes value, generating greater intra-industry dispersion in capital structure.

Our analysis produces a number of results. First, we find that more concentrated industries, and industries with looser corporate governance practices, exhibit greater intra-industry capital structure dispersion, which supports the relevance of agency effects on capital structure. Second, we find that industries in which assets are easier to transfer, and industries with a lower degree of product uniqueness among firms, exhibit greater capital structure dispersion, which is consistent with the implications of Shleifer and Vishny. Finally, we fail to find any empirical connection between intra-industry technological dispersion and capital structure dispersion.[4]

This paper is organized as follows. Section 2 reviews the leading theories as they pertain to intra-industry capital structure dispersion. Section 3 describes our empirical strategy. Section 4 presents our main findings. Section 5 examines two important extensions of our findings. Section 6 deals with robustness issues. Section 7 presents our conclusions. The appendix elaborates on one of the main industry grouping methods used throughout the study.

[4]This finding contrasts with some of the findings of MacKay and Phillips (2001), who, by connecting the technological position of a firm in an industry with its leverage, provide evidence consistent with Maksimovick and Zechner (1991).

2 Theoretical Implications on Intra-Industry Capital Structure Dispersion

In this section, we first review three theories that, for different reasons, consider how industry affiliation affects a firm's capital structure choice. We then examine their implications on intra-industry capital structure dispersion, and finally translate these implications into more concrete empirical predictions.

2.1 The Technology Effect

Maksimovic and Zechner (1991) relate the availability of different technologies in an industry to the existence of different capital structures and hence to intra-industry capital structure dispersion. We will refer to this relationship between technological dispersion and capital structure dispersion as the *technology effect*.

The logic of their argument is as follows: Suppose that firms in an industry can choose among technologies that differ on the use of inputs (of *uncertain* prices) to produce a similar product. In this case, both the *ex-post* realization of input prices and the number of firms in the industry choosing a specific technology determine the *ex-post* profitability of the technological choice. In equilibrium, a majority of firms choose what *ex-ante* is likely to be the most efficient technology.[5] Due to the large number of competitors with the same technology, these firms expose themselves to strong competition if, ex post, the technology ends up being the most efficient one. In contrast, the limited number of firms that choose the other technologies (ex-ante less likely to be the most efficient one) may enjoy weaker competition if the technology chosen becomes the most efficient technology ex post. The number of competitors with the same technology negatively affects the variability of a firm's cash-flows: If

[5]Ex-post, the realization of input prices can make *any* of the available technologies the most efficient to use.

a technology chosen by many competitors becomes the most efficient, multiple firms will expand their production, which reduces the positive effect on their cash flows. In contrast, if a technology chosen by a reduced number of competitors becomes efficient, a few firms expand their production, and the impact on their cash flows will be larger.

Once a link between intra-industry technological diversity and intra-industry differences in cash flow variability has been established, an implication on intra-industry capital structure dispersion easily follows. Specifically, Maksimovic and Zechner (1991) argue that, if a firm's capital structure choice precedes its choice of productive technology, risk-shifting incentives will induce more levered firms to use riskier technologies. Reversing the timing of the choices, i.e., choosing technology *before* capital structure, could reverse the association between risk and leverage. Such a reversal, however, will not affect the basic conclusion that intra-industry capital structure dispersion is positively correlated with intra-industry technological diversity. Thus, we will examine the following empirical implication:

- *Higher intra-industry capital structure dispersion will occur in industries where firms use more heterogenous production technologies.*

2.2 The Asset-Liquidity Effect

Shleifer and Vishny (1992) show that an important determinant of a firm's level of leverage is the liquidity of the secondary market for its assets. They argue that a firm's industry peers constitute the best buyers of the firm's assets because they can use them most productively. Accordingly, the capital structure of a firm's industry peers becomes an important determinant of the firm's leverage because it affects the secondary market for its assets. If a firm's competitors have less debt, the secondary market for the firm's assets will be more liquid, which in turn decreases the cost of debt, and promotes its use by the firm.

The cost of transferring assets, by affecting the liquidity of the secondary market, also affects the intra-industry capital structure dispersion. We refer to this effect as *the asset-liquidity effect*. When firms find it very costly to transfer assets to their industry peers, the secondary market loses its relevance. Subject to identical economic conditions, firms in a given industry will optimally choose the same amount of leverage, because they do not really need to take the financial condition of their peers into account. In contrast, when the transfer of assets among peers is inexpensive, the secondary market becomes relevant, so the financial condition of industry peers needs to be factored into a firm's decisions about its own leverage. When participating in a viable secondary market, industry peers can use different amounts of leverage: Some will use leverage aggressively and sell assets when distressed, and others will use leverage more conservatively and provide liquidity when competitors are distressed.

In addition, the asset-liquidity effect suggests that differences in technologies within an industry, by hindering the liquidity of the secondary market, will *decrease* intra-industry capital structure dispersion. This negative correlation between technological dispersion and intra-industry capital structure dispersion conflicts with the positive correlation suggested by Maksimovic and Zechner's theory of the technology effect.

We translate the previous discussion into the following empirical implications:

- *Higher intra-industry capital structure dispersion will occur in industries:*
  (i) in which assets are relatively easy to transfer among their constituent firms.
  (ii) where firms use more homogenous production technologies.

2.3 Agency Effects

In an influential paper, Leibenstein (1966) argues that firms will exhibit nonmaximizing behavior when the external environment fails to exert pressure on the firms'

decision-makers (what he calls *X-inefficiency*). The reason is that low environmental pressure reduces decision-makers' effort and thereby makes the actual cost of operations larger than the minimal cost at which the firm could be run. In a related vein, the agency view of the firm (Jensen and Meckling, 1976) argues that shareholders and managers have conflicting objectives regarding firms' policies.[6] These arguments have implications regarding all firm decisions, including its capital structure choice. Furthermore, when embedded in an industry analysis, they also have implications for intra-industry capital structure dispersion.

Consider first Liebenstein's X-inefficiency arguments. Traditionally, the level of competition in an industry has been related to the level of *environmental* pressure imposed on a firm's manager.[7] In less competitive (i.e., more concentrated) industries, firms' market power (and their associated rents) isolates managers from the pressure to minimize their firms' costs, including the cost of capital. In contrast, in highly competitive industries, firms' operating and financial policies must be fine-tuned to maintain a competitive edge. This connection between the level of competition in an industry and the dispersion in firm policies has been a common theme in the empirical literature in industrial organization. Indeed, this literature has analyzed how X-inefficiency can induce widespread dispersion in firm productivity and profitability measures.[8] Here we examine whether this connection extends empirically to firms' financial decisions: Does a low level of environmental pressure translate into a widespread variation in *financial* measures (i.e., leverage) within an industry?

The agency view of the firm also generates implications regarding intra-industry capital structure dispersion. In industries without agency problems, firm value maxi-

[6]Leibenstein's original arguments do not refer explicitly to agency issues but can be related to them. In this section we consider both these arguments and their implications simultaneously.

[7]Hicks (1935) already noted that "the best of all monopoly benefits is a quiet life."

[8]See Frantz (1988) for a survey of several studies which relate X-inefficiency to widespread variation in productivity or/and profitability among firms in an industry.

mization fully determines the choice of capital structure. This reduces intra-industry dispersion by leading industry peers to cluster around value maximizing capital structures. In contrast, in industries where shareholders cannot fully solve agency problems, managers will enjoy discretion in the choice of capital structure. This discretion, in turn, causes firms' financial choices to be affected by managerial preferences and objectives that interfere with pure firm value maximization. The precise form of such interference can depend on how the agency conflict is affected by factors purely related to the manager (e.g., his age, wealth, career concerns, or risk attitude) or to his relationship with the firm (e.g., the firm corporate culture, or its organizational form). Therefore, a basic implication of intra-industry dispersion emerges: Wider managerial discretion leads to myriad financial policies by industry peers and generates a greater dispersion in capital structures.[9]

Summing up, two empirical implications emanate from the previous discussion:

- *Higher intra-industry capital structure dispersion will occur:*
  (i) in highly concentrated industries.
  (ii) in industries in which agency problems are more severe.

3 Empirical Strategy

3.1 Data Sources and Industry Grouping

We use the COMPUSTAT industrial files from 1992 to 1997 to build all but the corporate governance variables, for which we use information from ExecuComp, the Forbes 800 corporate governance survey, and proxy statements. We exclude firms from the financial sector (SIC 6000-6999) from utilities (SIC 4910-4942) and from non-

[9]We are implicitly excluding situations of extreme managerial control in which an accentuated managerial aversion to debt would make all industry peers to cluster around very low levels of leverage (and hence to reduce intra-industry dispersion). In Section 5, we consider this issue further.

classifiable establishments (SIC 9995-9999). Following Titman and Wessels (1988) and Rajan and Zingales (1995), we average the variables over three-year periods in an attempt to reduce the error-in-variables problem. We refer to the 1995-97 averaged sample as our base case period and, in section 6, use the averages for the 1992-94 period as a robustness check.[10]

Due to the nature of our inquiry, it is essential to carefully group firms into industries to ensure competitive links between the firms in each group. Indeed, the traditional method of classification based on SIC has been criticized as unsuccessful at identifying the relevant variables that separate firms into economic markets, prompting other authors to develop alternative methods for grouping firms into industries.[11] We consider two alternative grouping methods. First, as in Andrade and Kaplan (1998), we employ the industry classification presented in the Value Line Investment Survey (i.e., VL). Value Line analysts evaluate each industry and publish a comprehensive industry grouping along with their analysis and data for the firms considered in each industry. We use the VL classification from their 1992-97 reports, after dropping industries in the financial sector and utilities. For the 1995-97 base case period, the initial VL classification consists of 74 industries comprised of 1,252 firms. Lack of data for some proxies, the inability to match with the data in corporate governance, and the exclusion of outliers reduced the working sample to 64 industries comprised of 930 firms.[12]

Second, we develop our own industry classification (i.e., OG).[13] We start with the

[10]We use the files from 1989-91 to compute some lagged variables (i.e., dispersion in past profitability, and corporate governance proxies) employed in the regressions for the 1992-94 sample.

[11]Clarke (1989) shows that the SIC system is not helpful to identify firms that display similar sales, profit rates or stock price changes. Kahle and Walking (1996) question the consistency of the SIC codes as reported by the COMPUSTAT and CRSP databases.

[12]We excluded outliers at the firm level following the Hadi (1992, 1994) method. Outliers reduced the sample form 956 to 930 firms. For the 1992-94 period we end up with 892 firms grouped in 66 industries.

[13]Other studies that develop their own industry classifications are Fama and French (1997), La-

aforementioned VL classification and modify it using several sources of public information about the firms that include industry trade publications and SEC filings.[14] Based on a careful revision, we keep 44 of the 74 VL industry categories (although we change some of the companies' classifications), redefine 11 industries, split 5 industries into 14, and eliminate 14 industries. In sum, we transform the VL classification into one with 69 industries with 820 firms. Missing data, the inability to match with the corporate governance data, and the exclusion of outliers further reduce the sample to 61 industries, with 697 firms in the 1995-97 period and 657 firms in the 1992-94 period. In section 3.4 below, we discuss explicitly the issue of firms in multiple industries (i.e., conglomerates) and in the appendix we describe in detail the adjustments made to transform the VL classification into the OG grouping.

3.2 Intra-Industry Capital Structure Dispersion Measures

We use leverage ratios as the main descriptive measure of a firm's capital structure. We define them as $\frac{BVD}{BVD+MVE}$, where BVD is the book value of firm debt and MVE is the market value of the firm equity. In section 6, we build leverage ratios using the book value of equity instead and also consider bond ratings as alternative measure of a firm's capital structure.

We then compute the cross-sectional standard deviation of the leverage ratios of the *six largest firms* in each industry (by volumes of sales) and use it as the main measure of intra-industry capital structure dispersion ($SD[Lev]$). We focus on the largest firms in each industry in order to increase the power of the tests to detect competition effects, which are more likely to manifest themselves in the largest firms

mont (1997), and Scharfstein (1998).

[14]We also examine industry almanacs, yearbooks, directories, handbooks, manuals, periodicals, and newsletters. In the Appendix we provide detailed information about the sources employed in the grouping procedure.

of an industry. In section 6 we check the robustness of our findings by considering alternative measures of dispersion–among them a measure built using all the firms in each industry group.

3.3 Industry Proxies

The right-hand side in our main regressions consists of proxies for industry characteristics. We include two kinds of industry proxies: (1) proxies that relate to the theoretical effects in terms of intra-industry capital structure dispersion as discussed in section 2, and (2) proxies that capture basic industry characteristics, which, although unrelated to the specific hypothesis of interest, are included as controls.

In contrast to how we build the intra-industry capital structure dispersion measures, we construct the industry proxies using information from *all* the firms in each industry group, not from only the six largest firms in order to measure industry characteristics more accurately. In section 6, we check the robustness of our results to other ways of constructing the industry variables (e.g., using only information about the industry largest six firms) and of constructing the left-hand side variable (e.g., using capital structure information from all the firms in the industry, and not only from the six-largest firms).

3.3.1 Proxies Suggested by Theoretical Effects

We consider three sets of proxies that relate to the theoretical implications discussed in section 2: (*i*) proxies for technological differences, (*ii*) a proxy for the cost of asset sales, (*iii*) agency proxies, both for "environmental pressure" on the firm (e.g., industry concentration), and for corporate governance practices within an industry. A brief discussion of each set of proxies follows.

(i) **Technological Differences**

The technology effect predicts that technological dispersion will be positively correlated with intra-industry capital structure dispersion, while the asset-liquidity effect predicts the opposite. Although these conflicting predictions can obscure the empirical impact of proxies related to technological differences, their sign, however, can allow us to discern which of the two effects has more empirical relevance. We measure technological differences in two ways—directly, through the variability of inputs, and indirectly, through the level of product uniqueness for the firms in an industry

(a) Input Variability

We first consider proxies that account for differences on the production functions (i.e., the mix of inputs) of firms within an industry. In our leading specifications, we use the coefficient of variation of the sales per employee ($CV(Sales/Emp)$)–a measure of the variability of the labor versus capital intensity across firms. Focusing on the coefficient of variation normalizes the standard deviation and helps avoid size effects that could distort the results. In section 6, we alternatively use $SD(PPE/TA)$–the standard deviation of the ratio of fixed assets (i.e., plant, property, and equipment) over total assets–which is a measure of the variability of fixed assets over total assets across firms.

(b) Product Uniqueness

We consider a proxy to measure technological differences based on the level of product uniqueness on firms in an industry. A high degree of product uniqueness in an industry is likely to be associated with the existence of differentiated technologies across firms and, consequently, with a high cost of transferring productive assets among firms.[15]

[15]However, product uniqueness can also be proxing for the cost of financial distress. While the cost of financial distress has no apparent implications of intra-industry dispersion on capital structure, it certainly has implications on the *level* of leverage that can be supported by the firms in an industry.

Following Titman and Wessels (1988), we use the industry average of selling expenses over sales ($SellExp/Sales$)–or, alternately, the industry average of research and development expenses over sales ($R\&D/Sales$)–to measure product uniqueness.

A positive relationship between $SellExp/Sales$ and capital structure dispersion would be consistent with the technology effect, and a negative one would be consistent with the asset-liquidity effect. Once again, the sign of a regressor will help us to assess the relative empirical relevance of these two theoretical effects.

(ii) **Cost of Asset Sales**

The asset-liquidity effect predicts high intra-industry capital structure dispersion when productive assets are easily transferable among industry peers. In order to capture this implication, we use a measure that is inversely related to the cost of transferring assets among firms—the ratio of leased assets over total fixed assets ($Leasing/FA$). We interpret high values of this ratio as representative of industries where assets are easily transferable among firms.[16] Leasing, a form of secured lending, gives creditors the right to repossess assets after default. Thus, a high use of leasing suggests a high value of the right to repossess, and, consequently, a low cost of transferring assets among firms. This leads us to interpret a positive sign in this variable as evidence consistent with the asset-liquidity effect.[17]

In section 6, we alternately use another measure to capture differences in the feasibility of transferring assets within an industry: The industry average sales of

Titman and Wessels (1988) document that firms with unique products have lower leverage ratios. In section 5, we discuss the implications of this alternative interpretation.

[16]Arguably, other reasons can be explaining the use of leasing in an industry (i.e., taxes). In section 6, we examine this issue explicitly.

