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Inside Debt and Mergers and Acquisitions

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Abstract

I empirically investigate the relation between chief executive officer (CEO) inside debt holdings and mergers and acquisitions (M&As), and find evidence consistent with the agency theory's prediction of a negative relation between CEO inside debt holdings and corporate risk taking. Further analysis shows that CEO inside debt holdings are positively correlated with M&A announcement abnormal bond returns and long-term operating performance, but negatively correlated with M&A announcement abnormal stock returns. Finally, I find evidence that acquirers restructure the postmerger composition of CEO compensation that mirrors their capital structure in order to alleviate incentives for wealth transfer from shareholders to bondholders or vice versa.

I. Introduction

Following the seminal paper by Jensen and Meckling (1976), several studies have investigated the relationship between executive compensation contract design and corporate behavior, mostly focused on salary, bonus, stocks, and stock options as major forms of compensation (e.g., Amihud and Lev (1981), Agrawal and Mandelker (1987), and Fenn and Liang (2001)). Prior research documents that equity-based compensation (EBC), in the form of stocks and stock options, aligns the interests of managers and stockholders and incentivizes managers to take risks for the shareholders' interests (e.g., Jensen and Meckling (1976), Smith and Stulz (1985), Guay (1999), Coles, Daniel, and Naveen (2006), and Low (2009)). A recent growing stream of literature reports that debt-like compensation, in the forms of pension benefits and deferred compensation, accounts for a significant part of the total executive compensation package, and in some firms,

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managers even hold more debt-like compensation than EBC (e.g., Bebchuk and Jackson (2005), Sundaram and Yermack (2007), Gerakos (2010), and Wei and Yermack (2011)). Managers' pension benefits and deferred compensation are debt-like compensation, since they represent fixed obligations by the company to make future payments to corporate insiders/managers (hence, these are usually referred to as "inside debt"). Inside debt is expected to align managers' interests with those of external debtholders and alleviate managers' risk-taking incentives, since inside debt is typically unsecured and unfunded, and if the firms go bankrupt, managers have claims equal to those of other unsecured creditors (Sundaram and Yermack (2007), Gerakos (2010), and Cassell, Huang, Sanchez, and Stuart (2012)). Consistent with the notion that inside debt aligns manager interests with those of external debtholders, Anantharaman, Fang, and Gong (2014) document a negative relation between chief executive officer (CEO) inside debt and bond yield spread. Wei and Yermack report that the disclosure of large CEO inside debt holdings leads to a transfer of value from equity to debt, a decrease in the volatility of both securities, and a decrease in overall firm value.

In this research, I examine the link between CEO inside debt holdings and corporate risk taking in merger and acquisition (M&A) activities and its implications for bondholder, shareholder, and firm value. M&As are among the largest and most readily observable forms of corporate investment. Furfine and Rosen (2011) document that, on average, M&As increase the default risk of the acquiring firms; therefore, they represent discretionary risk taking by the CEOs. In addition, M&As tend to intensify the inherent conflicts of interest among shareholders, bondholders, and managers (e.g., Jensen and Meckling (1976), Masulis, Wang, and Xie (2007)). For these reasons, M&As provide a unique ground for testing the potential effects of debt-like compensation on corporate investment and financing strategies and the implications of these effects for shareholder, bondholder, and corporate manager wealth. Following the theoretical arguments (e.g., Jensen and Meckling (1976), Edmans and Liu (2011)) and empirical applications (e.g., Sundaram and Yermack (2007), Wei and Yermack (2011), and Cassell et al. (2012)), the construct of interest is the CEO debt-to-equity ratio relative to the firm's respective ratio. Following prior research, I use the following four variables as proxies for the construct in my empirical tests: *relative CEO leverage*, which is measured as the ratio of the CEO's debt-to-equity scaled by the firm's debt-to-equity ratio (Sundaram and Yermack (2007), Edmans and Liu (2011), and Cassell et al. (2012)); *relative CEO leverage* $>$ *1 dummy*, which takes a value of 1 if the relative CEO leverage exceeds 1, and 0 otherwise (Sundaram and Yermack (2007), Cassell et al. (2012)); *relative CEO incentive*, which is the ratio of the marginal change in the value of CEO inside debt holdings to the marginal change in CEO inside equity holdings given the change in firm value, all scaled by the firm's respective ratio (Wei and Yermack (2011), Cassell et al. (2012)); and *relative CEO incentive* $>$ *1 dummy*, which takes a value of 1 if the relative CEO incentive exceeds 1, and 0 otherwise (Wei and Yermack (2011), Cassell et al. (2012)).

My analysis starts with the examination of the impacts of CEO inside debt holdings on M&A propensity over the period 2007–2010. Using a panel of 2,822 firm-year observations of 891 unique firms that had positive CEO inside debt

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holdings over the period 2006–2009, I find that the measures of the relative CEO debt-to-equity ratios are negatively correlated with firms' M&A propensities.[1] Based on the premise that debt-like compensation aligns the interests of debtholders and managers and induces managers to avoid risk-increasing actions that may increase the risk of default, I investigate the relations between CEO inside debt holdings and diversifying M&A propensity, the selection of M&A targets, the choice of financial leverage, and payment consideration. My analysis of a subsample of 296 unique firms that pursue 581 M&A deals over the period 2007–2010 shows that large relative CEO debt-to-equity ratio is associated with industry diversification, smaller proportion of cash payment for the targets, lower financial leverage, and smaller increase in firm risks post merger.

Further investigation of the operating performance and value implications of CEO inside debt holdings indicates that CEO inside debt holdings are positively correlated with short-term M&A announcement abnormal bond returns and long-term operating performance, but negatively correlated with M&A announcement abnormal stock returns. In addition, I find that acquiring firms restructure CEO compensation packages post merger to mirror their capital structure. Although my main sample is limited by disclosure rules starting in 2006, my primary findings hold when I follow Sundaram and Yermack (2007) in estimating inside debt for 2005 and expand the M&A sample to additionally include acquisitions in the year 2006. Also noteworthy is the fact that my findings are robust to alternative specifications, survive potential self-selection and endogeneity bias corrections, and persist after several robustness checks. Overall, my evidence suggests that CEO inside debt holdings motivate risk-decreasing M&As, which benefits the acquirer bondholders at the expense of shareholders in the short term; however, acquiring firms restructure CEO compensation packages post merger to mitigate CEOs' incentives to pursue corporate activities that lead to wealth transfer from shareholders to bondholders or vice versa in the long term.

My research contributes to the literature in several ways. First, empirical research on executive compensation so far has mostly focused on equity-based (i.e., stocks and stock options) and fixed (i.e., salary and bonus) compensation, while research on debt-like compensation has been limited due to the unavailability of data.[2] This research contributes to a growing research stream that investigates the effect of debt-like compensation on corporate investment and financial policies and the firm's stakeholder benefits based on recently available data. Second, to the best of my knowledge, I am the first to show direct evidence of the impact of debt-like compensation on M&As and its implications for firm operating performance, as well as its bond and stock performance. Finally, the research adds to the ongoing debate on the efficiency of inside debt as a form of

[1]Note that I use the CEO inside debt holdings at the end of the prior fiscal year, together with other variables, to predict the M&A propensity this year. However, I use CEO inside debt holdings up to the most recent year, when available, in other analyses as relevant.

[2]The accumulated or projected values of pension benefits were not disclosed in proxy statements until a Securities and Exchange Commission disclosure reform in 2006, and the ExecuComp database begins reporting executive pension data from the fiscal year 2006.

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compensation, which has significant implications for improving executive compensation efficiency as well as M&A outcomes.[3]

My research is close to that of Datta, Iskandar-Datta, and Raman (2001), who also examine the effects of executive compensation on M&As; however, my research is different from theirs in two crucial ways. First, while Datta et al. examine the effect of EBC, I consider the effect of debt-like compensation on M&As. Second, they define EBC as the sum of value of the new stock options granted during the year as a percentage of the total executive compensation that includes salary, bonus, value of restricted stock granted, value of the new stock options granted during the year, long-term incentive payouts, and other compensation. In contrast, I examine debt-based compensation out of the total compensation that includes outstanding stock, stock options, pension benefits, and deferred compensation on an *accumulated basis,* which would reflect the depth of the alignment of interests between managers and shareholders or bondholders more precisely.[4] My research is also close to that of Cassell et al. (2012), who investigate the links between CEO inside debt holdings and firm risk, research and development (R&D) investment, financial leverage, diversification, and asset liquidity. My research complements and extends theirs by focusing on M&A activities and examining the direct implications of the link between inside debt and corporate investment and financial behavior for firms' operating performance as well as bondholders' and shareholders' wealth.

The remainder of my paper proceeds as follows: Section II provides a description of the data and the construction of major variables. Section III includes the methodology, empirical results, and discussion. Section IV presents robustness checks, and Section V summarizes my empirical findings and conclusions.

II. Sample, Variable Construction, and Descriptive Statistics

My sample includes firms in the Compustat Executive Compensation (ExecuComp) database. This database includes over 80 different compensation items on more than 12,500 executives in companies that are listed in the Standard & Poor's (S&P) 500, S&P 400 MidCap, and S&P SmallCap 600 indexes, and provides compensation data for the executives (usually the top five) of each firm. The data are annual and available from 1992 onward, but executive pension data were unavailable until 2006 due to a Securities and Exchange

[3]It is worth highlighting that Bebchuk and Jackson (2005) question the effectiveness of inside debt in aligning the interests of managers and debtholders, arguing that managers can receive the actuarial values of their pensions in cash upon retirement, thereby effectively terminating their bondholder status. Furthermore, Bebchuk and Jackson note that firms and managers can make arrangements to shield the value of this debt-like compensation from the debtholders even when the firms become insolvent. However, Gerakos (2010) empirically examines the arrangements to protect the Supplemental Executive Retirement Plans (SERPs), which constitute a dominant part of executive pension, from bankruptcy and reports that only 3 out of the total 172 firms in his proprietary sample have an arrangement (in the form of Secular Trust) that protects SERP from bankruptcy. On the other hand, he reports that 99 out of 172 firms allow the CEO to take a lump-sum payout at retirement.

[4]The value of salary and bonus is usually fixed, paid directly in cash without delay, and accounts for a relatively small share of the total value of the cumulative compensation; thus, omitting salary and bonus from my compensation calculation is unlikely to bias the analysis and the results. However, in the robustness check, I explicitly control for the level of salary and bonus in my analysis.

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Commission (SEC) disclosure reform. Therefore, I obtained pension and deferred compensation data starting from 2006 from the ExecuComp database to estimate CEO inside debt holdings. In addition, I obtained the accounting data from Compustat, stock price and return data from the Center for Research in Security Prices (CRSP), bond price data from the Trade Reporting and Compliance Engine (TRACE), and M&A data from Thomson One Banker. To focus analysis on M&A deals that potentially have visible impacts on the respective acquirers, I follow the literature in filtering out those deals with values of less than $1 million.

Jensen and Meckling (1976) argue that inside debt could motivate managers to run firms in a way that alleviates the agency costs of debt, particularly when the managers' debt-to-equity ratios resemble those of the firms, since they would have no incentive in transferring wealth from the stockholders to the bondholders or vice versa. Edmans and Liu (2011) show analytically that managers' inside debt holdings are associated with conservative investment policies, which lead to increases (decreases) in the value of their firms' debt (equity). Following the theoretical arguments (e.g., Jensen and Meckling (1976), Edmans and Liu (2011)) and empirical applications (e.g., Sundaram and Yermack (2007), Wei and Yermack (2011), and Cassell et al. (2012)), the construct of interest is the CEO debt-to-equity ratio relative to the firm's respective ratio. Following prior research, I use four variables as proxies for the construct in my empirical tests: *relative CEO leverage*, which is measured as the ratio of the CEO debt-to-equity scaled by the firm's debt-to-equity ratio (Sundaram and Yermack (2007), Edmans and Liu (2011), and Cassell et al. (2012)); *relative CEO leverage* $>$ *1 dummy*, which takes a value of 1 if the relative CEO leverage exceeds 1, and 0 otherwise (Sundaram and Yermack (2007), Cassell et al. (2012)); *relative CEO incentive*, which is the ratio of the marginal change in the value of CEO inside debt holdings to the marginal change in CEO inside equity holdings given the change in firm value, all scaled by the respective firm's ratio (Wei and Yermack (2011), Cassell et al. (2012)); and *relative CEO incentive* $>$ *1 dummy*, which takes a value of 1 if the relative CEO incentive exceeds 1, and 0 otherwise (Wei and Yermack (2011), Cassell et al. (2012)). I provide a description of the estimation of option value in Appendix A, an estimation of the relative CEO leverage and relative CEO incentive in Appendix B, and definitions of variables in Appendix C.

Since several firms in the ExecuComp database do not provide inside debt (in the form of pension benefits and/or deferred compensation) to CEOs, I restrict the sample to those firms with positive CEO inside debt holdings.[5] I report the descriptive statistics of the data in Panel A of Table 1 for the full sample and Panel B for the subsample of a cross section of firms that engage in M&As. The full sample contains 2,822 firm-year observations of 891 unique firms with positive CEO inside debt holdings over the period 2006–2009. The M&A subsample, which is the intersection between the full sample and M&A data, has 296 firms that were involved in 581 M&A deals over the period 2007–2010. The descriptive statistics

[5]During the period 2006–2009, almost 60% of the CEO-year observations in the ExecuComp database have 0 inside debt, so including firm-year observations with 0 CEO inside debt could potentially bias the analysis results. Therefore, I follow Wei and Yermack (2011) and Cassell et al. (2012) in restricting the sample to those firms that have positive CEO inside debt holdings.

TABLE 1

Summary Statistics

Panel A of Table 1 reports descriptive statistics on the firm-year observation basis of an unbalanced panel of 891 unique firms whose CEOs have positive inside debt holdings in the form of pension and deferred compensation over the period 2006–2009. Panel B reports similar statistics of a subsample of 296 unique acquirers that announce M&A bids over the period 2007–2010. *Relative CEO leverage* is the ratio of the CEO's debt-to-equity scaled by the firm's debt-to-equity ratio. *Relative CEO leverage > 1 dummy* is an indicator that takes a value of 1 if the relative CEO leverage exceeds 1, and 0 otherwise. *Relative CEO incentive* is the ratio of the marginal change in the value of CEO inside debt holdings to the marginal change in CEO inside equity holdings given the change in firm value, all scaled by the firm's respective ratio. *Relative CEO incentive > 1 dummy* is an indicator that takes a value of 1 if the relative CEO incentive exceeds 1, and 0 otherwise. *Market-to-book ratio* is measured as the market value of assets divided by the book value of assets where the market value of assets is measured as (the market value of equity + preferred stock value + debt in current liabilities + long-term debt − deferred taxes and investment tax credit). *Free cash flow ratio (FCF)* is the ratio of the sum (earnings before interest, taxes, depreciation, and amortization (EBITDA) − income tax − interest − dividend payment) to the book value of assets at the beginning of the year. The *12-month cumulative returns* are calculated as the annual geometric mean returns based on CRSP monthly stock return for each fiscal year. *Book leverage* is the ratio of the sum of (short-term debt + long-term debt) to the book value of assets. *Market leverage* is the ratio of the sum of (short-term debt + long-term debt) to the sum of (short-term debt + long-term debt + market value of equity). *Sales growth* is defined as the average of the annual sales growth rates of the last 3 years. Other variables are as described in Appendix C.

