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THE HIDDEN NATURE OF EXECUTIVE RETIREMENT PAY

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ABSTRACT

*T*HERE are two competing theories of why public companies pay executives generous retirement benefits. One is that retirement pay is easier to hide from shareholders than other forms of compensation. The other is that retirement benefits align executives' interests with those of long-term creditors, since the executives may not receive their payouts if the firm goes bankrupt. The latter view depends on the assumption that retirement benefits put executives in a similar contractual position as the company's creditors. Yet no previous work has tested that assumption.

This Article provides the first systematic study of the contractual structure of executive retirement payouts. Using retirement pay data for thousands of executives, we show that a large proportion of executives link the value of their payouts to the company's stock price and receive the bulk of these payouts immediately following their departure—features that contradict the incentive-alignment theory of retirement pay. The evidence also shows that

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the full amount and structure of retirement pay are undisclosed—findings consistent with the camouflage theory. While the structure of some executives' payouts can be reconciled with the incentive-alignment theory, current rules do not give investors the information they need to tell the difference between payouts that align incentives and those that camouflage compensation. Lawmakers should require companies to reveal the structure of these payouts, and neither regulators nor commentators should assume that retirement benefits suppress top managers' appetite for risk.

INTRODUCTION.....	481
I. THE RETIREMENT PAY DEBATE.....	482
A. <i>The Optimal Contracting School</i>	483
B. <i>The Managerial Power School</i>	484
C. <i>The Structure of Retirement Pay and Incentive Alignment</i>	485
1. <i>Fixed payout and recovery in bankruptcy</i>	486
2. <i>Magnitude</i>	486
3. <i>Duration and limits on acceleration</i>	487
D. <i>Previous Research on Executive Retirement Pay</i>	488
II. EVIDENCE ON EXECUTIVE RETIREMENT PAY.....	489
A. <i>Methodology</i>	490
1. <i>Defined contribution plans</i>	490
2. <i>Defined benefit plans</i>	491
B. <i>Dataset and Summary Statistics</i>	491
III. RETIREMENT PAY AND INCENTIVES.....	493
A. <i>Retirement Pay and Stock Returns</i>	493
B. <i>The Duration of Retirement Pay</i>	499
1. <i>Summary statistics</i>	499
2. <i>Relationship with firm risk</i>	501
C. <i>Acceleration of Retirement Payouts</i>	502
D. <i>Retirement Pay and Camouflage</i>	504
1. <i>Hidden tax benefits</i>	505
2. <i>Camouflaged duration</i>	506
IV. IMPLICATIONS FOR POLICYMAKERS AND COMMENTATORS.....	506
A. <i>Regulation of Executive Retirement Pay</i>	507
1. <i>Disclosure of the structure of retirement pay</i>	507
2. <i>Disclosure of the magnitude of retirement pay</i>	508
3. <i>Regulation of banker pay</i>	509
B. <i>Future Analysis of Executive Retirement Pay</i>	510
CONCLUSION.....	512
APPENDIX.....	513

INTRODUCTION

Top executives at public companies receive a large proportion of their overall compensation in the form of retirement pay. There are two competing explanations for these arrangements. Some argue that promised retirement benefits are just like unsecured debt obligations, and thus align the interests of executives with those of the company's long-term creditors. For example, federal banking regulators, in search of ways to dampen the risk-taking incentives of top bank executives, have embraced this theory.¹ But others contend that, because retirement pay is easier to hide from public view than other forms of executive compensation, these arrangements merely allow public companies to pay executives in a way that is not transparent to investors. No previous study has, however, tested these competing theories by closely examining the contractual structure of executive retirement pay.

This Article takes the first step toward closing this gap by providing the first study of the structure of executive retirement pay at public companies. In contradiction of the incentive-alignment theory, the evidence reveals that retirement payouts at many companies do little to curb managers' incentives to take risk. Moreover, we show that neither the full amount nor the form of these payouts are disclosed to investors—findings consistent with the camouflage theory. We also find that the structure of some executives' retirement payouts is consistent with the incentive-alignment view. But because current law does not require public companies to disclose the structure of retirement pay, neither investors nor regulators can distinguish payouts that serve an incentive-alignment function from those that do not.

First, the value of a large proportion of executive retirement pay is linked to company stock prices. Indeed, our data suggest that the retirement benefits of more than one out of three executives are invested entirely in the company's stock. These benefits, which have previously been thought to provide executives with debt-like payouts, are instead functionally equivalent to stock-based pay—which can intensify, rather than dampen, executives' inclination to take risk.

Second, the evidence shows that many executives receive the bulk of their retirement payments immediately after leaving the firm. More than 20% of executives receive all of their payments in the year that they

¹ See Incentive-Based Compensation Arrangements, 76 Fed. Reg. 21,170, 21,779 (proposed Apr. 14, 2011) (to be codified at 12 C.F.R. pt. 42).

depart, and the median executive receives the entirety of her retirement pay within three years. Such pay is thus unlikely to align the interests of executives and long-term creditors. And, on average, executives receive these payments more quickly as firm risk increases, further insulating them from losses to which long-term creditors are exposed.

Third, we explain that even those executives who plan to receive their retirement pay over time often can accelerate their payouts. Thus, executives whose retirement pay is threatened by their firm's looming insolvency have the option to accelerate their payout and thereby avoid losses to which their firm's creditors are exposed. Finally, we show that the true amount and structure of retirement pay is hidden from investors, providing support for commentators who argue that retirement pay allows public companies to camouflage their executives' compensation.

To be sure, the competing explanations for retirement pay are not mutually exclusive. Some executives' payouts may meaningfully align their incentives with those of the company's creditors, while other executives' retirement pay may be better explained by the managerial power view. We show, however, that to tell the difference investors must know how these payouts are structured.

These findings have important implications for policymakers and commentators who are concerned about the impact of retirement pay on executive incentives. Disclosure rules should be amended to give investors the complete picture on retirement pay. Financial-sector regulators should not assume that retirement benefits curb bankers' pursuit of risk. And future scholarship examining whether retirement pay reflects managerial influence or incentive alignment would benefit by distinguishing these payments on the basis of their contractual structure.

The remainder of the Article proceeds as follows. Part I summarizes the two main theories of executive retirement pay. Part II describes the data we used to study the structure of executive retirement payouts. Part III presents our findings. Part IV offers implications for lawmakers and commentators. The final Part concludes.

I. THE RETIREMENT PAY DEBATE

Why do public companies give their executives such generous retirement benefits? Two major schools of thought have emerged. The first, the optimal contracting view, holds that market forces generally induce directors to pursue the pay bargain that is in shareholders' best

interests.² These scholars contend that retirement pay aligns executives' interests with those of the company's creditors, which ultimately benefits shareholders by reducing the company's cost of credit.³ By contrast, the managerial power school argues that executives wield significant influence over the directors who set their pay.⁴ These observers argue that executives prefer retirement pay because it is less transparent to investors.⁵

All agree, however, that to serve the incentive-alignment function described by the optimal contracting school, retirement pay must actually be debt-like—that is, the payments must similarly expose executives and creditors to the firm's insolvency risk.⁶ Yet almost nothing is known about whether executive retirement pay is actually structured in that way.

