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Managerial Entrenchment and Capital Structure: The Effect of Diversification

Shuangshuang Ji[a] sji2@uncc.edu, David C. Mauer[a] dmauer@uncc.edu, Yilei Zhang[a] yzhang74@uncc.edu

[a]Department of Finance, Belk College of Business, University of North Carolina at Charlotte, 9201 University City Blvd. Charlotte, NC 28223

Abstract

This paper empirically examines how diversification influences the relation between corporate governance and capital structure. Consistent with the creditor alignment hypothesis, we find a positive relation between managerial entrenchment and leverage in diversified firms. In contrast, we find a negative relation between managerial entrenchment and leverage in focused firms, which supports the managerial entrenchment hypothesis. These effects are stronger or only exist in samples with low excess values, which supports the agency channel through which governance influences leverage decisions. Our results are robust to different measures of leverage, diversification, and governance, and continue to hold when we attempt to account for selection bias and the joint endogeneity of leverage, diversification, and governance.

JEL classification: G32, G34
Keywords: Diversification, Financial leverage, Corporate governance, Managerial entrenchment, Creditor alignment

1. Introduction

The finance literature has conflicting views and empirical evidence on the relation between corporate governance and capital structure. Classic models of the agency problem of free cash flow (Jensen, 1986; Stulz, 1990; Hart and Moore, 1995) show that greater use of debt reduces agency costs, since it constrains managers from pursuing inefficient investment. When left to their discretion, however, entrenched managers may prefer less debt to reduce firm risk to protect their human capital (Fama, 1980; Amihud and Lev, 1981), or because of a dislike of performance pressures associated with commitments to disgorge cash (Jensen, 1986; Morellec,

2004).[1] This *managerial entrenchment hypothesis* predicts that entrenched managers will choose lower leverage and leverage will increase as governance improves (i.e., greater shareholder rights and more exposure to the disciplining influence of the market for corporate control). This hypothesis, which is the conventional view in the literature, has received some empirical support.[2]

In contrast, some theory suggests that entrenched managers may want higher leverage and may have better access to debt finance because their incentives are more aligned with those of creditors. There are three main arguments in support of this *creditor alignment hypothesis*. First, debt financing helps avoid dilution of control rights and reduces the likelihood of a takeover attempt (Harris and Raviv, 1988; Stulz, 1988). Second, as shown by Lambrecht and Myers (2008), firms with lower investor protection have limited access to equity financing and therefore rely more heavily on debt financing. They argue that firms with weak governance use debt as a commitment device to minimize the agency cost of equity. Third, John and Litov (2010) argue that less equity-oriented managers have incentives that are more naturally aligned with creditors and this allows for greater access to debt markets. This *creditor alignment hypothesis* predicts that entrenched managers will choose higher leverage and leverage will decreases as governance improves. There is a growing body of empirical evidence that supports this hypothesis.[3]

[1] By definition, entrenched managers are protected from the market for corporate control and are unwilling to voluntarily increase the firm's leverage to decrease their own discretion. Several papers have shown, particularly, Harris and Raviv (1988), Stulz (1988), and Zwiebel (1996), that a takeover threat can induce a manager to increase leverage.

[2] For example, see Agrawal and Mandelker (1987), Friend and Lang (1988), Mehran (1992), Jung et al. (1996), Berger et al. (1997), and Garvey and Hanka (1999).

[3] Nielsen (2006), John and Litov (2010), Renneboog and Smulders (2014), and Zhao and Zou (2015) show that firms with weak shareholder rights, as proxied by the Gompers, Ishii, and Metrick (2003) G-index, have higher leverage ratios. Wald and Long (2007) and John and Litov (2010) find that leverage increases after the adoption of state antitakeover amendments. Klock et al. (2005) and Chava et al. (2009) find that yields on bonds and loans, respectively, decrease as the G-index increases. In related work, Cremers et al. (2007) find that greater shareholder

The managerial entrenchment hypothesis is primarily a demand side theory about the reluctance of managers to take on debt financing. On the other hand, the creditor alignment hypothesis primarily relies on the willingness of creditors to supply debt, combined with management's willingness to accommodate. Since the managerial entrenchment and creditor alignment hypotheses make starkly different predictions about the relation between leverage and governance, it is surprising that there is no consensus on the relation in the empirical literature.[4] In this paper, we examine how a firm's diversification status influences the relation between managerial entrenchment and leverage. Diversification reduces the risk of a manager's undiversified portfolio. Therefore, managers in diversified firms are less concerned about the financial risk associated with debt and entrenched managers are more likely to pursue larger debt capacity provided by creditor alignment. Managers in focused firms, however, do not have the diversification status as a shield. Hence, entrenched managers in focused firms are more inclined to insure against downside risk by avoiding debt. Since all previous studies examine the relation between entrenchment and leverage in mixed samples of diversified and focused firms, it is perhaps not surprising that empirical results vary across samples.

To test whether diversification status influences the relation between capital structure and corporate governance, we construct a panel dataset of U.S. firms over the period 1998 to 2014. We use the Compustat Business Segment database to identify focused (single-segment) and diversified (multi-segment) firms. Based on empirical results in Hoechle et al. (2012) and Morellec et al. (2012), we select governance measures from ISS (formerly RiskMetrics),

control decreases bond yields if the firm is protected from takeover risk as proxied by an index of three anti-takeover provisions. Ortiz-Molina (2006) finds that greater alignment between managers and shareholders increases the cost of debt. Finally, Ashbaugh-Skaife et al. (2006) and John and Litov (2010) find that bondholder credit ratings are higher when the firm is protected from takeovers.

[4] One explanation could be related to differences in empirical measures (e.g., for corporate governance). Another explanation could be that the relation between capital structure and governance has changed over time and therefore studies using different sample periods find different results.

CDA/Spectrum, and ExecuComp that are significant determinants of firm value and policy decisions. The governance measures include the E-index of antitakeover provisions (Bebchuk et al., 2009), institutional ownership, CEO ownership, and an indicator of whether the CEO is powerful (i.e., chairman, president, and only insider on the board). We use these governance variables to construct equally-weighted and percentile-weighted governance indices, so that higher index values represent more equity alignment (less entrenchment).[5]

Since our empirical tests focus on how diversification affects the relation between corporate governance and leverage, we measure a firm's leverage net of the leverage of a comparable portfolio of focused firms. Following Berger and Ofek (1995), Ahn et al. (2006), and Kuppuswamy and Villalonga (2016), this adjusted leverage is computed as the difference between a firm's actual leverage ratio and its imputed leverage ratio, where the imputed leverage ratio is computed as the segment asset-weighted average of median leverage ratios of single segment firms in each of the firm's segments' industries. In our baseline specification, we regress the adjusted leverage ratio (hereafter adjusted leverage) on diversification (indicator for multi-segment firm), governance (governance indices or governance dummies), the interaction of diversification and governance, a set of controls, and fixed effects. As discussed in the next section, the coefficient on diversification measures the combined influence of "co-insurance" and creditor alignment on the leverage of diversified firms relative to focused firms.[6] The coefficient on governance measures the marginal effect of better governance (less entrenchment) on the leverage of focused firms. The coefficient on the interaction of diversification and governance

[5] As discussed in Section 4, our results are robust to alternative measures of governance, leverage, and diversification.

[6] The term co-insurance, originally coined by Lewellen (1971), refers to the hypothesized positive influence of diversification on leverage through a reduction in default risk driven by imperfect correlation among a conglomerate's portfolio of businesses. As Kuppuswamy and Villalonga (2016) note, the precise way to test the co-insurance hypothesis—and for our purposes the effect of managerial entrenchment on leverage in diversified firms—is to compare a firm's actual leverage to the leverage of a comparable portfolio of same-industry single-segment firms.

measures the marginal effect of better governance on the leverage of diversified relative to focused firms.

We find positive coefficients on diversification and governance, and a negative coefficient on their interaction. This indicates that the incremental effect of better governance increases the leverage of focused firms and decreases the leverage of diversified firms. Economically, better governance (equally-weighted or percentile-weighted governance index above yearly median) increases industry-adjusted leverage by about 1.5% in focused firms and decreases industry-adjusted leverage by about 1% in diversified firms. Although modest, relative to the sample mean leverage of 20%, these effects reflect an increase in leverage of about 8% for focused firms and a decrease in leverage of 5% in diversified firms. Thus, we find support for the creditor alignment hypothesis in diversified firms and the managerial entrenchment hypothesis in focused firms. These contrasting effects of corporate governance on leverage help explain why the literature finds mixed support for the effect of managerial entrenchment on leverage in samples containing both diversified and focused firms.

The creditor alignment and managerial entrenchment hypotheses are both premised on agency problems. Specifically, entrenched managers in diversified firms have better access to debt finance because their incentives are more aligned with creditors than with shareholders and entrenched managers in focused firms avoid debt finance based on self-interest. Thus, as a further check on the agency channel through which governance influences leverage decisions, we compute Berger and Ofek (1995) excess value measures and separate the sample into firm-years with above- and below-median excess value.[7] This experiment is motivated by the empirical results of Hoechle et al. (2012), who estimate that 16-21% of the Berger and Ofek

[7] The Berger and Ofek (1995) excess value measure assesses the degree to which a diversified (or focused) firm trades at a discount or premium relative to a comparable portfolio of focused firms in the same industry.

(1995) diversification discount is explained by poor corporate governance.[8] We find the effects of governance on the leverage of diversified and focused firms are much stronger in the below-median excess value group, where a lack of shareholder rights and therefore a larger value discount provide the necessary underpinnings for both the managerial entrenchment and creditor alignment hypotheses. Furthermore, we show that our results are robust to using a variety of different measures of leverage, corporate governance, and diversification.

A major concern with the analysis is the joint endogeneity of leverage, diversification, and governance. Further, addressing endogeneity is potentially more challenging in our case, since we model the interaction between endogenous variables (diversification status × governance). We use two estimation strategies to address these problems. First, we use a modified Heckman selection model developed by Chang et al (2016) to account for multiple endogenous variables and their interaction. Second, we use a three-step instrumental variables method developed for binary choice variables (Adams et al., 2009; Angrist and Pischke, 2009; Wooldridge, 2010). Both methods have limitations. Most important, both approaches require valid instruments for leverage, diversification, and governance which turns out to be a difficult task. Still, these tests—even though unlikely to fully resolve all endogeneity issues in our empirical setup—serve as important robustness tests to our main setting. When applying either method, we continue to find a positive relation between better governance and financial leverage in focused firms and a negative relation between better governance and financial leverage in

[8] Beginning with Lang and Stulz (1994) and Berger and Ofek (1995), a large literature documents that diversified firms have lower values than comparable portfolios of specialized firms. Campa and Kedia (2002) and Villalonga (2004b) argue that discounts are biased because the decision to diversify is endogenous and there are unobserved factors that influence firm diversification and value. However, Laeven and Levine (2007), Schmid and Walter (2009), Ammann et al. (2012), and Hoechle et al. (2012) find a robust diversification discount after accounting for endogeneity and omitted variable bias. Many other explanations for the diversification discount have been put forward in the literature. For example, poor data quality in Compustat (Villalonga, 2004a) or poor benchmarking in the Berger and Ofek measure (Hund et al., 2017). However, our analysis does not depend on the existence of a diversification discount, since we use the Berger and Ofek (1995) excess value measure only as a metric to separate the sample into firms that are more or less likely to have governance problems.

diversified firms. Overall, our results suggest that conditioning on diversification status is important when examining the relation between capital structure and corporate governance.

The remainder of the paper is organized as follows. Section 2 discusses hypotheses and empirical strategy. Section 3 describes the sample. Section 4 presents empirical results. Section 5 reports estimations accounting for the joint endogeneity of leverage, diversification, and governance. Section 6 concludes. The Appendix provides variable definitions.

2. Hypotheses and baseline empirical specification

In this section, we discuss hypotheses for the relation between leverage and corporate governance and explain how diversification influences this relation. We then describe our baseline regression specification.

2.1. Managerial entrenchment and creditor alignment hypotheses

The conventional thinking in the literature is that entrenched managers will choose low leverage to minimize performance pressure to meet debt obligations and to protect their private benefits of control that would likely be lost in bankruptcy. Mehran (1992), Berger et al. (1997), and Garvey and Hanka (1999), among others, empirically document that more entrenched CEOs manage firms with less leverage. This *managerial entrenchment hypothesis* predicts that entrenched managers choose low leverage, and by extension, leverage will increase as governance improves (e.g., fewer antitakeover amendments).