Variable	*N*	Mean	Q1	Median	Q3	Std. Dev.
Panel A. Full Sample						
CEO debt/equity ratio	2,822	0.508	0.050	0.188	0.539	0.940
Relative CEO leverage	2,822	3.946	0.197	0.726	2.139	12.984
Relative CEO leverage > 1 dummy	2,822	0.416	0.000	0.000	1.000	0.493
Relative CEO incentive	2,822	2.853	0.147	0.518	1.495	9.493
Relative CEO incentive > 1 dummy	2,822	0.338	0.000	0.000	1.000	0.473
Market-to-book ratio	2,822	1.228	0.733	1.010	1.504	0.767
FCF ratio	2,818	0.069	0.022	0.069	0.114	0.091
12-month cumulative returns	2,822	0.070	−0.157	0.092	0.297	0.483
CEO age	2,811	55.672	51.000	56.000	60.000	6.478
CEO tenure	2,805	7.037	3.000	5.000	9.000	6.506
Book leverage	2,822	0.264	0.151	0.252	0.356	0.167
Market leverage	2,822	0.288	0.121	0.234	0.408	0.223
Sales growth	2,822	0.047	−0.047	0.046	0.123	0.209
Book value of assets (in $ million)	2,822	10,116.19	1,236.10	3,118.63	9,084.03	22,179.54
Panel B. M&A Subsample						
CEO debt/equity ratio	581	0.322	0.030	0.132	0.334	0.637
Relative CEO leverage	581	3.183	0.135	0.496	1.721	11.870
Relative CEO leverage > 1 dummy	581	0.373	0.000	0.000	1.000	0.484
Relative CEO incentive	581	2.232	0.102	0.363	1.207	8.373
Relative CEO incentive > 1 dummy	581	0.298	0.000	0.000	1.000	0.458
Market-to-book ratio	581	1.360	0.842	1.184	1.694	0.777
FCF ratio	581	0.078	0.045	0.082	0.127	0.101
12-month cumulative returns	545	0.129	−0.057	0.136	0.311	0.339
CEO age	579	54.661	50.000	55.000	59.000	6.604
CEO tenure	577	6.744	3.000	5.000	9.000	6.213
Book leverage	581	0.273	0.162	0.254	0.358	0.172
Market leverage	581	0.265	0.116	0.212	0.360	0.206
Sales growth	581	0.104	0.008	0.086	0.185	0.206
Book value of assets (in $ million)	581	14,462.20	1,391.90	3,485.02	11,807.00	50,162.18

show that inside debt accounts for a significant share of the total compensation package. The average CEO debt/equity ratio is 0.51 (0.32) in the full sample (M&A subsample). In addition, a significant number of CEOs have inside leverage that exceeds their firm's market leverage (the means of *relative CEO leverage > 1 dummy* of the full sample and M&A subsample are 0.42 and 0.37, respectively). Furthermore, the average acquirer has higher market-to-book ratio, prior year stock returns, and sales growth rate, and is larger than the average firm in the full sample.

Table 2 reports the intertemporal and 2-digit Standard Industrial Classification (SIC) code industry distributions of the M&A subsample. It is noteworthy that the number of M&A deals peaked in 2007, the year that marks the beginning of the recent economic recession, and decreased thereafter. Some industries with

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TABLE 2

Intertemporal and Industry Distributions of M&As

Table 2 reports the intertemporal and 2-digit SIC code industries distribution of M&A activities of acquirers, whose CEOs have positive inside debt holdings, over the period 2007–2010.

Panel A. M&A Subsample Distribution by Year

Year	Frequency	%
2007	207	35.63
2008	144	24.78
2009	107	18.42
2010	123	21.17
Total	581	100.00

Panel B. M&A Subsample Distribution by Industries

SIC Code	Industry Description	Frequency	%
38	Measuring Analyzing Controlling Instruments; Photographic Medical and Optical Goods	57	9.81
35	Industrial and Commercial Machinery and Computer Equipment	54	9.29
28	Chemicals and Allied Products	48	8.26
73	Business Services	47	8.09
13	Oil and Gas Extraction	44	7.57
36	Electronic and Other Electrical Equipment and Components Except Computer Equipment	41	7.06
48	Communications	35	6.02
37	Transportation Equipment	31	5.34
49	Electric Gas and Sanitary Services	27	4.65
20	Food and Kindred Products	25	4.30
80	Health Services	25	4.30
50	Wholesale Trade: Durable Goods	16	2.75
29	Petroleum Refining and Related Industries	12	2.07
33	Primary Metal Industries	12	2.07
	Industries with <2% representation	107	18.41
	Total	581	100.00

a large number of acquirers include the following: measuring and controlling instruments, photographic medical and optical goods, industrial and commercial machinery and computer equipment, chemicals and allied products, business services, oil and gas extraction, electronic and electrical equipment, communications, and transportation equipment.

III. Research Methods, Empirical Results, and Discussion

A. Inside Debt and M&A Propensity

Financial economics literature suggests that EBC is designed to align the interests of managers and shareholders and motivate managers to take risks for the shareholders' benefit (e.g., Coles et al. (2006), Datta et al. (2001)).[6] Conversely, debt-like compensation, which helps to align the interests of managers with those of debtholders, is expected to induce managers to avoid risk-increasing actions that could increase the likelihood of default. When managers receive compensation in both debt and equity, they should run their firms in a way that considers the interests of both debt and equity investors. Therefore, the classic agency cost

[6]It is noted that, between stock- and option-based compensation, which together constitute equity-based compensation, stock-based compensation, with its value linearly correlated with stock price, can induce managers' risk taking or risk aversion; however, option-based compensation, due to its convex payoffs, induces risk taking (Coles et al. (2006)).

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of debt problem related to risk-shifting behavior in investments should diminish in importance (Sundaram and Yermack (2007)).

M&As are one of the largest and most readily observable forms of corporate investment. Furfine and Rosen (2011) document that, on average, M&As increase the default risk of the acquiring firms; therefore, M&As also represent discretionary risk taking by the CEOs of the acquirers. If debt-like compensation is successful in reducing managers' motivation to take risks, as suggested in the literature, I expect that the larger the relative CEO leverage (the relative CEO incentive), the lower the probability that a firm will pursue an M&A. However, in certain cases, pursuing diversifying M&As can help managers reduce their exposure to firm-specific risks (Amihud and Lev (1981)). In addition, pension benefits, which constitute a large part of inside debt, are generally determined in proportion to the average of the salary and bonus of executives over the last 3–5 years. Since managers' salary and bonus levels typically depend on firm size, managers can employ M&As to expand firm size and, thus, increase their fixed portion of the compensation package (Grinstein and Hribar (2004)). Harford and Li (2007) show that acquirer CEOs are better off due to new stock and option grants following the M&As. They also note that a CEO's salary and wealth are sensitive to good performance but are insensitive to poor performance after the acquisition. The postmerger limited downside effect but tremendous upside potential for debt-like compensation (on top of any new EBC) following an M&A deal could incentivize self-interested managers to pursue M&As, implying a positive relation between relative CEO leverage (relative CEO incentive) and the propensity for pursuing M&As.[7] Collectively, the opposing arguments offered above indicate that the relation between relative CEO leverage (relative CEO incentive) and a firm's propensity for pursuing M&As is unclear *a priori* and should be determined empirically.

To gauge the effects of a CEO's inside debt on a firm's propensity for pursing an M&A deal, I use a probit model that has the following form:

$$\text{(1)} \qquad \text{M\&A dummy}_{i,t} = \alpha + \beta \mathbf{X}_{i,t-1} + \delta \text{Year dummies} + \gamma \text{Industry dummies} + \varepsilon_{i,t},$$

where the dependent variable, *M&A dummy*, takes a value of 1 if a firm announces an M&A bid in year t, and 0 otherwise. $\mathbf{X}$ is a vector of the test and control variables, which are measured at the end of the preceding fiscal year. Following prior literature, besides the test variables, I include the following variables as controls: *size*, *market-to-book ratio*, *momentum*, *firm age*, *sales growth*, and *market leverage*. Harford (1999) observes that firms with excess cash are more likely to attempt M&As; therefore, I also control for excess cash in my estimation. A description of the control variables is provided in Appendix C. $\varepsilon_{i,t}$ is the error term that is assumed to be orthogonal to the variables on the right-hand side of equation (1). In addition, I include the 2-digit SIC code industry dummies to control

[7]This incentive also implies an endogenous relationship between compensation and the M&A decision, which requires a correction for potential endogeneity bias in empirical implementation (offered later in this section).

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for industry-fixed effects and year dummies to control for potential time-varying macroeconomic conditions.

The probit model estimation results are reported in Table 3. Column 1 reports coefficient estimates of *relative CEO leverage* and other control variables, as listed above. A CEO is expected to follow an even more conservative investment policy if his inside leverage is higher than the firm's financial leverage. Hence, in column 2, I replace *relative CEO leverage* with *relative CEO leverage* $>$ *1 dummy*. Similarly, I examine the effects of *relative CEO incentive* in column 3 and *relative CEO incentive* $>$ *1 dummy* in column 4. The probit model estimation results reported in the first four columns of Table 3 show that the coefficients on *relative CEO leverage*, *relative CEO leverage* $>$ *1 dummy*, and *relative CEO incentive* $>$ *1 dummy* are negative (-0.005, -0.139, and -0.073 in columns 1, 2, and 4, respectively) and significant at the 5% and 10% levels. However, the coefficient on *relative CEO incentive*, although negative, is not statistically significant. Most of the control variables have signs and significance consistent with those documented in the literature. The estimation results suggest that, when executive compensation is biased toward inside debt, CEOs are less likely to pursue M&As.[8]

It is not straightforward to interpret the magnitude of the coefficient estimates of the probit model, so to illustrate, I use the coefficient estimates in column 2 to estimate the marginal probability of pursing M&A. My (untabulated) estimation results indicate that, holding other variables unchanged at their sample means, the probability of pursuing M&A of firms with relative CEO leverage > 1 is lower than that of the firms with relative CEO leverage ≤ 1 by 2.92%. Given that the unconditional mean of pursuing M&A probability of the sample firm is 20.59%, the difference in the likelihood of pursing M&A between the two groups of firms sorted on relative CEO leverage is significant.

Self-interested CEOs who plan to pursue diversifying or unprofitable M&As may negotiate for inside debt compensation, which raises an endogeneity concern due to reverse causality and potentially biases the probit model estimates. To alleviate this endogeneity concern, I run two-stage instrumented variable (IV) probit regressions. Specifically, in the first stage, I estimate relative CEO leverage (relative CEO incentive) as a function of a group of selected instruments and other variables in the outcome regression. In the second stage, I estimate equation (1) using the predicted values of relative CEO leverage (relative CEO incentive) and other variables as regressors. Following prior research (e.g., Sundaram and Yermack (2007), Anantharaman et al. (2014), and Cassell et al. (2012)), I use the following variables, which are arguably important determinants of inside debt compensation, as instruments for relative CEO leverage (relative CEO incentive):

[8]Since debtholders can exert monitoring effects and help alleviate the agency problem of free cash flow, I expect CEOs to be more conservative with their firms' excess cash when they have high relative leverage (high relative incentive).To examine the cash monitoring effect of CEO inside debt holdings, I include an interaction between excess cash and relative CEO leverage (relative CEO incentive) and additionally include an interaction between market leverage and excess cash to account for possible external debtholder monitoring of cash. However, none of the coefficients on the interaction between excess cash and my test variables is statistically significant (results are not reported for brevity).

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TABLE 3

M&A Propensity

Table 3 reports the estimation results of probit models under the following form:

$$\text{M\&A dummy}_{i,t} = \alpha + \beta \mathbf{X}_{i,t-1} + \delta \text{Year dummies} + \gamma \text{Industry dummies} + \varepsilon_{i,t},$$

where *M&A dummy* takes a value of 1 if a firm announces an M&A bid in year t, and 0 otherwise. **X** is a vector of test and control variables. The test variables include *relative CEO leverage*, *relative CEO leverage > 1 dummy*, *relative CEO incentive*, and *relative CEO incentive > 1 dummy*. *Relative CEO leverage* is the ratio of the CEO's debt-to-equity scaled by the firm's debt-to-equity ratio. *Relative CEO leverage > 1 dummy* is an indicator that takes a value of 1 if the relative CEO leverage exceeds 1, and 0 otherwise. *Relative CEO incentive* is the ratio of the marginal change in the value of CEO inside debt holdings to the marginal change in CEO inside equity holdings given the change in firm value, all scaled by the firm's respective ratio. *Relative CEO incentive > 1 dummy* is an indicator that takes a value of 1 if the relative CEO incentive exceeds 1, and 0 otherwise. The remaining variables are controls and are defined in Appendix C. The model is estimated with 2-digit SIC code industries and year-fixed effects, but their estimates are suppressed for brevity. Heteroscedasticity-robust standard errors clustered by firms are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Variable	1	2	3	4	5	6
Relative CEO leverage	−0.005*					
	(0.003)					
Relative CEO leverage > 1 dummy		−0.139**				
		(0.070)				
Relative CEO incentive			−0.001			
			(0.004)			
Relative CEO incentive > 1 dummy				−0.073*		
				(0.043)		
Instrumented relative CEO leverage					−0.092**	
					(0.040)	
Instrumented relative CEO incentive						−0.109**
						(0.045)
Market leverage	−0.331*	−0.434**	−0.333*	−0.376**	−1.611**	−1.425***
	(0.176)	(0.205)	(0.201)	(0.179)	(0.628)	(0.533)
Excess cash	0.714*	0.675	0.715*	0.702*	2.033***	1.776***
	(0.389)	(0.428)	(0.430)	(0.387)	(0.747)	(0.648)
Market-to-book ratio	−0.006	−0.007	−0.006	−0.007	−0.039	−0.042
	(0.045)	(0.052)	(0.052)	(0.045)	(0.064)	(0.062)
Noncash working capital ratio	−0.580**	−0.523*	−0.578**	−0.554**	0.243	0.074
	(0.266)	(0.285)	(0.285)	(0.267)	(0.492)	(0.426)
Momentum	0.028	0.029	0.028	0.03	−0.037	−0.019
	(0.067)	(0.066)	(0.066)	(0.067)	(0.099)	(0.095)
Sales growth	0.561***	0.543***	0.560***	0.555***	0.326	0.383
	(0.149)	(0.155)	(0.155)	(0.149)	(0.259)	(0.235)
Size	0.107***	0.110***	0.107***	0.108***	−0.001	−0.006
	(0.026)	(0.031)	(0.031)	(0.026)	(0.052)	(0.052)
ln(Firm age)	−0.203***	−0.187***	−0.203***	−0.197***	−0.156**	−0.175**
	(0.055)	(0.064)	(0.064)	(0.056)	(0.074)	(0.070)
Intercept	−1.288***	−1.295***	−1.285***	−1.282***	0.009	0.044
	(0.296)	(0.327)	(0.332)	(0.296)	(0.656)	(0.644)
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	2,822	2,822	2,822	2,822	2,517	2,517
χ^2	100.40	82.45	78.01	101.95	67.99	73.21
Prob > χ^2	0.00	0.00	0.00	0.00		
Pseudo R^2	0.04	0.04	0.04	0.04		
Hausman Test of Endogeneity						
χ^2					8.02	8.30
p-value					0.00	0.00
Overidentification Test						
χ^2					4.96	3.83
p-value					0.29	0.43
Test of Weak Instruments						
F-statistic					2.70	2.66
p-value					0.03	0.03
Partial R^2					0.01	0.01

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natural logarithm of CEO's age;[9] a dummy variable that takes a value of 1 if the firm has a new CEO, and 0 otherwise; a dummy variable that takes a value of 1 if the firm is experiencing liquidity constraint proxied by negative operating cash flow, and 0 otherwise; a dummy variable that takes a value of 1 if the firm has favorable tax status (i.e., the firm has a loss carryforward), and 0 otherwise; maximum state tax rate on individual income;[10] and industry median relative CEO leverage (relative CEO incentive) by year.[11] The results of the second stage of the IV-probit model, reported in columns 5 and 6 of Table 3, show that both the *instrumented relative CEO leverage* and *instrumented relative CEO incentive* are negative (−0.092 and −0.109, respectively) and significant at the 5% level. Moreover, the Hausman test of endogeneity validates the need to correct for the endogeneity concern, and the overidentification test and the test of weak instruments indicate that the selected instruments are appropriate. This evidence indicates that my results are robust to the correction for endogeneity concern.