A. The Optimal Contracting School

Executive pay at public companies is negotiated between executives and the company's board of directors. Those in the optimal contracting school contend that market forces are strong enough to induce directors to pay executives in ways that are in shareholders' best interests.⁷ On this view, markets in products, labor, and corporate control discipline directors who depart from that deal.⁸ While slack in market forces may permit occasional departures from the pay arrangements that are best for

² See generally Andrei Shleifer & Robert W. Vishny, A Survey of Corporate Governance, 52 J. Fin. 737 (1997).

³ See, e.g., Rangarajan K. Sundaram & David L. Yermack, Pay Me Later: Inside Debt and Its Role in Managerial Compensation, 62 J. Fin. 1551 (2007) (providing an important early articulation of this view).

⁴ See generally Lucian Bebchuk & Jesse Fried, Pay Without Performance: The Unfulfilled Promise of Executive Compensation 61–120 (2004).

⁵ See Lucian A. Bebchuk & Robert J. Jackson, Jr., Executive Pensions, 30 J. Corp. L. 823, 827–28 (2005).

⁶ Compare Sundaram & Yermack, *supra* note 3, at 1558, with Bebchuk & Jackson, *supra* note 5, at 830 (debating whether retirement pay does, in fact, place executives and creditors in comparable contractual positions in the event of insolvency—but agreeing that this structure is necessary for retirement pay to align the parties' interests).

⁷ See, e.g., Frank H. Easterbrook, Managers' Discretion and Investors' Welfare: Theories and Evidence, 9 Del. J. Corp. L. 540 (1984).

⁸ See, e.g., Eugene F. Fama, Agency Problems and the Theory of the Firm, 88 J. Pol. Econ. 288, 291–92 (1980).

shareholders, in general, directors negotiate with executives for the pay package that is in shareholders' interests.⁹

Theorists in this school argue that executive retirement pay serves shareholders by reducing the agency cost of debt and therefore the cost of credit. Retirement arrangements merely reflect a promise to pay the executive in the future, making the executive a creditor of the firm—or, in other words, providing her with “inside debt.”¹⁰ Because retirement pay is usually treated as an unsecured claim in bankruptcy, the executive might not receive her retirement pay if the firm becomes insolvent. Thus, retirement pay motivates executives to avoid risks that might lead to insolvency—giving creditors comfort that is reflected in the company's cost of borrowing. This benefits shareholders, these theorists argue, by reducing the company's overall cost of capital.

B. The Managerial Power School

By contrast, those in the managerial power school argue that, although the directors' formal charge is to advance shareholder interests, in practice the interests of directors and shareholders frequently diverge. This problem is particularly acute, these theorists argue, when the directors negotiate with executives over pay.

Most directors personally own only very small amounts of their company's equity, and so they internalize very few of the costs of corporate decision-making.¹¹ Meanwhile, top executives can influence whether directors are nominated for reelection to the board.¹² And individual shareholders generally hold relatively small stakes in large public companies and so lack incentives to discipline directors who favor executives over shareholders. The costs to directors of resisting executives' pay demands are large, while the benefits are small.

⁹ See, e.g., John E. Core et al., *Executive Equity Compensation and Incentives: A Survey*, 9 *Fed. Res. Bank N.Y. Econ. Pol'y Rev.* 27, 27–28 (2003).

¹⁰ Sundaram & Yermack, *supra* note 3, at 1580 (coining this terminology). Those who take the optimal contracting view may argue that executive retirement pay promotes shareholders' interests for reasons unrelated to the cost of credit, for example because of tax considerations. In this Article, we focus solely on the increasingly popular view that, consistent with the inside-debt hypothesis, executive retirement pay aligns the interests of managers with those of creditors, reducing the company's cost of capital.

¹¹ See, e.g., Lucian Arye Bebchuk & Jesse M. Fried, *Executive Compensation as an Agency Problem*, 17 *J. Econ. Persp.* 71, 73–74 (2003).

¹² See, e.g., Lucian Arye Bebchuk et al., *Managerial Power and Rent Extraction in the Design of Executive Compensation*, 69 *U. Chi. L. Rev.* 751, 766–67 (2002).

Scholars in the managerial power school argue that executives' sway over directors skews executive pay away from the deal that is in the best interests of shareholders. They contend that managerial influence over pay manifests itself in three ways. First, public company executives are paid more than is necessary to motivate them—that is, executives extract rents from shareholders in the form of excess pay.¹³ Second, executive pay at public companies is inadequately linked to performance.¹⁴ And third, directors camouflage the amount and form of executive pay from public investors.¹⁵ Directors who are concerned that their executive pay decisions may draw the ire of shareholders prefer to pay executives in ways that are difficult to detect because this strategy further reduces the probability that directors will be disciplined for favoring the interests of executives over those of shareholders.¹⁶

These commentators argue that the heavy use of executive retirement pay reflects managerial influence rather than the bargain that is in the best interests of investors.¹⁷ Unlike other forms of compensation, retirement pay has historically been subject to virtually no disclosure requirements, allowing it to be easily camouflaged from shareholders.¹⁸ Current rules still do not require companies to disclose the additional benefits that executives receive when retirement pay is structured in a way that shifts tax burdens from the executive to the corporation.¹⁹ More importantly, current rules do not require companies to reveal the structure of retirement payouts. Thus, managerial power theorists contend that retirement pay is a way for directors to compensate executives without drawing attention from shareholders.

C. The Structure of Retirement Pay and Incentive Alignment

All observers agree that in order to align executives' incentives with those of creditors, the structure of a company's retirement pay must resemble the structure of the payments the creditors themselves are due

¹³ See, e.g., *id.* at 785.

¹⁴ See, e.g., *id.* at 781; see also Robert J. Jackson, Jr., *Private Equity and Executive Compensation*, 60 *UCLA L. Rev.* 638, 641–47 (2012).

¹⁵ See, e.g., Bebchuk et al., *supra* note 12, at 789.

¹⁶ See, e.g., *id.*

¹⁷ See, e.g., *id.* at 754–56.

¹⁸ See *id.* at 830–31. Today, retirement pay is subject to more extensive disclosure requirements, although these rules did not take effect until 2006. 17 C.F.R. § 229.402(h)–(i) (2013).

¹⁹ 17 C.F.R. § 229.402(h)–(i); see *infra* Section III.D.

to receive. In particular, for retirement payments to serve as inside debt, the amount and timing of the payments must place executives in a contractual position comparable to that of the company's creditors.

1. Fixed payout and recovery in bankruptcy

Unsecured creditors of public companies are typically entitled to fixed payments. If the company files for bankruptcy, these creditors usually recover pro rata with the firm's other unsecured lenders. For retirement payouts to align manager and creditor interests, the contractual structure of the payments should emphasize both features.

First, for retirement payments to serve as inside debt their amounts must be fixed rather than varying with the executive's or the company's performance. Unlike bonuses or stock-based pay, which reward managers for taking risk, fixed payments encourage executives to avoid risks that might render the firm insolvent.