However, there are at least three reasons to suggest that firms with poor governance have more debt and thereby, all else being equal, have higher leverage than firms with good governance. First, as argued by Harris and Raviv (1988) and Stulz (1988), managers may forgo equity finance in favor of debt finance to influence the distribution of voting rights to preserve

their private benefits of control. Second, Lambrecht and Myers (2008) posit that conflicts between shareholders and managers that engender high agency costs of equity lead to less equity financing and more reliance on debt financing. Lastly, entrenched managers who pursue safe projects and/or build empires to protect and diversify their human capital have interests more aligned with creditors than with equity holders, which allows for greater access to debt finance. Among others, Nielsen (2006) and John and Litov (2010) find empirically that firms with bad governance (many antitakeover amendments) use more leverage than firms with good governance (few antitakeover amendments). This *creditor alignment hypothesis* predicts that entrenched managers take advantage of their better access to debt finance and use more leverage. Importantly, it therefore also predicts that leverage will decrease as governance improves.

Since the managerial entrenchment and creditor alignment hypotheses make opposite predictions about the relation between leverage and governance, it is unclear why the empirical literature testing this relation has been unable to reach a consensus. Some likely culprits for the diverse results include differences in time periods and/or samples, and differences in variables used to measure leverage and corporate governance. We argue in this paper, however, that firm diversification status should influence the relation between leverage and governance, and that estimating the relation between leverage and governance without conditioning on diversification can produce almost any result.

The empirical literature finds that diversified firms have higher leverage relative to comparable portfolios of stand-alone firms (see, e.g., Berger and Ofek, 1995; Ghosh and Jain, 2000; Kuppuswamy and Villalonga, 2016). Lewellen (1971) attributes this additional debt capacity to a co-insurance effect, where the combination of diverse businesses under one corporate umbrella decreases variability of cash flows and thereby default risk. Hann et al.

(2013) find strong support for the co-insurance effect, showing that diversified firms have, on average, a lower cost of capital than comparable portfolios of focused firms. They further find that the reduction in the cost of capital is larger when a diversified firm's segments have lower cash flow correlation.

There is an agency problem in diversified firms that also encourages greater use of leverage. The source of the additional debt capacity stems from an alignment of manager and creditor interests which encourages diversification and enhances access to debt finance. Amihud and Lev (1981) argue that risk-averse and/or under-diversified managers have a strong incentive to pursue (possibly value-reducing) diversification strategies (e.g., pure conglomerate mergers) to diversify their employment risk. Subsequent authors, including Jensen (1986), Stulz (1990), and Aggarwal and Samwick (2003) argue that managers insulated from the market for corporate control will maximize their private benefits by building large diversified empires of businesses. These self-interested incentives of managers to diversify to reduce risk naturally align their interests with creditors. Importantly, Denis et al (1997) and Hoechle et al. (2012) directly link this agency motive to diversify to poor corporate governance by showing, respectively, that value-reducing diversification strategies are positively related to several indicators of poor corporate governance (e.g., low managerial and institutional share ownership) and that 16-21% of the estimated diversification discount can be explained by poor corporate governance.[9] Overall, this agency channel linking firm diversification to poor corporate governance establishes that the interests of entrenched managers in diversified firms will be more aligned with creditors than with shareholders. This in turn should allow these managers greater access to

[9] Denis et al. (1997) further show that diversification decreases when corporate governance improves resulting from external corporate control threats, financial distress, or management turnover.

debt finance, which according to the creditor alignment hypothesis, predicts higher leverage in diversified firms than in focused firms.

Empirically, both co-insurance and agency channels predict a positive relation between leverage and diversification. However, since the agency channel requires that managers are insulated from shareholders and the market for corporate control (i.e., entrenched), the agency channel further predicts that a diversified firm's access to credit should decrease as corporate governance improves and the incentives of managers become more aligned with shareholders. Thus, in accord with the creditor alignment hypothesis, leverage in diversified firms should decrease as governance improves.

The relation between leverage and governance in focused firms will likely depend on the incentives of entrenched managers to avoid debt. Unlike in diversified firms, where a manager's human capital is protected by diversification, entrenched managers in focused firms should be more inclined to insure against downside risk by avoiding debt. Consistent with the managerial entrenchment hypothesis, this suggests that leverage is lower in poorly governed focused firms and that leverage increases as governance improves.

2.2. Baseline empirical specification

We estimate the following baseline panel regression:

$$Lev_{it} = \alpha_t + \alpha_j + \beta_1 Div_{it} + \beta_2 Gov_{it} + \beta_3 Div_{it} \times Gov_{it} + \gamma' X_{it} + \varepsilon_{it} \quad (1)$$

where i indexes firms, t indexes time, j indexes industry, Lev_{it} is industry-adjusted leverage, Div_{it} is diversification, Gov_{it} is governance, α_t and α_j are year and industry fixed effects, and X_{it} is a vector of firm characteristics. In this specification, we focus on the signs and interpretation of the parameters, β_1, β_2, and β_3.

Let Div_{it} and Gov_{it} be indicator variables, such that $Div_{it} = 1$ for diversified firms and zero for focused firms, and $Gov_{it} = 1$ for firms with good corporate governance and zero for firms with bad corporate governance. Further, let subscript D (F) denote diversified (focused) and superscript G (B) denote good (bad) corporate governance. Thus, letting Lev_D^G (Lev_f^G) and Lev_D^B (Lev_f^B) denote, respectively, expected leverage conditional on the firm being diversified (focused) with good and bad corporate governance, respectively, we can interpret the coefficients β_1, β_2, and β_3 in equation (1) as follows:

$\beta_1 = Lev_D^B - Lev_F^B$ measures the difference in expected leverage between diversified and focused firms with bad corporate governance.[10] Economically, β_1 reflects both the co-insurance effect of diversification and the influence of poor corporate governance (i.e., the agency channel) on the leverage of diversified firms relative to focused firms. The co-insurance and creditor alignment hypotheses both predict $\beta_1 > 0$.

$\beta_2 = Lev_F^G - Lev_F^B$ measures the difference in expected leverage for focused firms with good and bad corporate governance. The managerial entrenchment hypothesis predicts $\beta_2 > 0$.

$\beta_3 = (Lev_D^G - Lev_D^B) - (Lev_F^G - Lev_F^B)$ measures the difference in the effects of good versus bad corporate governance on expected leverage for diversified versus focused firms. The creditor alignment hypothesis predicts $\beta_3 < 0$, since better governance in diversified firms decreases expected leverage.[11] Further note that the sum of β_3 and β_2 directly measures the

[10] Referring to equation (1), expected leverage conditional on the firm being diversified and having bad corporate governance is $E(Lev_{it}|Div_{it} = 1 \text{ and } Gov_{it} = 0) = \alpha_t + \alpha_j + \beta_1 + \gamma' X_{it}$, and expected leverage conditional on the firm being focused and having bad corporate governance is $E(Lev_{it}|Div_{it} = 0 \text{ and } Gov_{it} = 0) = \alpha_t + \alpha_j + \gamma' X_{it}$. The difference in expected leverage between diversified and focused firms with bad corporate governance is $Lev_D^B - Lev_F^B \equiv E(Lev_{it}|Div_{it} = 1 \text{ and } Gov_{it} = 0) - E(Lev_{it}|Div_{it} = 0 \text{ and } Gov_{it} = 0) = \beta_1$. The coefficients β_2 and β_3 can be derived similarly.

[11] This assumes $\beta_1 = (Lev_F^G - Lev_F^B) > 0$ (i.e., the entrenchment hypothesis holds for focused firms) or $|Lev_D^G - Lev_D^B| > |Lev_F^G - Lev_F^B|$, which is assumed true under the creditor alignment hypothesis.

effect of good versus bad governance on the expected leverage of diversified firms, which under the creditor alignment hypothesis is negative, i.e., $\beta_3 + \beta_2 < 0$.

We also regress Lev on Gov in subsamples of diversified and focused firms. These regressions allow for different sensitivities of diversified and focused firms to firm characteristics (i.e., the vector of γ' coefficients in equation (1)). In diversified firm regressions, the creditor alignment hypothesis predicts a negative coefficient on Gov. In focused firm regressions, the managerial entrenchment hypothesis predicts a positive coefficient on Gov.

3. Sample and variable description

We start with all firms having data on both the Compustat Fundamentals Annual and Compustat Business Segment data files. The sample begins in 1998 to avoid changes in segment reporting rules that potentially invalidate comparisons of the number of reported segments before and after this date.[12] Following Berger and Ofek (1995), we exclude firm-years in which at least one segment is classified as being in the financial sector (SIC codes 6000-6999), total sales are less than $20 million, or the sum of segment sales is not within 1% of consolidated firm totals.[13] We further exclude American Depository Receipts (ADRs), firm-years that are incorporated outside the U.S., and firm-years with any segments classified as regulated utilities (SIC codes 4900-4999). A firm-year is classified as diversified if it has more than one business segment with different four-digit SIC codes; otherwise the firm is classified as focused.

[12] In June 1997, the Financial Accounting Standards Board (FASB) issued Statement of Financial Accounting Standards (SFAS) to replace FASB 14 for reporting information about operating segments, which is effective for fiscal years commencing after December 15, 1997. Therefore, we start our sample from 1998 to make sure our results are not influenced by the change in segment reporting standards.

[13] If the deviation of the sum of segment sales is within 1% of consolidated firm totals, we adjust each segment's sales up or down by the percentage deviation.

Following Berger and Ofek (1995), Ahn et al. (2006), and Kuppuswamy and Villalonga (2016), we use industry-adjusted leverage as our primary leverage variable. For multi-segment firms, industry-adjusted leverage is the difference between a firm's actual leverage ratio and its imputed leverage ratio, where the imputed leverage ratio is the asset-weighted average of its segments' imputed leverage ratios. A segment's imputed leverage ratio in a year is the median leverage ratio of single-segment firms in the same industry and year based on three-digit SIC codes.[14] The computation is

$$Adjusted\ Leverage = Leverage - \sum_{S=1}^{N} \frac{Asset_S}{\sum_{S=1}^{N} Asset_S} \times Medium(Leverage_S) \qquad (2)$$

where S indexes segments, N is the total number of segments, and a firm's actual leverage ratio ($Leverage$) and the leverage ratios of single-segment firms ($Leverage_S$) used to compute the firm's imputed leverage ratio are computed as the ratio of total debt (long-term debt plus debt in current liabilities) to book value of total assets. For single-segment firms, $Adjusted\ Leverage$ in a year is the firm's leverage ratio minus its industry median leverage ratio in the year.

We also compute an adjusted *net* leverage ratio by subtracting cash and marketable securities from total debt in the computation of a firm's actual leverage ratio and the leverage ratios of single-segment firms used to compute the firm's imputed leverage ratio. This cash adjustment is motivated by the practical rule of thumb that cash may be viewed as negative debt and the finding in Duchin (2010) that diversified firms hold smaller cash balances than focused firms.[15] We report results below using adjusted leverage and adjust net leverage. In unreported

[14] If there are fewer than 5 single-segment firms in a segment's three-digit SIC code in a year, we use two-digit SIC code to define a segment's industry.

[15] We recognize that building cash balances and using excess cash to reduce debt may not be equivalent strategies when firms face financing constraints, and therefore it may not be appropriate to treat cash as negative debt (see, e.g., Acharya et al., 2007). Nevertheless, the adjusted net leverage ratio can at least account for the different cash balances documented in diversified and focused firms.

results, we also compute adjusted leverage ratios using market leverage defined as total debt divided by the market value of assets (estimated as the book value of assets plus the difference between the market and book values of equity). The results using market leverage are similar to those reported below.

For robustness, we also use unadjusted leverage and net (of cash) leverage ratios, and we alternatively measure leverage using the interest coverage ratio and the industry adjusted interest coverage ratio. Following Faulkender and Petersen (2006), we use the natural logarithm of one plus the interest coverage ratio, where the interest coverage ratio is equal to earnings before interest, taxes, depreciation, and amortization (EBITDA) divided by interest expense when EBITDA is positive and zero when EBITDA is negative. The industry adjusted interest coverage ratio is the difference between the natural logarithm of one plus the interest coverage ratio and the natural logarithm of one plus the imputed interest coverage ratio. See the appendix for details on the computation of the imputed interest coverage ratio.

We would like a measure of diversification's effect on firm value to sharpen our tests of how diversification influences the relation between leverage and governance. This will allow us to focus on more heavily discount firms where, as shown by Hoechle et al. (2012), diversification is more likely the product of self-interested entrenched managers. Following Berger and Ofek (1995), we measure the value of diversification as the excess value of a diversified firm relative to a portfolio of industry-matched single-segment firms. We compute excess value as the logarithm of the ratio of the firm's actual market value to its imputed value. A firm's actual market value is the sum of the total book value of debt and market value of equity. A firm's imputed value is the sum of the imputed values of its segments, with each segment's imputed value equal to the segment's sales multiplied by its industry median ratio of

total capitalization (books debt plus market value of equity) to sales. Industry median ratios are computed using only single-segment firms and are based on the narrowest SIC code grouping that yields at least five single-segment firms with data to compute the ratio. Following the literature, we exclude firm-years where a firm's actual value is more than four times or less than one-fourth imputed value.