B. Inside Debt and Risk-Decreasing M&As

1. Inside Debt and M&A Target Selection

Prior studies suggest that M&As may increase bondholder wealth through the coinsurance effect, since the likelihood of default decreases when the assets and liabilities of two firms are combined through M&A as compared to the likelihood of default in individual firms (see, e.g., Levy and Sarnat (1970), Lewellen (1971), and Higgins and Schall (1975)). The coinsurance argument implies that diversifying M&As are beneficial to bondholders, since existing risky debt is spread across the new firm's operations whose cash flows are imperfectly correlated. On the other hand, Datta et al. (2001) observe that, when executive compensation is biased toward equity, acquirers tend to select riskier targets with higher growth opportunities and the acquirers themselves become riskier after the M&A deals, as evidenced by an increase in the volatility of their stock returns. Based on the evidence documented in the literature, I hypothesize that, all else being equal, CEO inside debt holdings are positively correlated with the likelihood of diversifying M&A.

To examine the link between CEO inside debt holdings and the likelihood of diversifying M&A, I estimate a probit model with the dependent variable being a diversifying dummy that takes a value of 1 if the acquirer and target belong to different 2-digit SIC code industries, and 0 otherwise. I control for the following variables in the probit model: *size*, *market-to-book ratio*, *market leverage*, *momentum*, *firm age*, and industry- and year-fixed effects. The probit estimation results are reported in Table 4. Although the coefficients on *relative CEO leverage*

[9] Since CEO age and tenure tend to be positively correlated, I follow Cassell et al. (2012) in using only CEO age as an instrument, but my results are qualitatively similar if I use both CEO age and tenure as instruments.

[10] I obtain the state tax rates from http://www.nber.org/∼taxsim/state-rates/. These rates are calculated using the TAXSIM model (Feenberg and Coutts (1993)).

[11] Unlike Cassell et al. (2012), I do not use CEO age, firm size, and firm age as instruments, since I control for these variables in my main equation of the IV-Tobit model. Using these variables as instruments would raise a concern about their validity.

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TABLE 4
Diversifying M&A Propensity

Table 4 reports the estimation results of probit models under the following form:

$$\text{Diversifying dummy}_{i,t} = \alpha + \beta \mathbf{X}_{i,t-1} + \delta \text{Year dummies} + \gamma \text{Industry dummies} + \varepsilon_{i,t},$$

where *Diversifying dummy* takes a value of 1 if the acquirer and target belong to different 2-digit SIC code industries, and takes a value of 0 otherwise. **X** is a vector of test and control variables. The test variables include *relative CEO leverage*, *relative CEO leverage > 1 dummy*, *relative CEO incentive*, and *relative CEO incentive > 1 dummy*. *Relative CEO leverage* is the ratio of the CEO's debt-to-equity scaled by the firm's debt-to-equity ratio. *Relative CEO leverage > 1 dummy* is an indicator that takes a value of 1 if the relative CEO leverage exceeds 1, and 0 otherwise. *Relative CEO incentive* is the ratio of the marginal change in the value of CEO inside debt holdings to the marginal change in CEO inside equity holdings given the change in firm value, all scaled by the firm's respective ratio. *Relative CEO incentive > 1 dummy* is an indicator that takes a value of 1 if the relative CEO incentive exceeds 1, and 0 otherwise. The remaining variables are controls and are defined in Appendix C. Regressions are estimated with 2-digit SIC code industries and year-fixed effects, but their estimates are suppressed for brevity. Columns 5 and 6 report the second-stage estimation results of the IV-probit model. Heteroscedasticity-robust standard errors clustered by firms are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Variable	1	2	3	4	5	6
Relative CEO leverage	0.005					
	(0.006)					
Relative CEO leverage > 1 dummy		0.181*				
		(0.105)				
Relative CEO incentive			0.011			
			(0.009)			
Relative CEO incentive > 1 dummy				0.212**		
				(0.107)		
Instrumented relative CEO leverage					0.044*	
					(0.024)	
Instrumented relative CEO incentive						0.059**
						(0.028)
Market leverage	0.203	0.436	0.158	0.438	−0.449	−0.429
	(0.471)	(0.474)	(0.473)	(0.472)	(0.865)	(0.776)
Market-to-book ratio	−0.058	−0.069	−0.052	−0.073	0.043	0.024
	(0.113)	(0.111)	(0.113)	(0.111)	(0.270)	(0.234)
Size	0.117**	0.123***	0.114**	0.124***	0.069	0.066
	(0.047)	(0.047)	(0.047)	(0.047)	(0.077)	(0.074)
Momentum	0.164	0.184	0.156	0.186	0.043	0.038
	(0.151)	(0.151)	(0.151)	(0.151)	(0.228)	(0.218)
ln(Firm age)	0.066	0.038	0.068	0.04	0.116	0.108
	(0.097)	(0.098)	(0.097)	(0.098)	(0.118)	(0.112)
Cash flow ratio	1.802	1.968*	1.719	2.049*	1.256	1.273
	(1.171)	(1.158)	(1.171)	(1.162)	(1.937)	(1.793)
Intercept	−1.163	−1.352	−1.114	−1.401	−7.284***	−7.477***
	(0.948)	(0.955)	(0.948)	(0.959)	(1.832)	(1.791)
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	545	545	545	545	505	505
χ^2	107.95	108.84	108.81	109.3	118.89	132.02
Pseudo R^2	0.15	0.15	0.15	0.15		
Hausman Test of Endogeneity						
χ^2					0.68	0.80
p-value					0.41	0.37
Overidentification Test						
χ^2					4.78	4.62
p-value					0.31	0.33
Test of Weak Instruments						
F-statistic					1.92	2.49
p-value					0.09	0.03
Partial R^2					0.02	0.03

and *relative CEO incentive* are not statistically significant, the coefficients on *relative CEO leverage > 1 dummy* and *relative CEO incentive > 1 dummy* are positive (0.181 and 0.212, respectively) and statistically significant in columns 2 and 4. This evidence suggests that firms with CEOs whose compensation is biased toward inside debt are more likely to engage in risk-decreasing diversifying M&As.

Firms may make decisions on diversifying M&A and inside debt compensation jointly, which raises an endogeneity concern. To alleviate this concern, I employ the IV-probit model to reestimate the diversifying M&A model using instruments for relative CEO leverage (relative CEO incentive) similar to those employed in the M&A propensity probit model above and report the results of the outcome regressions in columns 5 and 6 of Table 4. The results show that the coefficients on *instrumented relative CEO leverage* and *instrumented relative CEO incentive* are both positive and statistically significant, consistent with the earlier finding; however, the Hausman endogeneity tests do not substantiate the endogeneity concern, suggesting that the probit-model estimation reported above is more efficient.[12]

2. Inside Debt and Financial Leverage and Methods of Payment

I have shown thus far that CEO inside debt holdings are associated with risk-decreasing investment, as evidenced by the positive correlation between CEO inside debt holdings and the likelihood of diversifying M&As. In this section, I investigate the link between CEO inside debt holdings and the acquirer's financial leverage following an M&A completion as well as the methods of payment for M&A targets.

The agency problem of debt that motivates risk shifting should diminish in importance when managers hold large inside debt, which enables firms to raise debt not only at a lower cost, but also with fewer restrictive covenants (Anantharaman et al. (2014)). Better access to the external debt market at a lower cost may lead to an increase in the financial leverage of the acquirers following an M&A deal. However, higher financial leverage increases the risk of default. Furthermore, the process of raising debt to make cash payment for M&A targets is analogous to substituting the more liquid and less risky assets (i.e., cash) with (target) assets that are more risky and less liquid, which would ultimately hamper the interest of the existing debtholders. Therefore, I predict that CEO inside debt holdings are negatively correlated with the change in financial leverage post merger and cash payments for M&A targets.

I examine the impact of CEO inside debt holdings on an acquirer's postmerger financial leverage in a multivariate setting. The dependent variable is the change in an acquirer's industry-adjusted book leverage from the year preceding an M&A bid announcement to 2 years following M&A completion.[13] Industry-adjusted book leverage is estimated as the difference between an acquirer's book leverage and its 2-digit SIC code industry's contemporaneous

[12] In an untabulated analysis, I examine the relation between CEO inside debt holdings and target riskiness, proxied by the target's book-to-market ratio, but the results are inconclusive.

[13] I thank an anonymous referee for suggestion to explore the effect of CEO inside debt on the *cumulative change* in an acquirer's financial leverage post merger.

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median book leverage. The advantage of examining the book leverage over market leverage is that the former is unlikely to be biased by a significant change in the acquirer stock price from the prebid period to the postcompletion period, as documented in the literature. Like Harford, Klasa, and Walcott (2009), I include the following variables as controls in my financial leverage regressions: *size*, *market-to-book ratio*, *momentum*, *prebid industry-adjusted book leverage*, *cash ratio*, *deal ratio*, *target public status*, and year-fixed effects.[14] Since firms self-select whether to pursue M&As in the first place and the sample includes only firms that pursue M&As, my financial leverage regressions are subject to potential self-selection bias; therefore, I follow the Heckman (1976), (1979) two-step procedure to address the self-selection bias concern. Specifically, in the first step, I estimate a probit model of a firm's propensity to pursue M&A in a given year (which I do above and report the results in Table 3). In the second step, I calculate the inverse Mill's ratio (IMR) as follows and augment my financial leverage regressions with the IMR.

$$(2) \qquad \text{If M\&A dummy}_{i,t} = 1, \quad \text{then IMR}_{i,t} = \frac{\varphi(\mathbf{X}\beta)}{\Phi(\mathbf{X}\beta)},$$

$$(3) \qquad \text{If M\&A dummy}_{i,t} = 0, \quad \text{then IMR}_{i,t} = \frac{-\varphi(\mathbf{X}\beta)}{(1-\Phi(\mathbf{X}\beta))},$$

where φ is the probability density function, Φ is the cumulative density function, and β is a vector of parameter estimates from the first stage. If the coefficient on IMR is significant, I can claim that self-selection has a significant impact on the second-stage estimates of the M&A payment choice, and controlling for self-selection bias is then valid.[15]

The change in industry-adjusted financial leverage regression results, reported in Panel A of Table 5, shows that the coefficients on my test variables are all negative, ranging from -0.009 to -0.001, and statistically significant, indicating that an acquirer's change in book leverage is negatively correlated with its CEO inside debt holdings in the year preceding the M&A bid announcement. Other control variables have signs and significance consistent with those reported in the literature. Furthermore, the coefficients on IMR in columns 1 and 3 are not statistically significant, suggesting that the concern for self-selection bias is not substantiated. The economic implication of the link between CEO inside debt holdings and acquirer's financial leverage is also important. The point estimates indicate that, holding all else equal, an acquirer with relative CEO leverage > 1 (relative CEO incentive > 1) is associated with a 0.3% (0.9%) decrease in industry-adjusted book leverage relative to an acquirer with relative CEO leverage ≤ 1 (relative CEO incentive ≤ 1). In undocumented results, I repeat the financial leverage analyses with market leverage, but the findings are qualitatively similar.

[14] I note that Harford et al. (2009) additionally control for 12-month change in lead economic indicators in their leverage regressions, but their coefficient estimates of this variable are insignificant (Table 4, p. 9). In my regressions, I control for possible time-varying macroeconomic conditions by including year dummies. However, my results are qualitatively unchanged if I control for 12-month change in lead economic indicators instead.

[15] See Wooldridge ((2002), p. 564).