Second, for retirement arrangements to serve as inside debt the executive must, in the event of bankruptcy, recover pro rata with the company's other unsecured creditors. Again, unlike bonuses or stock-based pay—both of which are typically worthless if the firm enters bankruptcy—payments that provide for creditor-like recoveries encourage executives to keep the firm solvent.²⁰

2. Magnitude

Retirement pay that serves an incentive-alignment function must also be large enough to make managers want to protect it. In particular, the inside debt payments owed to the executive must be substantial enough *relative to the value of the executive's holdings of company stock* to make the executive want to maximize the overall value of the firm rather than just the value of shareholder equity.

²⁰ Following previous work, we assume for purposes of this analysis that the value of equity in bankruptcy is typically zero. Thus, stock-based pay gives executives reason to take risks when the firm faces insolvency, because shareholders have little to lose, and much to gain, from such risks. For the same reasons, important recent work shows that bonuses contingent on solvency do not fully align the interests of executives and creditors. The reason is that solvency-contingent bonuses, like stock-based pay, are assumed to have zero value in bankruptcy. Because creditors are sensitive not only to *whether* bankruptcy occurs but also to the *amount they recover* in bankruptcy, bonuses of this kind—like stock-based pay—do not perfectly align manager and creditor interests. See Alex Edmans & Qi Liu, Inside Debt, 15 Rev. Fin. 75 (2011).

Economists have long agreed that, in firms financed by both equity and debt, an optimal compensation arrangement will include a mix of equity- and debt-like payouts that give executives reason to maximize firm value.²¹ Recent work exploring the optimal contracting theory has hypothesized that retirement benefits counterbalance the risk-taking incentives generated by equity-based pay by providing debt-like payouts that move managers' overall compensation mix toward the optimal level.²² Indeed, this work theorizes that, by comparing the value of the retirement pay owed to an executive to the value of the executive's holdings of company equity, it is possible to estimate the executive's personal leverage ratio—and thus her relative incentives to pursue the interests of creditors and shareholders.²³

3. Duration and limits on acceleration

The timing of retirement pay that serves as inside debt will also resemble the timing of payments to the company's creditors. Only retirement payments that are kept at risk until the firm's creditors are paid will fully align executives' interests with those of creditors.

To see why, note that a company's long-term creditors should take little comfort from retirement payouts that the executive will receive shortly after she leaves the firm.²⁴ Because the executive gets paid long before her decisions might cause these creditors to suffer losses, the payments give the executive little reason to manage the firm in a manner consistent with creditor interests.

Moreover, retirement arrangements that serve as inside debt will limit the executive's ability to accelerate her payments. If managers can arrange to accelerate their payouts to avoid losses that will be suffered

²¹ For the seminal theoretical work establishing this view, see Michael C. Jensen & William H. Meckling, *Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure*, 3 *J. Fin. Econ.* 305 (1976).

²² See Edmans & Liu, *supra* note 20.

²³ See, e.g., Chenyang Wei & David Yermack, *Investor Reactions to CEOs' Inside Debt Incentives*, 24 *Rev. Fin. Stud.* 3813, 3814 (2011); see also Frederick Tung & Xue Wang, *Bank CEOs, Inside Debt Compensation, and the Global Financial Crisis 4* (Boston Univ. Sch. of Law Working Paper No. 11-49, 2012), available at <http://ssrn.com/abstract=1570161>.

²⁴ This is especially true because it is common for retirement payments to commence upon the termination of an executive's employment. To the extent that the executive controls the timing of her termination, she may also control the timing of her retirement payouts—permitting her to avoid losses that cannot be avoided by the company's creditors.

by the company's lenders, the arrangements are unlikely to align executive and creditor interests.

D. Previous Research on Executive Retirement Pay

The debate over whether retirement pay aligns manager and creditor incentives (as those in the optimal contracting school argue) or merely conceals the amount and structure of executive pay (as managerial power theorists contend) has recently grown more vociferous. Each side has marshaled evidence consistent with its theory.

The ability to study executive retirement pay was long constrained by limited disclosure requirements.²⁵ Recently adopted disclosure rules, however, have led to the publication of studies that support the optimal contracting theory.²⁶ For example, Chenyang Wei and David Yermack have examined how bond and stock prices respond to firms' initial disclosures of chief executive officer ("CEO") retirement pay.²⁷ They found that bond prices rose, and stock prices fell, at firms that revealed higher levels of CEO retirement pay.²⁸ Frederick Tung and Xue Wang have investigated the relationship between bank CEO retirement pay and bank performance during the recent financial crisis.²⁹ They found, consistent with the view that retirement pay discourages managerial risk-taking, that more retirement pay was linked to better bank performance during the crisis.³⁰

Notwithstanding this evidence, managerial power theorists have expressed skepticism that retirement pay serves an incentive-alignment function. These scholars cite studies suggesting that the level of executive retirement pay is not related to the terms on which the

²⁵ Nevertheless, two early empirical papers, including work by one of us, attempted to estimate the value of executive retirement payments. See Bebchuk & Jackson, *supra* note 5, at 835; see also Sundaram & Yermack, *supra* note 3, at 1562.

²⁶ See, e.g., Joseph Gerakos, *CEO Pensions: Disclosure, Managerial Power, and Optimal Contracting* (Pension Research Council Working Paper No. WP2007-5, 2007), available at <http://ssrn.com/abstract=982180>.

²⁷ See Wei & Yermack, *supra* note 23, at 3815.

²⁸ See *id.* at 3814, 3831.

²⁹ Tung & Wang, *supra* note 23, at 1.

³⁰ *Id.* at 4.

company can borrow, but instead is closely related to indices of executive influence in the boardroom.³¹

Importantly, the optimal contracting and managerial power explanations for retirement pay are not mutually exclusive. In some firms, the structure of retirement pay may meaningfully align managers' incentives with those of creditors. In others, the structure of an executive's retirement pay may render the incentive-alignment explanation implausible, suggesting that managerial power may have influenced the bargain. To know which explanation is true at a particular firm, we need to know how that firm structures its managers' retirement pay. Yet very little is known about the structure of executive retirement pay.³²

II. EVIDENCE ON EXECUTIVE RETIREMENT PAY

Until recently, public companies were required to reveal relatively little information about executive retirement pay. In 2006, however, the Securities and Exchange Commission ("SEC") promulgated new rules designed to provide investors with information about the two principal types of executive retirement pay: defined contribution and defined benefit arrangements.³³ These disclosures allow us to provide the first systematic view into the structure of executive retirement pay at public companies.

³¹ Kelli A. Alces & Brian D. Galle, *The False Promise of Risk-Reducing Incentive Pay: Evidence from Executive Pensions and Deferred Compensation*, 38 *J. Corp. L.* 53, 55–56 (2012).

³² One recent study considers the structure of executive retirement pay in a limited sample of companies and concludes, as we do about the broader sample studied here, that "in practice, a substantial portion of debt-like compensation is subject to institutional modifications that reduce its risk of loss in insolvency, or make it effectively senior to outside debt. The incentive-alignment effect is weaker or non-existent in these cases." Divya Anantharaman et al., *Inside Debt and the Design of Corporate Debt Contracts*, *Mgmt. Sci. Articles in Advance* 1, 3–4 (Dec. 20, 2013), <http://pubsonline.informs.org/doi/pdf/10.1287/mnsc.2013.1813>.

³³ See generally 17 C.F.R. § 229.402(h)–(i) (2013) (requiring public companies to disclose, for specified executives, each executive's balance and earnings on her defined contribution retirement pay, as well as the amount each executive is entitled to receive under defined benefit retirement arrangements).