There is a long list of governance variables that have been used in the literature. Of most relevance to our analysis, Hoechle et al. (2012) and Morellec et al. (2012) find that institutional stock ownership, managerial stock ownership, CEO power, and an index of antitakeover defenses matter most for excess values and the influence of agency conflicts on leverage decisions, respectively. We use these four governance variables to construct governance indices. The governance measures in our indices include the proportion of shares owned by institutional investors, the proportion of shares owned by the CEO, a dummy variable equal to one for powerful CEO, and the Bebchuk et al. (2009) count of six antitakeover provisions (E-index). A CEO is classified as powerful if she is the only insider on the board and serves as chairman and president. Our choice of E-index rather than the broader G-index is primarily motivated by data availability. From 1990 to 2006, both indices are available for 1990, 1993, 1995, 1998, 2000, 2002, 2004, and 2006. However, the E-index is also available each year from 2007 and the G-index stops updating after 2006.[16] We obtain CEO ownership from ExecuComp, institutional ownership from CDA/Spectrum, and we construct the powerful CEO dummy and the E-index using data from ISS (formerly RiskMetrics).

We construct an equally-weighted and percentile-weighted index of good corporate governance. The equally-weighted index is the sum in a firm-year of zero/one indicator variables for the four governance measures. The E-index indicator variable is equal to one if a firm-year

[16] Prior to 2007, we follow the literature and assume that a firm's E-index is unchanged between reporting dates.

has a below median E-index for the year, and zero otherwise. The institutional and CEO ownership indicator variables, respectively, are equal to one if a firm-year has above median institutional and CEO ownership for the year, and zero otherwise. Lastly, the CEO power indicator variable is equal to one if the CEO is *not* powerful, and zero otherwise. The percentile-weighted index is computed as the sum in a firm-year of the percentile rankings of the four governance measures, which is then scaled to vary between zero and one. We first transform the powerful CEO dummy and E-index by computing (1 – powerful CEO) and (6 – E-index), respectively, so that higher values indicate better governance. We then compute firms' percentile rankings for institutional ownership, CEO ownership, (1 – powerful CEO), and (6 – E-index) by sample year and compute the percentile-weighted governance index as the simple average of the percentile rankings across the four governance measures.[17] In addition to our baseline governance indices, we also examine and discuss the robustness of our results to alternative measures of corporate governance.

We require firm-years to have complete data for industry-adjusted book leverage, excess value, governance variables, and all control variables in the baseline leverage regression to be included in the sample. Our final sample has 6,873 firm-year observations for 1,191 firms over 1998 to 2014. Panel A in Table 1 reports mean and median values for our variables for the full sample and the diversified (multi-segment) and focused (single segment) subsamples. Diversified firms account for 35% of sample firm-years, with an average (median) of 2.73 (2) segments. Mean and median leverage, net leverage, and adjusted net leverage are significantly larger in diversified firms than in focused firms. Correspondingly, the interest coverage ratio variables are significantly lower in diversified firms.

[17] We assume the percentile ranking when (1 – powerful CEO) = 1 (i.e., powerful CEO = 0) is 0.50 and the percentile ranking when (1 – powerful CEO) = 0 (i.e., powerful CEO = 1) is zero. The results reported below are robust if we use 0.75/0 or 1/0 instead of 0.50/0.

Consistent with the agency perspective that entrenched managers pursue diversification strategies, both the equally-weighted and the percentile-weighted good governance indices are significantly lower in diversified firms than focused firms. Further, the governance components of the indices all point in the direction that diversified firms have significantly worse corporate governance. Finally, we see that diversified firms are larger, have fewer growth opportunities, invest less in R&D, have lower risk as measured by cash flow volatility and proportion of investment grade bond ratings, and hold smaller cash balances than focused firms.

Panel B in Table 1 reports correlations between key variables. Leverage (interest coverage) variables are generally positively (negatively) related to diversification status and negatively (positively) related to our good governance indices, suggesting that entrenched managers use more debt. Consistent with Hoechle et al. (2012), we also see that better governed firms have larger Berger and Ofek (1995) excess value.

4. Empirical results

In this section, we first report univariate comparisons of key variables. We then report the results of regression analysis of the influence of diversification on the relation between leverage and corporate governance, followed by robustness checks on the sensitivities of the results to alternative measures of diversification, leverage, and corporate governance.

4.1. Univariate comparisons

Table 2 reports means of variables for the full sample and the diversified and focused subsamples grouped by good and bad corporate governance. A firm-year observation has good (bad) corporate governance if the equally-weighted governance index is above (below) the

median index for the year.[18] For diversified firms, we see that leverage and adjusted leverage are significantly larger and the interest coverage ratio and adjusted interest coverage ratio are significantly smaller in the bad corporate governance subsample than in the good corporate governance subsample. In comparison, adjusted leverage and interest coverage ratios are not significantly different between good and bad corporate governance groups of focused firms.

Consistent with agency motives for diversification where entrenched managers pursue empire building and/or lower risk investments to protect the value of their human capital, we see that poorly governed diversified firms are significantly larger, have more fixed assets and capital expenditures, and have lower cash flow volatility than better governed firms. We also see that poorly governed diversified and focused firms have lower cash balances, which is consistent with the "spending hypothesis" of Harford et al. (2008) where weakly controlled managers choose to spend rather than stockpile cash. Coincidentally, poorly governed firms are more likely to pay dividends, which can also help explain the lower cash balances in these firms. Lastly, observe that poorly governed firms are roughly twice as likely to have an investment grade rating. This is noteworthy because it suggests that firms with poor corporate governance have better access to debt financing than firms with good corporate governance, which is consistent with the creditor alignment hypothesis.

4.2. Baseline leverage regressions

Table 3 reports panel regressions of leverage on governance for the specifications discussed in Section 2.2. Panel A reports coefficient estimates from full sample regressions where adjusted leverage (columns (1)-(4)) and adjusted net leverage (columns (5)-(8)) are regressed on a dummy variable for multi-segment firms, *Diversified*, a governance index or

[18] The results reported in Table 2 are similar if instead we group firms into good and bad corporate governance subsamples using the percentile-weighted governance index.

governance dummy variable, *Governance*, and their interaction, *Diversified* ×*Governance*. Panel B reports coefficient estimates from regressions of leverage on governance in subsamples of diversified and focused firms, respectively. Each panel uses four governance measures; the equally-weighted and percentile-weighted governance indices and governance dummy variables computed from these indices. The governance dummy variables are equal to one when the corresponding index is above the median index for the year, and zero otherwise. All regressions include year dummies, industry dummies based on Fama-French 49 industries, and the firm characteristics used in the leverage regressions of Coles et al. (2006) and Kuppuswamy and Villalonga (2016). Additionally, we include dummy variables for whether the firm has an investment grade or speculative grade S&P bond rating, where the left-out group is firm-years without a bond rating. Lastly, to control for the effect of M&A activity on capital structure, we include a dummy variable equal to one if the ratio of acquisition expenditures to book value of total assets in the current year and/or previous year is greater than 5%.[19] The *t*-statistics reported in parentheses below parameter estimates are computed using robust standard errors corrected for clustering of observations at the firm level.

The coefficients on *Diversified* in Panel A are positive and six out of eight are significantly so. Thus, consistent with the co-insurance and creditor alignment hypotheses, diversified firms borrow more than comparable portfolios of focused firms. The coefficients on *Governance* in Panel A are significantly positive. As the coefficient on *Governance* in the full sample regression captures the effect of better governance on the leverage of single segment firms, the positive coefficients support the managerial entrenchment hypothesis for focused firms. That is, better governance mitigates the incentives of managers in focused firms to choose

[19] We discuss whether acquisition activity can explain the positive relation between diversification and leverage in poorly governed firms and provide a test of this alternative explanation for our results below.

low leverage. Using the coefficients on the governance dummy variables for ease of interpretation, the estimates on *Governance* in columns (2) and (4) for adjusted leverage or columns (6) and (8) for adjusted net leverage indicate that focused firms with good governance use at least 1.5% higher leverage than focused firms with bad governance. This is an increase in leverage of about 8% based on the mean leverage ratio in the sample. The interaction of diversification status and governance, *Diversified* × *Governance*, captures the effect of better governance on the leverage of diversified relative to focused firms. As seen in Panel A, the coefficients on the interactions are generally significantly negative, suggesting that better governance decreases leverage in diversified firms. Summing the coefficients on *Governance* and *Diversified* × *Governance* in the governance dummy columns, we estimate that diversified firms with good governance use from −0.6% (column (6)) to −1.5% (column (8)) less leverage than diversified firms with bad governance. Using the overall average effect of −1%, this is a decrease in leverage of 5% based on the mean leverage ratio in the sample. Thus, consistent with the creditor alignment hypothesis, diversified firms decrease leverage as governance improves.

The different effects of better governance on the leverage decisions of diversified and focused firms can be seen directly in the subsample regressions in Panel B. As seen there, leverage is decreasing with better governance in diversified firms and increasing with better governance in focused firms. These effects are economically significant. Using the regressions in columns (3) and (4), diversified firms with good governance use 6.5% (1.5/23) less leverage and focused firms with good governance use 9.6% (1.8/18.7) more leverage than their peers with bad governance.[20] These results are consistent with the predictions of the creditor alignment hypothesis for diversified firms and the managerial entrenchment hypothesis for focused firms

[20] These calculations are based on the mean leverage ratios of 23% and 18.7% for diversified and focused firms, respectively, reported in Table 2.

(i.e., a negative correlation between governance and leverage in diversified firms and a positive correlation between governance and leverage in focused firms).

A possible alternative explanation of our findings is that poorly governed firms may use debt to fund value-destroying diversifying acquisitions, thereby generating a positive relation between leverage and diversification in poorly governed firms. If entrenched managers are otherwise adverse to using debt financing (e.g., as reflected in the debt policies of focused-firm managers), this could explain the different effects of governance on leverage in diversified and focused firms that we see in our sample.[21] To address this alternative explanation, Table 4 reports leverage regressions after excluding 1,965 (842 diversified and 1,123 focused) firm-years with acquisition expenditures to book assets in the current and/or previous year greater than 5%.[22] We continue to find that better governance decreases leverage in diversified firms and increases leverage in focused firms.[23] Thus, it is unlikely that our results are driven by entrenched managers pursuing debt-financed value-destroying diversifying acquisitions.

In unreported leverage regressions that do not control for diversification and the interaction of diversification with governance, we find a positive and marginally significant (at the 10 percent level) coefficient on governance. Based only on this evidence, we would conclude that our data support the managerial entrenchment hypothesis, when in fact poorly-governed diversified firms use more leverage than well-governed diversified firms. Overall, the different effects of corporate governance on leverage in diversified and focused firms help explain why

[21] We thank an anonymous referee for suggesting this alternative explanation for our results.

[22] As a robustness check, we merge our sample with the SDC M&A database and identify firm-years with major M&A activity as those engaged in mergers with a total deal value to the market value of the firm's equity greater than 1% (and alternatively 5%) in the current and/or previous year. Excluding these firm-year observations, we find similar results to those reported in Table 4. Results are available upon request.

[23] Table 4 and subsequent tables (except indicated otherwise) only report results of the equally-weighted and percentile-weighted governance indices. The results using governance dummy variables are very similar and are available upon request.

the literature finds mixed support for the effect of managerial entrenchment on leverage in samples containing a mixture of diversified and focused firms.

4.3. Conditioning on the diversification discount

As discussed in Section 2, a prominent explanation for the diversification discount is agency problems resulting from a lack of alignment between managers and shareholders. Using the magnitude of the discount as a proxy for the costs resulting from these agency problems, we examine whether the effects of governance on leverage are more pronounced in firms with greater discounts. We use the Berger and Ofek (1995) excess value measure to estimate the effect of diversification on firm value. For diversified firms, excess value is the discount or premium of actual value relative to what the firm would be worth if its business segments were standalone firms. For focused firms, excess value is the discount or premium of actual value to industry median firm value. We compute the median excess value each year for diversified firms and the median excess value each year for focused firms, and separate diversified and focused firms into above and below median excess value groups using their respective medians. We then place the above median excess value diversified and focused firms into one sample and the below median excess value diversified and focused firms into another sample.

Table 5 reports regressions of adjusted leverage and adjusted net leverage on diversification, governance, and their interaction for the above and below median excess value samples. Columns (1) to (4) report results using the equally-weighted governance index and columns (5) to (8) report results using the percentile-weighted governance index. Each regression has control variables (not reported) and industry and year fixed effects. We use a Chow test to assess whether the coefficients on *Diversified*, *Governance*, and *Diversified* × *Governance* are statistically different in the above and below median excess value subsamples.

The numbers in square brackets in the below median excess value columns are *p*-values from Chow tests under the null hypothesis that the coefficients are equal.