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TABLE 5

Change in Industry-Adjusted Financial Leverage Regressions

Table 5 reports the results of the change in industry-adjusted financial leverage regressions. The dependent variable is the difference between an acquirer's industry-adjusted book leverage in the second year following the M&A bid completion and its respective industry-adjusted book leverage in the year preceding the M&A bid announcement. Industry-adjusted book leverage is calculated as the difference between a sample firm's book leverage and its 2-digit SIC code industry's contemporaneous median book leverage. In Panel A, the test variables include *relative CEO leverage*, *relative CEO leverage > 1 dummy*, *relative CEO incentive*, and *relative CEO incentive > 1 dummy*. *Relative CEO leverage* is the ratio of the CEO's debt-to-equity scaled by the firm's debt-to-equity ratio. *Relative CEO leverage > 1 dummy* is an indicator that takes a value of 1 if the relative CEO leverage exceeds 1, and 0 otherwise. *Relative CEO incentive* is the ratio of the marginal change in the value of CEO inside debt holdings to the marginal change in CEO inside equity holdings given the change in firm value, all scaled by the firm's respective ratio. *Relative CEO incentive > 1 dummy* is an indicator that takes a value of 1 if the relative CEO incentive exceeds 1, and 0 otherwise. In Panel B, the test variables include *proxy for change in relative CEO leverage* and *proxy for change in relative CEO incentive*. *Proxy for change in relative CEO leverage* (*proxy for change in relative CEO incentive*) is measured as the acquirer's 2-digit SIC code industry's median change in relative CEO leverage (relative CEO incentive). The remaining variables are controls and are defined in Appendix C. Estimates of control variables are suppressed in Panel B for brevity. Heteroscedasticity-robust standard errors clustered by firms are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Variable	1	2	3	4
Panel A. Change in 2-Year Industry-Adjusted Leverage and CEO Incentive Level				
Relative CEO leverage	−0.001**			
	(0.000)			
Relative CEO leverage > 1 dummy		−0.003*		
		(0.002)		
Relative CEO incentive			−0.001**	
			(0.000)	
Relative CEO incentive > 1 dummy				−0.009*
				(0.005)
Size	0.006	0.003	0.006	0.004
	(0.005)	(0.004)	(0.005)	(0.004)
Market-to-book ratio	0.003	−0.002	0.003	−0.002
	(0.015)	(0.012)	(0.015)	(0.013)
Prebid book leverage	−0.193***	−0.182***	−0.195***	−0.185***
	(0.052)	(0.049)	(0.052)	(0.048)
Momentum	−0.027	−0.011	−0.028	−0.012
	(0.020)	(0.017)	(0.020)	(0.017)
Cash ratio	−0.009	0.016	−0.008	0.021
	(0.073)	(0.072)	(0.073)	(0.071)
Deal ratio	0.025	0.026	0.025	0.027
	(0.018)	(0.019)	(0.018)	(0.019)
Public dummy	0.041*	0.030	0.041*	0.030
	(0.022)	(0.019)	(0.022)	(0.019)
IMR	0.046		0.047	
	(0.036)		(0.036)	
Intercept	−0.095	−0.008	−0.095	−0.008
	(0.094)	(0.033)	(0.094)	(0.033)
Year-fixed effects	Yes	Yes	Yes	Yes
No. of obs.	225	258	225	258
Adj. R^2	0.11	0.10	0.11	0.10
Panel B. Change in 2-Year Industry-Adjusted Leverage and Proxies for Change in CEO Incentive				
Proxy for change in relative CEO leverage	−0.006**	−0.008**		
	(0.030)	(0.004)		
Proxy for change in relative CEO incentive			−0.007**	−0.008**
			(0.003)	(0.004)
IMR		0.047		0.047
		(0.037)		(0.037)
Control variables	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes
No. of obs.	256	225	256	225
Adj. R^2	0.10	0.11	0.10	0.11

My evidence thus far suggests a significantly negative relation between an acquirer's change in financial leverage and its premerger CEO inside debt holdings. However, the level and structure of the compensation package of an acquirer's CEO could experience dynamic changes following an M&A due to "the flow of new grants which can swamp any incentive effect provided by the CEO's pre-acquisition portfolio" (Harford and Li (2007)). It is likely that the dynamic changes in the level and structure of the CEO's compensation package could explain the change in the acquirer's financial leverage, particularly when the change in financial leverage is gauged over the long term. However, the mechanical relationship between relative CEO leverage or relative CEO incentive and the acquirer's financial leverage (which is negative by design) poses a challenge to a test of the effect of the dynamic changes in CEO incentive on the acquirer's change in financial leverage. Since the literature does not provide clear guidance on the variables that could be used as instruments for the changes in CEO incentive, to overcome this mechanical relation challenge, I use the changes in the 2-digit SIC code industry median relative CEO leverage and relative CEO incentive as proxies for the changes in the acquirer's ones in my regressions. I acknowledge that the changes in the respective 2-digit SIC code industry's median CEO leverage and relative CEO incentive are not perfect but are appropriate proxies for the test variables, because they are positively correlated with the changes in those of the acquirer.[16] I report results of the regression of the change in financial leverage on the proxies for change in CEO incentive while controlling for other variables in Panel B of Table 5. As expected, the coefficients on the proxies for the changes in relative CEO leverage and relative CEO incentive are all negative, ranging from −0.008 to −0.006, and statistically significant at the 5% level, indicating a negative relation between the change in CEO inside debt holdings and the change in acquirer's financial leverage.

Next, I examine the relation between CEO inside debt holdings and the methods of payment for M&As. Since the proportion of cash (stocks) out of an M&A total payment is within the boundaries of 0% and 100%, I use the Tobit model to estimate the impact of inside debt on payment consideration while controlling for other firm and deal characteristics. The dependent variable is *cash proportion,* which is measured as the fraction of an M&A deal that is paid for with cash. Again, the test variables include *relative CEO leverage*, *relative CEO leverage* $>$ *1 dummy*, *relative CEO incentive*, and *relative CEO incentive* $>$ *1 dummy*. Consistent with my argument, I expect the coefficients on the test variables to be negative and significant. Following the literature (e.g., Dong, Hirshleifer, Richardson, and Teoh (2006), Faccio and Masulis (2005)), I include the following variables as controls: *market-to-book ratio*, *market leverage*, *momentum, diversifying dummy*, *relative size*, *target size*, *target public status*, and industry- and year-fixed effects. Faccio and Masulis suggest the need to control for the self-selection problem in any M&A payment consideration analysis in order to draw reliable conclusions about the determinants of the M&A payment choice.

[16]For instance, a regression of acquirers' changes in relative CEO incentive on their 2-digit SIC code industry's changes in median relative CEO incentive yields a coefficient estimate of 0.52, which is significant at the 4% level, and an F-statistic of 4.05.

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They reason that, if some potential acquirers do not actually bid due to their concern over losing corporate control or facing financial distress, then there exists a risk of underestimating the importance of one or more determinants of M&A consideration. Therefore, in some specifications, I follow Faccio and Masulis in augmenting the Tobit model with IMR, which is estimated from the M&A propensity model, to correct for potential self-selection bias.

I report the Tobit-model estimates in Table 6. Due to missing data for some control variables related to nonpublic targets, the number of observations used in my estimation decreases significantly from 355 in the full sample to roughly 80 in columns 3, 6, 9, and 12. Although the coefficients on the test variables are insignificant in some specifications, probably due to the smaller sample size caused by the target-related missing data, they are consistently negative and significant when I exclude those target-related control variables plagued with missing values. Furthermore, the results are not sensitive to the correction for potential self-selection bias. This evidence indicates that the higher the CEO inside debt holdings, the more prudent managers will be with their firms' cash and, thus, the lower (higher) the share of cash (stock) used for M&A payment. This result is also consistent with the earlier finding of a negative relation between CEO inside debt holdings and the acquirer's financial leverage post merger.

Firms can make decisions on payment methods and the form of executive compensation, such as inside debt, jointly, which raises an endogeneity concern and potentially biases the Tobit-model estimates. To address this endogeneity concern, I run the two-stage IV-Tobit regressions and employ the instruments for relative CEO leverage (relative CEO incentive) similar to those used in the IV-probit model discussed earlier in this section. The IV-Tobit estimation results are qualitatively similar to those reported in Table 6; however, the Hausman tests for endogeneity do not reject the null hypothesis that relative CEO leverage (relative CEO incentive) is exogenous to the proportion of cash payment; therefore, the Tobit-regression results reported in Table 6 are unlikely to be biased (the IV-Tobit model results are not reported for brevity but are available from the author).[17]

3. Inside Debt and Firm Risk

I have shown that CEO inside debt holdings motivate risk-decreasing investment and conservative financial policies in M&As. In this section, I am interested in examining the direct effects of CEO inside debt holdings on the acquirer's changes in total and idiosyncratic risks as a result of the M&As in both univariate and multivariate settings. Datta et al. (2001) report a positive relation between EBC and the change in acquirer firm risk proxied by the change in stock-return volatility of the acquirers. Consistent with the evidence that CEO inside debt holdings motivate firms to engage in investment and financial strategies that reduce

[17] In an unreported analysis, I follow Faccio and Masulis (2005) in estimating an ordered probit model where the dependent variable is *payment order*, which takes a value of 0 for pure stock, 1 for mixed stock and cash, and 2 for pure cash deals. I find that relative CEO leverage (relative CEO incentive) is negatively correlated with cash payment propensity, which is consistent with the Tobit-model results.

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TABLE 6
Payment Consideration

Table 6 reports the estimation results of Tobit models under the following form:

$$\text{Cash proportion}_{i,t} = \alpha + \beta \mathbf{X}_{i,t-1} + \delta \text{Year dummies} + \gamma \text{Industry dummies} + \varepsilon_{i,t},$$

where *Cash proportion* is the share of M&A payment made in cash. **X** is a vector of test and control variables. The test variables include *relative CEO leverage*, *relative CEO leverage > 1*, *relative CEO incentive*, and *relative CEO incentive > 1*. *Relative CEO leverage* is the ratio of the CEO's debt-to-equity scaled by the firm's debt-to-equity ratio. *Relative CEO leverage > 1 dummy* is an indicator that takes a value of 1 if the relative CEO leverage exceeds 1, and 0 otherwise. *Relative CEO incentive* is the ratio of the marginal change in the value of CEO inside debt holdings to the marginal change in CEO inside equity holdings given the change in firm value, all scaled by the firm's respective ratio. *Relative CEO incentive > 1 dummy* is an indicator that takes a value of 1 if the relative CEO incentive exceeds 1, and 0 otherwise. The remaining variables are controls and are defined in Appendix C. Regressions are estimated with 2-digit SIC code industries and year-fixed effects, but their estimates are suppressed for brevity. Heteroscedasticity-robust standard errors clustered by firms are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Variable	1	2	3	4	5	6	7	8	9	10	11	12
Relative CEO leverage	−0.006**	−0.006**	−0.002									
	(0.003)	(0.003)	(0.005)									
Relative CEO leverage > 1 dummy				−0.099*	−0.168*	0.187						
				(0.054)	(0.095)	(0.196)						
Relative CEO incentive							−0.009**	−0.009**	−0.004			
							(0.004)	(0.004)	(0.006)			
Relative CEO incentive > 1 dummy										−0.012*	−0.037*	−0.019
										(0.007)	(0.020)	(0.217)
Market leverage	0.132	0.243	0.541	0.183	0.300	0.747	0.116	0.216	0.533	0.244	0.397	0.590
	(0.315)	(0.332)	(0.449)	(0.334)	(0.347)	(0.471)	(0.314)	(0.331)	(0.449)	(0.323)	(0.338)	(0.432)
Market-to-book ratio	0.148*	0.149	0.143	0.134	0.136	0.150	0.147*	0.149	0.142	0.132	0.130	0.149
	(0.089)	(0.096)	(0.174)	(0.090)	(0.095)	(0.183)	(0.089)	(0.095)	(0.173)	(0.092)	(0.097)	(0.170)
Diversifying dummy	0.198**	0.164	0.563***	0.221**	0.184*	0.581***	0.192*	0.160	0.561***	0.220**	0.183*	0.570***
	(0.099)	(0.108)	(0.161)	(0.098)	(0.106)	(0.157)	(0.099)	(0.108)	(0.162)	(0.098)	(0.107)	(0.163)
ln(Firm age)	0.165**	0.287***	0.175	0.169***	0.320***	0.186	0.164**	0.281***	0.174	0.160**	0.309***	0.183
	(0.064)	(0.085)	(0.151)	(0.063)	(0.084)	(0.152)	(0.064)	(0.085)	(0.151)	(0.065)	(0.085)	(0.152)
Public dummy	−0.270**	−0.367***	0.244	−0.267**	−0.378***	0.197	−0.269**	−0.362***	0.246	−0.266**	−0.377***	0.234
	(0.109)	(0.122)	(0.180)	(0.110)	(0.123)	(0.180)	(0.109)	(0.122)	(0.181)	(0.110)	(0.123)	(0.183)

(continued on next page)

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TABLE 6 (continued)

Payment Consideration

Variable	1	2	3	4	5	6	7	8	9	10	11	12
Momentum	0.008	0.042	−0.303*	0.029	0.078	−0.255	0.002	0.033	−0.305*	0.034	0.077	−0.287
	(0.090)	(0.093)	(0.178)	(0.092)	(0.095)	(0.174)	(0.090)	(0.094)	(0.179)	(0.091)	(0.096)	(0.177)
Relative size			−0.001			−0.001			−0.001			−0.001
			(0.001)			(0.001)			(0.001)			(0.001)
Target size			−0.086			−0.085*			−0.086			−0.088*
			(0.052)			(0.051)			(0.052)			(0.052)
IMR		−0.233	−0.194		−0.341	−0.429		−0.200	−0.184		−0.393	−0.271
		(0.265)	(0.524)		(0.261)	(0.510)		(0.268)	(0.525)		(0.261)	(0.491)
Intercept	0.591*	0.589	0.664	0.580*	0.679	0.930	0.600**	0.562	0.651	0.578*	0.756	0.750
	(0.300)	(0.501)	(1.031)	(0.302)	(0.496)	(0.995)	(0.299)	(0.502)	(1.035)	(0.305)	(0.505)	(1.004)
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	355	298	80	355	298	80	355	298	80	355	298	80
Pseudo R^2	0.07	0.09	0.27	0.07	0.09	0.28	0.08	0.09	0.27	0.07	0.08	0.27

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firm risk, I expect CEO inside debt holdings to be negatively correlated with the acquirers' changes in total and idiosyncratic risks.

The univariate analysis of the change in the acquirers' stock daily return volatility from the window (−120, −60) prior to the bid announcement to the window (11, 70) after the M&A completion indicates that both the mean and median changes in stock-return volatility of the full sample are positive and highly significant, indicating an increase in total risk of the acquirers after the M&As. However, a comparison of the changes in stock-return volatility of the subgroups sorted on whether the relative CEO leverage (relative CEO incentive) is above or below the value of 1 indicates that the subgroup with relative CEO leverage (relative CEO incentive) less than 1 experiences a significantly larger increase in stock-return volatility than the other subgroup does based on the Wilcoxon rank-sum test. An additional analysis of the changes in idiosyncratic risk, which is measured as the standard deviation of the residuals of returns from the market model, of acquirers yields essentially similar findings (the univariate results are not reported to save space but are available from the author).

I report the results of the multivariate analysis of the changes in the acquirer's total risk (idiosyncratic risk) in columns 1–4 (columns 5–8) of Table 7. Besides the test variables, I control for firm and M&A deal characteristics and year-fixed effects. The coefficients on relative CEO leverage and relative CEO incentive are negative and significant as expected, but their respective dummy versions are insignificant. Collectively, the univariate and multivariate results indicate some, albeit weak, evidence that CEO inside debt holdings have a negative impact on the change in acquirer firm risk following an M&A.