A. Methodology

SEC rules now require companies to provide specified information about each type of executive retirement arrangement. The information permits us to identify different, but equally important, structural features of defined contribution and defined benefit retirement plans.

1. Defined contribution plans

The first type of executive retirement pay, defined contribution plans, allows executives to defer a certain amount of their current compensation and invest the deferred amounts in specified investment vehicles. Defined contribution arrangements are similar to the 401(k) arrangements that allow employees to defer a limited amount of income each year on a tax-advantaged basis.³⁴ Because the tax code limits the amount that employees can defer on this basis, however, companies often offer supplemental defined contribution plans that allow executives to defer pay beyond those limits.³⁵

The information revealed by the SEC's new disclosure rules allows us to examine whether defined contribution arrangements provide fixed payouts that might align executive and creditor interests. In particular, the evidence allows us to consider whether executives typically invest defined contribution benefits in their company's stock—in which case the benefits functionally provide executives with *equity* rather than inside debt.³⁶

³⁴ See 26 U.S.C. § 219(b) (2006) (setting forth these limits). Although prior research refers to defined contribution payments as “deferred compensation,” see, e.g., Wei & Yermack, *supra* note 23, at 3, for ease of exposition—and because, as a legal matter, other types of retirement pay also constitute deferred compensation—we refer to these payments as defined contribution retirement payments.

³⁵ Importantly, however, amounts deferred in supplemental defined contribution plans are available to satisfy creditor claims in bankruptcy, while amounts deferred through 401(k) plans are not.

³⁶ Following previous work, we describe nonqualified defined contribution retirement pay as compensation that the executive defers and invests in specified instruments. See Wei & Yermack, *supra* note 23, at 8. We note, however, that some types of stock-based pay, including restricted stock units (sometimes called “phantom” stock units), are often required by SEC rules to be included in the executive's nonqualified defined contribution retirement pay for purposes of disclosing the executive's compensation. See, e.g., Letter from Frederic W. Cook & Co., to Nancy M. Morris, Sec'y, U.S. Sec. & Exch. Comm'n 13 (Mar. 9, 2006), available at www.sec.gov/rules/proposed/s70306/rlalpern4813.pdf (advocating that this type of stock compensation be included in disclosures of executive retirement pay). Previous research in this area, however, has not considered the effects of this legal designation on the

2. *Defined benefit plans*

The second type of retirement pay, defined benefit plans, takes the familiar form of pensions: The company promises to pay the executive a specified amount after she leaves the company. When executives and companies enter into agreements governing these pensions, the parties must choose a payment schedule.³⁷ Once this schedule is chosen, the executive cannot accelerate the payments without incurring a 20% penalty tax.³⁸ In choosing this schedule, the executive balances the tax benefits of deferring payments against the risk that the firm will become insolvent. Our dataset allows us to estimate the duration of executives' defined benefit payments—and, thus, how long the payments are actually exposed to the risk that the company will become insolvent.

B. Dataset and Summary Statistics

The SEC's disclosure rules now require all public companies to provide information on both types of executive retirement pay. Drawing from these disclosures, we constructed a dataset including information on retirement pay for each year from 2006 through 2011 for more than 19,000 executives at more than 2100 U.S. public companies.³⁹

As we have noted, it is widely recognized that retirement pay constitutes a nontrivial proportion of overall executive compensation. Our evidence generally confirms that view. Table I presents the average total compensation of the executives in our sample and the average amount of that compensation conveyed as retirement pay.

incentive implications of retirement pay. This omission highlights the importance of examining the contractual structure of executive retirement pay when analyzing the incentive implications of those payments. See *infra* Section IV.B.

³⁷ Under Section 409A of the Internal Revenue Code, most executive retirement pay arrangements must specify the timing of these payments in order to avoid substantial tax penalties. 26 U.S.C. § 409A(a)(4)(B)(1) (2006).

³⁸ *Id.* § 409A(a)(1).

³⁹ Previous work has been limited to study of CEO retirement pay. See *supra* text accompanying notes 22–32. Because SEC rules require public companies to reveal retirement pay for each firm's CEO, chief financial officer, and three most highly paid executives, however, our dataset includes information on a wider range of executives. For details on the assembly of the dataset, see *infra* Appendix Section I.A, at 514.

Table I: Executive Retirement Pay: Summary Statistics⁴⁰

	2006	2007	2008	2009	2010	2011
Average Total Annual Pay	\$3.4M	\$3.4M	\$2.6M	\$2.2M	\$2.9M	\$3.2M
Average Annual Retirement Pay	—	\$0.4M	\$0.0M	\$0.4M	\$0.4M	\$0.4M
Average Total Retirement Payouts Owed to Executive	\$2.2M	\$1.9M	\$1.6M	\$1.8M	\$2.0M	\$2.1M

Table I shows that retirement payments promised to public company executives represent a nontrivial proportion of their annual pay. And, over time, executives build up a significant amount of retirement benefits. In 2011, the average executive in our sample was owed some \$2.1 million in retirement pay.

Moreover, our evidence indicates that executive retirement pay is about evenly divided between defined contribution pay and defined benefit pay.⁴¹ Table II below summarizes the average value of each type of retirement pay owed to the executives in our sample.

⁴⁰ We calculated the amounts in Table I by using the average change in the value of the defined contribution and defined benefit pay owed to the executives in our sample. Because these amounts were not required to be disclosed before 2006, we are unable to calculate the change in these values from the prior year. Some observers might be surprised that the average total retirement payment owed to the executives in our sample is just \$2.1 million, less than the average executive's annual compensation. Compare, e.g., Bebchuk & Jackson, *supra* note 5, at 837 tbl.2 (finding, in a sample of retired CEOs, that the average executive was owed \$21.7 million in defined benefit retirement pay alone). As we have noted, however, previous work has focused exclusively on retirement pay owed to CEOs at the largest public companies, while our sample includes a broader group of top executives in a broader sample of firms. See *supra* note 39.

⁴¹ These conclusions contrast with those of previous research, which has generally concluded that defined benefit pay—that is, pensions—represents a much larger proportion of executive retirement pay than defined contribution payments. See, e.g., Wei & Yermack, *supra* note 23, at 3824 n.7. These differences are likely attributable to the broader group of firms and executives included in our study. Previous work has focused only on the CEOs of the largest public companies, see, e.g., *id.* at 3819 n.4, 3824 n.7, 3825 n.8, 3828 n.9 (identifying a sample of 299 CEOs of large public companies), while our dataset includes several top executives from all of the firms in the S&P Composite 1500 Index. See *infra* Appendix Section I.A, at 514.

Table II: Composition of Executive Retirement Pay

	2006	2007	2008	2009	2010	2011
Average Defined Contribution Pay (% Total)	\$1.1M (50%)	\$1.0M (52%)	\$0.7M (43%)	\$0.8M (45%)	\$0.9M (45%)	\$0.9M (44%)
Average Defined Benefit Pay (% Total)	\$1.1M (50%)	\$0.9M (48%)	\$0.9M (57%)	\$1.0M (55%)	\$1.1M (55%)	\$1.2M (56%)

Our evidence allows us to explore the contractual structure of both types of executive retirement pay. In the next Part, we provide the first evidence on the structure of retirement payments for top executives at public companies—and the implications of our findings for the competing theoretical explanations for executive retirement pay.