The results show that the effects of governance on the leverage of diversified and focused firms are much stronger in the below-median excess value group, where poor governance and thereby lower excess value provide the necessary underpinnings for both the creditor alignment and managerial entrenchment hypotheses. The corresponding effects in the above median excess value sample reported in column (1) are insignificant. Further, according to Chow tests, the coefficient estimates on *Governance* and *Diversified* × *Governance* in columns (1) and (3) are significantly different. Similarly, strong differences can be seen across above and below median excess value comparisons in columns (2) and (4), (5) and (7), and (6) and (8).

As a robustness check, we partition the sample based on excess value greater than or less than zero. Consistent with the results reported in Table 5, we find that the effects of governance on leverage are much stronger (or only present) in the negative excess value sample. These results are available upon request.

4.4. Alternative measures of diversification, leverage, and governance

We first examine the robustness of our results to alternative measures of diversification. Table 6 reports regressions of adjusted leverage and adjusted net leverage on diversification, governance, and the interaction of diversification and governance replacing the diversification dummy variable (*Diversified*) with *Number of segments* − 1 (Panel A) and 1 − *Herfindahl index* (Panel B). We subtract one from number of segments so that this variable is zero for focused firms and increasing in the number of segments for diversified firms. We compute the Herfindahl index as $\sum_{i=1}^{n} S_i^2$, where n is the number of segments, and S_i is segment i's sales to total firm sales. Since the Herfindahl index ranges from zero when the firm has many segments to one

when the firm has only one segment, we use the variable 1 – *Herfindahl index* so that the measure is zero for focused firms and increasing in the degree of diversification otherwise. In each panel, we report full sample results and split-sample results based on above and below median excess value.

The results are robust to using these alternative diversification measures. We find positive coefficients on the count (Panel A) and continuous (Panel B) diversification measures, indicating that the additional debt capacity due to coinsurance and creditor alignment is increasing in the intensity of diversification. Furthermore, the positive coefficients on the governance indices indicate that better governance (i.e., greater manager-shareholder alignment) mitigates the negative effect of managerial entrenchment on the leverage of focused firms. The negative coefficients on the interactions of the intensity of diversification and the governance indices indicate that better governance offsets the additional debt capacity in diversified firms due to creditor alignment. Lastly, all the above effects are only significant in the below-median excess value subsamples.

We next explore alternative measures of leverage. First, we examine whether our results are sensitive to using industry-adjusted leverage. Panel A in Table 7 reports our baseline specification using an unadjusted leverage ratio and an unadjusted net leverage ratio. Although results are insignificant in the full sample and the above median excess value subsample, we continue to find that good corporate governance has a positive effect on the leverage of focused firms and a negative effect on the leverage of diversified firms in the below median excess value subsample. Second, we alternatively measure leverage using the interest coverage ratio and the adjusted interest coverage ratio. Consistent with our leverage ratio results, Panel B in Table 7 shows that good corporate governance has a negative effect on the interest coverage ratio of

focused firms and a positive effect on the interest coverage ratio of diversified firms, with the effects significant in the below median excess value subsample regressions.

Of potential concern, except for interest coverage, all reported leverage results are based on book leverage measures. The reason, as emphasized by Welch (2004) and Coles et al. (2006), is that market leverage measures may change passively due to changes in stock prices, and so may not reflect managerial decisions. Notwithstanding, all our results are robust to using market leverage measures. To save space, results are not tabulated but are available upon request.

Lastly, we consider alternative governance measures to assess whether our results are robust to how we measure governance. Table 8 reports baseline adjusted leverage and adjusted net leverage regressions using the E-index to measure governance. The E-index is one component of our governance indices, measuring how well a firm is insulated from the market for corporate control and thereby the degree to which a manager is entrenched (Bebchuk et al., 2009). We use the variable 6 – *E-index* so that a higher value indicates less entrenchment. As seen in the table, the results using this alternative governance measure confirm our conclusion that better corporate governance increases leverage in focused firms and decreases leverage in diversified firms.

4.5. Additional tests

All our specifications control for industry fixed effects based on Fama-French 49 industries. However, the literature suggests that firm fixed effects are also important in explaining leverage (see, e.g., Lemmon et al., 2008). Therefore, we examine whether our results are robust to firm fixed effects. When firm fixed effects replace industry fixed effects in our regression models, the coefficients on governance, diversification, and their interaction are no longer statistically significant. The reason, as discussed and shown in Zhou (2001) and Cain et

al. (2017), among others, is that both governance and diversification status are persistent and slow-moving. Thus, firm fixed effects wash out the primarily cross-sectional variation that we seek to explain (i.e., how the leverage of diversified and focused firms varies in the cross-section by corporate governance).

We examine the sensitivity of our results to finer as well as coarser industry fixed effects. Table 9 reports adjusted leverage regressions with industry fixed effects based on four-digit SIC codes, three-digit SIC codes, and two-digit SIC codes.[24] As seen there, our results are robust to variation in industry fixed effects.

Finally, we examine whether the relations between leverage and governance in diversified and focused firms are affected by the governance reforms enacted in the 2002 Sarbanes-Oxley Act (SOX) or by economic downturns. Using a difference-in-differences specification, we find no significant change in the relations between leverage and governance in diversified and focused firms in the post-SOX time period. We also include interactions of the governance indices with macro variables to investigate whether the leverage-governance relations in diversified and focused firms vary by state of the economy.[25] We find no evidence that the negative (positive) relation between leverage and better governance for diversified (focused) firms varies by state of the economy. Overall, the influence of diversification on the relation between leverage and governance does not appear to be sensitive to Sarbanes-Oxley governance changes or to variation in the state of the economy.

5. Endogeneity of leverage, diversification, and governance

[24] In our sample there are 286 different four-digit SIC codes, 192 different three-digit SIC codes, and 53 different two-digit SIC codes.

[25] The macro variables include dummy variables for the 2001 NBER-defined recession and the 2007-2009 financial crisis, the growth rate in real GDP, and the VIX index.

Campa and Kedia (2002) and Villalonga (2004b) argue that the decision to diversify is endogenous and show empirically that factors motivating firms to diversify are negatively correlated with firm value. In this way, the decision to diversify may not be causal to the diversification discount. In our analysis, there is a similar concern about the relations between diversification and leverage. Specifically, if the decision to diversify is endogenous, then characteristics that drive firms to diversify may be correlated with firm leverage. Furthermore, it is well established in the literature that corporate governance is endogenous (e.g., Demsetz and Lehn, 1985; Himmelberg et al., 1999) and it is therefore important to try to account for this endogeneity when assessing the relation between leverage and corporate governance. In this section, we use a modified Heckman self-selection model and an instrumental variables (IV) method to address endogenous selection and joint endogeneity, respectively, of leverage, diversification, and governance. Although useful exercises, we caution the reader that neither approach is fully capable of resolving the endogeneity problems in our case and therefore these exercises generally serve as additional robustness tests of the relations that we document above. We first discuss the two methods and then present the estimation results.[26]

5.1. Modified Heckman selection model

In the estimation of equation (1), a concern is that diversification and governance are not random decisions by firms, and therefore the effects we observe are at least partially attributable to selection bias. If a firm's choices are correlated with its leverage policy, the error term in our regression model will be correlated with the firm's decision to diversify, choice of governance,

[26] We have also tried to sharpen identification by exploiting changes in state antitakeover laws and changes in state corporate tax rates (e.g., Heider and Ljungqvist, 2015). The results of these analyses are mixed. Although we have some success using the shock to corporate governance induced by the staggered adoption of state antitakeover laws, recent analysis by Karpoff and Wittry (2018) shows that these laws may not be exogenous and this casts a shadow over our results. On the other hand, we have no success exploiting exogenous shocks to the attractiveness of leverage occasioned by increases in state corporate tax rates. Specifically, changes in state corporate tax rates have no influence on the relation between leverage and corporate governance for diversified or focused firms.

and their interaction, inducing bias in our coefficient estimates. We use a modified Heckman (1979) two-stage procedure used by Campa and Kedia (2002) to account for the endogenous choice of diversification and the extension of the procedure by Chang et al. (2016) to account for interactions of endogenous choice variables.

Let *GOV* and *DIV* denote the firm's choices of governance and diversification, where *GOV* is equal to one if a firm-year's governance index is above the sample median for that year and zero otherwise, and *DIV* is equal to one if the firm-year is diversified and zero otherwise. Further, we treat the interaction *DIV* × *GOV*, denoted *DG* for notational simplicity, as a separate standalone choice variable. We then model the firm's choices of diversification, governance, and their interaction as latent variables that satisfy:

$$DIV_{it}^{*} = \beta_d Z_{it} + \eta_{1it} \quad \begin{matrix} DIV_{it} = 1 & if\ DIV_{it}^{*} > 0 \\ DIV_{it} = 0 & if\ DIV_{it}^{*} < 0 \end{matrix} \tag{3a}$$

$$GOV_{it}^{*} = \beta_g Z_{it} + \eta_{2it} \quad \begin{matrix} GOV_{it} = 1 & if\ GOV_{it}^{*} > 0 \\ GOV_{it} = 0 & if\ GOV_{it}^{*} < 0 \end{matrix} \tag{3b}$$

$$DG_{it}^{*} = \beta_{dg} Z_{it} + \eta_{3it} \quad \begin{matrix} DG_{it} = 1 & if\ DG_{it}^{*} > 0 \\ DG_{it} = 0 & if\ DG_{it}^{*} < 0 \end{matrix} \tag{3c}$$

where DIV_{it}^{*}, GOV_{it}^{*}, and DG_{it}^{*} are unobserved latent variables, Z_{it} is a set of firm characteristics and instrument variables that affect the diversification and governance decisions, and η_{1it}, η_{2it}, and η_{3it} are independently distributed error terms.

In the first stage, we estimate (3a)-(3c) using probit models. These models include all the firm characteristic variables in the second stage leverage regression and a set of instruments. The key criteria for the instruments are that they are correlated with the endogenous choice variables (i.e., relevant) and not directly related to leverage except through their effects on the endogenous

choice variables (i.e., satisfy exclusion restriction). We use as instruments two firm variables (S&P 500 index dummy and major exchange dummy) and two macro variables (growth rate of real GDP and log of the number of Mergers and Acquisitions per year).[27] Although we can test the relevance of these instruments with a Wald test, to our knowledge there is not a test of exclusion for a Heckman model using instruments in the first stage analogous to, for example, the Sargan-Hansen test of overidentifying restrictions for IV estimators. This is an important caveat when using the Heckman model to account for endogeneity. Further, it is possible that one or more of our instruments violate the exclusion restriction by affecting leverage through channels other than through diversification and/or governance. With these caveats in mind, Table 10 reports first stage probit regression estimates for the models in (3a)-(3c), where governance choice is based on the equally-weighted and percentile-weighted governance indices. As seen there, all instruments are significant in at least one probit model and the Wald chi-square tests easily reject the null hypothesis that the coefficient estimates on the instruments are equal to zero.

From the first stage probit regressions, we obtain consistent estimates of β_d, β_g, and β_{dg} in (3a)-(3c), which we denote by $\hat{\beta}_d$, $\hat{\beta}_g$, and $\hat{\beta}_{dg}$. Using $\hat{\beta}_d$, we compute the inverse Mills ratios (IMR) for diversified (λ_{it}^d) and focused (λ_{it}^f) firms as

$$\lambda_{it}^d = \frac{\phi(\hat{\beta}_d Z_{it})}{\Phi(\hat{\beta}_d Z_{it})} \quad \text{and} \quad \lambda_{it}^f = \frac{-\phi(\hat{\beta}_d Z_{it})}{1-\Phi(\hat{\beta}_d Z_{it})} \tag{4a}$$

where $\phi(\cdot)$ and $\Phi(\cdot)$ are the probability density and cumulative distribution functions of the standard normal distribution. The ratio λ_{it}^d (λ_{it}^f) is an estimate of the probability that a firm

[27] These instruments are used by Campa and Kedia (2002) in their econometric analysis of the influence of diversification on firm value. See the Appendix for detailed definitions of these instruments.

decides to diversify (focus) over the cumulative probability of the firm's decision. Similarly, for good (g) and bad (b) governance firms, we compute the IMRs as

$$\lambda_{it}^{g} = \frac{\phi(\hat{\beta}_g Z_{it})}{\Phi(\hat{\beta}_g Z_{it})} \quad \text{and} \quad \lambda_{it}^{b} = \frac{-\phi(\hat{\beta}_g Z_{it})}{1-\Phi(\hat{\beta}_g Z_{it})} \tag{4b}$$

And for diversified firms with good governance (dg) and all other interacted categories of firms (dg^c), we compute the IMRs as

$$\lambda_{it}^{dg} = \frac{\phi(\hat{\beta}_{dg} Z_{it})}{\Phi(\hat{\beta}_{dg} Z_{it})} \quad \text{and} \quad \lambda_{it}^{dg^c} = \frac{-\phi(\hat{\beta}_{dg} Z_{it})}{1-\Phi(\hat{\beta}_{dg} Z_{it})} \tag{4c}$$