C. Inside Debt and M&A Announcement Abnormal Bond and Stock Returns

The effect of M&As on acquiring bondholders' announcement abnormal returns is mixed according to the literature. Kim and McConnell (1977) and Asquith and Kim (1982) find that the acquirer bonds' abnormal returns are insignificant. Eger (1983) and Maquieira, Megginson, and Nail (1998) document positive announcement abnormal returns. Yet Dennis and McConnell (1986), Billett, King, and Mauer (2004), and Bessembinder, Kahle, Maxwell, and Xu (2009) find evidence that the acquiring firm bonds earn negative announcement abnormal returns. I focus my research on inside debt and am interested in examining the possible impact of this form of compensation on the bond and stock performance of the acquirers. Intuitively, debt-like compensation would motivate managers to take a long-term view with respect to M&As, since they would not be receiving payment for their debt-like compensation for several years (for deferred compensation) or until their retirement (for pension benefits); thus, they will likely refrain from pursuing risk-increasing or value-destroying M&A projects that could adversely impact future pension and deferred compensation payments. Furthermore, if inside debt helps to "increase the total pie available to the contracting parties," as suggested by Bebchuk and Jackson (2005), then investors should view M&A deals favorably and reflect their views in the bond and stock prices when the acquiring managers hold sizeable inside debt. On the other hand, Datta et al. (2001)

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TABLE 7

Change-in-Risk Cross-Sectional Regressions

Table 7 reports the change-in-risk cross-sectional regression results. A change in total risk is measured as postacquisition minus preacquisition stock-return standard deviation in percentage. A change in idiosyncratic risk is measured as postacquisition minus preacquisition standard deviation of the return residuals in percentage estimated by the market model. *Relative CEO leverage* is the ratio of the CEO's debt-to-equity scaled by the firm's debt-to-equity ratio. *Relative CEO leverage > 1 dummy* is an indicator that takes a value of 1 if the relative CEO leverage exceeds 1, and 0 otherwise. *Relative CEO incentive* is the ratio of the marginal change in the value of CEO inside debt holdings to the marginal change in CEO inside equity holdings given the change in firm value, all scaled by the firm's respective ratio. *Relative CEO incentive > 1 dummy* is an indicator that takes a value of 1 if the relative CEO incentive exceeds 1, and 0 otherwise. The remaining variables are defined in Appendix C. Heteroscedasticity-robust standard errors clustered by firms are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Change in Total Risk				Change in Idiosyncratic Risk			
Variable	1	2	3	4	5	6	7	8
Relative CEO leverage	−0.004*				−0.005*			
	(0.002)				(0.003)			
Relative CEO leverage > 1 dummy		0.218				0.165		
		(0.136)				(0.134)		
Relative CEO incentive			−0.006**				−0.007**	
			(0.003)				(0.003)	
Relative CEO incentive > 1 dummy				0.086				0.191
				(0.148)				(0.165)
Size	−0.012	−0.003	−0.013	−0.005	−0.019	−0.010	−0.020	−0.009
	(0.049)	(0.049)	(0.050)	(0.049)	(0.036)	(0.035)	(0.036)	(0.035)
Market-to-book ratio	0.009	0.009	0.009	0.008	0.002	0.002	0.002	0.001
	(0.008)	(0.009)	(0.008)	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)
Book leverage	0.013	0.289	0.008	0.171	−0.289	−0.038	−0.288	−0.04
	(0.402)	(0.391)	(0.402)	(0.385)	(0.304)	(0.294)	(0.304)	(0.288)
Deal ratio	0.221	0.222	0.221	0.220	0.070	0.070	0.069	0.068
	(0.184)	(0.181)	(0.184)	(0.183)	(0.111)	(0.107)	(0.111)	(0.107)
Momentum	0.074	0.090	0.073	0.090	0.069	0.087	0.068	0.089
	(0.113)	(0.111)	(0.113)	(0.111)	(0.089)	(0.088)	(0.089)	(0.088)
ln(Firm age)	−0.023	−0.045	−0.023	−0.032	−0.121*	−0.139**	−0.122*	−0.139**
	(0.098)	(0.098)	(0.098)	(0.099)	(0.069)	(0.069)	(0.069)	(0.069)
Sales growth	0.955**	1.003***	0.955**	0.982***	0.338	0.383*	0.339	0.377*
	(0.384)	(0.379)	(0.383)	(0.379)	(0.219)	(0.218)	(0.219)	(0.218)
Cash dummy	0.033	0.044	0.032	0.035	0.085	0.092	0.083	0.092
	(0.126)	(0.125)	(0.126)	(0.125)	(0.087)	(0.086)	(0.087)	(0.087)
Stock dummy	−1.055**	−0.989**	−1.055**	−1.016**	−0.433	−0.375	−0.431	−0.364
	(0.495)	(0.465)	(0.495)	(0.482)	(0.287)	(0.272)	(0.287)	(0.274)
FCF ratio	−1.240	−1.324	−1.247	−1.251	−1.502***	−1.565***	−1.509***	−1.525***
	(1.106)	(1.111)	(1.105)	(1.107)	(0.561)	(0.566)	(0.561)	(0.563)
Public dummy	0.104	0.094	0.105	0.092	0.181	0.170	0.181	0.163
	(0.214)	(0.210)	(0.214)	(0.211)	(0.160)	(0.158)	(0.160)	(0.156)
Diversifying dummy	0.014	0.020	0.013	0.019	0.005	0.013	0.004	0.008
	(0.134)	(0.135)	(0.134)	(0.135)	(0.092)	(0.093)	(0.092)	(0.093)
Tender dummy	−0.097	−0.076	−0.096	−0.074	−0.154	−0.130	−0.151	−0.120
	(0.354)	(0.347)	(0.354)	(0.351)	(0.190)	(0.187)	(0.190)	(0.185)
Challenge dummy	−0.729*	−0.842*	−0.727	−0.756*	−0.363	−0.454*	−0.361	−0.412*
	(0.441)	(0.437)	(0.443)	(0.422)	(0.267)	(0.262)	(0.269)	(0.224)
High-tech dummy	0.001	0.001	0.001	0.007	−0.023	−0.022	−0.022	−0.010
	(0.148)	(0.148)	(0.147)	(0.148)	(0.110)	(0.112)	(0.110)	(0.112)
Target industry's M&A intensity	8.258**	8.317**	8.259**	8.266**	7.167***	7.186***	7.164***	7.245***
	(3.438)	(3.413)	(3.437)	(3.432)	(2.460)	(2.416)	(2.458)	(2.416)
Intercept	0.889	0.592	0.901	0.727	1.447*	1.195	1.457*	1.158
	(0.968)	(0.966)	(0.969)	(0.972)	(0.835)	(0.830)	(0.835)	(0.831)
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	519	519	519	519	519	519	519	519
Adj. R^2	0.20	0.21	0.20	0.02	0.15	0.15	0.15	0.15

report a positive correlation between acquiring managers' EBC and M&A announcement abnormal stock returns. It is worth noting that, by aligning managers' interests with those of the external bondholders, inside debt could motivate wealth transfer from shareholders to bondholders and, thereby, have a positive impact on the announcement abnormal *bond* returns but a negative impact on the M&A announcement abnormal *stock* returns. Based on these arguments, I predict a positive relation between CEO inside debt holdings and M&A announcement abnormal bond returns but need to empirically determine the impact of CEO inside debt holdings on abnormal stock returns.

I follow the procedure suggested by Bessembinder et al. (2009) in estimating M&A announcement abnormal bond returns using TRACE daily bond data.[18] TRACE was first implemented on July 1, 2002, and expanded in stages. The TRACE data set consists of all over-the-counter transactions in corporate bonds and covers essentially all publicly traded bonds during my sample period. I first calculate the daily institutional trade size-weighted bond price and daily bond return for each bond issue. A firm may have multiple bond issues; therefore, I treat a firm as a portfolio and estimate firm-level bond returns as the value-weighted average returns of the firm's different bond issues. Abnormal bond return is then estimated as the difference between a firm's daily bond return and its benchmark portfolio daily return. The benchmark portfolio return is calculated as the value-weighted average bond returns of the firms that have S&P long-term credit ratings similar to those of the acquirers in a given year.[19] The cumulative abnormal bond return (bond CAR) of a firm over a window is the sum of the firm's daily abnormal bond returns in that window. On the other hand, I use the market model and daily stock returns in the window $(-241, -41)$ to estimate the market model parameters and announcement cumulative abnormal stock return (stock CAR).

I examine the relation between relative CEO leverage (relative CEO incentive) and abnormal bond and stock returns in both univariate and multivariate settings. In unreported univariate analyses, I find that acquirers, on average, have negative bond CARs in the 3-day window centered on the M&A announcement day ($N = 154$, mean bond CAR $= -0.19\%$, p-value $= 0.10$) and positive stock CARs ($N = 571$, mean stock CAR $= 0.55\%$, and p-value $= 0.01$) over the same window. The former result is consistent with the evidence documented by Dennis and McConnell (1986), Billett et al. (2004), and Bessembinder et al. (2009). I further sort acquirers into high and low relative CEO leverage ratio (relative CEO incentive) subgroups and conduct univariate analysis of their relation with abnormal bond and stock returns, but the results are inconclusive.

[18]Bessembinder et al. (2009) report that using daily bond data significantly increases the power of the tests relative to using monthly data.

[19]Bessembinder et al. (2009) argue that, when using daily bond data, using both credit ratings and maturity for bond matching portfolio would reduce the matching possibility significantly, since many bonds are not traded on a daily basis and those bonds that are traded daily would reflect returns of the most liquid bonds; therefore, these authors use only credit ratings for bond portfolio matching. I follow Bessembinder et al. in using only credit ratings for bond portfolio matching in my analysis, but I control for an acquirer's bond maturity in later multivariate regressions. For a detailed discussion of the estimation of abnormal bond returns, readers should refer to Bessembinder et al. (2009).

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There are several factors that can explain the bond and stock CARs; therefore, I run cross-sectional regressions of bond and stock CARs over the window (−1, 1) and report the results in Panels A and B of Table 8, respectively. I include the following control variables in the cross-sectional regressions: Tobin's Q, size, excess cash, financial leverage, public ownership status, methods of payment, relative deal size, diversifying dummy, high-tech dummy, and target industry prior year M&A activities (e.g., Loughran and Ritter (2004), Moeller, Schlingemann, and Stulz (2005), and Masulis et al. (2007)).[20] In the bond CAR (stock CAR) regressions, I additionally control for the value-weighted average bond maturities (momentum). In Panel A, the coefficients on *relative CEO leverage > 1 dummy* and *relative CEO incentive > 1 dummy* are positive, ranging from 0.001 to 0.002, and significant at the 5% and 10% levels. However, the coefficients on *relative CEO leverage* and *relative CEO incentive*, although positive, are insignificant. These results indicate that, when executive compensation is biased toward inside debt, the interests of external bondholders and managers of the firm are aligned to the extent that economically benefits external bondholders.

The stock CAR regression results reported in Panel B of Table 8 show that, although the coefficients on the test variables are negative, only the coefficients on *relative CEO leverage > 1 dummy* are statistically significant at the 10% level, as shown in columns 3 and 4. The stock CAR regression results are essentially similar if I condition the sample on nonmissing bond CARs. I also examine the relation between CEO inside debt holdings and the value-weighted average of the bond and stock CARs but do not find a significant correlation between the two, indicating no significant impact of CEO inside debt holdings on the acquirer's total value (results unreported for brevity).[21] This evidence combined with the earlier documented positive (negative) relation between *relative CEO leverage > 1 dummy* and abnormal bond returns (abnormal stock returns) implies wealth transfer from shareholders to bondholders in M&As when CEO compensation is biased toward inside debt.

D. M&A and Dynamic Change in CEO Inside Debt Holdings

M&As are typically large investments that lead to significant changes in the acquirer's size, scope of operation, and capital structure. M&As could present a "natural opportunity" for the acquirer's board of directors and CEOs to negotiate for a new executive compensation package that may alter the level and structure of CEO compensation (Harford and Li (2007)). Equity-biased compensation could lead to risk taking for shareholders' benefits but potentially hamper those of the bondholders. Conversely, inside debt-biased compensation could trigger CEO conservatism, which would benefit bondholders but hamper shareholders' interest (e.g., a CEO may forego risky but positive net present value projects). Harford and Li argue that the dynamic compensation effect, which is the result of

[20] None of the acquirers in my sample engage in a hostile takeover, so I exclude hostile dummy from my cross-sectional regression.

[21] I thank an anonymous referee for suggesting that I examine the effect of CEO inside debt holdings on the value-weighted average of the abnormal bond and stock returns.

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TABLE 8

M&A Announcement Abnormal Return Cross-Sectional Regressions

Table 8 reports the ordinary least squares (OLS) estimation of the following model:

$$\text{CAR}_{i,t} = \alpha + \beta \mathbf{X}_{i,t-1} + \varepsilon_{i,t},$$

where CAR is the bond cumulative abnormal return over the window (−1, 1), based on the credit rating matching method, as described in the text, in Panel A, and cumulative abnormal stock returns over the window (−1, 1), using the market model, in Panel B. **X** is a vector of test and control variables. The test variables include *relative CEO leverage*, *relative CEO leverage > 1 dummy*, *CEO relative incentive*, and *CEO relative incentive > 1 dummy*. *Relative CEO leverage* is the ratio of the CEO's debt-to-equity scaled by the firm's debt-to-equity ratio. *Relative CEO leverage > 1 dummy* is an indicator that takes a value of 1 if the relative CEO leverage exceeds 1, and 0 otherwise. *Relative CEO incentive* is the ratio of the marginal change in the value of CEO inside debt holdings to the marginal change in CEO inside equity holdings given the change in firm value, all scaled by the firm's respective ratio. *Relative CEO incentive > 1 dummy* is an indicator that takes a value of 1 if the relative CEO incentive exceeds 1, and 0 otherwise. The remaining variables are controls and are defined in Appendix C. Estimates of the control variables and intercept are suppressed in Panel B for brevity. Heteroscedasticity-robust standard errors clustered by firms are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Abnormal Bond Return Cross-Sectional Regressions