III. RETIREMENT PAY AND INCENTIVES

Academics are now vigorously debating whether retirement pay gives executives important incentives to maximize firm value or is just excessive compensation camouflaged from view. The answer to these questions depends critically on the structure of the retirement payouts. Yet no previous work systematically analyzes the contractual details governing those payouts—or their implications for the competing theoretical explanations for executive retirement pay.

Do retirement arrangements pay executives fixed amounts, or are the amounts linked to company stock prices? What is the typical duration of executive retirement pay? Is there a meaningful link between the duration of these payments and firm risk? And what is the value of the tax benefits executives receive through retirement arrangements? Below we provide the first empirical insights on the answers to these questions.

A. Retirement Pay and Stock Returns

Theory predicts that retirement packages designed to align executive and creditor interests would pay fixed amounts. In practice, however, executives are permitted to invest their defined contribution benefits in the company's stock. Because the value of these benefits fluctuates with stock prices, they are unlikely to align manager and creditor interests.

Rather than providing executives with inside debt, retirement benefits invested in company stock increase the executives' equity holdings.

Current disclosure rules do not require public companies to reveal whether executives' defined contribution benefits are invested in company stock. But the SEC *does* require public companies to disclose executives' earnings on investments of defined contribution benefits.⁴² And, of course, data on the company's annual stock returns are publicly available. By comparing executives' returns on investment of their defined contribution benefits to the annual returns on the company's stock, we can estimate the extent to which the value of executive retirement payouts depends on stock prices.

At a summary level, the returns that executives earn on investment of their defined contribution payments appear to fluctuate over time. Figure I describes the average percentage earnings on executives' defined contribution benefits in our sample between 2006 and 2011.

Figure I: Average Executives' Returns on Defined Contribution Retirement Pay, 2006–2011



As Figure I shows, the value of defined contribution retirement pay is not fixed, but fluctuates considerably over time. And those fluctuations are consistent with changes in stock-market returns. For example, in 2006, when stocks in the S&P Composite 1500 Index performed

⁴² 17 C.F.R. § 229.402(i)(2)(iv) (2013).

relatively well, the average executive earned 24% on the investment of her retirement pay. By contrast, in 2008, when the value of those stocks fell considerably, the average executive *lost* 24% on the investment of her retirement benefits.

Of course, these patterns do not establish a close relationship between the returns executives receive on the investment of their retirement benefits and returns on their companies' own stock prices. In the Appendix, however, we describe multivariate regression analysis in which we examine that relationship more closely. The analysis shows that the returns on investment for executive retirement pay are economically and statistically significantly related to returns on the company's stock, even controlling for the returns on other investments that the executives might choose.⁴³ Overall, the evidence suggests that executive retirement benefits are frequently invested in the company's stock.

While there is a strong relationship between the value of executive retirement pay and stock returns in the overall sample, it might also be useful to know how many executives have invested all, or nearly all, of their retirement benefits in company stock. We examined this question by calculating the correlation between each executive's returns on investment of her retirement benefits and the returns on her company's stock between 2006 and 2011. Figure II below describes the distribution of correlations across our entire sample:

⁴³ As we explain in the Appendix, the multicollinear nature of the returns on public company stocks prevents us from ascertaining with precision the exact proportion of each executive's retirement pay invested in the executive's company's stock—as opposed to, say, an index of public company stocks. See *infra* Appendix Section II.A, at 519. It is important to distinguish between these two investments to the extent that we can because the incentive effects from investments in company stock are different from those from investments in the broader index. While investments in the company's own stock give the executive incentives to pursue risk that debtholders would prefer that the company avoid, see *supra* note 20, investments in the stocks of an index of public companies do not—although we note that neither investment provides the fixed payouts that would most precisely align the executive's incentives with those of the company's creditors.

To address this concern, we take two different approaches to modeling the relationship between the returns on executives' defined contribution retirement pay and the returns on the company's stock. See *infra* Appendix Section II.A, at 519. Both approaches identify an economically and statistically significant relationship between executives' returns on their retirement pay and the returns on the company's own stock.

Figure II. Executive-Specific Correlation Between Returns on Defined Contribution Payments and Stock Returns

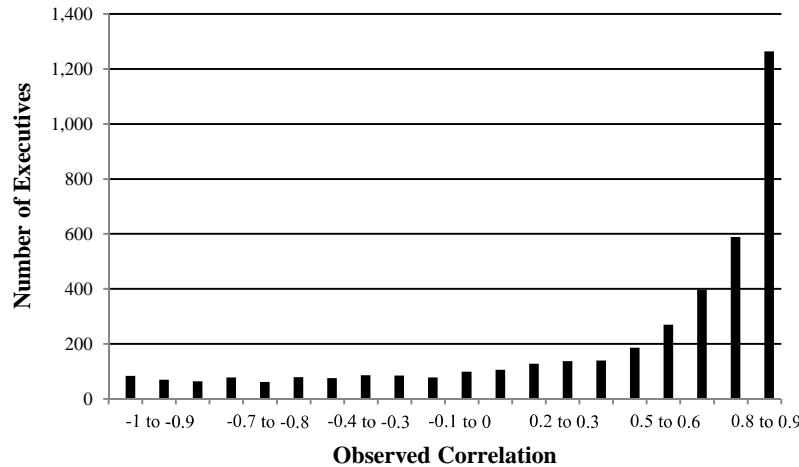


Figure II suggests that a significant proportion of public company executives invest nearly all of their defined contribution retirement pay in company stock.⁴⁴ For more than 1,200 executives, or over 30% of those with defined contribution retirement payments, there is nearly

⁴⁴ Previous scholarship has attempted to use securities disclosures to evaluate whether executives invest retirement pay in company stock. See, e.g., Wei & Yermack, *supra* note 23, at 3824 n.7; Tung & Wang, *supra* note 23, at 8, 13–14. Although securities rules do not require firms to disclose these investments, some companies provide such disclosures voluntarily. To examine the accuracy of such an approach, we reviewed securities disclosures for a sample of 300 executives that were most likely to have invested their retirement pay in company stock—that is, executives who had a correlation between the return on their retirement pay and the return on their company’s stock of 0.9 or greater. On the basis of these disclosures, we were able to determine the exact amount of the executive’s retirement pay that was invested in the company’s stock in only 25% of these cases. In the remaining cases, the disclosures either did not state whether the executive had invested her retirement pay in the company’s stock or indicated only that the executive was allowed to make such investments—not whether she had actually done so. Even in those cases where it was most likely that executives had invested their retirement pay in the company’s stock, then, these disclosures revealed that fact only occasionally. Thus, in our view, examining the correlation between returns on the executive’s retirement pay and the returns on the company’s stock—notwithstanding the shortcomings of this approach, see *supra* note 43—is a more informative method of studying the incentive effects of retirement pay than reviewing the company’s securities disclosures. We are grateful to Jeff Zhang for his assistance with this review.

perfect correlation between the company's stock returns and the executive's returns on investment for her retirement pay.⁴⁵ To be sure, the evidence also indicates that some executives do not invest these payments in the company's stock. But for those that do, the payments cannot serve the incentive-alignment function described by optimal contracting theorists.