[17]However, if intra-industry leverage dispersion is positively correlated with the industry average leverage, then leasing, as a component of leverage, may also feature positive correlation with dispersion. See section 5 for an explicit examination of this alternative interpretation and, more generally, for an analysis of the relationship between the level and the intra-industry dispersion of leverage.

plant, property, and equipment scaled by the total assets of the firms in the industry ($PPEsales/TA$). Although a positive association between $PPEsales/TA$ and intra-industry capital structure could be subject to different interpretations,[18] we will interpret high values of $PPEsales/TA$ as a reflection of a low cost of transferring assets and a positive sign for this regressor as supporting evidence for the asset-liquidity effect.

(*iii*) **Agency Effect Proxies**

(a) Industry Concentration

The agency effect predicts that environmental pressure affects intra-industry capital structure dispersion. As explained in section 2, this suggests linking industry concentration, a measure of the degree of competition in an industry, to intra-industry capital structure dispersion. We use the Herfindahl index (*Herf-index*), the sum of the squared values of firms' market shares, as the main measure of industry concentration. We will interpret a positive sign of the coefficient of *Herf-index* as evidence consistent with the agency effect.

(b) Corporate Governance Proxies

As argued above, the agency effect suggests that the intra-industry capital structure dispersion increases with the severity of the agency problem of the firms within the industry. An extensive literature in corporate governance (e.g. Shleifer and Vishny, 1997) has proposed several governance mechanisms to ameliorate such agency conflicts. We consider proxies related to two of those mechanisms–incentive compensation and composition of the board of directors–and, in addition, we use a measure of the tenure of the CEO in a firm as a measure of CEO entrenchment.

[18] For example, if some firms in the industry suffer a negative shock in their economic fundamentals, we would observe simultaneously a worsening in their financial conditions and an increase in their assets sales, which together could generate a positive correlation between industry asset sales and industry financial dispersion.

We interpret a less intense use of a corrective mechanism, or a larger CEO tenure, as evidence of a strong *residual* agency problem. This interpretation assumes that governance variables proxy for unobservable industry characteristics that make the agency conflict stronger in some industries than in others. However, this interpretation is not free of problems. Governance variables are endogenous and could be alternatively interpreted as positively related to the intensity of the *original* agency problem. Under this interpretation, it is unclear whether tighter governance represents higher managerial pressure *in equilibrium*.[19]

We use the ExecuComp database to gather information about the structure of CEO compensation (the percentage of stock-based compensation over total compensation, $VarComp$), in addition to using the Forbes 800 surveys and proxy statements to get information both on the length of the CEO tenure (the inverse of the number of years of the CEO in the firm to facilitate the interpretation, $CEOten^{-1}$), and on the composition of the board (percentage of outsiders over total members of the board, $BoOut$). We average lagged information (i.e., period 1992-94) across firms in the industry to build these corporate governance proxies.[20]

Table A summarizes the expected relationship between the proposed proxies and

[19]See Hermalin and Weisbach (2000) for a discussion of the difficulties on the interpretation of corporate governance variables in previous empirical work.

[20]We selected this delayed period to ameliorate the endogeneity problems in corporate governance variables. We also use a delayed period, 1989-91, for the analysis of the 1992-94 period. The results were also checked for robustness using current, i.e., not lagged, information.

the theoretical effects.

Table A
Predicted Correlations with Intra-Industry Capital Structure Dispersion

	$CV(Sales/Emp)$	$SellExp/Sales$	$Leasing/FA$	$Herf\text{-}index$	$Governance$
Technological Effect	$(+)$	$(+)$			
Asset-Liquidity Effect	$(-)$	$(-)$	$(+)$		
Agency Effect				$(+)$	$(-)$

3.3.2 Control Variables

In addition, our regressions control for the following factors: (i) intra-industry dispersion in firms' past profitability, (ii) industry risk, (iii) industry growth opportunities, and (iv) average size of the firms in the industry.

(i) Dispersion in Past Profitability

It has been previously documented (e.g., Titman and Wessels, 1988) that a firm's past profitability is negatively associated to its current leverage, what makes us expect that differences in intra-industry dispersion in firms' past profitability induce greater intra-industry capital structure dispersion. To account for this effect, we include the dispersion in past profitability as a control in the regressions. Following Titman and Wessels (1988), we calculate past profitability as the ratio of operating income over total assets averaged over the three previous years. We then compute the standard deviation of such ratios to get our proxy of intra-industry dispersion in past profitability ($SD(OI/TA)_{t-1}$). We use 1992-94 for the 1995-97 sample period, and 1989-1991 for the 1992-94 sample period. Furthermore, in section 6, we consider other measures profitability dispersion (including contemporaneous intra-industry profitability dispersion).

(*ii*) **Risk controls**

In risky industries, firms are exposed to frequent and sizable economic shocks. This exposure may lead firms to frequent and careful fine-tuning of their finances, what, eventually, can translate into a lower intra-industry capital structure dispersion.[21]

We utilize two different measures of industry risk. First, we average the coefficients of variation of the firms' cash flows ($CV(CF)$).[22] Specifically, for each firm, we compute the time-series standard deviation of its twelve quarterly cash flows in the 3-year sample period and then divide it by its time-series average to obtain its coefficient of variation. We then average such coefficients of variation across the firms in the industry. (In section 6, we check the robustness of this measure by using the average of the time-series standard deviation of stock returns across firms in the industry at a monthly frequency, $SD(Ret)$.) Second, we control for effects on intra-industry dispersion that are related to the systematic risk of the firms in an industry. This systematic risk can be interpreted as related to the cyclicality of the industry prospects.[23] We measure systematic risk by calculating the beta of a firm's assets (β_A) and averaging them across the firms in the industry. In order to obtain such betas, we use the firms' equity betas as provided by COMPUSTAT, and unlever the equity betas in the usual way.[24]

[21]However, this implication is sensible to the presence of convex adjustments costs. For instance, by developing a dynamic model of capital structure with adjustment costs, Fischer, Heinkel and Zechner (1989) show that firms with highly volatile assets that must incur large costs of financial adjustment feature a broader range of leverage values, in which they do not recapitalize.

[22]Quarterly operating cash flows are calculated as: Income before extraordinary items (which represents the income of a company after all expenses except provisions for common and/or preferred dividends) plus Depreciation and Amortization.

[23]Firms in highly cyclical industries may have a larger cost of separation from the optimal level of leverage. This cost is due to the tendency toward *positive* correlated shocks in such industries.

[24]The equity beta is calculated for a 5-year (60-month) time period, using month-end closing prices (adjusted by dividends and stock splits) for the stock, and S&P 500 index monthly data for the market. To unlever the equity beta, we exclude firms with more than 60% of Debt/Equity and assume a zero beta for the debt of the remaining firms in the industry. We then used the usual expression $\beta_A = \frac{\beta_E}{[1+(1-T_C)\frac{D}{E}]}$ computing the firm tax rate, T_C, as: [total income taxes]/[pre-tax

(*iii*) **Growth Opportunities**

We control for differences in growth opportunities across industries as well. Growth opportunities can affect intra-industry capital structure dispersion for various reasons. First, growth opportunities are likely to be associated with larger asymmetries of information between firm insiders and markets, what can increase firms' recapitalization costs and eventually translate into a high intra-industry dispersion in capital structures. Second, if growth opportunities are not evenly shared by the firms within an industry, then both a wide range of firm equity values and, as a result, a high intra-industry capital structure dispersion can appear. For these reasons, we expect a positive relationship between intra-industry capital structure dispersion and *both* the *level* of growth opportunities in the industry and the *dispersion* of such opportunities among firms in the industry.

In order to measure growth opportunities, we follow Titman and Wessels (1988) and use the ratio of a firm's capital expenditures over total assets (Inv/TA) as a measure of growth opportunities for the firm and then average them across the firms in the industry to obtain the industry measure. In section 6, we report on the use of alternative measures of growth opportunities as controls, including measures of dispersion of growth opportunities.

(**iv**) **Size**

Size effects–that large and small companies show very different behavior in the data–are among the most pervasive facts in corporate finance.[25] We include size controls to ensure that intra-industry capital structure dispersion is not an artifact of the differences in size among firms across industries. We use the industry average of

income].

[25]For instance, Rajan and Zingales (1995) find a positive relationship between size and market value of leverage. Titman and Wessels (1988) find that small firms use more short term debt.

the logarithms of the firms' asset values ($\log(Assets)$) as the size control in the base specification.[26] In section 6 we consider the dispersion in firm size within industries ($SD[\log(Assets)]$) as an alternative size control.

3.4 The Conglomerate Issue

A difficult issue for any study in which the allocation of firms into industries is central is the treatment of firms that operate in multiple industries, i.e., conglomerates. Prior literature has not offered a unified treatment of the issue. For instance, Maksimovic and Phillips (2001) differentiate stand-alone from conglomerates by looking at the percentage of production in a given 3-digit SIC, and others like Lamont (1997) or Scharfstein (1997) have found the use of SIC questionable and have preferred to simply exercise their best judgement in classifying conglomerates. We ourselves consider two alternative approaches. First, we simply use the VL classification directly as offered by the Value Line analysts. There each firm is included in a unique industry according to their competitive links without making any other adjustment for conglomeration. Second, we take the OG classification–our own refinement of the VL grouping–and make additional adjustments for conglomerates, which we describe next.[27]

The adjustments made for the presence of conglomerates in our sample go as follows. First, for all the 697 (657) firms in the sample period 1995-97 (1992-94), we use information from COMPUSTAT segment files to determine the ones that operate in more than one 4-digit SIC, and classify as stand-alone any firm with 85% or more of their sales in a unique 4-digit SIC. This leaves us with 195 (202) potential

[26] Alternately, in Section 6 we report on the use of $\log^2(Assets)$ as a size control. In addition, we consider $\log(Sales)$ (not reported) and find no material differences in the results.

[27] In addition to these two polar approaches, we present the results of our study (see section 6.5 below) for industries in which, arguably, the problem of conglomeration is either absent or highly ameliorated–the firms in such industries present few segments or, as described below, such segments are highly integrated. See also section 6.3 for a differential treatment of conglomerates when the SIC are use to group firms.

conglomerates in the 1995-97 (1992-94) sample. Second, from these 195 (202) candidates, we consider as a non-conglomerate any firm which, although operating in two or more 4-digit SIC, fulfills the following two requirements: (a) it shows clear economic connection among all its segments, and (b) it belongs to an industry in which all the other competitors are comprised of similar, comparable segments. Firms in 22 industries fulfill these requirements.[28] These criteria leave us with 75 (77) conglomerates candidates in the 1995-97 (1992-94) sample period. Third, we then focus on multiple-segment firms that are included in industries where some of its members lack comparable additional segments. For these firms, we make no additional adjustments if (a) their segments show a clear economic relationship with the firm's main 4-digit SIC and (b) no other alternative industry group was available for the segment to be relocated.[29] Fourth, we adjust using COMPUSTAT segment data the remaining fourteen (sixteen) conglomerates in the 1995-97 (1992-94) sample period. The adjustment consists in (a) recalculating firm variables by taking into account information only referred to the segments connected to the industry in which the firm is included[30] and (b) reallocating unrelated segments to a second industry. Such reallocation only occurs when the sales of the segment represents at least 5% of the total sales of the six biggest competitors in another industry. We adjust 14 (16) conglomerates affecting 19 (18) industries in the 1995-97 (1992-94) period. Finally, we check for firms that–due to lack of enough competitors in the original grouping–were outside of the

[28]These industries are: Aluminum, Auto & Truck, Cement & Aggregates, Chemical, Copper-Nickel & Zinc Mining, Food Processing, Gold & Silver Mining, Homebuilding, Machinery (Construction), Newspaper, Packaging and Containers, Paper & Forest Products, Photographic Equip. & Supply, Publishing, Steel, Telecommunication Services, TV Broadcasting, and five oil-related industries.

[29]Examples of such segments are: "marketing operations," "other operations," and "corporate." We also include in this case, associated-segments in the retail industries.

[30]COMPUSTAT segment file only offers segment data on Sales, Identifiable Assets, Operating Profits, Depreciation, and Capital Expenditures. With the Sales segment data we adjust the market shares of firms in 19 (18) industries in the 1995-97 (1992-94) sample, what affected the measure of *Herf-index*. For the same industries we additionally adjust four of the controls in the regressions, $SD(OI/TA)_{t-1}$, Inv/TA, $\log(Assets)$, and β_A.

initial sample. We identify as such General Electric and Philip Morris in the 1995-97 sample, and General Electric in the 1992-94 sample.[31] We include the segments of these firms in the corresponding industries to recalculate the industry proxies with them.[32]

4 Results

4.1 Univariate Analysis

We begin by describing several statistical patterns in our variables of interest. In Table 1, we present descriptive statistics on $SD(Lev)$, the main measure of intra-industry capital structure dispersion, and on the main regressors. Furthermore, in Figure 1 we present a histogram on the distribution of $SD(Lev)$ with OG grouping. The $SD(Lev)$ distribution is centered around 11%, with a minimum of 2% and a maximum of 39.6%.[33] Examples of industries with low leverage dispersion are Healthcare Information Systems ($SD(Lev) = 2.0\%$), Food Processing (2.4%), Semiconductor Equipment (2.9%), Petroleum Drilling Services (3.6%), Computer Software (4.0%), and Drug Producers (4.6%). High dispersion industries are Retail Building Supply (39.6%), Retail Auto-parts (24.2%), Trucking/Transport (24.2%), Food Wholesalers (23.9%), Drugstores (21.6%), and Restaurants (21%).

Cross-sectional differences in intra-industry financial dispersion are also apparent

[31] In 1992-94 Philip Morris was included in the tobacco group which was absent in the 1995-97 sample due to lack of competitors in the sample.

[32] The inclusion of the segment did not affect the computation of the main dependent variable in the regression, $SD(Lev)$.

[33] The regressions use the $\log[SD(Lev)]$ as the dependent variable. However, we report the univariate results on $SD(Lev)$ to facilitate the interpretation. $SD(Lev)$, the standard deviation among leverage ratios, is constrained between 0 and 1 and therefore has, by construction, a minimum of 0 (no dispersion) and a maximum of 0.5 which occurs when half of the firms in the industry have no leverage and half only have debt in their capital structures. In section 6 we examine if this limited range is induced some undesirable on the regression results.

from the dispersion in debt ratings.[34] Using information from the 55 OG industries with available information on bond ratings, we find 5 industries with *low* rating dispersion (the six largest firms in the industry which have bond ratings clustered in only one notch), 34 industries with *medium* dispersion (firms belonging to two different notches), and 16 industries with *high* dispersion (firms in three or more notches).[35]

In Table 2, we present the univariate correlations between $SD(Lev)$, and industry characteristics.[36] In the OG grouping, $Leasing/FA$ and *Herf-index* show positive and significant correlations, while two other proxies, $CV(Sales/Emp)$ and $SellExp/Sales$, show no statistically significant correlations. (Notice, however, that $SellExp/Sales$ is marginally significant in VL.) Further, from the corporate governance variables, $VarComp$ shows a negative and significant correlation in both groupings; $CEOten^{-1}$ is also negative but only significant in OG, and $BoOut$ is not significant in any classification. Finally, risk controls (β_A both in OG and VL, and $CV(CF)$ only in OG) show negative significant correlations. The rest of the controls fail to show any significant univariate correlation.

4.2 Regression Analysis

The overall conclusion suggested by Table 2 is that intra-industry dispersion varies significantly in correlation with some of the industry characteristics. Without control for correlation across characteristics, a univariate analysis is solely suggestive and cannot ensure whether the differences are related to the proxies of interest or other factors. We present a regression analysis to examine whether these results can be

[34] We describe in subsection 6.1.2 how we compile information about firm bond ratings.

[35] A rating notch consolidates minuses and pluses in bond ratings. For instance, the AA rating category constitutes a notch and would include AA+ and AA-.

[36] We also provide in Table 3 the matrix of correlations among regressors.

supported when we control for correlations across characteristics.

4.2.1 Base Case

As our main specification, we regress the $log[SD(Lev)]$ on seven regressors that proxy for the theoretical effects—$BoOut$, $CEOten^{-1}$, $VarComp$, $CV(Sales/Emp)$, $Leasing/FA$, *Herf-index*, $SellExp/Sales$—and to five controls—$SD(OI/TA)_{t-1}$, $CV(CF)$, β_A, Inv/TA, and, $Log(Assets)$. We run OLS regressions, using White's (1980) heteroskedasticity-consistent standard errors.[37]

Table 4 presents the results, first for the VL grouping and then for the OG grouping—neither of which we adjust for conglomerates—and finally for the final OG grouping, where we make that adjustment.[38] Notice that, with very few exceptions, the three regressions present very similar results. All regressors have the same signs and show similar levels of significance.