Variable	1	2	3	4	5	6	7	8
Relative CEO leverage	0.001	0.001						
	(0.001)	(0.001)						
Relative CEO leverage > 1 dummy			0.001*	0.001*				
			(0.000)	(0.000)				
Relative CEO incentive					0.002	0.002		
					(0.002)	(0.002)		
Relative CEO incentive > 1 dummy							0.002**	0.002**
							(0.001)	(0.001)
ln(Bond maturity)	0.001	0.001	−0.001	−0.001	0.001	0.001	−0.001	−0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Market-to-book ratio	−0.002	−0.002	−0.003	−0.003	−0.002	−0.002	−0.002	−0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Size	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Book leverage	0.004	0.006	0.008	0.009	0.004	0.005	0.006	0.007
	(0.005)	(0.007)	(0.007)	(0.008)	(0.005)	(0.007)	(0.006)	(0.008)
Cash dummy	0.005*	0.005*	0.005*	0.005*	0.005*	0.005*	0.005*	0.005*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Stock dummy	−0.009	−0.009	−0.007	−0.007	−0.010	−0.009	−0.008	−0.007
	(0.010)	(0.011)	(0.010)	(0.011)	(0.010)	(0.011)	(0.010)	(0.011)
Excess cash	−0.008	−0.009	−0.009	−0.010	−0.006	−0.007	−0.010	−0.011
	(0.012)	(0.012)	(0.013)	(0.013)	(0.011)	(0.012)	(0.012)	(0.013)
Deal ratio	−0.002	−0.002	−0.002	−0.002	−0.002	−0.002	−0.002	−0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Public dummy	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Diversifying dummy	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Tender dummy	−0.001	−0.001	0.001	0.001	−0.001	−0.001	0.001	0.001
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Challenge dummy	0.016**	0.016**	0.014*	0.013*	0.017***	0.017**	0.014**	0.014**
	(0.007)	(0.007)	(0.007)	(0.007)	(0.006)	(0.007)	(0.007)	(0.007)
High-tech dummy	−0.004	−0.005	−0.006*	−0.006*	−0.004*	−0.005*	−0.005*	−0.006*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Target industry's M&A intensity	−0.103**	−0.102**	−0.097**	−0.095**	−0.105**	−0.104**	−0.099**	−0.098**
	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)
IMR		−0.005		−0.005		−0.004		−0.005
		(0.008)		(0.007)		(0.007)		(0.008)
Intercept	−0.003	0.005	0.005	0.017	−0.001	0.007	0.003	0.013
	(0.012)	(0.023)	(0.010)	(0.023)	(0.011)	(0.023)	(0.010)	(0.022)
No. of obs.	143	134	143	134	143	134	143	134
Adj. R^2	0.03	0.01	0.01	0.01	0.03	0.01	0.01	−0.01

(continued on next page)

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TABLE 8 (continued)

M&A Announcement Abnormal Return Cross-Sectional Regressions

Panel B. Abnormal Stock Return Cross-Sectional Regressions

Variable	1	2	3	4	5	6	7	8
Relative CEO leverage	−0.001 (0.001)	−0.001 (0.001)						
Relative CEO leverage > 1 dummy			−0.004* (0.002)	−0.003* (0.002)				
Relative CEO incentive					−0.001 (0.001)	−0.001 (0.001)		
Relative CEO incentive > 1 dummy							−0.001 (0.005)	−0.001 (0.005)
IMR		−0.003 (0.012)		−0.003 (0.012)		−0.003 (0.012)		−0.003 (0.012)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	534	519	534	519	534	519	534	519
Adj. R^2	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

compensation increases following an M&A deal, may offset the alignment normally provided by the CEO's premerger portfolio. Jensen and Meckling (1976) suggest that setting a compensation structure of managers that resembles the firm's capital structure would alleviate both the agency cost of debt and the agency cost of equity. Therefore, I predict that the acquirer's board of directors would restructure CEO compensation in such a way that moves CEO inside leverage toward the firm's financial leverage post merger. Specifically, I expect a negative (positive) change in relative CEO leverage and relative CEO incentive post merger if the relative CEO leverage and relative CEO incentive are greater than 1 (less than 1) before the M&A.[22]

I examine the changes in relative CEO leverage, relative CEO incentive, and the components of the CEO compensation package in the first and second year post merger from those in the year preceding the M&A announcement and report the medians of these changes in Panel A of Table 9. Overall, there is little change in the relative CEO leverage, but the relative CEO incentive decreases significantly following an M&A deal. Interestingly, consistent with my prediction, the subgroup of acquirers with relative CEO leverage and relative CEO incentive greater than 1 (less than 1) in the year preceding the M&A deal experience a significant decrease (increase) in their CEO leverage and relative CEO incentive in each of the 2 years following the M&A completion. This evidence corroborates my prediction that the acquirer's board restructures CEO compensation to mirror the firm's capital structure following an M&A deal. In an additional analysis of the components of CEO compensation package, I find that acquirer CEOs of both subgroups sorted on relative CEO leverage or relative CEO incentive greater or less than 1 experience a significant increase (decrease) in inside debt (equity)

[22]I thank an anonymous referee for suggesting that I examine the dynamic changes of CEO compensation in M&As.

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TABLE 9

Change in CEO Compensation

Panel A of Table 9 reports the changes in relative CEO leverage, relative CEO incentive, and the components of the CEO's compensation package in the first and second year following an M&A completion from those in the year preceding the M&A announcement. Panel B reports the changes of the same variables adjusted by the acquirer's 2-digit SIC code industry's respective median values. *Relative CEO leverage* is the ratio of the CEO's debt-to-equity scaled by the firm's debt-to-equity ratio. *Relative CEO incentive* is the ratio of the marginal change in the value of CEO inside debt holdings to the marginal change in CEO inside equity holdings given the change in firm value, all scaled by the firm's respective ratio. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, based on the Wilcoxon signed-rank test.

	All		Pre-M&A Relative CEO Leverage > 1		Pre-M&A Relative CEO Leverage ≤ 1	
Variable	*N*	Median	*N*	Median	*N*	Median
Panel A. Change in CEO Compensation						
One Year Post-M&A Completion versus One Year before M&A Announcement						
Change in relative CEO leverage	418	0.0129	164	−0.4178**	254	0.0411***
Change in relative CEO incentive	418	−0.0566***	164	−1.2083***	254	0.0028
Change in CEO total compensation (in $ thousands)	418	122.51	166	239.24	255	4.33
Change in CEO pension and deferred compensation (in $ thousands)	418	568.11***	166	1,157.52***	256	392.81***
Change in CEO salary and bonus (in $ thousands)	418	24.24	166	25.94	256	22.72
Change in CEO equity value (in $ thousands)	418	−3,175.57***	166	−2,749.57***	256	−3,921.41
Two Year Post-M&A Completion versus One Year before M&A Announcement						
Change in relative CEO leverage	305	0.0401*	118	−0.4743*	187	0.0782***
Change in relative CEO incentive	305	−0.0300***	118	−1.0696***	187	0.0298**
Change in CEO total compensation (in $ thousands)	305	276.42	119	616.29	189	164.20
Change in CEO pension and deferred compensation (in $ thousands)	305	790.58***	119	1,943.65**	190	494.60***
Change in CEO salary and bonus (in $ thousands)	305	42.37	119	36.50	190	44.02*
Change in CEO equity value (in $ thousands)	305	−4,272.14***	119	−4,544.28***	190	−3,441.11***
Panel B. Change in Industry-Adjusted CEO Compensation						
One Year Post-M&A versus One Year before M&A						
Change in relative CEO leverage	416	−0.0136	162	−0.4894**	254	0.0523***
Change in relative CEO incentive	416	−0.0904***	162	−1.1979***	254	−0.0001
Change in CEO total compensation (in $ thousands)	416	−40.46*	164	−9.09	259	−51.51**
Change in CEO pension and deferred compensation (in $ thousands)	416	752.05***	164	1,185.08***	260	630.39***
Change in CEO salary and bonus (in $ thousands)	416	1.27	164	−14.06**	260	15.00
Change in CEO equity value (in $ thousands)	416	−1,203.64***	164	−1,771.62**	260	−704.59**
Two Year Post-M&A versus One Year before M&A						
Change in relative CEO leverage	304	−0.0019	118	−0.4933*	186	0.0428***
Change in relative CEO incentive	304	−0.0796***	118	−1.2818***	186	−0.0045
Change in CEO total compensation (in $ thousands)	304	−218.23**	119	−183.29	192	−313.81**
Change in CEO pension and deferred compensation (in $ thousands)	304	865.78***	119	1,488.70*	193	736.58***
Change in CEO salary and bonus (in $ thousands)	304	15.91	119	−17.21*	193	20.69
Change in CEO equity value (in $ thousands)	304	−1,406.08***	119	−3,727.20***	193	1,052.05

values but insignificant changes in their salary and bonus and total annual compensation.[23]

Since a CEO's pension value tends to increase with his or her age and tenure, the significant increase in CEO inside debt value, which comprises pension and deferred compensation, as reported in Panel A of Table 9, is expected even without M&As. Moreover, my sample period coincides with the economic recession, which could explain the reported decrease in CEO equity holdings. These factors combined suggest that the documented decrease in relative CEO leverage and relative CEO incentive could be a time trend rather than the result of an acquirer's

[23]The total annual compensation is the variable TDC1 obtained from the ExecuComp database, which is calculated as follows: TDC1 = Salary + Bonus + Other Annual + Restricted Stock Grants + Long-Term Incentive Plan Payouts + All Other + Value of Option Grants.

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restructure of CEO compensation following an M&A deal. To rule out an alternative explanation that the documented evidence is driven by the time trend, I examine the changes in industry-adjusted CEO compensation in the first and second years after the M&A completion from that of the year preceding the M&A announcement and report the results in Panel B of Table 9. I adjust an acquirer's CEO compensation by its 2-digit SIC code industry's contemporaneous median CEO compensation. Consistent with my earlier finding, the results show that the subgroup of acquirers with relative CEO leverage and relative CEO incentive greater than 1 (less than 1) in the year preceding the M&A announcement experience a significant decrease (increase) in their relative CEO leverage and relative CEO incentive in each of the 2 years following the M&A deal. An additional analysis of the change in industry-adjusted components of the CEO compensation package yields results qualitatively similar to those reported in Table 9. While the postmerger increase in inside debt is expected, the decrease in equity value, even after adjustment for the industry's median value, is somewhat surprising. A possible explanation could be the decrease in stock prices typically observed for acquirers following their M&As (e.g., Loughran and Vijh (1997), Rau and Vermaelen (1998), and Mitchell and Stafford (2000)). In short, the evidence in Panels A and B of Table 9 consistently supports my prediction that acquirers restructure CEO compensation packages to mirror their capital structure post merger.

E. Inside Debt and Long-Term Operating, Bond, and Stock Performance

Payments for pensions and deferred compensation typically have a long horizon; therefore, managers are expected to pursue M&As with relatively long-term goals to protect their interests. Based on this argument, I expect inside debt to be positively associated with long-term operating performance as well as bond and stock performance post merger. Nevertheless, if inside debt leads to wealth transfer from shareholders to bondholders, it could be positively correlated with long-term bond performance but negatively correlated with long-term stock performance.

I measure operating performance as the ratio of earnings before interest, tax, and depreciation and amortization (EBITDA) to the book value of assets. I follow Barber and Lyon (1996) in selecting a matched portfolio for each sample firm in the year prior to the M&A bid announcement. The matched portfolio includes firms that are in the same 2-digit SIC code industry as the sample firm, have not been involved in any M&As over the last 3 years, and have operating performance within the range of 90%–110% that of the sample firm in the year preceding the M&A announcement. I adjust a sample firm's operating performance by the contemporaneous median operating performance of the matched portfolio and compare the matched portfolio-adjusted operating performance of the acquirers in each of the 2 years after the M&A completion to that in the year preceding the M&A bid announcement.

Results of the univariate analysis of operating performance, as reported in Table 10, show that acquirers, on average, manage to improve their operating performance in each of the 2 years following the M&A completion in comparison with

TABLE 10

Operating Performance: Univariate Analysis

Table 10 reports the changes in matched portfolio-adjusted operating performance of the acquirers. A matched portfolio is selected for each sample firm in the year preceding the M&A bid announcement. The matched portfolio includes firms that are in the same 2-digit SIC code industry as the sample firm, have not been involved in any M&A over the last 3 years, and have operating performance within the range of 90%–110% of the sample's operation performance in the year preceding the M&A announcement. Then the matched portfolio-adjusted operating performance of the acquirer in each of the 2 years following the M&A effective date is compared to that of the year preceding the M&A bid announcement. The one-sample *t*-test (Wilcoxon signed-rank test) is used to make statistical inference about the means (medians) of a subgroup. The two-sample *t*-test (Wilcoxon rank-sum test) is used to make statistical inference about the differences in the means (distributions) between the low and high inside leverage subgroups. *Relative CEO leverage* is the ratio of the CEO's debt-to-equity scaled by the firm's debt-to-equity ratio. *Relative CEO incentive* is the ratio of the marginal change in the value of CEO inside debt holdings to the marginal change in CEO inside equity holdings given the change in firm value, all scaled by the firm's respective ratio. The table reports the *t*-statistics of the *t*-tests, and the *z*-statistics of the Wilcoxon rank-sum tests. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Relative CEO Leverage and Operating Performance

Operating Performance Statistics	Full Sample	Low Relative CEO Leverage	High Relative CEO Leverage	Difference	*t*-/*z*-Statistics for Difference	Relative CEO Leverage ≤ 1	Relative CEO Leverage > 1	Difference	*t*-/*z*-Statistics for Difference
Year t + 1									
Mean	0.0010	−0.0102*	0.0118***	−0.0220	−3.50***	−0.0048	0.0102***	−0.0150	−2.32**
Median	0.0066***	0.0009	0.0141***	−0.0132	−3.20***	0.0028	0.0130***	−0.0102	−1.92*
N	501	247	254			309	192		
Year t + 2									
Mean	0.0084***	0.0010	0.0159***	−0.0149	−2.47**	0.0047	0.0158***	−0.0111	−1.72*
Median	0.0050***	0.0033	0.0093***	−0.0060	−1.76*	0.0035**	0.0101**	−0.0066	−1.06
N	298	149	149			197	101		
Panel B. Relative CEO Incentive and Operating Performance									
Year t + 1									
Mean	0.0010	−0.0066	0.0083**	−0.0149	−2.36**	−0.0033	0.0109***	−0.0142	−2.05**
Median	0.0066***	0.0011	0.0118***	−0.0107	−2.44**	0.0033**	0.0127***	−0.0094	−1.61
N	501	248	253			352	149		
Year t + 2									
Mean	0.0084***	0.0030	0.0140***	−0.0110	−1.81*	0.0072**	0.0119*	−0.0047	−0.67
Median	0.0050***	0.0035	0.0058***	−0.0023	−1.15	0.0047***	0.0053*	−0.0006	−0.21
N	298	151	147			220	78		

that in the year preceding the M&A announcement. Interestingly, the operating performance improvement concentrates on those acquirers with high relative CEO leverage and high relative CEO incentive. Furthermore, the differences in the changes in operating performance between acquirers sorted on relative CEO leverage or relative CEO incentive are statistically significant in each of the 2 years following M&A completion. In addition, acquirers with relative CEO leverage > 1 (relative CEO incentive > 1) also experience significant improvement in operating performance, although their changes in operating performance are not statistically different from those of the acquirers with relative CEO leverage ≤ 1 (relative CEO incentive ≤ 1) based on the Wilcoxon rank-sum test.

Table 11 reports the multivariate regression of the change in matched portfolio-adjusted operating performance in the second year following M&A completion on the changes in relative CEO leverage and relative CEO incentive over the same period.[24] Other control variables are measured at the end of the year preceding the M&A announcement. All coefficients on *relative CEO leverage* and *relative CEO incentive* are positive, ranging from 0.004 to 0.008, and statistically

[24]I thank an anonymous referee for suggesting that I examine the dynamic effect of CEO compensation on long-term operating, bond, and stock performance.