The IMRs in (4a)-(4c) are then used to compute estimates of the corrections for self-selection as

$$\lambda_{it}^{Div} = \lambda_{it}^{d} \times DIV_{it} + \lambda_{it}^{f} \times (1 - DIV_{it}) \tag{5a}$$

$$\lambda_{it}^{Gov} = \lambda_{it}^{g} \times GOV_{it} + \lambda_{it}^{b} \times (1 - GOV_{it}) \tag{5b}$$

$$\lambda_{it}^{Div\times Gov} = \lambda_{it}^{dg} \times DG_{it} + \lambda_{it}^{dg^c} \times (1 - DG_{it}) \tag{5a}$$

In the second stage leverage regression, the lambdas in (5a)-(5c) are included as separate regressors to the baseline specification in (1) and the equation is estimated using OLS. Assuming the errors in equations (1) and (3a)-(3c), ε_{it}, η_{1it}, η_{1it}, and η_{1it}, are multivariate normally distributed with zero means, standard deviations σ_ε and 1, and correlations $\rho_{\varepsilon\eta_1}$, $\rho_{\varepsilon\eta_2}$, and $\rho_{\varepsilon\eta_3}$, it is straightforward to show that the coefficients on λ_{it}^{Div}, λ_{it}^{Gov}, and $\lambda_{it}^{Div\times Gov}$ will be equal to $\rho_{\varepsilon\eta_1}\sigma_\varepsilon$, $\rho_{\varepsilon\eta_2}\sigma_\varepsilon$, and $\rho_{\varepsilon\eta_3}\sigma_\varepsilon$, respectively. For example, since $\sigma_\varepsilon > 0$, a positive coefficient on λ_{it}^{Div} indicates a positive correlation between the firm's decision to diversify and leverage. This suggests that firm and/or market factors that drive diversification decisions also drive the decision to choose more leverage, which indicates that the coefficient on the diversification variable in equation (1) will be upward biased. The inclusion of the lambdas in the second stage

regressions will reduce this bias and eliminate it asymptotically. Testing whether the estimated coefficients on the lambdas are different from zero is therefore a test of selection bias in the sample.

5.2. IV Estimator

We also use the instrumental variables (IV) method discussed in Adams et al. (2009), Angrist and Pischke (2009, p. 191), and Wooldridge (2010, p. 939) for binary endogenous variables. We start with the three endogenous dummy variables *DIV*, *GOV*, and *DG* (= *DIV* × *GOV*). The IV method mimicking two-stage least squares involves three steps. In the first stage (step), we use the estimated probit models reported in Table 10 to compute the fitted probabilities Prob(*DIV*), Prob(*GOV*), and Prob(*DG*). The second stage has two steps. First, the fitted probabilities are used as instruments in OLS regressions of the three endogenous dummy variables on all leverage regression controls and the corresponding instrument. These regressions are then used to compute the fitted values $\widehat{DIV}$, $\widehat{GOV}$, and $\widehat{DG}$. In the last step, the fitted values are used as regressors in the leverage regressions.[28]

5.3. Results

Table 11 reports estimates from second stage leverage regressions for the modified Heckman and IV methods. For comparison, the table also reports estimates from OLS regressions that do not account for the endogeneity of diversification, governance, and their interaction. Note that *Diversified*, *Governance*, and *Diversified* × *Governance* are dummy variables in the OLS and Heckman regressions, and are continuous fitted variables in the IV

[28] Since each endogenous regressor has exactly one instrument (i.e., its fitted probability), the second stage is just-identified and we are unable to perform a Sargan-Hansen test of overidentifying restrictions. Thus, like the modified Heckman procedure described in Section 5.1 but for a different reason, we cannot conduct a formal test of the exclusion restriction. However, instrument relevance is not a problem for this IV estimator.

models. Panel A uses the equally-weighted governance index and Panel B uses the percentile-weighted governance index.

In comparison to the OLS results, the coefficients on *Governance* and *Diversified* × *Governance* are basically unchanged in the Heckman model. This is, relative to bad governance firms, we continue to find a positive effect of good governance on leverage in focused firms and a negative effect of good governance on leverage in diversified firms. The coefficients on the lambdas (λ^{Div}, λ^{Gov}, and $\lambda^{Div\times Gov}$) are generally significant in the Heckman specifications. This indicates the presence of selection bias and suggests that characteristics that determine firms' diversification and governance choices are correlated with leverage policy. Lastly, using the IV method to address endogeneity, we continue to find positive coefficient on *Governance* and negative coefficients on *Diversified* × *Governance*, which supports the entrenchment hypothesis in focused firms and the creditor alignment hypothesis in diversified firms.

6. Summary and conclusions

We find that corporate governance has opposite effects on financial leverage depending on whether a firm is diversified or focused. Using governance measures that are increasing in shareholder rights (decreasing in managerial entrenchment), we find a negative relation between governance and financial leverage in diversified firms. In contrast, we find a positive relation between governance and financial leverage in focused firms. These results are robust to a variety of different measures of leverage, diversification, and corporate governance. Our results are also robust when we use a Heckman model to correct for self-selection and when we use an IV method to address the joint endogeneity of leverage, diversification, and governance.

The negative relation between better governance and financial leverage in diversified firms is consistent with the creditor alignment hypothesis, which posits that entrenched managers in diversified firms have additional debt capacity because their interests are more aligned with creditors. On the other hand, the positive relation between financial leverage and better governance in focused firms is consistent with the conventional thinking that entrenched managers choose low leverage to minimize performance pressure to meet debt obligations and to protect their private benefits of control that would likely be lost in bankruptcy. We argue that the managerial entrenchment hypothesis is primarily a demand side theory about the reluctance of managers to take on debt financing, while the creditor alignment hypothesis primarily relies on the willingness of creditors to supply debt, combined with management's willingness to accommodate. We use a firm's diversification status to identify the two hypotheses. Because diversification reduces the risk of a manager's undiversified portfolio, entrenched managers in diversified firms are more likely to pursue larger debt capacity provided by creditor alignment. In contrast, entrenched managers in focused firms are more inclined to insure against downside risk by avoiding debt. Overall, the different effects of corporate governance on leverage in diversified and focused firms help explain why the literature finds mixed support for the effect of managerial entrenchment on leverage in samples containing a mixture of diversified and focused firms.

Appendix: Variable definition

Variable	Definition (source of data)
Leverage	Total debt (long-term debt plus debt in current liabilities) divided by the book value of total assets. (Compustat)
Net leverage	Net leverage is total debt minus cash and marketable securities scaled by the book value of total assets. (Compustat)
Adjusted leverage	Industry adjusted leverage ratio. For multi-segment firms, adjusted leverage is the difference between a firm's leverage ratio and its imputed leverage ratio, where the imputed leverage ratio is the asset-weighted average of its segments' imputed leverage ratios. A segment's imputed leverage ratio is the median leverage ratio of single-segment firms in the same industry and year. For single segment firms, adjusted leverage is the difference between a firm's leverage ratio and its industry-year median leverage ratio. For segments of multi-segment firms and single segment firms, industry is based on the narrowest SIC grouping (from four-digit SIC code to two-digit SIC code) that includes at least five single-segment firms. (Segment/Compustat)
Adjusted net leverage	Industry adjusted net leverage is constructed the same way as adjusted leverage, except leverage is computed as total debt minus cash and marketable securities scaled by the book value of total assets. (Segment/Compustat)
Ln(1 + Interest coverage ratio)	Natural logarithm of one plus the interest coverage ratio, where the interest coverage ratio is computed as earnings before interest, taxes, depreciation, and amortization (EBITDA) divided by interest expense. We set the interest coverage ratio equal to zero when EBITDA is negative. (Compustat)
Ln(Adjusted interest coverage ratio)	Difference between the natural logarithm of one plus the interest coverage ratio and the natural logarithm of one plus the imputed interest coverage ratio, where the imputed interest coverage ratio is the sales-weighted average of segments' imputed interest coverage ratios. A segment's imputed interest coverage ratio is the median interest coverage ratio of single-segment firms in the same industry and year. The imputed interest coverage ratio for a single segment firm is the segment's imputed interest coverage ratio. Industry is based on the narrowest SIC grouping that includes at least five single-segment firms.
Governance variables	
EW governance index	Equally-weighted governance index, which equals the sum of zero/one indicator variables for four measures of corporate governance. The governance measures (defined below) include: E-index, institutional ownership, CEO ownership, and powerful CEO. The E-index indicator variable is equal to one if a firm-year has a below same-year median E-index, and zero otherwise. The institutional ownership indicator variable is equal to one if a firm-year has an above same-year median institutional ownership, and zero otherwise. The CEO ownership indicator variable is equal to one if the proportion of shares owned by the CEO in a year is above the same-year median proportion of shares owned by the CEO. The non-powerful CEO indicator variable is equal to one minus an indicator variable for powerful CEO.
PW governance index	Percentile-weighted governance index, which equals the sum of the percentile rankings of the four governance measures used in the construction of the EW governance index, and is then scaled to vary between zero and one. The E-index and powerful CEO variables are transformed to (6 – E-index) and (1 – powerful CEO), respectively, so that higher values indicated better governance. We assume the percentile ranking when (1 – powerful CEO) = 1 (i.e., powerful CEO = 0) is 0.50 and the percentile ranking when (1 – powerful CEO) = 0 (i.e., powerful CEO = 1) is zero.

E-index	Bebchuk, Cohen, and Ferrell (2009) entrenchment index based on the sum of zero/one indicator variables for six anti-takeover provisions: staggered boards, limits to shareholder bylaw amendments, poison pills, golden parachutes, and supermajority requirements for mergers and charter amendments. (ISS)
Institutional ownership	Number of shares owned by institutional investors divided by total number of shares outstanding. (CDA/Spectrum)
CEO stock ownership	Number of shares owned by CEO divided by total number of shares outstanding. (ExecuComp)
Powerful CEO	Dummy variable equal to one when the CEO is the only insider on the board of directors and serves as chairman of the board and president of the company, and otherwise zero. (ISS)
Diversification variables	
Diversified	Dummy variable equal to one if a firm-year has more than one business segment with different four-digit SIC code, and zero otherwise. (Compustat/Segment)
Number of segments	Number of segments with different four-digit SIC codes. (Compustat/Segment)
Herfindahl index	Herfindahl index is computed as $\sum_i^n S_i^2$ where n is the number of segments and S_i is the share of segment i sales to total firm sales. The Herfindahl index ranges from zero when the firm has many segments (high diversification) to one when the firm has only one segment (i.e., zero diversification). (Compustat/Segment)
Excess value (EV)	Logarithm of the ratio of a firm's actual market value to its imputed value. A firm's actual market value is the sum of the total book value of debt and market value of equity. A firm's imputed value is the sum of the imputed values of its segments, with each segment's imputed value equal to the segment's sales multiplied by its industry median ratio of total capital (book debt plus market value of equity) to sales. Industry median ratios are computed each year using only single-segment domestic firms, and are based on the narrowest SIC code grouping that yields at least five single-segment firms with sufficient data to compute the ratio. Single-segment domestic firms have no foreign sales and exports less than 10% of sales. Following Berger and Ofek (1995), we exclude from the analysis firm-year excess values where the firm's actual value is more than four times imputed value or less than one-fourth imputed value. We also exclude firm-year observations when the sum of segment sales deviates from the consolidated firm's total sales by more than 1%. (Compustat/Segment)
Control variables	
Log sales	Logarithm of sales in constant dollars using the CPI with base year 2014. (Compustat)
Market-to-book ratio	Ratio of book assets plus the difference between the market and book values of equity to the book value assets. (Compustat)
Return on assets	Ratio of earnings before interest and tax to the book value of assets. (Compustat)
Fixed assets ratio	Ratio of net property, plant, and equipment to the book value of assets. (Compustat)
R&D/sales	Ratio of research and development expense to sales, where research and development expense is set equal to zero when missing. (Compustat)
CAPEX/sales	Ratio of capital expenditures to sales. (Compustat)

Cash flow volatility	Standard deviation of the ratio of operating income after depreciation to assets over the prior four years. (Compustat)
Cash	Ratio of cash and marketable securities to the book value of assets. (Compustat)
Dividend payer	Dummy variable equal to one if the firm pays dividends, and zero otherwise. (Compustat)
Rated	Dummy variable equal to one if the firm has an S&P credit rating, and zero otherwise. (Compustat)
Investment rating	Dummy variable equal to one if S&P credit rating is BBB– and above, and zero otherwise. (Compustat)
Speculative rating	Dummy variable equal to one if S&P credit rating is below BBB–, and zero otherwise. (Compustat)
M&A activity	Dummy variable equal to one if the ratio of expenditures on acquisitions to book value of assets in current year and/or previous year is greater than 5%. (Compustat)

Instruments for diversification and governance

S&P 500 index dummy	Dummy variable equal to one if the firm belongs to the S&P 500 index, and zero otherwise. (ISS)
Major exchange dummy	Dummy variable equal to one if the firm is listed on the NYSE, Amex, or Nasdaq markets, and zero otherwise. (CRSP)
GDP growth rate	Change in logarithm of real U.S. GDP between two consecutive years. (BEA)
Log number M&A per year	Natural logarithm of the number of completed mergers and acquisitions in a year. (SDC)

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Descriptive statistics and correlations

We require firm-years to be in the Compustat Business Segment database and have governance and firm data. The full sample has 6,873 firm-year observations over 1998 to 2014. Panel A reports descriptive statistics. The diversified and focused subsamples are firm-year observations with multiple segments and one segment, respectively. All variables are defined in the Appendix. Asterisks on mean and median values in the diversified sample indicate whether they are significantly different from the corresponding mean and median values in the focused sample. Panel B reports Pearson correlation coefficients between leverage, diversification, and governance. There are fewer firm-year observations for interest coverage ratio and adjusted interest coverage ratio (6,020) because of zero interest expense. We use ***, **, and * to denote significance at the 1% level, 5% level, and 10% level, respectively.