In the first, third and fifth columns in Table 4, we present regressions excluding governance regressors, i.e., $BoOut$, $CEOten^{-1}$, and, $VarComp$; in the second, fourth and sixth columns, we include such regressors. Without governance regressors, three of the four theoretical effects proxies–*Herf-index*, $Leasing/TA$, and $SellExp/Sales$–emerge as significant, while the fourth, $CV(Sales/Emp)$, does not. Also, risk controls tend to be negatively related to dispersion, and so is the proxy for growth opportunities.[39] The inclusion of governance regressors does not affect the sign of

[37] We also regressed $SD(Lev)$ (without logs) and found that the signs and significance of the coefficients (non-reported) are virtually identical. See section 6 for other issues on specification robustness.

[38] As described in section 3.4 the main differences between the OG grouping without adjusting for conglomerates and the final OG one consist of reallocation of some segments and the effect of such reallocation on some industry proxies, i.e., Herf-*index*, $SD(OI/TA)_{t-1}$, β_A, Inv/TA, and, $Log(Assets)$.

[39] We use the VL and the final OG grouping for all the regressions in this and further sections. Regressions with OG unadjusted for conglomerates present no substantial differences with the regressions using the OG final grouping and are available from the authors upon request.

any other regressor, maintains the significance of the proxies related to theoretical effects, and improves substantially the fit of the regression (R^2 increases by about 30% in all groupings). An F-test on the joint significance of the governance regressors easily rejects the hypothesis that, jointly, they have no influence on intra-industry capital structure dispersion. Finally, among governance regressors, $VarComp$, the percentage of CEO variable compensation, shows a negative and significant coefficient and emerges as the most significant governance variable. $CEOten^{-1}$ is significant only in the OG groupings, while $BoOut$ lacks significance in all regressions.

In sum, the regressions in Table 4 document the following cross-sectional patterns in intra-industry leverage dispersion. Greater dispersion occurs in industries (i) that are more concentrated, (ii) with looser tight governance practices, (iii) in which leasing is an important financial vehicle, (iv) in which firms produce less unique products, (v) that are less risky, and (vi) with fewer growth opportunities.

4.2.2 Interpretation of the Results

We start by considering the economic significance of the estimates in Table 4. For instance, in the OG regression with governance variables, the coefficient on *Herf-index* is 1.461. An increase of one standard deviation in such coefficient (i.e., .117) is associated with an increase of 19% in $SD(Lev)$ (i.e., a change of .33 standard deviations of $SD(Lev)$).[40] As a consequence of such change, an industry at the median level of the capital structure dispersion (0.103) would shift to percentile 57% (i.e., 0.122). We similarly can interpret the impact of changes in other proxies. One standard deviation increase in $VarComp$, $Leasing/FA$, or $SellExp/Sales$ is associated with a change in the $SD(Lev)$ of -18% ($-.31$ change in standard deviation), 13% (.22), or -18% ($-.32$), respectively. The size of these numerical relationships suggests a

[40] As in the univariate case, we find it more natural to interpret our results in terms of $SD(Lev)$ rather than on $log[SD(Lev)]$.

significant economic association among the regressors and the intra-industry leverage dispersion.

Next, we examine the empirical findings in light of the predictions of the theoretical effects described in section 2. The evidence fails to support the main implication of the technology effect–that technological dispersion in an industry should be positively correlated with intra-industry leverage dispersion. Indeed, we find no such effect of $CV(Sales/Emp)$, which appears non-significant, and find that $SellExp/Sales$, the other proxy positively related to technological heterogeneity, is negative and significant, opposite to the predictions of the technology effect.

In contrast, the evidence appears consistent with the implications of the asset-liquidity effect. On the one hand, the use of leasing (an indirect measure of the cost of transferring assets among firms) is positively correlated with intra-industry leverage dispersion. On the other hand, the negative sign on $SellExp/Sales$ can also be interpreted according to its logic: High intra-industry technological heterogeneity limits the transferability of assets among industry peers, which induces firms in an industry toward similar levels of leverage. Finally, the results vindicate the presence of agency effects in capital structure. The positive sign on *Herf-index* and the negative ones on governance variables (especially on $VarComp$) are strongly consistent with agency effects: In more competitive industries, and in industries in which managers are subject to tighter controls, managers choose similar levels of leverage, which result in low intra-industry dispersion in capital structures.

5 Leverage, Leverage Dispersion, and Interaction Terms

In this section, we modify the specification in section 4 in order to examine two issues that can affect the interpretation of the findings above. First, we include the

average industry leverage as an additional control. Second, we consider interaction terms among proxies in an attempt to sharpen further the implications of the findings documented in Table 4.

5.1 Level of Leverage and Leverage Dispersion

Among the industry proxies to explain $SD(Lev)$, we did not include the average leverage in the industry (i.e., Lev). While the discussion in section 3 offered no specific reason for such inclusion, it can be argued that the first moment of a probability distribution may constitute a "natural" control when explaining the second moment of such distribution. Furthermore, in the case of leverage, the strong sample correlation between the industry average and the intra-industry standard deviation (.57 in OG, .64 in VL) raises a question on the significance of the effects identified in Table 4: Are these effects truly related to the intra-industry *dispersion* of leverage, or are they related instead to the industry *level* of leverage?

Before addressing this question, we must point out a number of caveats raised by the inclusion of Lev in intra-industry dispersion regressions. First, the way in which $SD(Lev)$ is constructed can create a mechanical relationship with Lev.[41] Second, Lev may proxy for other effects, already proxied by other regressors, which creates a multicollinearity problem that hampers the interpretation of the regressions. In particular, Lev includes leasing, is inversely related to the cost of financial distress, and is directly related to tight corporate governance practices. Third, the endogeneity of Lev makes its inclusion as an explanatory variable problematic. Fourth, it is not clear that including leverage facilitates the interpretation of the results. We are documenting the effect of industry characteristics on intra-industry leverage dispersion,

[41] A tendency toward lower dispersion may occur when an industry shows very low or very high levels of leverage. In section 6, we consider alternative measures of intra-industry capital structure dispersion that, among other things, expressly address this issue.

even if they contribute to such dispersion *through* its effect on the level of leverage.

Previous caveats notwithstanding, we present results that include Lev in the basic regressions. By looking at Panel A of Table 5, we extract four conclusions.[42] First, Lev shows a positive sign and emerges as a very significant regressor in both regressions: High leverage industries are those featuring more dispersion. Second, the fit of the regression improves considerably in the OG regression (from .54 to .61) and very substantially in the VL regression (from .46 to .72). Third, all the proxies that were significant in the base specification keep their signs and (with two exceptions) remain significant. In particular, proxies related to agency effects, i.e., $CEOten^{-1}$, $VarComp$, and *Herf-index*, and the one related to the asset-liquidity effect, i.e., $Leasing/FA$, remains significant. Such significance reinforces the message of Table 4, that liquidity provision and agency effects are associated with intra-industry capital structure dispersion. Fourth, the two exceptions are (i) $SellExp/Sales$ which becomes marginally insignificant in OG, and totally insignificant in VL, and (ii) β_A, which becomes insignificant in both regressions.[43]

We also run regressions (not reported) of Lev as a dependent variable (built as the industry average of the leverage of the largest six firms) on the proxies used in Table 4 for both OG and VL groupings. These regressions show the expected effects of such regressors on leverage: a negative sign on $SellExp/Sales$, a positive on $\log(Assets)$, and a negative both on $CV(CF)$ and β_A. Furthermore, these regressions also show no effect of Herf-*index* and a negative sign of $VarComp$. The lack of significance for Herf-*index* demonstrate that agency effects can impact an industry's dispersion of

[42] To be consistent with the construction of the other proxies, Lev is built as the average leverage ratio of *all the firms* in the industry. Running a regression by building Lev, using information from only the largest six firms in each industry (not reported) yields very similar results.

[43] This loss of significance may be due to multicollinearity: Lev and $SellExp/Sales$ (and to some extent β_A) may be proxing for the cost of financial distress in an industry, which makes their effects impossible to separate in the data. As shown in Table 3, the univariate correlations between Lev and $SellExp/Sales$, and Lev and β_A are in OG (VL) $-.52$ ($-.56$) and $-.55$ ($-.54$), respectively.

leverage without affecting its level of leverage. Finally, the negative sign of $VarComp$ contrasts with the findings by Berger, Ofek, and Yermack (1997), who show that a firm tends to feature lower leverage when its managers receive a lower proportion of their pay via variable compensation.

5.2 Interaction Terms

The findings in Table 4 suggest that agency effects, as measured by corporate governance variables and by industry concentration, influence intra-industry capital structure dispersion: When agency effects are stronger, so is the intra-industry dispersion in leverage ratios. In addition, we find that proxies potentially related to the cost of financial distress ($SellExp/Sales$ in Table 4 or, Lev in Panel A of Table 5) are related to intra-industry capital structure dispersion.

These two findings beg the question of whether the intensity of the agency effects can be related to the intensity of the effects of financial distress costs, or whether they are independent effects. A sensible hypothesis is that the managerial leeway on capital structure choices will manifest itself more strongly in industries in which such leeway is potentially less harmful for the firm value (i.e., industries in which the financial distress costs are low). In order to examine this hypothesis, we modify the specification used in section 4 with the introduction of interaction terms. Such terms are built by combining proxies that measure agency effects, i.e., *Herf-index* and $VarComp$, with the proxy that can be associated to financial distress costs, i.e., $SellExp/Sales$.

In Panel B of Table 5, we present four regressions that consider these interaction effects. In the first column of Panel B, we include $Herf{\times}SellExp$, the product of *Herf-index* and $SellExp/Sales$ in the specification of Table 4. In the second column of Panel B, in addition to $Herf{\times}SellExp$, we control for Lev, the average industry

level of leverage. In the third column of Panel B, we include $VarComp \times SellExp$, which considers the ratio of variable compensation over total compensation to build the interaction term, while in the last column, we additionally control for the level of leverage, Lev.[44]

Three conclusions emerge from the Panel B regressions. First, *Herf-index* remains robust to the introduction of either interaction term. In contrast, $VarComp$ loses its significance if its own interaction term is included, and $SellExp/Sales$ loses its significance in all cases. Second, the first two regressions offer suggestive evidence for the hypothesis that low financial distress costs accentuate agency effects on dispersion. Consistent with this hypothesis, a negative sign for $Herf \times SellExp$ emerges, although its coefficient is statistically significant only in the first regression. Third, the last two regressions fail to show confirmatory evidence: None of the interaction terms (i.e., the coefficient of $VarComp \times SellExp$) show any significance.

Overall, the analysis fails to reject the independence between the effects of agency proxies and those of financial distress proxies on intra-industry capital structure dispersion. Although perhaps due to the strong colinearity present in the data, we proceed conservatively and leave untouched our main specification in this study, i.e., the base specification of section 4.

6 Robustness Checks

In this section we present a number of robustness checks over the base case in section 4. We consider (*i*) alternative measures of capital structure dispersion (Tables 6 and 7), (*ii*) alternative proxies for the industry variables (Table 8), (*iii*) an alternative industry grouping (Table 9), (*iv*) a different sample period (Table 10), and (*v*) different

[44]Building interaction terms with alternative corporate governance proxies produces similar results (not reported).

procedures of building the sample (Tables 11 and 12).

6.1 Alternative Measures of Intra-Industry Capital Structure Dispersion

In Table 4, we used the logarithm of the standard deviation of the leverage ratios of the six largest firms in each industry as the measure of intra-industry capital structure dispersion. We now consider alternative measures of intra-industry capital structure dispersion. First, we estimate a *conditional* heteroskedasticity model that explains the intra-industry dispersion on leverage ratios while controlling for determinants of the leverage ratios.[45] Roughly, one can think of this measure as consisting of the residuals of the regression of the firm leverage level on its determinants, and of this model as one that explains the dispersion of these residuals. Second, we run regressions using the dispersion of firm bond ratings rather than the dispersion of firm leverage ratios. Third, we consider regressions with alternative measures of leverage (i.e., the ratio of debt over equity instead of debt over total value).

6.1.1 A Conditional Model of Intra-Industry Capital Structure Dispersion

We consider the following model of conditional heteroskedasticity:

$$y_i = \mathbf{x}_i'\beta + u_i$$

$$u_i \sim N(0, \exp(\mathbf{z}_i'\alpha)).$$

In this model, y_i represents the firm's leverage, $\mathbf{z}_i'$ represents the regressors that measure industry characteristics, and $\mathbf{x}_i'$ represents the determinants of firm leverage (including industry dummies).[46] Following Rajan and Zingales (1995), we include in $\mathbf{x}_i'$: $FixedAssets/TA$ (proxy for tangible assets), $CapExp/TA$ (proxy for growth

[45] The model is run to explain the dispersion of *all* the firms in each industry and not only for the largest six firms as in the base case. See subsection 6.5 for further discussion on this issue.

[46] We also exclude industry dummies (not reported) and found very similar results.

opportunities),[47] $Log[Assets]$ (proxy for size), and $EBITDA/TA$ (proxy for profitability). As suggested in Harvey (1976) we estimate model the previous model by maximum likelihood.[48]

Table 6 presents the results of the conditional heteroskedasticity model. The results are very similar to those obtained in the base case (Table 4). With the exception of $Leasing/FA$ in VL, which keeps its sign but loses some significance, the rest of the proxies that were significant in the base case maintain their signs and significance. In addition, $BoOut$ now shows a negative and significant coefficient in OG. Furthermore, the control proxies feature signs and significance also very similar to those in the base case. In addition, past profitability dispersion, $(SD(OI/TA)_{t-1})$ shows a positive significant sign in OG.

The similarity of the results obtained with conditional measures of leverage is remarkable, and constitutes a validation of the findings in Table 4. Conditional and unconditional measures of leverage are conceptually very different, so we find the fact that conditional dispersion is explained by the very same factors as unconditional dispersion an interesting finding in itself.

6.1.2 Other Measures of Intra-Industry Capital Structure Dispersion

We next consider measures of intra-industry capital structure dispersion based on firms' debt ratings as a measure of their financial situation. Classification agencies produce issuer debt-ratings after considering public and private firm information and

[47] Rajan and Zingales (1995) use the ratio of market value to book value, i.e. $\frac{MV}{BV} = \frac{BVD+MVE}{BVD+BVE}$ as a growth opportunity proxy. In contrast, as in Titman and Wessels (1988), we use $CapExp/TA$, in order to avoid a spurious relationship with our dependent variable (that is the market value leverage, i.e., $\frac{BVD}{BVD+MVE}$). We also run regressions using MV/BV (not reported) and obtained very similar results.

[48] The estimation can be also made by FGLS through a two-step procedure. (See Amemiya, 1985 pp. 203-207, or Greene, 1997, pp. 558-562.) The results (not reported) are very similar to those in Table 6.

their subjective assessments about the firm's creditworthiness. We use the Standard & Poor's firm debt ratings as reported by COMPUSTAT.[49]

We build several measures of industry rating dispersion. First, we measure the standard deviation of the values obtained according to the numerical scale given by COMPUSTAT to the rating categories. Although a bit arbitrary, this measure seems a simple yet reasonable way to capture differences in capital structure dispersion across industries. We compute this measure both for senior ratings and for subordinated ones.

Second, we use an ordinal rating dispersion measure built as follows. We assign a *1* if an industry has all their big-6 firms within a single category or rating notch. We assign a *2* if the industry includes two adjacent rating categories, and a *3* if an industry has either three adjacent categories (e.g., AAA, AA, A) or two separated categories (e.g., AAA, BB or AAA, A). Similarly, we assign *4*, *5* and *6* when the industry includes more rating categories.[50]

The first three columns in Table 7 present the results using bond ratings in the OG industry grouping. The first column shows results measuring dispersion with the standard deviation of the *senior* bond ratings; the second column refers to *subordinated* bond ratings; and the third shows the results of an Ordered Probit model that considers the ordinal dispersion measure described above.[51]

Table 7 shows that using ratings reduces the significance of most of the variables of the base regression, which may be due to the reduction in power induced by the

[49]COMPUSTAT defines the S&P's senior (subordinate) debt rating as the S&P's assessment of the creditworthiness of an obligator with respect to senior (subordinated) debt. We examined the consistency of the COMPUSTAT S&P's reported ratings with the ratings published by Moody's Bond Record.

[50]Previous analyses have not found major differences between either dealing with debt ratings as a categorical variable or cardinalizing them by a linear scale. See Kaplan and Urwitz (1979), Maddala and Nelson, (1974), and McKelvey and Zavoina (1975).