As noted in Part I, economists evaluate an executive's incentives by comparing the value of her inside debt holdings to the value of her holdings of company equity. Recent scholarship has argued that this can be done by comparing the value of the retirement pay owed to the executive with the value of her stock holdings.⁴⁶ This work has generally treated defined contribution retirement pay as inside debt.⁴⁷ But the evidence presented here shows that, for many executives, these benefits in fact represent holdings of the company's *stock*. By treating these payouts as debt-like, how much have researchers erred in estimating the executive's relative holdings of debt- and equity-like payouts?

To answer that question, we focused only on the executives with nearly perfect correlation between the company's stock returns and the executive's returns on investing her retirement pay. We then calculated each executive's individual leverage ratio—that is, the ratio of her holdings of inside debt to her holdings of company stock. First, we calculated this ratio assuming that all defined contribution payouts are debt-like—even though, for this group of executives, it is clear that nearly all of the pay is instead invested in company stock. We then recalculated the ratio, excluding defined contribution benefits

⁴⁵ Although our sample includes nearly 8,500 unique executives with defined contribution retirement pay, we have information on returns on the investment of those payments for three or more years for only approximately 4,000 of those executives. Because our dataset has a limited number of observations for each executive, our correlation estimates are likely to be biased downward. Thus, the frequency of nearly perfect correlations between executives' returns on their defined contribution benefits and the returns on their company's stock price is especially striking. Nevertheless, there may be close correlation between the returns on an executive's defined contribution payments and the company's stock even if the executive is not invested in the company's stock—for example, if the payments are invested in the broader market and the executive is employed by a bellwether firm. See *supra* note 43. In the Appendix, we describe additional analysis we conducted to address this possibility. The analysis suggests that a significant proportion of executives' defined contribution payments are directly invested in the company's stock. See *infra* note 84.

⁴⁶ See, e.g., Wei & Yermack, *supra* note 23, at 3824–27; Tung & Wang, *supra* note 23, at 8, 14.

⁴⁷ Wei & Yermack, *supra* note 23, at 3817; Tung & Wang, *supra* note 23, at 13.

altogether.⁴⁸ Finally, we recalculated the ratio assuming that all defined contribution benefits are *equity* holdings—the appropriate treatment for these executives. Table III below presents the average leverage ratio for the executives in our sample under each approach:

Table III: Effect of the Structure of Defined Contribution Payouts on Select Executives' Leverage Ratios

	Debt Includes Defined Contribution Benefits	Debt Excludes Defined Contribution Benefits	Equity Includes Defined Contribution Benefits
Average Leverage Ratio	1.12	0.51	0.30

As Table III shows, a failure to consider the contractual structure of retirement pay will distort any assessment of the incentive effects of those payouts. Among the group of executives whose defined contribution benefits are largely invested in company stock, there is little question that it is inaccurate to treat these payouts as inside debt. By doing so, for this group of executives observers will estimate the average executive's leverage ratio at 1.12, rather than the correct level of 0.30. Even excluding these payouts from an executive's personal leverage ratio altogether causes significant error, leading to an estimated personal leverage ratio of 0.51—an error of almost 100%.⁴⁹

⁴⁸ Some commentators, acknowledging that defined contribution retirement payments may reflect holdings of company stock rather than holdings of inside debt, have taken this approach. See, e.g., Tung & Wang, *supra* note 23, at 53–54.

⁴⁹ In some cases, SEC disclosures of the executive's equity holdings may already include stock held in the form of defined contribution retirement benefits. See U.S. Sec. & Exch. Comm'n, Item 403 of Regulation S-K—Security Ownership of Certain Beneficial Owners and Management Question 2.02, <http://www.sec.gov/divisions/corpfin/guidance/execcomp403interp.htm> (last updated Mar. 13, 2007). In these cases, excluding the value of these benefits from the leverage calculation altogether, rather than including them as additional holdings of equity, may appropriately reflect the executive's personal leverage ratio. Whether SEC rules require disclosures of equity holdings to include stock held in the form of retirement benefits depends on the specific terms of the agreement between the executive and the company. See *id.* Thus, the appropriate measure of the executive's leverage ratio depends on those terms. In our view, this detail further highlights the

B. The Duration of Retirement Pay

For retirement pay to function as inside debt, its duration must be comparable to the duration of the company's debt obligations. But in practice, executives and companies have significant freedom with respect to the timing of retirement payouts—and may arrange for most of the payouts to be made in a lump sum soon after the executive's departure. In previous work, one of us presented limited anecdotal evidence that executives frequently receive their retirement pay in a cash lump sum immediately following their departure.⁵⁰ Other commentators have acknowledged that such lump-sum payments are incompatible with the predictions of the incentive-alignment view of these payments,⁵¹ but no previous work has provided systematic empirical evidence on the timing of executive retirement pay.

We provide the first such evidence below. The data reveal that more than 20% of executives receive all of their defined benefit retirement payments in the year that they leave the firm, and that the median executive receives all of her retirement pay less than three years after her departure. Moreover, the evidence shows that retirement pay of short duration is economically and statistically significantly linked to higher levels of firm risk.

1. Summary statistics

Public companies are not required to disclose the duration of retirement payouts. But when an executive leaves the firm, SEC rules *do* require the company to disclose any defined benefit payouts the executive receives in that year.⁵² By dividing the payouts made to the executive in the year she retires by the entire amount she is owed, we can calculate the percentage of the executive's total retirement pay that she receives each year. We can then estimate the duration of the executive's retirement payouts—that is, how long it will take the company to pay the entire amount the executive is owed.⁵³

importance of considering the contractual structure of retirement payouts when assessing their incentive implications. See *infra* notes 67–68 and accompanying text.

⁵⁰ Bebchuk & Jackson, *supra* note 5, at 831 & n.25.

⁵¹ See, e.g., Sundaram & Yermack, *supra* note 3, at 1579 & n.22.

⁵² 17 C.F.R. § 229.402(h)(2)(v) (2013).

⁵³ For purposes of our analysis, we assume that executives receive a constant defined benefit payout each year, starting with the year they depart the firm. In interviews, executive

What percentage of their total defined benefit payouts do executives receive in the year they leave the firm? Figure III below shows the distribution of the percentage of their total defined benefit pay that the executives in our sample received in their departure year.

Figure III: Percentage of Executives' Total Defined Benefit Pay Received in Departure Year

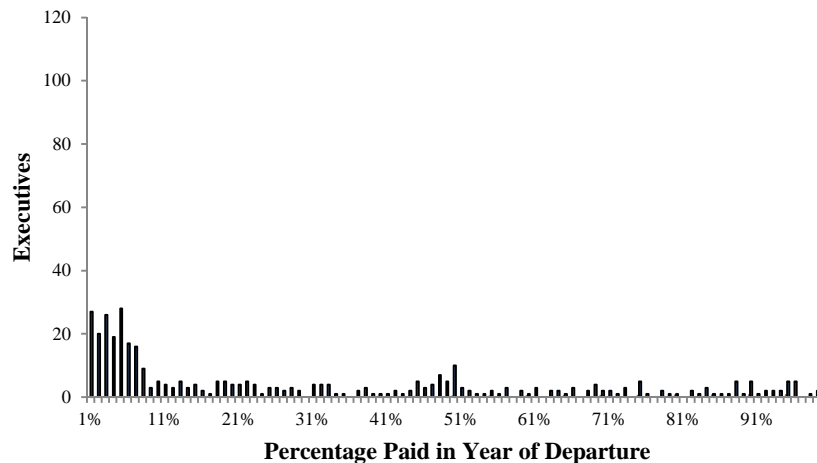


Figure III provides striking evidence of the short duration of executive retirement payouts for many executives. Among the 498 executives for whom we can observe the duration of these payouts, more than 110—over 20% of the sample—receive the *entire* amount of defined benefit pay they are owed in the year of their departure. The median executive

compensation attorneys who have worked with executives and public companies on these arrangements indicated that these payout schedules are usually constant across time.