Panel A. Descriptive statistics

	Full sample N = 6,873		Diversified sample N = 2,434		Focused sample N = 4,439	
	Mean	Median	Mean	Median	Mean	Median
Leverage measures						
Leverage	0.202	0.193	0.230***	0.232***	0.187	0.164
Net leverage	0.044	0.082	0.132***	0.160***	–0.005	0.010
Adjusted leverage	0.031	0.000	0.029	0.021	0.032	0.000
Adjusted net leverage	0.019	0.002	0.049***	0.041***	0.003	0.000
Ln(1 + Interest coverage ratio)	2.820	2.502	1.261***	2.383***	2.948	2.618
Ln(Adj. interest coverage ratio)	1.246	0.848	1.024***	0.759***	1.382	0.924
Diversification measures						
Diversified	0.354					
Number of segments	1.612	1.000	2.729***	2.000***	1.000	1.000
Herfindahl index	0.838	1.000	0.541***	0.513***	1.000	1.000
Excess value	0.098	0.073	–0.001***	–0.008***	0.152	0.117
Governance measures						
EW governance index	2.338	2.000	2.156***	2.000***	2.438	2.000
PW governance index	0.470	0.473	0.443***	0.450***	0.485	0.488
Governance components						
CEO stock ownership	0.021	0.003	0.020*	0.003	0.022	0.003
Institutional ownership	0.740	0.763	0.705***	0.725***	0.759	0.784
Powerful CEO	0.205		0.237***		0.187	
E-Index	1.969	2.000	2.085***	2.000***	1.905	2.000
Firm Characteristics						
Log sales	7.462	7.399	7.814***	7.693***	7.270	7.147
Market-to-book ratio	2.024	1.637	1.720***	1.502***	2.190	1.738
Return on assets	0.146	0.140	0.141***	0.136***	0.149	0.143
Fixed assets ratio	0.289	0.220	0.291	0.232***	0.288	0.211
R&D/sales	0.053	0.007	0.025***	0.007***	0.068	0.008
CAPEX/sales	0.080	0.038	0.063***	0.035***	0.089	0.039
Cash flow volatility	0.049	0.033	0.038***	0.026***	0.055	0.038
Cash	0.158	0.095	0.098***	0.055***	0.191	0.132
Dividend payer	0.540		0.707***		0.447	
Rated	0.483		0.609***		0.415	
Investment rating	0.308		0.430***		0.241	
Speculative rating	0.176		0.179		0.174	
M&A activity	0.286		0.346***		0.253	

(*continued*)

Table 1 – *continued*

Panel B. Correlations between leverage, diversification, and governance

	1	2	3	4	5	6	7	8	9	10	11
1 Leverage	1.000										
2 Net leverage	0.846***	1.000									
3 Adj. leverage	0.613***	0.378***	1.000								
4 Adj. net leverage	0.572***	0.609***	0.818***	1.000							
5 Ln(1 + Int. cov. ratio)	–0.619***	–0.574***	–0.330***	–0.336***	1.000						
6 Ln(Adj. int. cov. ratio)	–0.509***	–0.540***	–0.250**	–0.253***	0.841***	1.000					
7 Diversified	0.121***	0.226***	–0.009	0.095***	–0.107***	–0.104**	1.000				
8 No. of segments	0.119***	0.210***	–0.011	0.079***	–0.115***	–0.104***	0.835***	1.000			
9 Herfindahl index	–0.112***	–0.214***	–0.014	–0.117***	0.107***	0.094***	–0.884***	–0.846***	1.000		
10 Excess value	–0.044***	–0.147***	–0.016	–0.168***	0.146***	0.110***	–0.145***	–0.138***	0.153***	1.000	
11 EW gov. index	–0.083***	–0.104***	–0.011	–0.046***	0.065***	0.018	–0.144***	–0.144***	0.140***	0.067***	1.000
12 PW gov. index	–0.083***	–0.116***	–0.003	–0.053***	0.070***	0.029**	–0.156***	–0.157***	0.156***	0.084***	0.890***

Table 2

Univariate comparisons by good and bad corporate governance

The table reports means of variables for the full sample and diversified and focused subsamples grouped by good and bad corporate governance. A firm-year observation has good (bad) corporate governance if the EW governance index is above (below) the median index for the year. A firm-year observation is diversified (focused) if the firm has multiple (one) segments. All variables are defined in the Appendix. Asterisks on means in the bad governance columns indicate whether they are significantly different from the corresponding means in the good governance columns. We use ***, **, * to denote significance at the 1% level, 5% level, and 10% level, respectively.

	Full sample N = 6,873		Diversified sample N = 2,434		Focused sample N = 4,439	
	Good governance N = 3,016	Bad governance N = 3,857	Good governance N = 1,109	Bad governance N = 1,325	Good governance N = 2,128	Bad governance N = 2,311
Leverage	0.189	0.212***	0.212	0.245***	0.178	0.195***
Net leverage	0.016	0.065***	0.102	0.158***	–0.021	0.010***
Adjusted leverage	0.030	0.032	0.017	0.039***	0.035	0.030
Adjusted net leverage	0.010	0.026***	0.030	0.065***	0.001	0.004
Ln(1 + Int. cov. ratio)	2.901	2.761***	2.690	2.568**	3.000	2.904*
Ln(Adj. int. cov. ratio)	1.260	1.236	1.086	0.991*	1.340	1.418
Excess value	0.116	0.083**	0.012	–0.013	0.169	0.136**
Log sales	7.244	7.633***	7.590	8.001***	7.107	7.419***
Market-to-book ratio	2.075	1.984***	1.715	1.725	2.222	2.160
Return on assets	0.148	0.144*	0.141	0.140	0.152	0.147
Fixed assets ratio	0.266	0.307***	0.266	0.311***	0.266	0.308***
R&D/sales	0.054	0.052	0.024	0.026	0.066	0.070
CAPEX/sales	0.077	0.082	0.055	0.071***	0.087	0.091
Cash flow volatility	0.050	0.048**	0.040	0.036***	0.055	0.055
Cash	0.173	0.147***	0.111	0.087***	0.198	0.184**
Dividend payer	0.452	0.608***	0.609	0.790***	0.393	0.497***
Rated	0.385	0.561***	0.523	0.681***	0.334	0.489***
Investment rating	0.193	0.398***	0.309	0.531***	0.153	0.321***
Speculative rating	0.192	0.163***	0.214	0.149***	0.180	0.168
M&A activity	0.289	0.283	0.366	0.330*	0.261	0.244

Table 3

Effects of diversification and governance on leverage

The dependent variables are industry-adjusted leverage (Adjusted leverage) and industry-adjusted leverage net of cash and marketable securities (Adjusted net leverage). The full sample is firm-years in the Compustat Business Segment database with governance and firm data. The focused (diversified) subsample is firm-years with (more than) one business segment with different four-digit SIC code. The regressions include industry fixed effects based on Fama-French 49 industries and year fixed effects. Panel A reports full sample regressions and Panel B reports diversified and focused subsample regressions. The equally-weighted and percentile-weighted governance indices are based on E-index, institutional ownership, CEO ownership, and powerful CEO. Higher values for the indices indicate better governance and/or less entrenchment. Regressions are reported using the indices and dummy variables based on the indices. Governance dummy is equal to one if the governance index is greater than the median governance index and zero otherwise. Median governance indices are computed by year and separately for the full sample and the diversified and focused subsamples. All variables are defined in the Appendix. *T*-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Full sample regressions

	Dependent variable: Adjusted leverage				Dependent variable: Adjusted net leverage			
	Equally-weighted		Percentile-weighted		Equally-weighted		Percentile-weighted	
	Governance index	Governance dummy	Governance index	Governance dummy	Governance index	Governance dummy	Governance index	Governance dummy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Diversified	0.032**	0.006	0.042*	0.009	0.054**	0.028**	0.076**	0.035***
	(2.03)	(0.64)	(1.90)	(0.90)	(2.54)	(2.18)	(2.47)	(2.67)
Governance	0.009**	0.015**	0.080**	0.016**	0.011*	0.018*	0.092**	0.021**
	(2.29)	(2.11)	(2.49)	(2.22)	(1.88)	(1.82)	(2.03)	(2.01)
Diversified × governance	–0.015***	–0.023**	–0.099**	–0.026**	–0.016*	–0.024	–0.126*	–0.036**
	(–2.64)	(–1.98)	(–2.19)	(–2.15)	(–1.90)	(–1.49)	(–1.95)	(–2.12)
Log sales	0.007**	0.007**	0.007**	0.007**	0.028***	0.028***	0.028***	0.028***
	(2.07)	(2.08)	(2.15)	(2.08)	(5.29)	(5.28)	(5.29)	(5.27)
Market-to-book ratio	–0.004	–0.004	–0.004	–0.004	–0.026***	–0.026***	–0.026***	–0.026***
	(–1.47)	(–1.42)	(–1.48)	(–1.42)	(–6.94)	(–6.91)	(–6.96)	(–6.92)
Return on assets	–0.032	–0.032	–0.035	–0.033	–0.009	–0.008	–0.012	–0.011
	(–0.61)	(–0.61)	(–0.67)	(–0.63)	(–0.13)	(–0.13)	(–0.17)	(–0.15)
Fixed asset ratio	–0.007	–0.007	–0.005	–0.007	0.197***	0.196***	0.199***	0.197***
	(–0.25)	(–0.27)	(–0.18)	(–0.27)	(5.14)	(5.12)	(5.18)	(5.14)
R&D/sales	0.017	0.016	0.018	0.017	–0.245***	–0.245***	–0.243***	–0.244***
	(0.34)	(0.33)	(0.36)	(0.34)	(–3.32)	(–3.32)	(–3.30)	(–3.32)
CAPEX/sales	–0.022	–0.021	–0.024	–0.022	–0.019	–0.017	–0.021	–0.020
	(–1.03)	(–0.95)	(–1.08)	(–1.00)	(–0.66)	(–0.61)	(–0.73)	(–0.69)
Dividend payer	–0.015*	–0.015*	–0.014*	–0.015*	–0.017	–0.017	–0.016	–0.017
	(–1.88)	(–1.89)	(–1.80)	(–1.87)	(–1.44)	(–1.46)	(–1.41)	(–1.46)

Cash flow volatility	0.050	0.052	0.050	0.049	–0.181	–0.179	–0.182	–0.183
	(0.59)	(0.61)	(0.59)	(0.58)	(–1.57)	(–1.55)	(–1.58)	(–1.59)
Investment rating	0.070***	0.070***	0.070***	0.069***	0.070***	0.070***	0.071***	0.070***
	(6.44)	(6.45)	(6.49)	(6.44)	(4.74)	(4.75)	(4.76)	(4.74)
Speculative rating	0.148***	0.149***	0.149***	0.149***	0.162***	0.162***	0.163***	0.163***
	(12.40)	(12.41)	(12.41)	(12.43)	(10.26)	(10.28)	(10.29)	(10.32)
M&A activity	0.036***	0.036***	0.036***	0.036***	0.089***	0.089***	0.089***	0.089***
	(6.60)	(6.60)	(6.59)	(6.60)	(11.14)	(11.15)	(11.15)	(11.15)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.234	0.234	0.233	0.234	0.286	0.286	0.286	0.286
Number of observations	6,873	6,873	6,873	6,873	6,873	6,873	6,873	6,873