[51]An OLS regression (not reported) shows similar results.

limited number of observations.[52] However, the results are quite consistent with those obtained in the base case in Table 4. This consistency is noteworthy given the absence of a linear relationship between the rating and leverage ratio dispersion measures used in the different regressions.[53] Furthermore, Table 7 singles out industry concentration as perhaps the strongest (i.e., more robust) of the findings: *Herf-index* keeps its sign and significance in all regressions. Most of the other variables that are significant in our base case tend to maintain their signs, and occasionally some of the variables, e.g. $Leasing/FA$, retain their statistical significance.

In each of the last two columns of Table 7, we present regressions that use two different measures of firm leverage. First, we use the ratio of debt book value over equity market value (D/E). The use of this measure not only provides an additional robustness check, but it also ensures that the limited range of the variable in our base specification has no spurious effect on the results.[54] So, in the fourth column, we present the results of a regression of the log of the standard deviation of leverage, ($Log[SD(D/E)]$) on the prior industry characteristics.[55] Second, in the fifth column, we present a regression similar to the one in the base case except that leverage ratios are built using the book value of equity instead of its market value ($Log[SD(LevBV)]$). Using book values has drawbacks (e.g., failure to incorporate current firm information) but may help capture some firms' behavior of making fi-

[52]The number of industries is 55 in the first regression, 25 in the second (due to limited availability of data on subordinated ratings), and 50 in the third one because we ignored industries for which the computation of the ordinal measure was unclear.

[53]For instance, we cardinalize the ordinal measure for ratings (as described above), calculate the standard deviation among the big six firms using it, and compute the linear correlation coefficient with the standard deviation of the leverage ratios of the big six firms in each industry; in doing so, we find that, although significantly positive (its p-value is 0.01) the correlation is only 0.31.

[54]The main measure of leverage dispersion, $SD(Lev)$, is constructed as debt over total firm value, and hence is constrained between 0 and 0.5, a constriction that induces a finite upper limit, log(0.5), on the dependent variable.

[55]Using the ratio D/E, we also run regressions with VL grouping and using a conditional heteroskedasticity model of leverage. The results (not reported) are very similar.

nancial decisions based on accounting rather than purely economic considerations.

The results of these two last regressions are very similar to those in Table 4. With the exception of $SellExp/Sales$, which loses its significance and even changes its sign on the book value regression, the rest of proxies always keep their sign and usually keep their significance. As before, these results suggest connections between intra-industry capital structure dispersion and industry concentration, industry governance practices, firm product uniqueness, and industry risk.

6.2 Alternative Proxies of Industry Characteristics

We next consider the use of alternative proxies for industry characteristics. In Table 8, we present eight regressions run by substituting one at a time the proxies used in our base case.[56]

First, consider alternative proxies related to the theoretical effects. In column 1 we substitute the proxy for technological heterogeneity, i.e., $CV(Sales/Emp)$ for $SD(PPE/TA)$, i.e., the industry standard deviation of the firm ratios of Plant, Property and Equipment over Total Assets. $SD(PPE/TA)$ presents a negative sign and does not affect the estimates of the other variables, sharing its lack of significance with our base case measure: $CV(Sales/Emp)$.

The second check (see column 2) includes $PPEsales/TA$ as a measure of industry asset illiquidity. $PPEsales/TA$ features a correlation of 0.09 with $Leasing/FA$. The coefficient of $PPEsales/TA$ as the one on $Leasing/FA$, is positive although less significant. The introduction of $PPEsales/TA$ does not affect the estimates of the other variables.[57]

[56]The exception is the governance variables, whose robustness we assess in the main regression by including three of them simultaneously.

[57]Because a tax effect might be explaining the use of leasing in an industry, we also run the base case regression including controls for the level of taxes paid in the industry (i.e., the industry averages of the tax paid by firms, and/or the income taxes paid normalized by sales). The inclusion of these

We next check the robustness of the concentration result with respect to the use of a different concentration measure. Following Opler and Titman (1994), we use the 4-firm concentration ratio (i.e., $CR4$) as an alternative concentration measure. In our sample, the $CR4$ is highly correlated with the *Herf-Index*, i.e., 0.73, and, when $CR4$ is included, it shows a positive and significant coefficient without affecting other estimates in the regression.

We also considered two alternative specifications to check for the existence of non-monotonicities in the relationship between concentration and leverage dispersion. First, we introduced simultaneously Herf-$index$ and Herf-$index^2$ as regressors. However, multicollinearity problems (the pairwise correlation among them is above 0.97) impedes to extract clear conclusions. Nevertheless, in all but one case, we found no significance on the squared term and a slight reduction on t-values for the linear one.[58] Second, we looked for structural breaks on the relationship between concentration and leverage and found a positive and significant relationship for values on the Herf-$index$ up to the $86th$ percentile (in OG) and a statistically insignificant relationship from the $86th$ percentile on. In conclusion, none of the previous two monotonicity checks offers strong evidence to reject monotonicity on the relationship between concentration and leverage dispersion.

We also examine the robustness of the proxy of product uniqueness, by using $R\&D/Sales$ instead of $SellExp/Sales$ in the regression. (These variables feature a positive correlation of 0.62.) The coefficient of the $R\&D/Sales$ keeps the same negative sign as the one in $SellExp/Sales$ and strengthens its significance without

tax controls (not reported) does not affect any of our base case results, including the coefficient on $Leasing/FA$.

[58]Only with OG and OLS we find a significantly negative sign for the squared term. This result does not hold in any of the VL regressions, in those with OG that use the conditional heteroskedasticity model, or in the regressions 1992-94 period run below. This monotonicity analysis is available from the authors upon request.

affecting other estimates in the regression.[59]

We also consider different proxies for our controls. In column 5, we use the current profitability dispersion (i.e., $SD(OI/TA)_t$) instead of the past one (i.e., $SD(OI/TA)_{t-1}$). In column 6, we use $SD(Ret)$ (i.e., stock return volatility) instead of $CV(CF)$ as a measure of industry risk. Finally, in columns 7 and 8, we use two other size controls (i.e., $Log^2(Assets)$, and $SD[Log(Assets)]$).[60] A glance to Table 8 shows that these substitutions do not alter the significance (or lack of) of the rest of estimates and produce no other meaningful effect on the results.

Some other proxies are also tried in the regressions (not-reported). We use the industry standard deviation of the return on assets as an alternative proxy of technology dispersion and the industry standard deviation of past operating income over sales as a measure of past profitability dispersion. As alternative measures of the industry growth opportunities, we use the market-to-book value industry average without affecting the results. Furthermore, we include a measure of the dispersion of growth opportunities in an industry (i.e., the standard deviation of the investments over total assets in the industry), which appears as significant and leaves the rest of the regressors practically unaffected.

In summary, the use of alternative proxies does not unveil any serious robustness issues in our base case regressions. Our main results remain solid: High industry concentration, more aggressive use of leasing, less product differentiation, and looser industry corporate governance practices are associated positively with intra-industry capital structure dispersion.

[59]Unfortunately, the information reported by Compustat on $R\&D$ make us lose sixteen industries where we cannot compute a meaningful $R\&D$ measure. Alternately, we build the $R\&D/Sales$ variable by substituting, at the firm level, $R\&D$'s missing values by zeros. The results (not reported) are very similar.

[60]We also introduce controls for size and size dispersion simultaneously without affecting the results. Additionally, some other size controls will be reported in section 6.5, where we report regressions after we split the sample according to the industry dispersion in firm size.

6.3 SIC Industry Grouping

In Table 9 we run regressions grouping industries according to SIC. We group firms according to their primary 4-digit SIC, and we use the 3-digit SIC when less than 20 firms were available in the same 4-digit SIC.

A comparison between the results obtained with OG and VL grouping and those obtained using SIC grouping constitutes not only a robustness test but it also provides an assessment of how a careful industry grouping can reveal empirical facts that would otherwise remain unnoticed. Moreover, using the SIC segment information allows us to separate firms into conglomerates and stand-alones, and to examine the theoretical implications from the effects after we eliminate potentially confounding cross-subsidization effects that may be present in conglomerates. As in Maksimovic and Phillips (2001), we consider firms with more than 97.5% of its sales in an unique 3-digit SIC as stand-alone.[61]

In the first two columns of Table 9, we present the results of the base case specification using the SIC grouping. The third and fourth columns consider a conditional leverage model,[62] and the fifth and sixth consider a model, that uses a measure of rating dispersion as the dependent variable. We present the result alternately using a sample of stand-alone firms (odd number columns), and including conglomerates (even number ones)

Overall, the results show lower statistical significance than in the base case Table 4. Yet, with some exceptions, the signs of the major variables remain the same. For instance *Herf-index* keeps its sign in all regression and becomes significant in four of them. $SellExp/Sales$ and β_A also keep their sign and significance in four of the six

[61] In Subsection 6.5 we also use SIC information to identify conglomerates and contrast their behavior with stand-alones using the OG and VL grouping methods.

[62] The regressions consider all the firms in the sample grouped by SIC codes. The results (not reported) that only use the six firms in each industry are very similar.

regressions. The corporate governance variables show consistent signs with our base case but the significance of some of the variables changes: Board composition gains significance—the coefficient in *BoOut* is significantly negative in three regressions—while CEO tenure loses significance. Also, the comparison between the odd and even columns shows an interesting contrast in the significance of certain regressors that tend to be more significant in the sample with only stand-alones but that lose significance when conglomerates are included. This difference suggests that, perhaps due to the existence of internal capital markets, some effects are particularly relevant for stand-alones. We examine this issue further in subsection 6.5 below.

We extract two main conclusions from Table 9. First, we confirm that a careful industry groping can be important to reveal certain industry effects otherwise hidden in the data. Second, we find perhaps weaker but no conflicting evidence by using the SIC classification: None of the results in Table 4 are reversed, although, in some specifications, a number of estimates lose their significance.[63]

6.4 Different Sample Period: 1992-1994

In Table 10, we consider a different sample period. Specifically, we regress variables built with information from the COMPUSTAT industrial files and average them over the period 1992-1994.[64] The first two columns in Table 10 present the regressions for OG using unconditional (base case) and conditional measures of intra-industry leverage dispersion. The last two columns present the results for VL.

[63] As an additional check of the accuracy of the industry grouping, we regress firm leverage ratios exclusively on industry dummies, with the presumption that a better industry grouping will translate into a better fit in the regression. We limit ourselves to the 723 common firm observations in the OG and VL industry classifications and include 69 industry dummies for OG, 74 for VL and, 79 for the 4-digit SIC. The results show a slightly better fit in OG ($R^2 = .423$ and $adjR^2 = .362$) than in VL ($R^2 = .407$ and $adjR^2 = .345$), and a substantially better fit from these groupings when compared with the SIC grouping ($R^2 = .337$ and $adjR^2 = .277$).

[64] The corporate governance and the past profitability dispersion proxies are calculated over the three-year period 1989-1991.

We find very similar results to those obtained in the period 1995-1997 (Tables 4 and 6). Our four main findings on intra-industry capital structure dispersion persist: A positive correlation with concentration, a negative correlation with the tightness of the corporate governance industry practices, a positive correlation with the use of leasing, and a negative one with the amount of product uniqueness of the firms in the industry. Most of the controls share signs and significance with those in the base case.

The replication of our findings during the 1992-1994 period, and, consequently, the confirmation that these findings are not specific to a particular sample period, suggest to us that the characteristics described by our proxies play a central role in shaping the intra-industry capital structure dispersion. In our view, this replication constitutes a strong validation of the analysis presented in this study.

6.5 Other Robustness Checks

In Tables 11 and 12, we present our final set of robustness checks. In the first two columns of Table 11, we present regressions run by separating industries according to the asset (i.e., size) dispersion of their constituent firms. In the next two columns, we perform a similar analysis by separating industries in two equal groups according to their past profitability dispersion. Splitting the sample in these two dimensions ensures that our findings were not driven by an imperfect control on asset dispersion or past profitability dispersion.

The results in Table 11 confirm the basic pattern in the findings, although the reduced number of observations limits the significance of some of the variables. Once again, concentration appears positively related to intra-industry capital structure dispersion. Furthermore, proxies related to governance variables, leasing use, and product uniqueness show signs and significance levels consistent with earlier results.

In Table 12, we present the results of the regressions run when the variables are built using information from only the six largest firms in the industry (first column), and from all firms in the industry (second column), for both the dependent variable and the regressors. Building the variables in this form contrasts with the procedure followed in Table 4 where we used information from the six largest firms in an industry to construct the measure of intra-industry capital structure dispersion (our dependent variable) and from all the firms in the industry to construct the industry proxies.[65]

Very similar results emerge. $Leasing/FA$ and *Herf-index* maintain their signs and significance, while the corporate governance proxies and $SellExp/Sales$ maintain their signs but lose some significance in some of the regressions.

Finally, in the last column of Table 12, we run a regression that only considers industries without conglomerates—according to the rule explained in section 3.4—which shrinks the OG sample to just 42 industries. Once again, the results are quite stable: *Herf-index*, $Leasing/FA$, $SellExp/Sales$, and the corporate governance regressors keep their signs and significances. Replicating the results with a sample without conglomerates not only provides further validation for the central results of the study but also ensures they are not driven by potential misclassifications of firms that operate in multiple industries, i.e., conglomerates.

7 Concluding Remarks

This paper examines the dispersion in capital structures among the leading competitors within industries. Specifically, we focus on the intra-industry dispersion among the six largest firms in each industry and then relate this dispersion to industry characteristics. This empirical analysis produces a number of results. First, we find that

[65]We provide the regressions for the OG grouping. Regressions using VL (not reported) show similar results.

intra-industry capital structure dispersion is greater in industries (*i*) that are more concentrated, (*ii*) in which firms use leasing more intensively, (*iii*) with higher selling expenses, and (*iv*) with looser corporate governance practices.

Overall, the evidence shows that market power and the ability of firms to transfer productive assets are important forces behind intra-industry capital structure dispersion. The evidence also shows that agency issues can be of central importance. These findings suggest an important role for competitors as providers of liquidity in the secondary market for productive assets, and support a strong role for managers on capital structure decisions.

These findings also raise some other questions. Do the main forces identified here also affect the dynamics of intra-industry dispersion of capital structures? How do firms adjust when they deviate from their optimal capital structures? Is the speed of adjustment related to industry characteristics? Do firms coordinate their financial decisions? If so, what are the mechanisms used for such coordination? Do intermediaries play an important coordinating role, or do market conditions fully determine such coordination? A careful examination of these issues constitutes a promising agenda for future research.

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Table 1: Descriptive Statistics

This table shows descriptive statistics of the main variables used in the analysis, both for OG and VL industry groupings. SD(Lev) is the intra-industry standard deviation of leverage ratios. Leverage ratios are computed as the ratio of total debt to total debt plus the market value of equity. BoOut, CEOten^{-1}, and VarComp are, respectively, industry averages of the % of outsiders in the board, the inverse of the CEO tenure, and the % of variable over total compensation. CV(Sales/Emp) is the industry average of the coefficients of variation of sales-per-employee ratios. Leasing/FA, SellExp/Sales, β_A, Inv/TA and Log(Assets) are, respectively, industry averages of leasing over fixed assets, selling expenses over sales, asset betas, and the log of assets. Herf-index is the industry Herfindahl index. CV(CF) is the industry average of the firms' time-series coefficients of variation calculated using 1995-97 quarterly cash flows. SD(OI/TA)$_{t-1}$ is the industry standard deviation of the firms' past operating income to total assets ratios. All averages calculated over the three-year 1995-97 period at the firm level, except for BoOut, CEOten^{-1}, VarComp and SD(OI/TA)$_{t-1}$ which are calculated over 1992-94.

	Mean	Median	Std. Dev.	Min.	Max.
	OG | VL	OG | VL	OG | VL	OG | VL	OG | VL
SD(Lev)	.121 | .122	.103 | .111	.069 | .067	.020 | .024	.396 | .312
BoOut	.467 | .515	.432 | .494	.198 | .081	.123 | .194	.894 | .879
CEOten^{-1}	.318 | .273	.286 | .265	.174 | .128	.045 | .030	.758 | .750
VarComp	.487 | .338	.469 | 329	.183 | .095	.167 | .053	.848 | .664
CV(Sales/Emp)	.411 | .427	.386 | .386	.208 | .231	.100 | .096	1.013 | 1.250
Leasing/FA	.020 | .017	.008 | .010	.036 | .032	.000 | .000	.244 | .244
Herf-index	.245 | .192	.205 | .157	.117 | .092	.066 | .046	.614 | .418
SellExp/Sales	.209 | .192	.216 | .178	.108 | .094	.048 | .034	.589 | .470
SD(OI/TA)$_{t-1}$	.061 | .061	.052 | .057	.034 | .021	.015 | .026	.175 | .118
CV(CF)	.490 | .447	.455 | .397	.206 | .182	.196 | .118	1.124 | 1.123
β_A	.732 | .897	.666 | .852	.288 | .204	.178 | .524	1.936 | 1.626
Inv/TA	.078 | .074	.071 | .067	.032 | .032	.008 | .008	.171 | .194
Log(Assets)	7.357 | 7.282	7.252 | 7.135	1.021 | .901	5.602 | 5.854	11.228 | 10.697

Figure 1:
Distribution of the Leverage Dispersion Across Industries

Histogram for the intra-industry standard deviation of leverage ratios distribution. Leverage ratios are computed as the ratio of total debt to total debt plus the market value of equity.