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TABLE 11

Operating Performance: Multivariate Regressions

Table 11 reports the OLS estimation of the following model:

$$\text{Change in matched portfolio-adjusted operating performance}_{i,t+2} = \alpha + \beta \mathbf{X}_{i,t-1} + \varepsilon_{i,t},$$

where *Change in matched portfolio-adjusted operating performance* is measured as the difference between an acquirer's matched portfolio-adjusted operating performance in the second year following the M&A completion and its respective matched portfolio-adjusted operating performance the year preceding the M&A announcement. **X** is a vector of test and control variables. In Panel A, the test variables include *change in relative CEO leverage* and *change in relative CEO incentive*. In Panel B, the test variables include *proxy for change in relative CEO leverage* and *proxy for change in relative CEO incentive*. *Change in relative CEO leverage (change in relative CEO incentive)* is computed as the difference between relative CEO leverage (relative CEO incentive) in the second year after the M&A completion and that in the year preceding the M&A announcement. *Proxy for change in relative CEO leverage* (*proxy for change in relative CEO incentive*) is measured as the acquirer's 2-digit SIC code industry's median change in relative CEO leverage (relative CEO incentive). Remaining variables are controls and are defined in Appendix C. Estimates of control variables in Panel B are suppressed for brevity. Heteroscedasticity-robust standard errors clustered by firms are reported in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

	Change in Matched Portfolio-Adjusted Operating Performance			
Variable	1	2	3	4
Panel A. Change in Matched Portfolio-Adjusted Operating Performance and Change in CEO Incentive				
Change in relative CEO leverage	0.005**	0.004*		
	(0.002)	(0.002)		
Change in relative CEO incentive			0.008***	0.007**
			(0.003)	(0.003)
Tender dummy	−0.007	−0.016	−0.009	−0.017
	(0.014)	(0.015)	(0.014)	(0.015)
Deal ratio	0.011	0.011	0.012	0.011
	(0.009)	(0.010)	(0.009)	(0.009)
Market-to-book ratio	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Diversifying dummy	0.014**	0.015*	0.015**	0.016**
	(0.007)	(0.008)	(0.007)	(0.008)
Cash dummy	−0.003	−0.005	−0.004	−0.005
	(0.006)	(0.007)	(0.006)	(0.007)
Stock dummy	0.010	0.010	0.009	0.009
	(0.030)	(0.032)	(0.030)	(0.031)
IMR		−0.019		−0.017
		(0.016)		(0.016)
Intercept	0.005	0.035	0.004	0.032
	(0.006)	(0.025)	(0.006)	(0.024)
Year-fixed effects	Yes	Yes	Yes	Yes
No. of obs.	265	226	265	226
Adj. R^2	0.03	0.02	0.04	0.02
Panel B. Change in Matched Portfolio-Adjusted Operating Performance and Proxies for Change in CEO Incentive				
Proxy for change in relative CEO leverage	0.019**	0.021**		
	(0.009)	(0.010)		
Proxy for change in relative CEO incentive			0.024**	0.026**
			(0.011)	(0.012)
IMR		−0.024*		−0.025*
		(0.014)		(0.014)
Intercept	0.003	0.042*	0.004	0.044**
	(0.007)	(0.022)	(0.007)	(0.022)
Control variables	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes
No. of obs.	265	226	265	226
Adj. R^2	0.03	0.04	0.04	0.04

significant. Using the change in matched portfolio-adjusted operating performance in the first year (instead of the second year) following M&A completion as the dependent variable in the regressions yields qualitatively similar results (results are not reported for brevity).

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Firms set CEO compensation to motivate CEO efforts to improve corporate performance. On the other hand, a performance-based incentive scheme suggests that corporate operating performance also determines the level and composition of CEO compensation package. This two-way relationship raises an endogeneity concern and potentially renders the coefficient estimates in Panel A of Table 11 biased and inconsistent. To alleviate this endogeneity concern, I replace the changes in acquirer CEO inside debt in Panel A with their proxies, which are the respective changes in their 2-digit SIC code industry, and then reestimate the model and report the results in Panel B of Table 11. Consistent with the results in Panel A, the coefficients on the proxies for both relative CEO leverage and relative CEO incentive are positive, ranging from 0.019 to 0.026, and significant at the 5% level. In an additional test, I examine the impact of CEO inside debt holdings in the year preceding the M&A announcement on the changes in acquirer operating performance 2 years after the M&A completion and also observe a significantly positive relationship between the two (results not reported for brevity).

Next I examine acquirer CEO inside debt holdings on the firm's long-term abnormal bond and stock returns proxied by their respective buy-and-hold abnormal returns (BHARs). The BHARs are calculated as follows:

$$\text{BHAR}_i = \Pi_{t=1}^{T}(1+R_{i,t}) - \Pi_{t=1}^{T}(1+R_{\text{Benchmark},t}), \tag{4}$$

where BHAR_i is the BHAR of firm i. I estimate the bond BHARs based on the credit rating matching method, as described earlier, over the 1- and 2-year periods starting 10 days after the M&A completion. On the other hand, the stock BHARs over the same periods are calculated based on the matched firm-adjusted method suggested by Barber and Lyon (1997) and Lyon, Barber, and Tsai (1999). For each sample firm, I select a matched firm from the same 2-digit SIC code industry that has not been involved in any M&As over the last 3 years; has size, proxied by the market value of equity measured 11 days prior to the bid announcement, within the range of 70%–130% of the size of the sample firm; and has a book-to-market ratio closest to that of the sample firm's in the year preceding an M&A.

I perform univariate and multivariate analyses of the relation between premerger relative CEO leverage (relative CEO incentive) and postmerger bond and stock BHARs. I do not report the results for brevity (they are available from the author) but summarize the findings as follows. The univariate analysis of the bond BHARs indicates that acquirer bonds outperform their benchmarks by 1.54% and 2.22% over the 1- and 2-year periods, respectively, following the M&A completion, whereas the bonds of acquirers with high relative CEO leverage (relative CEO incentive) outperform those of acquirers with low relative CEO leverage (relative CEO incentive). On the other hand, the stock BHAR analysis shows that acquirer stocks, on average, underperform those of the matched firms by 4.92% and 7.11% over the 1- and 2-year periods, respectively, post merger; however, there is little evidence of a statistically significant difference in stock performance between the two subgroups of acquirers sorted on premerger relative CEO leverage or relative CEO incentive.

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I follow Datta et al. (2001) in specifying the bond and stock BHAR multivariate regression models.[25] Specifically, aside from the test variables, which include the changes in relative CEO leverage and relative CEO incentive, I include the following variables as controls: *acquirer size*, *deal ratio*, *market-to-book ratio*, *payment consideration*, *diversifying dummy*, *challenge dummy*, *book leverage*, and M&A announcement year dummies. For the bond (stock) BHAR regressions, I additionally control for bond maturity (momentum). It is noted that relative CEO leverage and relative CEO incentive are mechanically related to the bond performance, because bond and stock values are used in the calculation of these two constructs. To address the concern that such a mechanical relationship could bias the coefficient estimates of the test variables, I run the long-term abnormal bond (stock) BHAR regressions using the respective changes in the 2-digit SIC code industry's median relative CEO leverage or relative CEO incentive as proxies for those of the acquirer. The bond (stock) BHAR regression results indicate that the changes in CEO inside debt holdings are positively (negatively) correlated with the long-term bond (stock) performance.

IV. Robustness Checks

In the calculation of the relative CEO leverage and relative CEO incentive, I consider outstanding stock, stock options, pension, and deferred compensation but do not account for salary and bonus. As a robustness check, I explicitly include the natural logarithm of the CEO's salary and bonus as an additional control variable and rerun my multivariate analyses. I find that the results are essentially unchanged. In an alternative test, I follow Cassell et al. (2012) in estimating the relative CEO incentive adjusted for the present value of expected future cash compensation. The expected future cash compensation itself is estimated based on the CEO expected decision horizon and recent salary and bonus. My findings are qualitatively similar.[26]

Some acquirers in my sample made more than one M&A deal over the sample period, and my documented results could be driven by serial M&As pursued by these acquirers. To rule out the possibility that the results are limited to serial M&As, I retain only the first merger pursued by each acquirer in the sample period that is not preceded by another M&A in the previous 3 years and rerun the analyses. Although the sample becomes smaller, the findings are qualitatively unchanged.

Finally, it is possible that my findings are biased by restricting M&A deals to the sample period 2007–2010, because this period was dominated by the recent economic recession. To alleviate this concern, I used a web crawler program to collect input data from the proxy reports (Form DEF 14A), which firms file with the SEC and which are made available on the SEC (Edgar) Web site (http://www.sec.gov/edgar/searchedgar/companysearch.html), for all firms included in the ExecuComp database. I then followed the procedure

[25] Datta et al. (2001) estimate only stock BHAR regressions.

[26] Readers may refer to Cassell et al. (2012) for a detailed explanation of the calculation of relative CEO incentive adjusted for the present value of expected future cash compensation.

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prescribed in Sundaram and Yermack (2007) to estimate CEO inside debt (in the form of SERP) and compute *relative CEO leverage* and *relative CEO incentive* for the fiscal year 2005, and expanded my M&A sample to include 147 M&A deals announced in 2006. My results (unreported for brevity) generally hold with the new expanded sample except that the effects of the changes in relative CEO leverage and relative CEO incentive on bond and stock BHARs become either marginally significant (for bond BHARs) or insignificant (for stock BHARs). Therefore, I refrain from drawing conclusions about the effects of CEO inside debt holdings on long-term bond and stock performance post merger.

V. Summary and Conclusions

Inside debt is a crucial part of executive compensation, but empirical research to date has mostly overlooked this form of compensation. Agency theory predicts that debt-like compensation aligns the interests of managers and external debtholders and motivates managers to run firms in a way that serves debtholders' interests. Consistent with agency theory, my empirical investigation of the relation between CEO inside debt holdings and M&A activities shows that CEO inside debt holdings are associated with risk-decreasing M&As. Specifically, CEO inside debt holdings have a negative effect on M&A propensity. When firms do engage in M&As, CEO inside debt holdings motivate diversifying M&As, lowering financial leverage, and using stocks for payment; these holdings also have a negative impact on the change in acquiring firm risk following the M&As. In the short term, inside debt-biased CEO compensation has a positive impact on the acquirer's M&A announcement abnormal bond returns but a negative impact on its abnormal stock returns, implying wealth transfer from shareholders to bondholders. Over the long term, changes in CEO inside debt holdings are positively correlated with acquirers' postmerger operating performance. I also find evidence that, to alleviate the concern that a biased structure of CEO compensation could motivate corporate behavior, which leads to wealth transfer from shareholders to bondholders or vice versa, acquirers restructure the composition of CEO compensation post merger in a way that mirrors their firms' capital structure. Finally, it is crucial to emphasize that this research examines only one form of debt-like compensation, namely, pension and deferred compensation. There may be other forms of debt-based compensation, such as direct debts, that have not been covered and could potentially be interesting topics for future research.

Appendix A. Estimating Option Values

Estimates of a stock option's value or sensitivity to stock price or stock-return volatility are calculated based on the Black-Scholes (1973) formula for valuing European call options but modified to account for dividend payouts following Merton (1973).

$$\text{Option value} = \left[Se^{-dT}N(Z) - Xe^{-rT}N\left(Z - \sigma T^{\left(\frac{1}{2}\right)}\right)\right], \tag{A-1}$$

where

$$Z = \frac{\left[\ln\left(\frac{S}{X}\right) + T\left(r - d + \frac{\sigma^2}{2}\right)\right]}{\sigma T^{\left(\frac{1}{2}\right)}};$$

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N = cumulative probability function for the normal distribution,
S = price of the underlying stock,
X = option exercise price,
σ = expected stock-return volatility over the life of the option,
r = log transformation of risk-free interest rate,
T = time to maturity of the option in years, and
d = log transformation of expected dividend yield over the life of the option.

I follow Core and Guay (2002) and Frank and Goyal (2007) to estimate the value of unexercised options held by executives (i.e., options granted in previous years whose value is not reported). The inputs are obtained as follows:

i) Exercise price for unexercised options: To estimate the average exercise price for unexercised exercisable options, I follow a two-step process. First, I compute the ratio of the realizable value of in-the-money exercisable options and the number of unexercised exercisable options. Second, I subtract this ratio from the fiscal year-end stock price. The resulting number is an estimate of the average exercise price for unexercised exercisable options held by executives. Similarly, an estimate of the average exercise price of unexercised unexercisable options can be obtained by subtracting the ratio of in-the-money unexercisable options to the number of unexercised unexercisable options from the fiscal year-end stock price.

ii) Option maturity for unexercised exercisable options: The maturity of unexercised exercisable options is assumed to be 4 years less than the average maturity of the new grants. In case no grants are made this year, the maturity is set at 6 years. The maturity of unexercisable options is set at 1 less than the average maturity of the new grants. In case no grants are made this year, the maturity is set at 9 years.

iii) Stock price, risk-free rate, dividend yield, and volatility: These inputs are obtained from Compustat, CRSP, and ExecuComp databases.

Appendix B. Relative CEO Leverage and Relative CEO Incentive

Following Edmans and Liu (2011), Wei and Yermack (2011), and Cassell et al. (2012), I calculate *relative CEO leverage* as follows:

$$\text{(B-1)} \qquad \begin{aligned} \text{Relative CEO leverage} &= (D_{\text{CEO}}/D_{\text{FIRM}}) \div (E_{\text{CEO}}/E_{\text{FIRM}}) \\ &= (D_{\text{CEO}}/E_{\text{CEO}}) \div (D_{\text{FIRM}}/E_{\text{FIRM}}), \end{aligned}$$

where D_{CEO} and E_{CEO} are the manager's inside debt and inside equity, and D_{FIRM} and E_{FIRM} are the total debt and equity claims against the company, including those held by the CEO. *Relative CEO incentive* is calculated according to the following formula:

$$\text{(B-2)} \qquad \begin{aligned} \text{Relative CEO incentive} &= (\Delta D_{\text{CEO}}/\Delta E_{\text{CEO}}) \div (\Delta D_{\text{FIRM}}/\Delta E_{\text{FIRM}}) \\ &= (\Delta D_{\text{CEO}}/\Delta D_{\text{FIRM}}) \div (\Delta E_{\text{CEO}}/\Delta E_{\text{FIRM}}). \end{aligned}$$

A CEO's equity consists of shares and options, so I estimate ΔE_{CEO} as follows:

$$\text{(B-3)} \qquad \Delta E_{\text{CEO}} = S + \Sigma_i N_i(\Delta N_i),$$

where S and N are the number of shares and options held by the CEO, and ΔN is the option delta calculated according to the Black-Scholes (1973) model with the assumptions provided in Appendix A. The CEO's options come in tranches, indexed by subscript i, which have different exercise prices and times to maturity. Equation (8) is the "total delta"

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of a manager, because it captures the overall change in his equity holding per $1.00 change in stock price.