Panel B. Subsample regressions

	Dependent variable: Adjusted leverage				Dependent variable: Adjusted net leverage			
	Governance index		Governance dummy		Governance index		Governance dummy	
	Diversified sample (1)	Focused sample (2)	Diversified sample (3)	Focused sample (4)	Diversified sample (5)	Focused sample (6)	Diversified sample (7)	Focused sample (8)
Equally-weighted governance index								
Governance	–0.009*	0.012***	–0.015*	0.018**	–0.011	0.016***	–0.018	0.024**
	(–1.79)	(2.87)	(–1.69)	(2.52)	(–1.61)	(2.63)	(–1.53)	(2.39)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.278	0.238	0.278	0.236	0.310	0.287	0.310	0.286
Number of observations	2,434	4,439	2,434	4,439	2,434	4,439	2,434	4,439
Percentile-weighted governance index								
Governance	–0.043	0.099***	–0.011	0.018**	–0.081	0.127***	–0.020	0.024**
	(–1.14)	(3.03)	(–1.15)	(2.57)	(–1.54)	(2.77)	(–1.53)	(2.36)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted *R*-squared	0.277	0.239	0.277	0.236	0.310	0.288	0.310	0.286
Number of observations	2,434	4,439	2,434	4,439	2,434	4,439	2,434	4,439

Table 4

Effects of diversification and governance on leverage excluding observations with M&A activity

The dependent variables are industry-adjusted leverage and industry-adjusted leverage net of cash and marketable securities. The full sample excludes firms-years if the ratio of expenditures on acquisitions to total book assets in the current and/or previous year is greater than 5%. The focused (diversified) sample is firm-years with (more than) one business segment with different four-digit SIC code. The regressions include industry fixed effects based on Fama-French 49 industries and year fixed effects. Panel A uses an equally-weighted (EW) governance index based on E-index, institutional ownership, CEO ownership, and powerful CEO. Panel B uses a percentile-weighted (PW) governance index based on E-index, institutional ownership, CEO ownership, and powerful CEO. Higher values for both indices indicate better governance and/or less entrenchment. All variables are defined in the Appendix. *T*-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Dependent variable: Adjusted leverage			Adjusted net leverage		
	Full sample (1)	Diversified sample (2)	Focused sample (3)	Full sample (4)	Diversified sample (5)	Focused sample (6)
Panel A. Governance is EW governance index						
Diversified	0.043***			0.072***		
	(2.65)			(3.17)		
Governance	0.009**	–0.015***	0.011**	0.010*	–0.021***	0.014**
	(2.06)	(–2.92)	(2.38)	(1.66)	(–2.92)	(2.26)
Diversified × governance	–0.022***			–0.025***		
	(–3.48)			(–2.68)		
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.222	0.263	0.228	0.268	0.298	0.267
Number of observations	4,908	1,592	3,316	4,908	1,592	3,316
Panel B. Governance is PW governance index						
Diversified	0.064***			0.110***		
	(2.75)			(3.36)		
Governance	0.066*	–0.111***	0.079**	0.073	–0.191***	0.104**
	(1.87)	(–2.62)	(2.18)	(1.56)	(–3.18)	(2.21)
Diversified × governance	–0.154***			–0.205***		
	(–3.18)			(–2.93)		
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.222	0.263	0.228	0.268	0.301	0.267
Number of observations	4,908	1,592	3,316	4,908	1,592	3,316

Table 5

The dependent variables are industry-adjusted leverage and industry-adjusted leverage net of cash and marketable securities. The sample is firm-years in the Compustat Business Segment database with governance and firm data. We compute the median excess value each year for diversified firms and the median excess value each year for focused firms, and separate diversified and focused firms into above and below median excess value groups using their respective medians. We then place the above median excess value diversified and focused firms and below median excess value diversified and focused firms into separate samples. Diversification is measured with a dummy variable equal to one if the firm-year is multi-segment. The EW governance index is an equally-weighted governance index and the PW governance index is a percentile-weighted governance index. Both indices are based on E-index, institutional ownership, CEO ownership, and powerful CEO. Higher index values indicate better governance and/or less entrenchment. All regressions include the controls used in Table 3, industry fixed effects based on Fama-French 49 industries, and year fixed effects. All variables are defined in the Appendix. *T*-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. The numbers in square brackets are *p*-values from Chow tests of the null hypothesis that the coefficients in the above median excess value regressions are equal to the corresponding coefficients in the below median excess value regressions. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Governance is EW governance index				Governance is PW governance index			
	Above median excess value		Below median excess value		Above median excess value		Below median excess value	
	Adj. lev (1)	Adj. net lev (2)	Adj. lev (3)	Adj. net lev (4)	Adj. lev (5)	Adj. net lev (6)	Adj. lev (7)	Adj. net lev (8)
Diversified	0.017	0.023	0.046***	0.080***	0.034	0.052	0.057**	0.110***
	(0.72)	(0.79)	(2.70)	(3.27)	(1.08)	(1.23)	(2.26)	(3.03)
			[0.111]	[0.023]			[0.378]	[0.104]
Governance	0.004	-0.002	0.016***	0.024***	0.053	0.028	0.124***	0.187***
	(0.69)	(-0.23)	(3.38)	(3.57)	(1.20)	(0.47)	(3.36)	(3.51)
			[0.013]	[0.000]			[0.048]	[0.001]
Diversified × Governance	–0.009	0.004	–0.022***	–0.034***	–0.083	–0.041	–0.134**	–0.232***
	(–1.11)	(0.39)	(–3.19)	(–3.32)	(–1.33)	(–0.49)	(–2.44)	(–2.91)
			[0.083]	[0.000]			[0.362]	[0.013]
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.212	0.262	0.265	0.280	0.212	0.262	0.266	0.281
Number of observations	3,444	3,444	3,428	3,428	3,444	3,444	3,428	3,428

Table 6

Effects of diversity intensity on the leverage and governance relation

The dependent variables are industry-adjusted leverage and industry-adjusted leverage net of cash and marketable securities. The sample is firm-years in the Compustat Business Segment database with governance and firm data. Panel A measures the intensity of diversification by the number of segments and Panel B measures the intensity of diversification by the Herfindahl index. We report regression results for the full sample, and above and below median excess value subsamples. Subsample construction is described in Table 5. For focused firms, Number of segments − 1 = 0 and 1 − Herfindahl index = 0. Governance is measured by the equally-weighted index of E-index, institutional ownership, CEO ownership, and powerful CEO. Higher index values indicate better governance and/or less entrenchment. All regressions include the controls used in Table 3, industry fixed effects based on Fama-French 49 industries, and year fixed effects. All variables are defined in the Appendix. *T*-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. The numbers in square brackets are *p*-values from Chow tests of the null hypothesis that the coefficients in the above median excess value regressions are equal to the corresponding coefficients in the below median excess value regressions. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively. Number of firm-year observations is 6,873.

	Dependent variable: Adjusted leverage			Dependent variable: Adjusted net leverage		
	Full sample (1)	Above median excess value (2)	Below median excess value (3)	Full sample (1)	Above median excess value (2)	Below median excess value (3)
Panel A. Diversification measure: Number of segments						
Number of segments − 1	0.010	0.001	0.017**	0.020**	0.005	0.031***
	(1.52)	(0.13)	(2.27)	(2.20)	(0.43)	(2.88)
			[0.056]			[0.026]
Governance	0.008*	0.002	0.013***	0.010*	–0.001	0.021***
	(1.98)	(0.44)	(3.10)	(1.81)	(–0.11)	(3.29)
			[0.014]			[0.001]
(Number of segments − 1) ×	–0.007**	–0.003	–0.010***	–0.008**	0.000	–0.015***
Governance	(–2.46)	(–0.81)	(–3.02)	(–2.12)	(0.04)	(–3.22)
			[0.083]			[0.003]
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-square	0.233	0.226	0.270	0.285	0.303	0.295
Number of observations	6,873	3,444	3,428	6,873	3,444	3,428

(*continued*)

Table 6 – *continued*

	Dependent variable: Adjusted leverage			Dependent variable: Adjusted net leverage		
	Full sample (1)	Above median excess value (2)	Below median excess value (3)	Full sample (1)	Above median excess value (2)	Below median excess value (3)
Panel B. Diversification measure: Herfindahl index						
1 – Herfindahl index	0.061**	0.023	0.092***	0.110***	0.043	0.155***
	(2.20)	(0.56)	(2.91)	(2.86)	(0.80)	(3.49)
			[0.045]			[0.016]
Governance	0.009**	0.003	0.015***	0.010*	-0.001	0.023***
	(2.22)	(0.54)	(3.44)	(1.90)	(-0.18)	(3.47)
			[0.007]			[0.000]
(1 – Herfindahl index) ×	–0.031***	–0.015	-0.045***	–0.033**	0.006	–0.064***
Governance	(–2.82)	(–0.95)	(-3.49)	(–2.19)	(0.27)	(–3.50)
			[0.042]			[0.000]
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-square	0.234	0.226	0.272	0.286	0.305	0.296
Number of observations	6,873	3,444	3,428	6,873	3,444	3,428

Table 7

Effects of diversification and governance on unadjusted leverage and interest coverage ratio

The dependent variables in Panel A are ratios of total debt (long-term debt plus debt in current liabilities) and total debt minus cash and marketable securities to the book value of total assets. The dependent variables in Panel B are the natural logarithms of one plus the interest coverage ratio and the industry-adjusted interest coverage ratio. We set the interest coverage ratio equal to zero when earnings are negative and estimate a tobit model with a lower limit of zero to account for the left censoring in the estimation. We use standard OLS estimation for the industry-adjusted interest coverage ratio, because the difference in firm and industry interest coverage ratios is not censored at zero. The sample is firm-years in the Compustat Business Segment database with governance and firm data. We report regression results for the full sample, and above and below median excess value subsamples. Subsample construction is described in Table 5. Diversification is measured with a dummy variable equal to one if the firm-year is multi-segment. Governance is measured by the equally-weighted index of E-index, institutional ownership, CEO ownership, and powerful CEO. Higher index values indicate better governance and/or less entrenchment. All regressions include the controls used in Table 3, industry fixed effects based on Fama-French 49 industries, and year fixed effects. All variables are defined in the Appendix. *T*-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. The numbers in square brackets are *p*-values from Chow tests of the null hypothesis that the coefficients in the above median excess value regressions are equal to the corresponding coefficients in the below median excess value regressions. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Leverage is measured by unadjusted book leverage ratio

	Dependent variable: Unadjusted leverage			Dependent variable: Unadjusted net leverage		
	Full sample (1)	Above median excess value (2)	Below median excess value (3)	Full sample (1)	Above median excess value (2)	Below median excess value (3)
Diversified	0.008	–0.013	0.025	0.040*	0.007	0.065***
	(0.52)	(–0.58)	(1.39)	(1.86)	(0.23)	(2.61)
			[0.028]			[0.016]
Governance	0.006	–0.001	0.013**	0.008	–0.008	0.023***
	(1.42)	(–0.13)	(2.56)	(1.36)	(–0.93)	(3.20)
			[0.005]			[0.000]
Diversified × governance	–0.008	0.001	–0.016**	–0.012	0.011	–0.031***
	(–1.38)	(0.18)	(–2.34)	(–1.45)	(0.98)	(–3.21)
			[0.011]			[0.000]
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-square	0.394	0.392	0.418	0.571	0.603	0.545
Number of observations	6,873	3,444	3,428	6,873	3,444	3,428

(*continued*)

Table 7 – *continued*

Panel B. Leverage is measured by interest coverage ratio

	Dependent variable: Ln(1 + Interest coverage ratio)			Dependent variable: Ln(Adjusted interest coverage ratio)		
	Full sample (1)	Above median excess value (2)	Below median excess value (3)	Full sample (1)	Above median excess value (2)	Below median excess value (3)
Diversified	–0.139	–0.064	–0.254*	–0.304**	–0.325	–0.308**
	(–1.09)	(–0.33)	(–1.87)	(–2.15)	(–1.44)	(–2.28)
			[0.028]			[0.923]
Governance	–0.017	0.062	–0.084*	–0.077	0.012	–0.153***
	(–0.39)	(0.91)	(–1.86)	(–1.64)	(0.16)	(–3.19)
			[0.006]			[0.003]
Diversified × governance	0.058	–0.030	0.151***	0.128**	0.058	0.198***
	(1.16)	(0.18)	(2.73)	(2.28)	(0.67)	(3.47))
		(–0.41)	[0.001]			[0.044]
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-square	0.170	0.164	0.188	0.419	0.413	0.445
Number of observations	6,020	2,920	3,097	6,020	2,920	3,097
Censored observations	3.16%	2.77%	3.52%			

Table 8

Effects of diversification and governance on leverage with governance measured by E-index