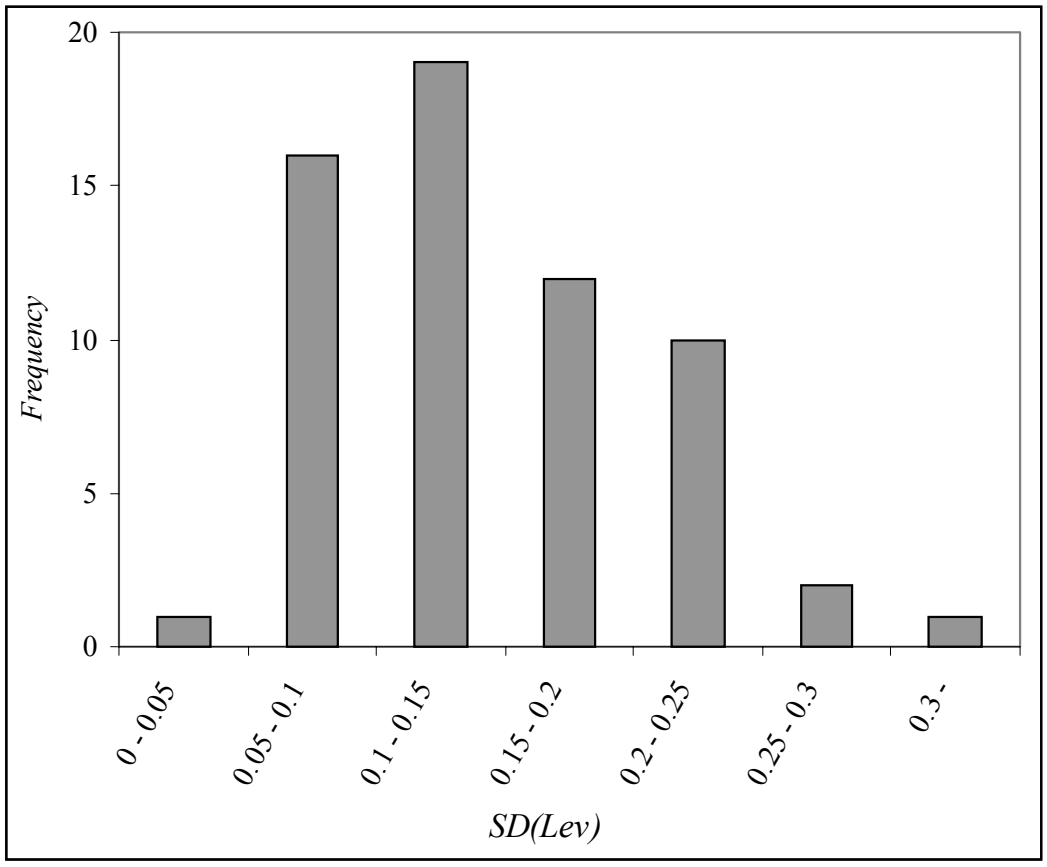

Table 2: Correlations with SD(Lev)

This table shows the univariate correlation coefficients between SD(Lev), and the base case regressors. SD(Lev) is the intra-industry standard deviation of leverage ratios. Leverage ratios are computed as the ratio of total debt to total debt plus the market value of equity. BoOut, CEOten^{-1}, and VarComp are, respectively, industry averages of the % of outsiders in the board, the inverse of the CEO tenure, and the % of variable over total compensation. CV(Sales/Emp) is the industry average of the coefficients of variation of the sales-per-employee ratios. Leasing/FA, SellExp/Sales, β_A, Inv/TA and Log(Assets) are, respectively, industry averages of leasing over fixed assets, selling expenses over sales, asset betas, and the log of assets. Herf-index is the industry Herfindahl index. CV(CF) is the industry average of the firms' time-series coefficients of variation computed using 1995-97 quarterly cash flows. SD(OI/TA)$_{t-1}$ is the industry standard deviation of the firms' past operating income to total assets ratios. All averages are computed over the three-year 1995-97 period at the firm level, except for BoOut, CEOten^{-1}, VarComp and SD(OI/TA)$_{t-1}$ which are calculated over 1992-94. The first column corresponds to OG industry classification, and the second to VL classification. P-values are in parentheses.

	OG grouping	VL grouping
BoOut	.017	.104
	(.90)	(.41)
CEOten^{-1}	$-.213^{*}$	.012
	(.10)	(.92)
VarComp	$-.426^{***}$	$-.358^{***}$
	(.00)	(.00)
CV(Sales/Emp)	.127	$-.042$
	(.33)	(.74)
Leasing/FA	$.389^{***}$	$.337^{***}$
	(.00)	(.01)
Herf-index	$.273^{**}$	$.313^{***}$
	(.03)	(.01)
SellExp/Sales	$-.189$	$-.231^{*}$
	(.14)	(.07)
SD(OI/TA)$_{t-1}$	$-.163$	$-.167$
	(.21)	(.19)
CV(CF)	$-.450^{***}$	$-.074$
	(.00)	(.56)
β_A	$-.386^{***}$	$-.326^{***}$
	(.00)	(.01)
Inv/TA	$-.102$	$-.174$
	(.44)	(.17)
Log(Assets)	$-.126$	.194
	(.33)	(.13)

Table 3: Correlations coefficients among RHS variables

This table shows pairwise correlation coefficients among the main regressors for both groupings $\frac{\text{OG}}{\text{VL}}$. Lev is the intra-industry average of leverage ratios. Leverage ratios are computed as the ratio of total debt to total debt plus the market value of equity. BoOut, CEOten^{-1}, and VarComp are, respectively, industry averages of the % of outsiders in the board, the inverse of the CEO tenure, and the % of variable over total compensation. CV(Sales/Emp) is the industry average of the coefficients of variation of the sales-per-employee ratios. Leasing/FA, SellExp/Sales, β_A, Inv/TA and Log(Assets) are, respectively, industry averages of leasing over fixed assets, selling expenses over sales, asset betas, and the log of assets. Herf-index is the industry Herfindahl index. CV(CF) is the industry average of the firms' time-series coefficients of variation computed using 1995-97 quarterly cash flows. SD(OI/TA)$_{t-1}$ is the industry standard deviation of the firms' past operating income to total assets ratios. All averages are computed over the three-year 1995-97 period at the firm level, except for BoOut, CEOten^{-1}, VarComp and SD(OI/TA)$_{t-1}$, which are calculated over 1992-94.

Ind. group.: $\frac{\text{OG}}{\text{VL}}$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) BoOut	1.												
(2) CEOten^{-1}	-.10	1.											
	.23												
(3) VarComp	.15	-.04	1.										
	.24	-.00											
(4) CV(Sales/Emp)	-.12	-.24	-.22	1.									
	-.03	-.19	-.02										
(5) Leasing/FA	.06	-.13	-.09	.02	1.								
	-.00	-.09	-.10	-.08									
(6) Herf-index	-.06	.14	-.17	.09	.01	1.							
	.03	-.14	.00	-.06	.15								
(7) SellExp/Sales	-.06	-.19	-.05	.06	-.07	.07	1.						
	-.14	-.14	.01	.09	-.11	.19							
(8) SD(OI/TA)$_{t-1}$	-.07	-.16	.05	.22	-.05	-.16	.47	1.					
	-.01	-.22	.16	.41	-.02	.10	.35						
(9) CV(CF)	-.04	.05	.14	.01	-.13	-.08	.04	.01	1.				
	-.12	.06	-.11	.01	-.09	.08	.07	-.09					
(10) β_A	-.30	.08	.25	-.08	-.10	.03	.33	.30	.07	1.			
	-.33	-.14	.35	.05	-.08	.17	.31	.39	.06				
(11) Inv/TA	.11	-.03	.08	.05	.01	-.15	-.29	-.02	-.03	-.06	1.		
	.22	-.14	.23	-.02	.02	-.06	-.34	.22	-.14	-.08			
(12) Log(Assets)	.32	.07	.48	-.20	-.07	-.07	-.17	-.24	-.06	-.10	.02	1.	
	.32	.26	.15	.01	.02	.07	-.10	-.23	-.09	-.22	.11		
(13) Lev.	.14	-.05	-.19	-.03	.17	.02	-.52	-.37	-.23	-.55	.07	.23	1.
	.14	.14	-.24	-.17	.21	-.01	-.56	-.40	-.06	-.54	.11	.44	

Table 4: Base Case

The two first columns show the results for the VL industry grouping, the second two for the OG grouping before adjusting for conglomerates, and the last two for the OG grouping adjusting for conglomerates. The dependent variable, Log[SD(Lev)], is the log of the intra-industry standard deviation of leverage ratios. Leverage ratios are computed as the ratio of total debt to total debt plus the market value of equity. BoOut, CEOten^{-1}, and VarComp are, respectively, industry averages of the % of outsiders in the board, the inverse of the CEO tenure, and the % of variable over total compensation. CV(Sales/Emp) is the industry average of the coefficients of variation of the sales-per-employee ratios. Leasing/FA, SellExp/Sales, β_A, Inv/TA and Log(Assets) are, respectively, industry averages of leasing over fixed assets, selling expenses over sales, asset betas, and the log of assets. Herf-index is the industry Herfindahl index. CV(CF) is the industry average of the firms' time-series coefficients of variation computed using 1995-97 quarterly cash flows. SD(OI/TA)$_{t-1}$ is the industry standard deviation of the firms' past operating income to total assets ratios. All averages are computed over the three-year 1995-97 period at the firm level, except for BoOut, CEOten^{-1}, VarComp and SD(OI/TA)$_{t-1}$ which are calculated over 1992-94. The estimation is done by OLS with White heteroscedasticity-consistent standard errors. t-statistics are in parentheses. The regressions include an intercept whose coefficient is not reported. ***, **, and * denote 1%, 5%, and 10% significance level respectively. The F-test [(a)] is a joint significance test for BoOut, CEOten^{-1}, and VarComp. (p-values for this test in parentheses.)

	VL grouping		OG grouping Pre-Conglomerate adjusted		OG grouping	
BoOut		1.196 (1.59)		−.004 (-.01)		.029 (.10)
CEOten^{-1}		−.386 (-.98)		−.918** (-2.27)		−.983** (-2.38)
VarComp		−2.144*** (-2.76)		−1.099*** (-2.60)		−1.070** (-2.49)
CV(Sales/Emp)	.043 (.24)	−.004 (-.02)	.245 (.70)	−.056 (-.17)	.171 (.47)	−.129 (-.38)
Leasing/FA	2.870** (2.01)	2.096* (1.73)	3.846*** (2.57)	2.740** (2.42)	3.967*** (3.82)	3.335*** (3.57)
Herf-index	1.673** (2.41)	1.619** (2.41)	.989** (2.18)	1.221** (2.26)	1.336** (2.44)	1.461** (2.52)
SellExp/Sales	−1.770** (-2.19)	−2.099*** (-2.98)	−1.047* (-1.85)	−1.916*** (-2.88)	−1.208* (-1.79)	−1.883*** (-2.75)
SD(OI/TA)$_{t-1}$	4.123 (.96)	3.092 (.77)	1.168 (.97)	2.818 (1.36)	1.952 (.81)	3.105 (1.43)
CV(CF)	−.003 (-.17)	−.007 (-.37)	−.034** (-2.47)	−.022 (-1.47)	−.034*** (-2.55)	−.020 (-1.40)
β_A	−1.216*** (-3.15)	−.530 (-.1.22)	−.892*** (-3.18)	−.623** (-2.02)	−.893*** (-3.19)	−.627** (-2.09)
Inv/TA	−5.402** (-2.12)	−5.311** (-2.37)	−4.030 (-1.61)	−4.120** (-2.01)	−4.002 (-1.59)	−4.051** (-1.98)
Log(Assets)	.006 (.08)	.096 (1.13)	−.065 (-.96)	.051 (.58)	−.049 (-.67)	.046 (.51)
F-test[(a)]		2.90** (.04)		3.14** (.03)		3.17** (.03)
R^2	.34	.46	.41	.53	.43	.54
N	64	64	61	61	61	61

Table 5: Leverage level and Interaction terms

(See table description in next page)

	Panel A		Panel B			
	OG	VL	Interaction effects (OG)			
Lev	2.308***	3.745***		2.164***		2.358***
	(3.44)	(6.10)		(3.05)		(3.54)
BoOut	.113	.790*	.158	.186	.016	.055
	(.40)	(1.69)	(.52)	(.63)	(.05)	(.19)
$CEOten^{-1}$	−.750**	−.048	−.908**	−.719*	−.981**	−.735*
	(-1.98)	(-.15)	(-2.13)	(-1.81)	(-2.32)	(-1.92)
VarComp	−.726*	−1.336**	−1.121**	−.778*	−.985	−.330
	(-1.86)	(-1.99)	(-2.46)	(-1.85)	(-1.03)	(-.41)
CV(Sales/Emp)	−.065	.105	−.003	.007	−.137	−.102
	(-.17)	(.78)	(-.01)	(.02)	(-.38)	(-.26)
Leasing/FA	2.750***	1.586*	3.270***	2.747***	3.341***	2.764***
	(3.51)	(1.66)	(3.77)	(3.62)	(3.57)	(3.69)
Herf-index	1.321***	1.205**	3.471**	2.551**	1.454**	1.284**
	(2.55)	(2.45)	(2.48)	(2.02)	(2.44)	(2.42)
SellExp/Sales	−1.004	.174	.176	.192	−1.664	.015
	(-1.57)	(.27)	(.14)	(.17)	(-.73)	(.01)
$SD(OI/TA)_{t-1}$	3.948**	.924	2.456	3.501*	3.214	4.462**
	(2.09)	(.26)	(1.06)	(1.70)	(1.44)	(2.34)
CV(CF)	−.009	−.007	−.018	−.008	−.020	−.009
	(-.65)	(-.68)	(-1.11)	(-.55)	(-1.37)	(-.66)
β_A	−.356	−.173	−.594**	−.353	−.625**	−.341
	(-1.38)	(-.60)	(-1.99)	(-1.35)	(-2.04)	(-1.30)
Inv/TA	−3.628**	−3.257*	−3.862*	−3.540**	−4.022*	−3.487**
	(-2.45)	(-1.93)	(-1.90)	(-2.34)	(-1.97)	(-2.44)
Log(Assets)	−.029	−.041	.040	−.028	.046	−.031
	(-.39)	(-.60)	(.47)	(-.39)	(.50)	(-.41)
Herf × SellExp			−8.938*	−5.430		
			(-1.69)	(-1.09)		
VarComp × SellExp					−.431	−1.970
					(-.11)	(-.61)
R^2	.61	.72	.55	.62	.54	.62
N	61	64	61	61	61	61

Table 5: Description

Panel A shows regressions that add the industry average of market value leverage, Lev, as a regressor in the base specification of Table 4, both for OG and VL grouping. Panel B includes interaction-effects of the base specification proxies in Table 4. The dependent variable, Log[SD(Lev)], is the log of the intra-industry standard deviation of leverage ratios. Leverage ratios are computed as the ratio of total debt to total debt plus the market value of equity. BoOut, CEOten^{-1}, and VarComp are, respectively, industry averages of the % of outsiders in the board, the inverse of the CEO tenure, and the % of variable over total compensation. CV(Sales/Emp) is the industry average of the coefficients of variation of the sales per-employee ratios. Leasing/FA, SellExp/Sales, β_A, Inv/TA and Log(Assets) are, respectively, industry averages of leasing over fixed assets, selling expenses over sales, asset betas, and the log of assets. Herf-index is the industry Herfindahl index. CV(CF) is the industry average of the firm time-series coefficients of variation computed using 1995-97 quarterly cash flows. SD(OI/TA)_{t-1} is the industry standard deviation of the firms' past operating income to total assets ratios. All averages are computed over the three-year 1995-97 period at the firm level, except for BoOut, CEOten^{-1}, VarComp, and SD(OI/TA)_{t-1} which are calculated over 1992-94. Herf×SellExp and VarComp×SellExp represent the interaction-effects of the selling expenses over sales variable times the industry Herfindahl index and the % of variable compensation, respectively. Results are presented for OG grouping. The models are estimated with OLS. The standard errors are White heteroscedasticity-consistent. t-statistics are in parentheses. The regressions include an intercept whose coefficient is not reported. ***, **, and * denote 1%, 5%, and 10% significance level respectively.