We also separately checked this claim for robustness through additional analysis of the data. Most executives who receive defined benefit payouts retire, providing us with only one year of data describing the amount of their payouts. In some cases, however, the executive remains employed with the firm, and thus is subject to disclosure of defined benefit payouts in subsequent years. We identified 106 such executives in our sample. In unreported analysis, we then compared the annual distributions for these executives to observe whether they are consistent over time. The evidence indicated that these amounts were indeed consistent over time. When analyzing the difference in each executive's annual distributions, we found that the median difference in annual distributions is zero, and that approximately 75% of distributions are within \$100 of the amount of the prior year's distribution for that executive.

receives 38% of her total benefits in the year she leaves the company, suggesting that she receives all of her retirement pay in less than three years. Of course, the data also show that some executives receive their retirement pay over a longer period of time, evidence consistent with the incentive-alignment view of retirement pay. But the median executive in our sample can expect to receive all of her payouts in just three years. To the extent that this timing allows executives to receive their retirement payouts before the company's creditors are paid, retirement pay of short duration cannot be expected to align manager and creditor interests.

2. *Relationship with firm risk*

Executives are most likely to value speedy payout of their retirement benefits when the firm faces significant risk of insolvency. Thus, we would expect to observe a relationship between the duration of executive retirement pay and firm risk. Does the evidence confirm this prediction?

To examine that question, we collected data describing five measures of firm risk: firm leverage (measured using two similar proxies);⁵⁴ volatility of the firm's stock price; prices on the firm's credit default swaps ("CDS"), which measure the cost of insuring against a default on the company's debt; and the Altman Z-Score, a measure that is frequently used to predict corporate bankruptcy. We then constructed a multivariate regression model that estimates the relationship between the duration of executive retirement payouts and each of these five measures of risk. The results, described in detail in the Appendix, are striking. The models show an economically and statistically significant relationship between the duration of executive retirement pay and all five measures of firm risk. The more quickly executives receive their retirement pay, the results indicate, the riskier the firm. These findings are robust to a series of standard controls for differences among executives and firms.⁵⁵

The finding that the duration of executive retirement payouts is related to firm risk does not, of course, establish the causal direction of that relationship. On one hand, executives at riskier firms may choose speedier payouts because they anticipate that the firm may soon face

⁵⁴ For additional detail on these measures, see *infra* Appendix Section I.A, at 514–15.

⁵⁵ These controls include firm size, the executive's age, the executive's total compensation, and the value of the executive's defined benefit payments and holdings of firm equity. For additional detail on these models, see *infra* Appendix Section II.B, at 520.

insolvency or because they do not trust their successors. On the other hand, firm risk may rise because retirement pay of short duration gives executives little reason to protect the company from insolvency. For present purposes, it is not important whether executives choose retirement pay of short duration because the firm is risky or vice versa. What is important is that the duration of retirement pay dictates the extent to which these arrangements align the interests of executives and creditors.

C. Acceleration of Retirement Payouts

Although executives typically receive the bulk of their retirement pay shortly after they leave the firm, our sample also includes many managers who received their payouts over time. It might be argued that, for these executives, retirement pay serves an important incentive-alignment function. But this will only be true if the executives are meaningfully restricted from accelerating these payouts in the event that the firm faces insolvency.

In practice, executives have considerable freedom to withdraw from both defined contribution and defined benefit arrangements immediately in the event that the firm faces insolvency.⁵⁶ To be sure, the tax code penalizes executives who choose to accelerate their retirement payouts. But in many cases, executives can still be expected to withdraw these benefits before the company enters bankruptcy.

As noted in Part I, when an executive elects to receive retirement pay over time, the tax code requires that she and the company agree to a schedule on which the compensation is to be paid out. If the executive later chooses to accelerate that schedule, the payouts are subject to a 20% penalty tax.⁵⁷ This penalty was enacted in response to the popular outrage that followed when top Enron executives withdrew more than \$53 million in retirement pay weeks before that company declared

⁵⁶ It is true that contracts governing these payments typically prohibit accelerations. The reason, however, is that Section 409A requires that acceleration be prohibited in order to avoid tax penalties. See 26 U.S.C. § 409A(a)(3) (2012). In practice, directors can and do amend these agreements to permit executives to accelerate retirement payments when the firm faces insolvency. One straightforward way to give creditors comfort that amendments like these will not lead to acceleration of executive retirement pay would be to require creditor approval for any such amendments. In interviews, however, practitioners in this field told us that they were unaware of any situation in which creditors have the contractual right to approve amendments to these arrangements.

⁵⁷ See 26 U.S.C. § 409A(a)(1)(B)(i)(II) (2006).

bankruptcy.⁵⁸ Policymakers hoped that the penalty would discourage executives from withdrawing retirement benefits when bankruptcy is on the horizon.⁵⁹ But the provision instead merely limits accelerations to cases in which executives are most certain that bankruptcy is coming—and when the company's insolvency will be deepest.

To see why, note that, once an executive has agreed to receive her retirement pay at a later date, she will decide whether to receive her payouts early by weighing the costs of the 20% Section 409A penalty against the threat to her future payouts posed by her firm's bankruptcy risk.⁶⁰ When her estimate of the second cost is greater than the first, she will accelerate her payouts.

Consider, for example, an executive scheduled to receive \$10 million in retirement pay ten years from today. Now suppose that the executive discovers that there is a 30% probability that the company will file for bankruptcy, in which case its creditors will lose 40% of the principal owed to them. When deciding whether to accelerate her payouts, the executive will compare the \$2 million cost of the tax penalty ($\$10 \text{ million} \times 20\%$)⁶¹ to the \$1.2 million she expects to lose in bankruptcy ($\$10 \text{ million} \times 30\% \times 40\%$). In this case, the executive will not accelerate: She can do better in bankruptcy than she can by paying the 20% tax. But now suppose that the executive expects that there is a 50% probability that the firm will enter bankruptcy and that creditors will suffer losses of 60% of their principal in bankruptcy proceedings. Then the executive will expect to lose \$3 million in bankruptcy ($\$10 \text{ million} \times 50\% \times 60\%$), while the tax penalty remains only \$2 million. Now we

⁵⁸ See, e.g., Staff of Joint Comm. on Taxation, 108th Cong., Rep. of Investigation of Enron Corporation and Related Entities Regarding Fed. Tax and Compensation Issues, and Policy Recommendations 14 (Comm. Print 2003).

⁵⁹ See *id.* at 20.