The dependent variables are industry-adjusted leverage and industry-adjusted leverage net of cash and marketable securities. The sample is firm-years in the Compustat Business Segment database with governance and firm data. We report regression results for the full sample, and above and below median excess value subsamples. Subsample construction is described in Table 5. Diversification is measured with a dummy variable equal to one if the firm-year is multi-segment. Governance is measured by the variable 6 – E-index. Since the E-index is the sum of 0/1 indictor variables for six anti-takeover provisions, higher values for 6 – E-index indicate better governance. All regressions include the controls used in Table 3, industry fixed effects based on Fama-French 49 industries, and year fixed effects. All variables are defined in the Appendix. *T*-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. The numbers in square brackets are *p*-values from Chow tests of the null hypothesis that the coefficients in the above median excess value regressions are equal to the corresponding coefficients in the below median excess value regressions. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Dependent variable: Adjusted leverage			Dependent variable: Adjusted net leverage		
	Full sample (1)	Above median excess value (2)	Below median excess value (3)	Full sample (1)	Above median excess value (2)	Below median excess value (3)
Diversified	0.038**	0.034	0.036*	0.092***	0.083**	0.083***
	(2.10)	(1.29)	(1.70)	(3.59)	(2.36)	(2.74)
			[0.908]			[0.995]
6 – E-index	0.007**	0.005	0.009**	0.010**	0.006	0.013**
	(2.23)	(1.28)	(2.14)	(2.02)	(0.99)	(2.20)
			[0.364]			[0.191]
Diversified × (6 – E-index)	–0.007**	–0.010*	–0.010**	–0.019***	–0.013*	–0.020***
	(–2.46)	(–1.72)	(–2.08)	(–3.23)	(–1.69)	(–2.77)
			[0.898]			[0.308]
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-square	0.233	0.227	0.268	0.287	0.307	0.293
Number of observations	6,873	3,444	3,429	6,873	3,444	3,429

Table 9

Effects of diversification and governance on leverage with different industry fixed effects

The dependent variable in all regressions is industry-adjusted leverage. The sample is firm-years in the Compustat Business Segment database with governance and firm data. We report regression results for the full sample, and above and below median excess value subsamples. Subsample construction is described in Table 5. Diversification is measured with a dummy variable equal to one if the firm-year is multi-segment. Governance is measured by the equally-weighted index of E-index, institutional ownership, CEO ownership, and powerful CEO. Higher index values indicate better governance and/or less entrenchment. All regressions include the controls used in Table 3, industry fixed effects, and year fixed effects. The industry fixed effects in regression (1)-(3) are based on 286 different four-digit SIC codes in our sample, the industry fixed effects in regressions (4)-(6) are based on 192 different three-digit SIC codes in our sample, and the industry fixed effects in regressions (7)-(9) are based on 53 different two-digit SIC codes in our sample. All variables are defined in the Appendix. *T*-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. The numbers in square brackets in columns (3), (6), and (9) are *p*-values from Chow tests of the null hypothesis that the coefficients in the above median excess value regressions are equal to the corresponding coefficients in the below median excess value regressions. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Industry fixed effects: 4-digit SIC codes			Industry fixed effects: 3-digit SIC codes			Industry fixed effects: 2-digit SIC codes		
	Full sample (1)	Above Median EV (2)	Below Median EV (3)	Full sample (4)	Above Median EV (5)	Below Median EV (6)	Full sample (7)	Above Median EV (8)	Below Median EV (9)
Diversified	0.030**	0.024	0.031*	0.028*	0.019	0.039**	0.023	0.006	0.039**
	(2.05)	(1.08)	(1.82)	(1.78)	(0.79)	(2.15)	(1.46)	(0.28)	(2.17)
			[0.719]			[0.300]			[0.077]
Governance	0.012***	0.007	0.015***	0.011***	0.006	0.016***	0.009**	0.004	0.015***
	(3.07)	(1.24)	(3.08)	(2.71)	(1.10)	(3.37)	(2.12)	(0.69)	(3.14)
			[0.095]			[0.039]			[0.021]
Diversified × governance	–0.016***	–0.012	–0.017***	–0.016***	–0.010	–0.022***	–0.014**	–0.007	–0.023***
	(–2.92)	(–1.43)	(–2.60)	(–2.64)	(–1.11)	(–3.09)	(–2.45)	(–0.88)	(–3.24)
			[0.482]			[0.115]			[0.033]
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-square	0.339	0.343	0.392	0.293	0.312	0.323	0.224	0.225	0.259
Number of observations	6,873	3,444	3,429	6,873	3,444	3,429	6,873	3,444	3,429

Table 10

Probit regressions explaining the choice of diversification, governance, and their interaction

The table reports first-stage probit regressions for the choice of diversification, governance, and the interaction of diversification and governance on a set of instruments and controls. A firm-year is diversified if it has more than one business segment. A firm-year has good corporate governance if the equally-weighted (EW) governance index is above its sample median for the year (columns (1)-(3)), or if the percentile-weighted (PW) governance index is above its sample median for the year (columns (4)-(6)). The governance indices are based on E-index, institutional ownership, CEO ownership, and powerful CEO. Higher values for both indices indicate better governance and/or less entrenchment. The instrumental variables in the regressions are S&P 500 index dummy, major exchange dummy, growth rate of real GDP, and the natural logarithm of the number of completed mergers and acquisitions in a year. The null hypothesis of the Wald test is that the coefficient estimates on the instrumental variables are equal to zero. *Z*-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Governance is measured by EW governance index			Governance is measured by PW governance index		
Dependent variable is choice of	Diversified (1)	Governance (2)	Div. × Gov. (3)	Diversified (4)	Governance (5)	Div. × Gov. (6)
S&P 500 index dummy	–0.188	–0.450***	–0.362***	–0.188	–0.472***	–0.329**
	(–1.50)	(–4.78)	(–2.79)	(–1.50)	(–4.87)	(–2.48)
Major exchange dummy	0.353*	0.036	0.385**	0.353*	–0.117	0.262
	(1.73)	(0.26)	(2.17)	(1.73)	(–0.74)	(1.41)
GDP growth rate	3.851***	–2.105*	–0.065	3.851***	0.574	1.629
	(2.91)	(–1.68)	(–0.04)	(2.91)	(0.47)	(1.05)
Log number of M&A per year	–0.103	0.384***	0.383***	–0.103	–0.003	0.100
	(–1.10)	(4.09)	(3.11)	(–1.10)	(–0.03)	(0.87)
Log sales	0.036	0.075**	0.046	0.036	0.083**	0.053
	(0.75)	(2.15)	(0.98)	(0.75)	(2.30)	(1.13)
Market-to-book ratio	–0.166***	0.031	–0.091*	–0.166***	0.030	–0.106**
	(–3.92)	(1.26)	(–1.81)	(–3.92)	(1.20)	(–2.17)
Return on assets	–1.138***	0.493	–0.502	–1.138***	0.827**	–0.437
	(–2.60)	(1.48)	(–1.04)	(–2.60)	(2.48)	(–0.94)
Fixed asset ratio	–0.648***	–0.488***	–0.535**	–0.648***	–0.387**	–0.468**
	(–2.59)	(–2.84)	(–2.23)	(–2.59)	(–2.14)	(–1.96)

(*continued*)

Table 10 – *continued*

Dependent variable is choice of	Governance is measured by EW governance index			Governance is measured by PW governance index		
	Diversified (1)	Governance (2)	DIV. × GOV. (3)	Diversified (4)	Governance (5)	DIV. × GOV. (6)
R&D/sales	–3.602***	–0.395	–3.221***	–3.602***	–0.325	–3.182***
	(–5.44)	(-1.13)	(–4.35)	(–5.44)	(–1.00)	(–4.18)
CAPEX/sales	–0.378	0.383**	–0.490	–0.378	0.372*	–0.511
	(–1.12)	(2.00)	(–1.44)	(–1.12)	(1.82)	(–1.59)
Dividend payer	0.495***	–0.276***	0.074	0.495***	–0.305***	0.101
	(5.77)	(–4.31)	(0.88)	(5.77)	(–4.64)	(1.21)
Cash flow volatility	–0.841	–0.684	–0.778	–0.841	–0.156	–0.563
	(–0.95)	(–1.25)	(–0.85)	(–0.95)	(–0.27)	(–0.57)
M&A activity	0.235***	–0.046	0.111*	0.235***	–0.030	0.147***
	(4.05)	(–0.93)	(1.88)	(4.05)	(–0.63)	(2.62)
Investment rating	0.454***	–0.483***	–0.015	0.454***	–0.553***	–0.084
	(3.53)	(–5.04)	(–0.12)	(3.53)	(–5.68)	(–0.67)
Speculative rating	0.182	–0.120	0.098	0.182	–0.181**	0.078
	(1.60)	(–1.44)	(0.87)	(1.60)	(–2.15)	(0.70)
Pseudo R-sq	0.135	0.061	0.064	0.135	0.071	0.063
Wald test (chi-squared)	35.32***	105.42***	54.12***	35.32***	95.99***	37.28***
Number of observations	6,873	6,873	6,873	6,873	6,873	6,873

Effects of diversification and governance on leverage accounting for selection bias and endogeneity

The dependent variables are industry-adjusted leverage and industry-adjusted leverage net of cash and marketable securities. The key right-hand-side variables are dummy variables for diversification, governance, and their interaction, where *Diversified* is equal to one if the firm-year has more than two segments and *Governance* is equal to one if the firm-year governance index is above the median governance index in that year. Panel A uses an equally-weighted (EW) governance index based on E-index, institutional ownership, CEO ownership, and powerful CEO. Panel B uses a percentile-weighted (PW) governance index based on E-index, institutional ownership, CEO ownership, and powerful CEO. Higher values for both indices indicate better governance, so that *Governance* equals one for good (above median) governance. Columns (1) and (4) report baseline OLS regressions of adjusted-leverage on *Diversified*, *Governance*, *Diversified* × *Governance*, control variables, and industry and year fixed effects. Columns (2) and (5) report adjusted-leverage regressions using a modified Heckman (1979) method to account for selection bias where we include in the OLS regression corrections for self-selection for *Diversified* (λ^{Div}), *Governance* (λ^{Gov}), and *Diversified* × *Governance* ($\lambda^{Div\times Gov}$) computed using the probit regressions reported in Table 10. Columns (3) and (6) report second-stage adjusted leverage regressions using the IV method discussed in Adams et al. (2009), Angrist and Pischke (2009, p. 191), and Wooldridge (2010, p. 939) to account for dummy variable endogenous variables. The first stage uses the estimated probit regressions in Table 10 to compute fitted probabilities for diversification, governance, and their interaction. These fitted probabilities are then used as instruments in OLS regressions of the three endogenous dummy variables on all leverage regression controls and the corresponding instrument. Fitted values from these OLS regressions are then used as regressors in the leverage regressions reported in columns (3) and (6). The control variables are those used in Table 3. All variable are defined in the Appendix. *T*-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Corporate governance based on EW governance index

	Dependent variable: Adjusted leverage			Dependent variable: Adjusted net leverage		
	OLS	Heckman	IV	OLS	Heckman	IV
	(1)	(2)	(3)	(4)	(5)	(6)
Diversified	0.006	–0.021	0.022	0.028**	0.003	0.054**
	(0.64)	(–0.41)	(1.17)	(2.18)	(0.04)	(2.17)
Governance	0.015**	0.015**	0.030*	0.018*	0.016	0.089***
	(2.11)	(2.16)	(1.78)	(1.82)	(1.62)	(3.82)
Diversified × governance	–0.023**	–0.024**	–0.080*	–0.024	–0.024	–0.142**
	(–1.98)	(–2.04)	(–1.94)	(–1.49)	(–1.52)	(–2.54)
λ^{Div}		0.089*			0.146*	
		(1.76)			(1.68)	
λ^{Gov}		–0.150**			–0.371***	
		(–1.99)			(–3.76)	
$\lambda^{Div\times Gov}$		0.140*			0.249***	
		(1.86)			(2.59)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.233	0.235	0.225	0.286	0.291	0.266
Number of observations	6,873	6,873	6,873	6,873	6,873	6,873

(*continued*)

Table 11 – *continued*

Panel B. Corporate governance based on PW governance index

	Dependent variable: Adjusted leverage			Dependent variable: A	
	OLS (1)	Heckman (2)	IV (3)	OLS (4)	Heck (5
Diversified	0.009 (0.90)	–0.021 (–0.43)	–0.000 (–0.03)	0.035*** (2.67)	0.01 (0.17
Governance	0.016** (2.22)	0.016** (2.26)	0.016 (0.99)	0.021** (2.01)	0.01 (1.76
Diversified × governance	–0.026** (–2.15)	–0.026** (–2.20)	–0.022 (–0.58)	–0.036** (–2.12)	–0.03 (–2.10
λ^{Div}		0.061 (1.53)			0.13 (1.74
λ^{Gov}		–0.134* (–1.93)			–0.30 (–3.40
$\lambda^{Div \times Gov}$		0.138* (1.68)			0.21 (2.01
Controls	Yes	Yes	Yes	Yes	Ye
Industry fixed effects	Yes	Yes	Yes	Yes	Ye
Year fixed effects	Yes	Yes	Yes	Yes	Ye
Adjusted R-squared	0.233	0.235	0.233	0.286	0.29
Number of observations	6,873	6,873	6,873	6,873	6,87

Highlights:

- Diversification influences the relation between corporate governance and leverage
- Positive relation between managerial entrenchment and leverage in diversified firms
- Negative relation between managerial entrenchment and leverage in focused firms
- Results are robust to different measures of leverage, diversification, and governance