Table 6: Conditional Leverage Dispersion Regressions

This table shows a maximum likelihood estimation of the following conditional heteroskedasticity model of leverage:

$$y_i = \mathbf{x}_i'\beta + u_i, \qquad u_i \sim N(0, \exp(\mathbf{z}_i'\alpha))$$

y_i represents the firm's leverage ratio (debt over debt plus market value of equity); $\mathbf{x}_i'$ represents firm characteristics; and $\mathbf{z}_i'$ represents industry characteristics, $\mathbf{x}_i'$ include a dummy per industry and four variables: fixed over total assets, capital expenditure over total assets, log(assets), and EBITDA over total assets. The industry characteristics ($\mathbf{z}_i'$) are the following. BoOut, CEOten^{-1}, and VarComp are, respectively, industry averages of the % of outsiders in the board, the inverse of the CEO tenure, and the % of variable over total compensation. CV(Sales/Emp) is the industry average of the coefficients of variation of the sales-per-employee ratios. Leasing/FA, SellExp/Sales, β_A, Inv/TA and Log(Assets) are, respectively, industry averages of leasing over fixed assets, selling expenses over sales, asset betas, and the log of assets. Herf-index is the industry Herfindahl index. CV(CF) is the industry average of the firms' time-series coefficients of variation computed using 1995-97 quarterly cash flows. SD(OI/TA)$_{t-1}$ is the industry standard deviation of the firms' past operating income to total assets ratios. All averages are computed over the three-year 1995-97 period at the firm level, except for BoOut, CEOten^{-1}, VarComp and SD(OI/TA)$_{t-1}$, which are calculated over 1992-94. t-statistics are in parentheses. The regressions include an intercept whose coefficient is not reported. ***, **, and * denote 1%, 5%, and 10% significance level respectively. The like-lihood ratio test [(a)] is a joint test of significance for BoOut, CEOten^{-1}, and VarComp. (p-values for this test in parentheses). LLF [(b)] denotes the log-likelihood function. The two first columns present the results for the own grouping (OG) industry classification, and the last two columns for the Value Line (VL) classification.

	OG grouping		VL grouping	
BoOut		−.630*		.121
		(-1.70)		(.15)
CEOten^{-1}		−1.439***		−.354
		(-3.12)		(-.75)
VarComp		−1.171***		−1.725**
		(-2.82)		(-1.96)
CV(Sales/Emp)	.483	−.064	.026	−.027
	(1.58)	(-.19)	(.20)	(-.20)
Leasing/FA	6.625***	6.470***	4.133*	3.412
	(3.15)	(2.93)	(1.71)	(1.41)
Herf-index	2.070***	2.010***	1.313**	1.386**
	(3.24)	(3.19)	(1.96)	(2.02)
SellExp/Sales	−2.141***	−2.417***	−1.882***	−2.335***
	(-2.74)	(-2.98)	(-2.55)	(-3.04)
SD(OI/TA)$_{t-1}$	5.997**	6.490**	−.270	1.953
	(2.05)	(2.22)	(-.12)	(.83)
CV(CF)	−.026	−.003	.204	.116
	(-1.19)	(-.14)	(.64)	(.36)
β_A	−2.334***	−2.272***	−.221	.014
	(-6.54)	(-5.99)	(-.62)	(.04)
Inv/TA	−2.955**	−3.493**	−3.506**	−3.817**
	(-1.98)	(-2.21)	(-2.14)	(-2.24)
Log(Assets)	.006	.179**	−.007	.060
	(.09)	(2.22)	(-.12)	(.88)
LR-test[(a)]		21.35***		5.38
		(.00)		(.14)
LLF[(b)]	488.77	499.76	660.73	663.40
N	697	697	930	930

Table 7: Other measures of intra-industry financial dispersion (OG grouping)

This table shows regressions of alternative measures of intra-industry financial dispersion on industry characteristics. The first column includes the log of the S&P's senior debt rating intra-industry standard deviation. The second column includes S&P's subordinated debt ratings instead of senior ratings. The third column presents an ordinal intra-industry rating dispersion measure. The last two column includes the log of the intra-industry standard deviation of two different measures of leverage ratio: debt to equity market value, and debt to book value of assets. BoOut, CEOten^{-1}, and VarComp are, respectively, industry averages of the % of outsidersin the board, the inverse of the CEO tenure, and the % of variable over total compensation. CV(Sales/Emp) is the industry average of the coefficients of variation of the sales-per-employee ratios. Leasing/FA, SellExp/Sales, β_A, Inv/TA and Log(Assets) are, respectively, industry averages of leasing over fixed assets, selling expenses over sales, asset betas, and the log of assets. Herf-index is the industry Herfindahl index. CV(CF) is the industry average of the firms' time-series coefficients of variation computed using 1995-97 quarterly cash flows. SD(OI/TA)_{t-1} is the industry standard deviation of the firms' past operating income to total assets ratios. All averages are computed over the three-year 1995-97 period at the firm level, except for BoOut, CEOten^{-1}, VarComp and SD(OI/TA)_{t-1}, which are calculated over 1992-94. The rating ordinal dispersion model is estimated using an ordered probit estimation. The rest of the models are estimated with OLS. The standard errors are White heteroscedasticity-consistent. t-statistics are in parentheses. The regressions include an intercept whose coefficient is not reported. ***, **, and * denote 1%, 5%, and 10% significance level respectively. [(a)] pseudo-R^2 in the ordered probit case. Regressions are presented using the own grouping (OG) industry classification.

	Log[SD(Senior Rating)]	Log[SD(Subord. Rating)]	Rating Disp. Oprobit	Log[SD (D/E)]	Log[SD (LevBV)]
BoOut	−.518	−1.149	−1.174	−.154	−.295
	(-1.60)	(-1.16)	(-1.09)	(-.31)	(-1.11)
CEOten^{-1}	.319	.174	−.524	−1.154*	−.610**
	(1.04)	(.15)	(-.40)	(-1.87)	(-2.06)
VarComp	.306	.630	−.156	−1.503**	−.241
	(.72)	(.80)	(-.10)	(-2.09)	(-.72)
CV(Sales/Emp)	.080	−.894	−1.922*	.501	−.064
	(.21)	(-.95)	(-1.70)	(.98)	(-.18)
Leasing/FA	3.337***	3.384	7.449	4.042**	.526
	(3.03)	(1.54)	(1.60)	(2.29)	(.70)
Herf-index	1.547***	4.412*	10.881***	1.606**	.840**
	(3.21)	(2.09)	(5.80)	(2.04)	(2.01)
SellExp/Sales	1.259*	−1.479	4.433*	−3.777***	.206
	(1.91)	(-.83)	(1.91)	(-2.66)	(.31)
SD(OI/TA)_{t-1}	1.189	7.243	6.675	−.607	3.741**
	(.48)	(1.34)	(.79)	(-.17)	(2.21)
CV(CF)	−.044**	−1.870*	.030	.022	−.006
	(-2.25)	(-1.76)	(.48)	(.95)	(-.59)
β_A	−.137	.471	−.457	−.739*	−.694***
	(-.50)	(.77)	(-.46)	(-1.88)	(-3.24)
Inv/TA	2.592	4.425	4.799	−7.471**	−2.194
	(1.52)	(1.63)	(.66)	(-2.19)	(-1.11)
Log(Assets)	−.021	.365	.023	.177	.036
	(-.31)	(1.08)	(.10)	(1.62)	(.64)
$R^{2(a)}$	.41	.67	.39	.57	.37
N	55	25	50	59	61

Table 8: Specifications with alternative proxies (OG grouping)

(Table description in next page)

	Base Case	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
BoOut	.029	.011	.277	.082	-.061	.056	.055	.025	.211
	(.10)	(.04)	(.88)	(.28)	(-.17)	(.18)	(.17)	(.08)	(.80)
$CEOten^{-1}$	**-.983**	**-.956**	**-1.352**	-.731	-.656	**-.947**	**-.998**	**-.998**	**-1.037**
	(-2.38)	(-2.36)	(-2.53)	(-1.73)	(-1.48)	(-2.31)	(-2.34)	(-2.42)	(-2.69)
VarComp	**-1.070**	**-1.111**	**-1.297**	**-1.118**	-.741	**-.974**	**-1.144**	**-1.089**	**-.848**
	(-2.49)	(-2.65)	(-2.48)	(-2.58)	(-1.56)	(-2.27)	(-2.77)	(-2.54)	(-2.11)
CV(Sales/Emp)	-.129		-.228	.049	-.360	.008	-.127	-.129	-.177
	(-.38)		(-.64)	(.14)	(-.90)	(.02)	(-.37)	(-.39)	(-.57)
SD(PPE/TA)		-.073							
		(-1.46)							
Leasing/FA	**3.335**	**3.328**		**2.593**	**3.188**	**3.474**	**3.486**	**3.359**	**3.235**
	(3.57)	(3.71)		(2.80)	(3.80)	(2.61)	(3.47)	(3.58)	(3.03)
PPEsales/TA			17.209						
			(1.71)						
Herf-index	**1.461**	**1.349**	**1.343**		**2.084**	**1.277**	**1.552**	**1.459**	**2.200**
	(2.52)	(2.42)	(2.38)		(2.44)	(2.42)	(2.51)	(2.52)	(3.27)
CR4				**1.219**					
				(2.38)					
SellExp/Sales	**-1.883**	**-1.653**	**-1.955**	**-1.645**		-1.217	**-1.875**	**-1.898**	**-1.632**
	(-2.75)	(-2.26)	(-2.91)	(-2.26)		(-1.56)	(-2.65)	(-2.76)	(-2.50)
R&D/Sales					**-6.497**				
					(-2.37)				
$SD(OI/TA)_{t-1}$	3.105	2.360	3.210	3.173	3.730		3.151	3.170	4.502
	(1.43)	(1.11)	(1.46)	(1.35)	(1.42)		(1.44)	(1.47)	(1.94)
$SD(OI/TA)_t$						-.299			
						(-.21)			
CV(CF)	-.020	-.021	-.021	**-.029**	-.023	-.023		-.020	-.021
	(-1.40)	(-1.48)	(-1.28)	(-2.36)	(-1.69)	(-1.68)		(-1.38)	(-1.70)
SD(Ret)							-.016		
							(-.86)		
β_A	**-.627**	**-.615**	-.462	**-.596**	-.324	**-.593**	**-.627**	**-.621**	**-.758**
	(-2.09)	(-2.04)	(-1.30)	(-2.11)	(-.92)	(-2.05)	(-2.10)	(-2.07)	(-2.34)
Inv/TA	**-4.051**	-3.539	**-5.264**	-3.001	-2.330	-3.819	**-4.018**	**-4.078**	**-4.026**
	(-1.98)	(-1.64)	(-2.35)	(-1.39)	(-.91)	(-1.78)	(-1.98)	(-2.00)	(-2.09)
Log(Assets)	.046	.075	.041	.060	.046	.023	.055		
	(.51)	(.78)	(.45)	(.63)	(.47)	(.25)	(.65)		
Log^2(Assets)								.003	
								(.62)	
SD[Log(Assets)]									**-.420**
									(-2.38)
R^2	.54	.54	.52	.55	.56	.52	.53	.54	.58
N	61	61	61	61	52	61	61	61	61
Correlation$^{(a)}$		-.09	.09	.73	.62	.55	.20	.99	-.08
		(.48)	(.51)	(.00)	(.00)	(.00)	(.12)	(.00)	(.53)

Table 8: Description

This table shows regressions of the log of the intra-industry standard deviation of leverage ratios, Log[SD(Lev)], on alternative industry proxies. Leverage ratios are computed as the ratio of total debt to total debt plus the market value of equity. The base results are in the "base case" column. In each other column, an independent variable from the base case is substituted by an alternative proxy. In column [1], SD(PPE/TA) or the intra-industry standard deviation of firms' fixed-to-total assets is used as opposed to CV(Sales/Emp). In column [2], the industry average of plant, property and equipment (PPE) sales over total assets is used instead of Leasing/FA. In column [3], the four-firm industry concentration ratio (CR4) is used instead of the Herf-index. In column [4], the industry average of research and development expenses to sales (R&D/Sales) is used instead of the SellExp/Sales. In column [5], the intra-industry standard deviation of the operating income to total assets ratio is averaged over the 1995-97 period instead of the 1992-94 period of the base case. Column [6] substitutes CV(CF) by the industry average of the time-series standard deviation of each firm 1995-97 monthly stock returns, SD(Ret). The Last two columns [7]-[8] present alternative size controls: First, the square of Log(Assets), and then the intra-industry standard deviation of frims' Log(Assets). All regressions are estimated by OLS. The standard errors are White heteroscedasticity-consistent. t-statistics are in parentheses. The regressions include an intercept whose coefficient is not reported. Coefficients are in bold when the level of significance is 5% or lower. The last row [(a)] shows the correlation coefficients between the new variable included in each case and the substituted variable from the base case. (p-values in parentheses.)

Table 9: SIC Industry Grouping

This table shows results for a 3-digit SIC grouping. The first two columns consider OLS estimations of the log of the intra-industry standard deviation of leverage ratios, Log[SD(Lev)], on industry characteristics. The third and fourth columns show maximum likelihood estimations of the following conditional heteroskedasticity model of leverage:

$$y_i = \mathbf{x}_i'\beta + u_i, \qquad u_i \sim N(0, \exp(\mathbf{z}_i'\alpha))$$

y_i represents the firm's leverage ratio (debt over debt plus market value of equity); $\mathbf{x}_i'$ represents firm characteristics, and $\mathbf{z}_i'$ represents industry characteristics. $\mathbf{x}_i'$ include a dummy per industry and four variables: fixed over total assets, capital expenditures over total assets, log(assets), and EBITDA over total assets. The last two columns show OLS estimations of the log of the S&P's senior debt rating intra-industry standard deviation on industry characteristics. The industry characteristics for all models are the following. BoOut, CEOten^{-1}, and VarComp are, respectively, industry averages of the % of outsiders in the board, the inverse of the CEO tenure, and the % of variable over total compensation. CV(Sales/Emp) is the industry average of the coefficients of variation of the sales-per-employee ratios. Leasing/FA, SellExp/Sales, β_A, Inv/TA and Log(Assets) are, respectively, industry averages of leasing over fixed assets, selling expenses over sales, asset betas, and the log of assets. Herf-index is the industry Herfindahl index. CV(CF) is the industry average of the firms' time-series coefficients of variation computed using 1995-97 quarterly cash flows. SD(OI/TA)$_{t-1}$ is the industry standard deviation of the firms' past operating income to total assets ratios. All averages are computed over the three year 1995-97 period at the firm level, except for BoOut, CEOten^{-1}, VarComp and SD(OI/TA)$_{t-1}$ which are calculated over 1992-94. The models in the first, third and fifth columns restrict the sample to stand alone firms that have 97.5% or more of their sales in an unique 3-digit SIC. The models in the second, fourth and sixth columns use the entire sample. The standard errors for the OLS models are White heteroscedasticity-consistent. t-statistics are in parentheses. The regressions include an intercept whose coefficient is not reported. ***, **, and * denote 1%, 5%, and 10% significance level. The last row [(a)] indicate the Log-likelihood function for the conditional heteroskedasticity models.