Following Wei and Yermack (2011), I use data from the company's Form 10-K equity compensation footnote, which reports the total number of employee stock options outstanding and their average exercise price reported in Compustat, and assume that the average remaining life of each firm's options is 4 years to estimate the delta of a representative option outstanding at each firm and the firm's total delta in an expression similar to equation (8). Similar to Wei and Yermack, I approximate the ratio $\Delta D_{\text{CEO}}/\Delta D_{\text{FIRM}}$ as follows:

$$\Delta D_{\text{CEO}}/\Delta D_{\text{FIRM}} \quad \approx \quad D_{\text{CEO}}/D_{\text{FIRM}}. \tag{B-4}$$

Appendix C. Definitions of Variables

Appendix C provides information on the terms used in this article, along with their definitions and the sources from which they were obtained.

12-month cumulative returns: The annual geometric mean returns based on CRSP monthly stock returns for a fiscal year. Source: CRSP

Book leverage: The ratio of the sum of (short-term debt + long-term debt) to the book value of assets. Source: Compustat

Cash dummy: An indicator that takes a value of 1 if the payment is fully in cash, and 0 otherwise. Source: Thomson One Banker

Cash flow ratio: The ratio of (EBITDA − income tax − interest − dividend payment) to the book value of assets at the beginning of the year. Source: Compustat

Cash ratio: The ratio of cash and equivalents to the book value of assets at the beginning of the year. Source: Compustat

CEO age: Age of the CEO. Source: ExecuComp

CEO tenure: Number of years that a CEO has held the CEO title at the current firm. Source: ExecuComp

Challenge dummy: An indicator that takes a value of 1 if a competing bid is present, and 0 otherwise. Source: Thomson One Banker

Deal ratio: M&A deal value divided by the acquirer's market value of equity measured 4 weeks before a bid announcement. Source: Thomson One Banker

Diversifying dummy: An indicator that takes a value of 1 if the acquirer and target do not belong to the same 2-digit SIC code industry, and 0 otherwise. Source: Compustat

Excess cash: Deviation of a firm's cash holdings from its expected cash holdings, where cash holdings are estimated as a function of firm size, leverage, market to book, cash flow, standard deviation of cash flow for the last 10 years, net working capital (net of cash), research and development, capital expenditures, acquisition spending, dividend, S&P long-term credit ratings, and industry- and year-fixed effects (see Opler, Pinkowitz, Stulz, and Williamson (1999), Harford, Mansi, and Maxwell (2008)). Source: Compustat

Firm age: Number of years that a firm has been included in Compustat. Source: Compustat

Free cash flow ratio (FCF): Operating income before depreciation minus interest expense minus income taxes minus capital expenditures, scaled by book value of total assets. Source: Compustat

High-tech dummy: An indicator that takes a value of 1 if an acquirer belongs to any of the following 4-digit SIC industries: 3571, 3572, 3575, 3577, 3578, 3661, 3663, 3669, 3671, 3672, 3674, 3675, 3677, 3678, 3679, 3812, 3823, 3825, 3826, 3827, 3829, 3841, 3845, 4812, 4813, 4899, 7371–7375, 7378, or 7379, and 0 otherwise. Source: Compustat

Hostile dummy: An indicator that takes a value of 1 if an M&A is a hostile takeover, and 0 otherwise. Source: Thomson One Banker

Inside debt: The sum of the present value of accumulated pension benefits and deferred compensation. Source: ExecuComp

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M&A dummy: An indicator that reflects whether a sample firm announces an M&A bid in a given year. Source: Thomson One Banker

Market leverage: The ratio of the sum of (short-term debt + long-term debt) to the sum of (short-term debt + long-term debt + market value of equity). Source: Compustat

Market-to-book ratio: The market value of assets divided by the book value of assets, where the market value of assets is measured as (the market value of equity + preferred stock value + debt in current liabilities + long-term debt − deferred taxes and investment tax credit). Source: Compustat

Momentum: Momentum is calculated as the buy-and-hold return over the 12 months preceding the bid announcement. Source: CRSP

Noncash working capital ratio: Current assets minus current liabilities minus cash and cash equivalents divided by the book value of assets. Source: Compustat

Public dummy: An indicator that takes a value of 1 if the target in an M&A is a publicly listed firm, and 0 otherwise. Source: Thomson One Banker

Relative CEO incentive: The ratio of the marginal change in the value of CEO inside debt holdings to the marginal change in CEO inside equity holdings given the change in firm value, all scaled by the firm's respective ratio. Source: Compustat and ExecuComp

Relative CEO incentive $>$ 1 dummy: An indicator that takes a value of 1 if the relative CEO incentive exceeds 1, and 0 otherwise. Source: Compustat and ExecuComp

Relative CEO leverage: The ratio of CEO's debt-to-equity scaled by the firm's debt-to-equity ratio. Source: Compustat and ExecuComp

Relative CEO leverage $>$ 1 dummy: An indicator that takes a value of 1 if the relative CEO leverage exceeds 1, and 0 otherwise. Source: Compustat and ExecuComp

Relative size: The ratio of acquirer's to target's market value of equity measured 4 weeks before bid announcement. Source: Thomson One Banker

Sales growth: The average of the annual sales growth rates of the last 3 years. Source: Compustat

Size: The logarithm transformation of book value of assets. Source: Compustat

Stock dummy: An indicator that takes a value of 1 if the payment is fully in stock, and 0 otherwise. Source: Thomson One Banker

Target industry's M&A intensity: The value of all corporate control transactions of at least $1 million reported by Thomson One Banker for each prior year and 2-digit SIC code industry divided by the total book value of assets of all Compustat firms in the same 2-digit SIC code industry and year. Source: Compustat and Thomson One Banker

Tender dummy: An indicator that takes a value of 1 if an M&A is conducted through tender offer, and 0 otherwise. Source: Thomson One Banker

References

Agrawal, A., and G. N. Mandelker. "Managerial Incentives and Corporate Investment and Financing Decisions." *Journal of Finance*, 42 (1987), 823–837.

Amihud, Y., and B. Lev. "Risk Reduction as a Managerial Motive for Conglomerate Mergers." *Bell Journal of Economics*, 12 (1981), 605–617.

Anantharaman, D.; V. W. Fang; and G. Gong. "Inside Debt and the Design of Corporate Debt Contracts." *Management Science*, 60 (2014), 1260–1280.

Asquith, P., and E. H. Kim. "The Impact of Merger Bids on the Participating Firms' Security Holders." *Journal of Finance*, 37 (1982), 1209–1228.

Barber, B. M., and J. D. Lyon. "Detecting Abnormal Operating Performance: The Empirical Power and Specification of Test Statistics." *Journal of Financial Economics*, 41 (1996), 359–399.

Barber, B. M., and J. D. Lyon. "Detecting Long-Run Abnormal Stock Returns: The Empirical Power and Specification of Test Statistics." *Journal of Financial Economics*, 43 (1997), 341–372.

Bebchuk, L. A., and R. J. Jackson, Jr. "Executive Pensions." *Journal of Corporate Law*, 30 (2005), 823–855.

Bessembinder, H.; K. M. Kahle; W. F. Maxwell; and D. Xu. "Measuring Abnormal Bond Performance." *Review of Financial Studies*, 22 (2009), 4219–4258.

https://doi.org/10.1017/S0022109014000593 Published online by Cambridge University Press

Billett, M. T.; T. D. King; and D. C. Mauer. "Bondholder Wealth Effects in Mergers and Acquisitions: New Evidence from the 1980s and 1990s." *Journal of Finance*, 59 (2004), 107–135.
Black, F., and M. Scholes. "The Pricing of Options and Corporate Liabilities." *Journal of Political Economy*, 81 (1973), 637–654.
Cassell, C. A.; S. X. Huang; J. M. Sanchez; and M. D. Stuart. "Seeking Safety: The Relation between CEO Inside Debt Holdings and the Riskiness of Firm Investment and Financial Policies." *Journal of Financial Economics*, 103 (2012), 588–610.
Coles, J. L.; N. D. Daniel; and L. Naveen. "Managerial Incentives and Risk-Taking." *Journal of Financial Economics*, 79 (2006), 431–468.
Core, J., and W. Guay. "Estimating the Value of Employee Stock Option Portfolios and Their Sensitivities to Price and Volatility." *Journal of Accounting Research*, 40 (2002), 613–630.
Datta, S.; M. Iskandar-Datta; and K. Raman. "Executive Compensation and Corporate Acquisition Decisions." *Journal of Finance*, 56 (2001), 2299–2336.
Dennis, D. K., and J. J. McConnell. "Corporate Mergers and Security Returns." *Journal of Financial Economics*, 16 (1986), 143–187.
Dong, M.; D. Hirshleifer; S. Richardson; and S. H. Teoh. "Does Investor Misvaluation Drive the Takeover Market?" *Journal of Finance*, 61 (2006), 725–762.
Edmans, A., and Q. Liu. "Inside Debt." *Review of Finance*, 15 (2011), 75–102.
Eger, C. E. "An Empirical Test of the Redistribution Effect in Pure Exchange Mergers." *Journal of Financial and Quantitative Analysis*, 4 (1983), 547–572.
Faccio, M., and R. Masulis. "The Choice of Payment Method in European Mergers and Acquisitions." *Journal of Finance*, 60 (2005), 1345–1388.
Feenberg, D., and E. Coutts. "An Introduction to the TAXSIM Model." *Journal of Policy Analysis and Management*, 12 (1993), 189–194.
Fenn, G. W., and N. Liang. "Corporate Payout Policy and Managerial Stock Incentives." *Journal of Financial Economics*, 60 (2001), 45–72.
Frank, M. Z., and V. K. Goyal. "Corporate Leverage Adjustment: How Much Do Managers Really Matter?" Working Paper, University of Minnesota (2007).
Furfine, C., and R. Rosen. "Mergers Increase Default Risk." *Journal of Corporate Finance*, 174 (2011), 832–849.
Gerakos, J. "CEO Pensions: Disclosure, Managerial Power, and Optimal Contracting." Working Paper, University of Chicago (2010).
Grinstein, Y., and P. Hribar. "CEO Compensation and Incentives: Evidence from M&A Bonuses." *Journal of Financial Economics*, 73 (2004), 119–143.
Guay, W. "The Sensitivity of CEO Wealth to Equity Risk: An Analysis of the Magnitude and Determinants." *Journal of Financial Economics*, 53 (1999), 43–71.
Harford, J. "Corporate Cash Reserves and Acquisitions." *Journal of Finance*, 54 (1999), 1969–1997.
Harford, J.; S. Klasa; and N. Walcott. "Do Firms Have Leverage Targets? Evidence from Acquisitions." *Journal of Financial Economics*, 93 (2009), 1–14.
Harford, J., and K. Li. "Decoupling CEO Wealth and Firm Performance: The Case of Acquiring CEOs." *Journal of Finance*, 62 (2007), 917–949.
Harford, J.; S. A. Mansi; and W. F. Maxwell. "Corporate Governance and Firm Cash Holdings in the US." *Journal of Financial Economics*, 87 (2008), 535–555.
Heckman, J. J. "The Common Structure of Statistical Models of Truncation, Sample Selection, and Limited Dependent Variables and a Simple Estimator for Such Models." *Annals of Economic and Social Measurement*, 5 (1976), 475–492.
Heckman, J. J. "Sample Selection as a Specification Error." *Econometrica*, 47 (1979): 153–161.
Higgins, R. C., and L. D. Schall. "Corporate Bankruptcy and Conglomerate Merger." *Journal of Finance*, 30 (1975), 93–111.
Jensen, M. C., and W. H. Meckling. "Theory of the Firm: Managerial Behavior, Agency Cost, and Ownership Structure." *Journal of Financial Economics*, 3 (1976), 305–360.
Kim, E. H., and J. J. McConnell. "Corporate Mergers and the Co-Insurance of Corporate Debt." *Journal of Finance*, 32 (1977), 349–365.
Levy, H., and M. Sarnat. "Diversification, Portfolio Analysis, and the Uneasy Case for Conglomerate Mergers." *Journal of Finance*, 25 (1970), 795–802.
Lewellen, W. G. "A Pure Financial Rationale for the Conglomerate Merger." *Journal of Finance*, 26 (1971), 521–537.
Loughran, T., and J. R. Ritter. "Why Has IPO Underpricing Changed over Time?" *Financial Management*, 33 (2004), 5–37.
Loughran, T., and A. M. Vijh. "Do Long-Term Shareholders Benefit from Corporate Acquisitions?" *Journal of Finance*, 52 (1997), 1765–1790.
Low, A. "Managerial Risk-Taking Behavior and Equity-Based Compensation." *Journal of Financial Economics*, 92 (2009), 470–490.

https://doi.org/10.1017/S0022109014000593 Published online by Cambridge University Press

Lyon, J. D.; B. M. Barber; and C.-L. Tsai. "Improved Methods for Tests of Long-Run Abnormal Stock Returns." *Journal of Finance*, 54 (1999), 165–201.
Maquieira, C. P.; W. L. Megginson; and L. A. Nail. "Wealth Creation versus Wealth Redistributions in Pure Stock-for-Stock Mergers." *Journal of Financial Economics*, 48 (1998), 3–33.
Masulis, R. W.; C. Wang; and F. Xie. "Corporate Governance and Acquirer Returns." *Journal of Finance*, 62 (2007), 1851–1889.
Merton, R. C. "Theory of Rational Option Pricing." *Bell Journal of Economics and Management Science*, 4 (1973), 141–183.
Mitchell, M. L., and E. Stafford. "Managerial Decisions and Long-Term Stock Price Performance." *Journal of Business*, 73 (2000), 287–329.
Moeller, S. B.; F. P. Schlingemann; and R. M. Stulz. "Wealth Destruction on a Massive Scale? A Study of Acquiring-Firm Returns in the Recent Merger Wave." *Journal of Finance*, 60 (2005), 757–782.
Opler, T.; L. Pinkowitz; R. Stulz; and R. Williamson. "The Determinants and Implications of Corporate Cash Holdings." *Journal of Financial Economics*, 52 (1999), 3–46.
Rau, P. R., and T. Vermaelen. "Glamour, Value and the Post-Acquisition Performance of Acquiring Firms." *Journal of Financial Economics*, 49 (1998), 223–253.
Smith, C. W., and R. M. Stulz. "The Determinants of Firms' Hedging Policies." *Journal of Financial and Quantitative Analysis*, 20 (1985), 391–405.
Sundaram, R. K., and D. L. Yermack. "Pay Me Later: Inside Debt and Its Role in Managerial Compensation." *Journal of Finance*, 62 (2007), 1551–1588.
Wei, C., and D. L. Yermack. "Investors Reactions to CEO's Inside Debt Incentives." *Review of Financial Studies*, 24 (2011), 3813–3840.
Wooldridge, J. *Econometric Analysis of Cross Section and Panel Data.* Cambridge, MA: MIT Press (2002).

https://doi.org/10.1017/S0022109014000593 Published online by Cambridge University Press