Dep. Variab.	Log[SD(Lev)]		Conditional Lev. Disp.		Log[SD(Senior Rating)]	
Sample	Stand-alone	All Firms	Stand-alone	All Firms	Stand-alone	All Firms
BoOut	−.168	−.297	−.637***	−.383***	−.731*	−.076
	(-.57)	(-.91)	(-3.93)	(-2.86)	(-1.88)	(-.20)
CEOten^{-1}	−.489	.801	.231	.015	−.976	−.713
	(-.78)	(1.39)	(.87)	(.07)	(-1.33)	(-1.23)
VarComp	.205	−.314	−.456	−.571***	.613	.500
	(.48)	(-.72)	(-1.58)	(-2.55)	(1.25)	(.95)
CV(Sales/Emp)	.134	.733**	.572***	.514***	−.347	−.091
	(.39)	(2.21)	(3.62)	(3.72)	(-.95)	(-.23)
Leasing/FA	1.123***	.088	.421	.469	−.012	.379
	(3.64)	(.13)	(1.07)	(1.59)	(-.02)	(.72)
Herf-index	.973	.402	.548*	.614**	1.070**	1.567**
	(1.33)	(.50)	(1.92)	(2.40)	(2.17)	(2.56)
SellExp/Sales	−2.967***	−1.909*	−2.581***	−1.915***	−.177	.296
	(-2.54)	(-1.75)	(-7.38)	(-6.84)	(-.23)	(.71)
SD(OI/TA)$_{t-1}$	−.084	.143	−2.934***	−2.692***	.045	−.370
	(-.25)	(.52)	(-3.55)	(-3.82)	(.20)	(-.73)
CV(CF)	.082	−.021	.005	.033	−.028	−.105
	(.47)	(-.13)	(.06)	(.50)	(-.14)	(-.54)
β_A	−1.152***	−.869***	−.300***	−.286***	.297	.139
	(-3.177)	(-2.708)	(-6.90)	(-7.49)	(1.10)	(.44)
Inv/TA	−4.269	−2.201	1.988**	2.207***	−.448	.454
	(-1.482)	(-.885)	(2.03)	(2.66)	(-.17)	(.27)
Log(Assets)	−.321**	−.192	−.130*	−.142***	−.077	.034
	(-2.283)	(-1.573)	(-1.91)	(-2.61)	(-.47)	(.18)
R$^{2(a)}$	.51	.37	1486.13	1962.72	.19	.17
N	76	77	3592	5021	61	70

Table 10: Sample Period 1992-94

This table shows the same base case specifications but measuring the variables over the 1992-94 period. The two first columns present the results for the own grouping (OG) industry classification, and the last two for the Value Line (VL) classification. First and third columns shows the OLS estimation of the log of the intra-industry standard deviation of leverage ratios, Log[SD(Lev)], on industry characteristics. Second and fourth columns shows a maximum likelihood estimation of the following conditional heteroskedasticity model of leverage:

$$y_i = \mathbf{x}_i'\beta + u_i, \qquad u_i \sim N(0, \exp(\mathbf{z}_i'\alpha))$$

y_i represents the firm's leverage ratio (debt over debt plus market value of equity); $\mathbf{x}_i'$ represents firm characteristics, and $\mathbf{z}_i'$ represents industry characteristics. $\mathbf{x}_i'$ include a dummy per industry and four variables: fixed over total assets, capital expenditures over total assets, log(assets), and EBITDA over total assets. The industry characteristics for the four models are the following. BoOut, CEOten^{-1}, and VarComp are, respectively, industry averages of the % of outsiders in the board, the inverse of the CEO tenure, and the % of variable over total compensation. CV(Sales/Emp) is the industry average of the coefficients of variation of the sales-per-employee ratios. Leasing/FA, SellExp/Sales, β_A, Inv/TA and Log(Assets) are, respectively, industry averages of leasing over fixed assets, selling expenses over sales, asset betas, and the log of assets. Herf-index is the industry Herfindahl index. CV(CF) is the industry average of the firms' time-series coefficients of variation computed using 1992-94 quarterly cash flows. SD(OI/TA)$_{t-1}$ is the industry standard deviation of the firms' past operating income to total assets ratios. All averages are computed over the three-year 1992-94 period at the firm level, except for BoOut, CEOten^{-1}, VarComp and SD(OI/TA)$_{t-1}$, which are calculated over 1989-91. The standard errors for the OLS models are White heteroscedasticity-consistent. t-statistics are in parentheses. The regressions include an intercept whose coefficient is not reported. ***, **, and * denote 1%, 5%, and 10% significance level respectively. The last row [(a)] indicate the Log-likelihood function for the conditional heteroskedasticity models (second and fourth columns.)

	OG grouping		VL grouping	
	Log[SD(Lev)]	Conditional Lev. Disp	Log[SD(Lev)]	Conditional Lev. Disp
BoOut	.275	.833	1.111	−.833
	(.39)	(1.10)	(1.51)	(-1.02)
CEOten^{-1}	−.515	−1.657***	−1.236	−1.814**
	(-1.04)	(-3.45)	(-1.48)	(-2.44)
VarComp	−.519	−.474	−1.262**	.942
	(-1.21)	(-1.06)	(-2.41)	(1.37)
CV(Sales/Emp)	.009	.095	.512*	.716*
	(.02)	(.29)	(1.68)	(1.91)
Leasing/FA	4.537*	7.646***	1.880	13.335***
	(1.80)	(2.46)	(.96)	(3.34)
Herf-index	2.014***	3.283***	1.758***	3.049***
	(3.09)	(4.27)	(3.06)	(4.70)
SellExp/Sales	−2.475***	−2.551***	−1.480*	−3.649***
	(-3.31)	(-3.18)	(-1.76)	(-4.40)
SD(OI/TA)$_{t-1}$	6.129**	11.310***	−1.585	−.413
	(2.18)	(3.65)	(-.53)	(-.13)
CV(CF)	−.287	−1.309***	−.046*	−.033
	(-.91)	(-3.42)	(-1.74)	(-.87)
β_A	−.258	−1.129***	.027	−.107
	(-1.03)	(-4.15)	(.10)	(-.42)
Inv/TA	−3.992	−8.510***	−.899	−4.538*
	(-1.40)	(-3.11)	(-.37)	(-1.68)
Log(Assets)	.154**	.294***	.071	.212***
	(1.98)	(3.64)	(.98)	(2.81)
$R^{2(a)}$	.40	526.62	.40	103.37
N	61	657	66	892

Table 11: Sample Splits Regressions (OG grouping)

This table shows the same base case regressions for the own grouping (OG) industry classification, but splitting the sample in two equal parts, according to, first, intra-industry asset dispersion and second, intra-industry past profitability dispersion. First and third columns present the results for the lower (asset and past profitability) dispersion half samples. Second and fourth columns have the high dispersion half samples results. All regressions are estimaed using OLS with White heteroskedasticity consistent standard errors, and regressing the log of the intra-industry standard deviation of leverage ratios (Log[SD(Lev)]) on industry characteristics. Leverage ratios are computed as the ratio of total debt to total debt plus the market value of equity. BoOut, CEOten^{-1}, and VarComp are, respectively, industry averages of the % of outsiders in the board, the inverse of the CEO tenure, and the % of variable over total compensation. CV(Sales/Emp) is the industry average of the coefficients of variation of the sales-per-employee ratios. Leasing/FA, SellExp/Sales, β_A, Inv/TA and Log(Assets) are, respectively, industry averages of leasing over fixed assets, selling expenses over sales, asset betas, and the log of assets. Herf-index is the industry Herfindahl index. CV(CF) is the industry average of the firms' time-series coefficients of variation computed using 1995-97 quarterly cash flows. SD(OI/TA)$_{t-1}$ is the industry standard deviation of the firms' past operating income to total assets ratios. All averages are computed over the three-year 1995-97 period at the firm level, except for BoOut CEOten^{-1}, VarComp and SD(OI/TA)$_{t-1}$ that are calculated over 1992-94. The regressions include an intercept whose coefficient is not reported. ***, **, and * denote 1%, 5%, and 10% significance level respectively.

Divided Sample	Bottom Half Asset Disp.	Top Half Asset Disp.	Bottom Half Profit. Dispr.	Top Half Profit. Dispr.
BoOut	.588 (1.08)	.477 (1.07)	−.350 (.90)	.828* (2.03)
CEOten^{-1}	−.533 (-.68)	−.914 (-.96)	−.729* (-1.98)	−1.589* (-1.83)
VarComp	−1.599** (-2.64)	−.197 (-.20)	−1.137*** (-3.02)	−1.807* (-1.89)
CV(Sales/Emp)	.392 (.070)	−.684 (-1.29)	−.867* (-2.06)	.032 (.06)
Leasing/FA	2.676*** (2.89)	7.034** (2.23)	1.568** (2.49)	1.735 (.69)
Herf-index	2.602* (1.92)	1.758* (2.05)	1.395** (2.40)	.698 (.75)
SellExp/Sales	−2.855*** (-2.83)	−1.069 (-.73)	−3.049*** (-3.37)	−2.437* (-1.86)
SD(OI/TA)$_{t-1}$	5.729 (.72)	2.498 (.85)	7.753 (.83)	2.340 (.74)
CV(CF)	.052 (.51)	−.039*** (-3.63)	−.026* (-1.93)	.019 (.56)
β_A	−.631 (-1.40)	−.672 (-1.02)	−2.146*** (-4.62)	.187 (.37)
Inv/TA	−5.010 (-1.47)	−4.809 (-1.45)	−7.975*** (-4.34)	−5.250 (-1.49)
Log(Assets)	.146 (1.33)	−.113 (-.92)	.114 (1.57)	−.069 (-.69)
R^2	.60	.73	.81	.61
N	31	30	30	31

Table 12: Other Robustness Checks (OG grouping)

This table presents the same base case regressions for the own grouping (OG) industry classification, but using different samples to calculate LHS and RHS variables. First column presents the results using all firms in the sample to calculate both dependent and independent variables. Second column model uses only the biggest six firms per industry in term of sales to calculate both dependent and independent variables. The final regression is similar to the base case but using only industries with no conglomerates under the 85% in an unique 4-digit SIC rule. All regressions in this table are estimated using OLS with White heteroskedasticity consistent standard errors, and regressing the log of the intra-industry standard deviation of leverage ratios (Log[SD(Lev)]) on industry characteristics. Leverage ratios are computed as the ratio of total debt to total debt plus the market value of equity. BoOut, CEOten^{-1}, and VarComp are, respectively, industry averages of the % of outsiders in the board, the inverse of the CEO tenure, and the % of variable over total compensation. CV(Sales/Emp) is the industry average of the coefficients of variation of the sales-per-employee ratios. Leasing/FA, SellExp/Sales β_A, Inv/TA, and, Log(Assets) are, respectively, industry averages of leasing over fixed assets, selling expenses over sales, asset betas, and the log of assets. Herf-index is the industry Herfindahl index. CV(CF) is the industry average of the firms' time-series coefficients of variation computed using 1995-97 quarterly cash flows. SD(OI/TA)$_{t-1}$ is the industry standard deviation of the firms' past operating income to total assets ratios. All averages are computed over the three-year 1995-97 period at the firm level, except for BoOut, CEOten^{-1}, VarComp and SD(OI/TA)$_{t-1}$ that are calculated over 1992-94. The regressions include an intercept whose coefficient is not reported. ***, **, and * denote 1%, 5%, and 10% significance level respectively.

Sample used for Dep. and Indep. variables	All firms	Big-6 firms	Stand-alone
BoOut	−.335	−.077	−.153
	(-1.43)	(-.25)	(-.48)
CEOten^{-1}	−.866***	−.864	−.988**
	(-2.96)	(-1.53)	(-2.21)
VarComp	−.429	−.900**	−1.527***
	(-1.19)	(-2.41)	(-3.67)
CV(Sales/Emp)	.125	−.225	−.408
	(.43)	(-.62)	(-1.01)
Leasing/FA	3.157***	2.496***	5.575***
	(2.73)	(2.70)	(2.89)
Herf-index	.800*	.307***	1.089**
	(1.81)	(2.99)	(2.35)
SellExp/Sales	−.959	−.931*	−2.787***
	(-1.65)	(-1.72)	(-4.04)
SD(OI/TA)$_{t-1}$	1.495	4.392	5.329*
	(.70)	(1.10)	(1.85)
CV(CF)	−.010	−.423	−.011
	(-.83)	(-1.22)	(-.71)
β_A	−.987***	−.604***	−.875*
	(-4.69)	(-2.79)	(-1.72)
Inv/TA	−4.411***	−2.173	−8.529***
	(-2.55)	(-.93)	(-4.82)
Log(Assets)	.094	.043	.164
	(1.33)	(.52)	(1.66)
R^2	.66	.51	.65
N	61	61	42

Appendix: On the construction of the OG industry classification

The starting point for the OG classification is the Value Line Investors Service industry grouping. However, we check additional sources of company information. First, using the industry name obtained in the VL classification, we revise *The Encyclopedia of Business Information Sources*[1] which provides a list of public information references organized by industries (e.g., industry almanacs, directories, handbooks, periodicals, newsletters and yearbooks.)[2] Second, having obtained a list of publications for each of the groups mentioned in VL, we try first to obtain at least two sources to check the consistency of the competitor list. If two or more sources are accessible, we, conservatively, only include the companies listed in all of them. If less than two sources are available, we review additionally the firms' SEC 10-K Reports.[3]

As a general rule, we usually are able to obtain the main competitors of each industry from the industry publications, but the 10-K reports are useful to double-check the business definition, products and competition of each firm selected.

Although our OG classification is based on the VL industry grouping, the two classifications vary broadly. Fourteen of the VL industries are eliminated: Building Materials, Diversified Co., Electrical Equipments, Industrial Services, Metal Fabricating, and Recreation are discarded due to poor industry classification; and Autoparts Replacements, Housing/Recreational Vehicles, Home Appliances, Coal/Alternate energy and Tire & Rubber are discarded due to lack of information. Other eliminations are because of industry merging: Chemical Basic, Diversified and Specialty merged into Chemical General; Copper and Metal Mining merged into Copper, Nickel & Zinc Mining.

Other industries are redefined: Entertainment, into TV Broadcasting; Environmental, into Solid Waste Management; Machinery, into Construction Machinery; Medical Services, into Medical Services excluding HMOs; Precision Instruments, into Photographic Equipments; Petroleum Integrated and Petroleum Producing, into Petroleum Development/Exploration and Petroleum Refining; Computer Software & Services, into Computer Software; Telecommunication Services, into Telecommunication (Voice, Data and Cellular); and Trucking/Transport Leasing, into Trucking & Transport. Additionally, other industries are split: Beverages (alcoholic), into Beers and Wine/Spirit Beverages; Hotel/Gaming, into Hotel/Lodging and Gambling/Casinos; Oilfield Services/Equipment, into Petroleum Drilling and Oilfield Services; Retail Stores and Retail (Special lines), into Department

[1] Editions 9th - 12th (James Woy, editor. Gale Research Inc.)

[2] A major part of those publications are from industry associations, trade and professional societies. Among the most informative sources to assess competitive links among firms in an industry are Fairchild Publications' directories and Plunkett Research's industry almanacs.

[3] We do not find industry publications in few industries: Auto-Parts manufacturers, Cement and Aggregates, Photographic Equipments, Machinery (construction), and Office Eq.& Supp. Sell/Dist. For these industries the VL classification and SEC 10-K Reports are the only sources employed.

Stores, Discount Stores, Retail Electronics, Retail Off-Pricers, Retail Specialty Stores, Retail Auto-Parts, Retail Books & Music and Retail Furniture.

In summary, 44 of the VL industries are kept (although some of the companies change their classification); 11 industries are redefined; 5 of the old ones are split into 14; and 14 of the VL industries are eliminated. In sum, we transform the VL classification into one with 69 industries that include 820 firms. Next, we provide the actual industry name and the sources used to group the firms.

1. Advertising (6 firms): a) Standard Directory of Advertising Agencies: The Agency Red Book. American Association of Advertising Agencies. Skokie, Ill, National Register Pub. Co. Vol. 1997 and 1994.

2. Air Transport (13 firms): a) The Aviation & Aerospace Almanac. Washington, D.C.: Aviation Week Group Newsletters, McGraw-Hill. Vol. 1997 and 1994. b)Aviation Daily. Washington, D.C. : Aviation Week Group Newsletters, McGraw-Hill. Vol. 1997 and 1994.

3. Beverage Alcoholic - Beer (9 firms): a) Beverage World Databank. Dayton, Ohio: Keller International Pub. Corp. Vol. 1997, and 1993/94. b) Beverage Industry Annual Manual. New York, Magazines for Industry. Vol. 1996/97 and 1993/94. c) Modern Brewery Age. Norwalk, CT, Business Journals. Vol. 1997 and 1994.

4. Beverage Alcoholic - Wine/Spirit (6 firms): a) Beverage World Databank. Dayton, Ohio : Keller International Pub. Corp. Vol. 1997, and 1993/94. b) Beverage Industry Annual Manual. New York, Magazines for Industry. Vol. 1996/97 and 1993/94.

5. Aluminum (6 firms): a) Aluminum: profile of the industry. Published by Metal Week. New York, N.Y. : McGraw-Hill. 1982. b) Aluminum Statistical Review. New York, Aluminum Association. Vol. 1997

6. Apparel (14 firms): a) Fairchild's Textile & Apparel financial directory. New York, Fairchild Publications, Book Division. Vol. 1997 and 1995.

7. Auto & Truck (8 firms): a) Ward's Auto World. Detroit, Mich., Ward's Communications, inc. V. 33 (1997) and 30 (1994).b) AAMA motor vehicle facts & figures. Detroit, MI.: American Automobile Manufacturers Association. Vol. 1997 and 1994.

8. Auto Parts Manufacturers (10 firms).

9. Beverage - Soft Drinks (6 firms): a) Beverage World Databank. Dayton, Ohio : Keller International Pub. Corp. Vol. 1997, and 1993/94. b) Beverage Industry Annual Manual. New York, Magazines for Industry. Vol. 1996/97 and 1993/94. c) Statistical profile: the soft drink industry in the United States. Washington, National Soft Drink Association. 1986

10. Retail Building Supply (9 firms): a) Plunkett's retail industry almanac. Galveston, Tex.: Plunkett Research, vol. 1997, and 1999. b) Construction review. Washington, U. S. Department of Commerce, Domestic and International Business Administration, Bureau of Domestic Commerce, Vol. 42-43 (1997) and Vol. 38-40 (1992-94).

11. Cable T.V. (11 firms): a) Plunkett's entertainment & media industry almanac. Houston, Tex.: Plunkett Research, Ltd. 1998. b) Broadcasting & cable yearbook. New Providence, N.J. : R.R. Bowker. Vol. 1 &2, years 1993, 1994, 1995, 1996 and 1997. c)

Cable vision. Denver, International Thomson Communications, Inc.. Vol. 1992-93, 1993-94, 1994-95, 1995-96, 1996-97 and 1997-98.

12. Cement & Aggregates (7 firms): a) http://portcement.org/index.asp, The Portland Cement Association..

13. Chemical (12 firms): a) http://neis.com/ ChemIndustry.com, The Chemical Industry Home Page. b) http://chemicalguide.com/ sponsored by the American Chemistry Council. c) Directory of chemical producers: United States of America. Menlo Park, Chemical Information Services, Stanford Research Institute. Vol. 1992. d) Chemical manufacturers directory of trade name products / compiled by Michael and Irene Ash.. Endicott, NY : Synapse Information Resources, 2000.e) Chemical week. Buyers' guide & industry almanac. New York, NY : Chemical Week Associates. Vol. 1992, 1993, 1994, 1995, 1996, 1997, 1998.

14. Computer & Peripherals (10 firms): a) Hoover's guide to computer companies. Austin, TX: Hoover's Business Press, 1996-2nd ed, and 1995-1st ed. b) Computer Industry Almanac, annual, Dallas, TX. Vol. 1992, 1993, 1994, 1995, 1996.

15. Copper, Nickel & Zinc Mining (7 firms): a) Non-ferrous Metal Yearbook. Howell, N.J: American Bureau of Metal Statistics, Inc., Vol. 1990, 1997 and 1998. b) Non-ferrous metal data. New York, American Bureau of Metal Statistics. Vol. 1992, 1993, 1995 and 1996. c) Minerals yearbook / prepared by the staff of the Bureau of Mines. Washington : The Bureau : Supt. of Docs., U.S.. Vol. 1992, 1993, 1994, 1995, 1996 and 1997.

16. Toiletries/Cosmetics (7 firms): a) http://ctfa.org/, The Cosmetic, Toiletry, and Fragrance Association Home Page. b) CTFA membership directory. / Who's who in the cosmetic industry. Washington, Cosmetic, Toiletry and Fragrance Association. 1990.

17. Aerospace/Defense (14 firms): a) Aerospace facts and figures. Washington, D.C., Aerospace Industries Association of America. Vol. 1998/97, 1996/97, 1995/96, 1994/95, 1993/94 and 1992/93. b) The aviation & aerospace almanac. Washington, D.C. : Aviation Week Group Newsletters, McGraw-Hill, ed. 1997, 1996 and 1993. c) United States space directory. Bethesda, MD : Space Publications. Vol. 1995-96, 1999

18. Drug - Pharmaceutical (28 firms): a) Pharmaceutical manufacturers : an international directory / by David B. Braun. Park Ridge, NJ : Noyes Publications, 1995. b) Pharmaceutical manufacturers of the United States / edited by D.J. De Renzo. 4th ed. Park Ridge, N.J., U.S.A. : Noyes Data Corp., 1987. c) Plunkett's health care industry almanac. Dallas, Tex. : Corporate Jobs Outlook. Vol. 1995, 1997-98. d) Pharmaceutical Manufacturers Association. Yearbook. Washington.

19. Drugstores (7 firms): a) http://www.nacds.org/, National Association of Chain Drug Stores Home page. b) Plunkett's retail industry almanac. Galveston, Tex. : Plunkett Research. 1997, 1999/2000. c) Fairchild's retail stores financial directory. New York : Fairchild Books & Visuals, Fairchild Fashion & Merchandising Group. Vol. 1992/93, 1994, 1995, 1996, 1997 and 1999. d) NACDS-Lilly digest. Indianapolis, Eli Lilly and Co.. 1985

20. Electronics Components (26 firms): a) Electronics manufacturers directory. Twinsburg, Ohio : Harris Pub., c1993-1998. b) Electronics industry year book. Newton, Mass.:

Cahners Electronics Group. 1999.

21. TV Broad. / Entertainment (15 firms): a) Plunkett's entertainment & media industry almanac. Houston, Tex. : Plunkett Research, Ltd. 1998. b) Entertainment industry economics : a guide for financial analysis / Harold L. Vogel. 2nd ed.; New York : Cambridge University Press, 1990.

22. Waste Management (6 firms): a) http://www.swana.org/, Solid Waste Association of North America Home page. b) Statistical record of the environment / compiled and edited by Arsen J. Darnay. Detroit : Gale Research, 1992.

23. Food Processing (35 firms): a) Food processing. Chicago, Putman Pub. Co. Vol 53 (1992) - 58 (1997). b) FoodReview / United States Department of Agriculture, Economic Research Service. Washington, D.C.. Vol. 17(1994) - 19(1996).

24. Food Wholesalers (8 firms): a) Progressive grocer's marketing guidebook. New York, Progressive Grocer Co., 1992-1997. b) Fairchild's retail stores financial directory. New York : Fairchild Books & Visuals, Fairchild Fashion & Merchandising Group. Vol. 1992/93, 1994, 1995, 1996, 1997 and 1999.

25. Furn./Home Furnishings (9 firms): a) Household furniture and bedding / prepared by Market Research Division. New York. Fairchild Publications, 1976. b) NHFA reports to the home furnishings industry. Chicago, National Home Furnishings Association. 1989. c) Furniture retailer: official journal of the National Home Furnishings Association. Greensboro, NC: Pace Communications, V. 4 (1992) - V. 9 (1997). d) The Competitive edge. (Chicago) National Home Furnishings Association. V. 66 (1992) - V. 71 (1997).

26. Natural Gas - Distribution (26 firms): a) http://www.aga.org/, American Gas Association Home page. b) Plunkett's energy industry almanac / editor and publisher, Jack W. Plunkett; Houston, Tex. : Plunkett Research, Ltd., 1999. c) Financial times oil and gas international year book. Essex (England): Longman, 1982-1996.

27. Natural Gas - Diversified (17 firms): a) http://www.aga.org/, American Gas Association Home page. b) Plunkett's energy industry almanac / editor and publisher, Jack W. Plunkett; Houston, Tex. : Plunkett Research, Ltd., 1999. c) Financial times oil and gas international year book. Essex (England) : Longman, 1982-1996.

28. Gold/Silver Mining (10 firms): a) American metal market. New York : (s.n.), V. 100 (1992) - V. 106 (1998). b) Minerals yearbook / prepared by the staff of the Bureau of Mines. Washington : The Bureau : Supt. of Docs., U.S. G.P.O.. Vols. 1992-1997.

29. Grocery (16 firms): a) Directory of supermarket, grocery & convenience store chains. New York, N.Y. Business Guides. 1996, 1997. b) Annual report of the grocery industry. New York: Progressive Grocer. 1995-1998. c) Progressive grocer's marketing guidebook. New York, Progressive Grocer Co., 1992-1997. d) Fairchild's retail stores financial directory. New York : Fairchild Books & Visuals, Fairchild Fashion & Merchandising Group. Vol. 1992/93, 1994, 1995, 1996, 1997 and 1999.

30. Healthcare Info Systems (6 firms): a) Plunkett's health care industry almanac. Dallas, Tex. : Corporate Jobs Outlook. Vol. 1995, 1997-98.

31. Homebuilding (8 firms): a) http://homebuilder.com/, National Association of

Homebuilders web page. b) Construction review. Washington, U. S. Department of Commerce, Domestic and International Business Administration. Vol. 38(1992) - 43(1997). c) Builder. Washington, National Association of Home Builders. 1992-1997.

32. Gambling, Casinos (15 firms): a) Plunkett's entertainment & media industry almanac. Houston, Tex. : Plunkett Research, Ltd. 1998. b) http://www.ahma.com/, American Hotel & Motel Association Home page.

33. Hotel/Lodging (13 firms): a) http://www.ahma.com/, American Hotel & Motel Association Home page. b) http://www.lodgingmagazine.com/, Lodging magazine web page. c) Directory of hotel & motel systems. New York, American Hotel Association Directory Corp.. 1991. d) Hotel & motel management. Cleveland (etc.) Harcourt Brace Jovanovich. 1992-1997. e) Texas accommodations guide, 2000. Dallas, TX : Recognition Communications, 1999

34. Household Products (6 firms): a) Soap, cosmetics, chemical specialties. New York, Mac Nair-Dorland Co. Official publication of Chemical Specialties Manufacturers Association. 1992-1997. b) Soap/cosmetics/chemical specialties. Blue book. New York. 1982.

35. Photographic Equip/Supply (10 firms).

36. Machinery - Construction (8 firms).

37. Maritime (6 firms): a) The business of shipping / Lane C. Kendall and James J. Buckley. 6th ed. Centreville, Md.: Cornell Maritime Press, 1994. b) National transportation statistics / prepared by Research and Special Programs Administration, Transportation Systems Center, Statistical Information Reporting Branch. Cambridge, Mass.: The Branch; Washington, D.C. 1993, 1995, 1996, 1997. c) Review of maritime transport. New York, United Nations. 1992-1997. d) Lloyd's maritime directory. Colchester, Essex : Lloyd's of London Press, 1984. e) Maritime transport. / International sea-borne trade statistics yearbook. Department of International Economic and Social Affairs, Statistical Office. New York : United Nations. 1986.

38. Medical Services (17 firms): a) Plunkett's health care industry almanac. Dallas, Tex.: Corporate Jobs Outlook. Vol. 1995, 1997-98.

39. Medical Supplies (34 firms): a) Plunkett's health care industry almanac. Dallas, Tex.: Corporate Jobs Outlook. Vol. 1995, 1997-98.

40. Newspaper (12 firms): a) Newspaper advertising source. Wilmette, IL : Standard Rate & Data Service, Vol. 75(1993) - 79(1997). b) Circulation. Malibu, Calif. American Newspaper Markets, Inc. 1992, 1994 and 1997. c) Plunkett's entertainment & media industry almanac. Houston, Tex.: Plunkett Research, Ltd. 1998

41. Office Eq.& Supp. Sell/Dist. (8 firms).

42. Petroleum Drilling Services (16 firms): a) Plunkett's energy industry almanac / editor and publisher, Jack W. Plunkett; Houston, TX: Plunkett Research, Ltd., 1999. b) National petroleum news. Market facts. Des Plaines, Ill. : Hunter Pub., 1992, 1994, 1996, 1997. c) U.S.A. oil industry directory. Tulsa, Okla., PennWell Pub. Co. 1994, 1995.

43. Oilfield Services (11 firms): a) Plunkett's energy industry almanac / editor and publisher, Jack W. Plunkett; Houston, Tex. : Plunkett Research, Ltd., 1999. b) National

petroleum news. Market facts. Des Plaines, Ill. : Hunter Pub., 1992, 1994, 1996, 1997. c) U.S.A. oilfield service, supply, and manufacturers directory. Tulsa, Okla.: PennWell Pub. Co.1990. d) U.S.A. oil industry directory. Tulsa, Okla., PennWell Pub. Co. 1994, 1995.

44. Petroleum - Develop./Explorat. (26 firms): a) Plunkett's energy industry almanac / editor and publisher, Jack W. Plunkett; Houston, Tex. : Plunkett Research, Ltd., 1999. b) National petroleum news. Market facts. Des Plaines, Ill. : Hunter Pub., 1992, 1994, 1996, 1997. c) U.S.A. oil industry directory. Tulsa, Okla., PennWell Pub. Co.1994, 1995. d) Financial Times oil and gas international year book. Essex (England): Longman, 1982-1996.

45. Petroleum - Refineries (8 firms): a) Plunkett's energy industry almanac / editor and publisher, Jack W. Plunkett; Houston, Tex. : Plunkett Research, Ltd., 1999. b) National petroleum news. Market facts. Des Plaines, Ill. : Hunter Pub., 1992, 1994, 1996, 1997. c) U.S.A. oil industry directory. Tulsa, Okla., PennWell Pub. Co.1994, 1995. d) Financial Times oil and gas international year book. Essex (England): Longman, 1982-1996.

46. Packaging & Container (11 firms): a) Packaging digest. Chicago, etc., Delta Communications. 1994-1998. b) Packaging. Boston, MA : Cahners Pub. Co. 1992-1994.

47. Paper & Forest Products (18 firms): a) Pulp & paper. San Francisco, Miller Freeman Publications. 1989-1996 b) American paper industry. Chicago, Paper Industry Management Assn. V. 75, 1993.

48. Publishing (10 firms): a) Publishers, distributors, & wholesalers of the United States. New York : R.R. Bowker. 1992/93 - 1997/1998. b) Publishers' international ISBN directory / International ISBN Agency, Berlin. Munchen: K.G. Saur ; New York: R.R. Bowker. 1992/93 - 1996/97. c) Plunkett's entertainment & media industry almanac. Houston, Tex.: Plunkett Research, Ltd. 1998

49. Railroad (8 firms): a) http://www.railroadpm.org/, Railroad performance measures web page. Members of the Association of American Railroads. b) Railroad facts. Washington, D.C.: Office of Information and Public Affairs, Association of American Railroads. 1988.

50. Restaurants (24 firms): a) Technomic restaurant information services. Chicago, Ill.: Technomic Information Services. 1994, 1997. b) Directory of chain restaurant operators. (New York, N.Y.) : Business Guides, Inc.,1990. c) The food professional's guide : the James Beard Foundation directory of people, products and services / compiled by Irena Chalmers. New York : American Showcase: Wiley, 1990.

51. Department Stores (9 firms): a) Fairchild's retail stores financial directory. New York: Fairchild Books & Visuals, Fairchild Fashion & Merchandising Group. Vol. 1992/93, 1994, 1995, 1996, 1997 and 1999. b) Plunkett's retail industry almanac. Galveston, Tex.: Plunkett Research, vol. 1997, and 1999. c) Journal of retailing. New York, New York University, School of Retailing. 1992-97.

52. Discount Stores (10 firms): a) Fairchild's retail stores financial directory. New York: Fairchild Books & Visuals, Fairchild Fashion & Merchandising Group. Vol. 1992/93, 1994, 1995, 1996, 1997 and 1999. b) Plunkett's retail industry almanac. Galveston, Tex.:

Plunkett Research, vol. 1997, and 1999.

53. Retail Electronics (8 firms): a) Fairchild's retail stores financial directory. New York: Fairchild Books & Visuals, Fairchild Fashion & Merchandising Group. Vol. 1992/93, 1994, 1995, 1996, 1997 and 1999. b) Plunkett's retail industry almanac. Galveston, Tex.: Plunkett Research, vol. 1997, and 1999.

54. Retail Off-Pricers (8 firms): a) Fairchild's retail stores financial directory. New York: Fairchild Books & Visuals, Fairchild Fashion & Merchandising Group. Vol. 1992/93, 1994, 1995, 1996, 1997 and 1999. b) Plunkett's retail industry almanac. Galveston, Tex.: Plunkett Research, vol. 1997, and 1999.

55. Retail Specialty Stores (12 firms): a) Fairchild's retail stores financial directory. New York: Fairchild Books & Visuals, Fairchild Fashion & Merchandising Group. Vol. 1992/93, 1994, 1995, 1996, 1997 and 1999. b) Plunkett's retail industry almanac. Galveston, Tex.: Plunkett Research, vol. 1997, and 1999. c) Journal of retailing. New York, New York University, School of Retailing. 1992-97.

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