⁶⁰ For ease of exposition, we assume that the executive can predict with accuracy the probability of bankruptcy and the losses creditors will incur in the bankruptcy proceeding. Of course, in practice executives may be unable to accurately predict those variables. If an executive is risk averse, this uncertainty will make her even more likely to withdraw her retirement benefits early, because early withdrawal ensures that the executive will receive a specified amount of cash. By contrast, if the executive waits until the firm enters bankruptcy, she will bear the risk that the depth of the firm's insolvency is greater than she anticipated, further reducing her payout.

⁶¹ For simplicity, we include here only the 20% penalty, although acceleration may increase the executive's tax burden in other ways—for example, by requiring her to include all of her retirement pay as income in a single tax year. See 26 U.S.C. § 409A(a).

can expect the executive to accelerate her retirement payouts in anticipation of bankruptcy.⁶²

To be sure, Section 409A deters some executives from accelerating. But we can still expect executives to accelerate in cases where bankruptcy is especially likely or the company's insolvency will be particularly deep. Managers' freedom to accelerate their retirement pay allows them to avoid losses that other creditors will suffer in bankruptcy. Thus, even retirement pay of relatively long duration may be of limited use in aligning executive and creditor interests.

D. Retirement Pay and Camouflage

Managerial power scholars have traditionally argued that companies shift executive compensation into retirement pay to camouflage it from investors. This view might seem to have become obsolete in 2006, when the SEC adopted new rules mandating disclosure of retirement pay. But the 2006 disclosure rules are incomplete in two ways, permitting retirement pay to continue to serve a cloaking function. First, as we explain below, the 2006 rules do not force companies to reveal certain retirement-related tax benefits that executives receive. Second, companies are not required to reveal the duration of retirement payouts. If executives are paid out quickly, they are insulated from the company's insolvency risk—but investors cannot see this from reading the company's disclosures.

⁶² Accelerated retirement payments made to executives within one year prior to bankruptcy may be voided as a preferential transfer, see 11 U.S.C. § 547(b) (2012), so long as the transfer meets the statutory requirements for such transfers. See, e.g., *In re Enron Corp.*, 357 B.R. 32, 37 (Bankr. S.D.N.Y. 2006). However, for several reasons such clawbacks appear to be relatively rare in practice. For one thing, accelerated payments will not be recoverable if the executive receives the payment outside the one-year window before bankruptcy. For another, pre-bankruptcy payments to employees can be difficult to recoup even when creditors have a legal right to reclaim them; for example, Enron paid hundreds of key employees an estimated \$73 million in bonuses less than a week before its bankruptcy, but only \$7 million had been recovered from individuals no longer employed by Enron as of December 2003. See Lynn M. LoPucki, *Courting Failure: How Competition for Big Cases is Corrupting the Bankruptcy Courts* 150 (2005). Finally, as one might expect, "legal hurdles, expense, and time often discourage" creditors from litigating to recoup such payments. Mike Spector et al., *In Trouble and Paying Out: Financially Sick Firms Often Grant Bonuses in Months Before Bankruptcy Filing*, *Wall St. J.* (Dec. 3, 2012, 8:18 PM), <http://online.wsj.com/news/articles/SB10001424127887323830404578145182000348430>.

1. Hidden tax benefits

All public companies are required to disclose each executive's total pay in a clear, simple table, known as the "Summary Compensation Table," in their annual proxy statements.⁶³ Since 2006, these tables have included the value of each executive's retirement benefits as part of the executive's total annual pay.⁶⁴ The tables do not, however, include the value of tax savings that executives receive through supplemental defined contribution benefits. Thus, consistent with the managerial power view, these arrangements may allow public company directors to pay executives in a manner that is not transparent to investors.

Supplemental defined contribution plans do not receive the preferred tax treatment given to 401(k)s and similar arrangements. Therefore, part of the tax on this type of compensation is shifted from the executive to the company. When a company defers an executive's pay through a tax-advantaged arrangement like a 401(k), the company is entitled to deduct the deferred pay immediately from its income for tax purposes. But when pay is deferred through supplemental arrangements that are not tax-advantaged, the company cannot take this deduction until the executive receives the payout. The executive, by contrast, enjoys the same tax treatment on amounts deferred in the supplemental arrangement as she does in her regular 401(k), avoiding taxes on deferred amounts until the amounts are paid out. The executive's tax savings from receiving this treatment—equal to the amount of her gains on investments of defined contribution benefits multiplied by her tax rate—are equal to the gains the company foregoes through deferral of its deduction.⁶⁵ Although SEC disclosure rules do not require these savings to be included in disclosures of the executive's total pay, our dataset allows us to estimate their value for the first time.

Because our dataset includes information on each executive's earnings on the investment of her defined contribution benefits before they are paid out, we can estimate her tax savings by multiplying those

⁶³ 17 C.F.R. § 229.402(c) (2013).

⁶⁴ *Id.* § 229.402(c)(2)(vii).

⁶⁵ For examples demonstrating how companies provide executives with this tax treatment of amounts above the federal statutory limit by increasing the company's tax burden, and for additional detail on our calculation of the approximate magnitude of the tax savings the executives in our sample enjoyed as a result of such arrangements, see *infra* Appendix Subsection I.B.3, at 517–18. See also Myron S. Scholes et al., *Taxes and Business Strategy: A Planning Approach* 204 (4th ed. 2009).

earnings by her tax rate. To be conservative, we assume a marginal tax rate of 20%, although in practice we would expect rates to be much higher.

Using this approach, we conservatively estimate that, from 2009 through 2011, the executives in our sample with defined-contribution plans received, on average, about \$32,500 in annual tax savings through these arrangements.⁶⁶ To be sure, this unreported compensation reflects only a small proportion of the average executive's overall pay. Nevertheless, consistent with the managerial power theory, companies can use these arrangements to convey these savings to executives without revealing their true costs to investors.

2. Camouflaged duration

More importantly, SEC rules do not force companies to disclose the duration of retirement pay. Thus, executives who wish to avoid their company's insolvency risk can—and do—receive their retirement payouts quickly without investors' knowledge. As the managerial power view predicts, our study shows that some executives take advantage of this lack of disclosure to persuade directors to structure retirement pay in a way that favors managers—to the detriment of investors.

IV. IMPLICATIONS FOR POLICYMAKERS AND COMMENTATORS

The debate over whether retirement pay aligns the interests of managers and creditors or merely camouflages the amount and structure of executive compensation has drawn considerable attention from policymakers and academics alike. The evidence presented in this Article suggests that understanding the contractual structure of these payouts is critical to answering these questions. Our findings point to important lessons for both lawmakers and commentators concerned about the incentive effects of retirement pay.

The study offers three insights for policymakers. First, existing disclosure rules do not reveal the structure of executive retirement pay. These rules should be revised to require public companies to disclose whether retirement benefits are invested in the company's stock and the

⁶⁶ Because the returns on executives' investments of their defined contribution benefits between 2006 and 2008 were unusually volatile, see *supra* Figure 1, we focus on the unreported tax savings generated by those investments from 2009 through 2011, the most recent years for which we have data.

2014] *Hidden Nature of Executive Retirement Pay* 507

duration of retirement payouts. Second, the rules governing summary disclosure of executive pay levels do not require companies to include the tax benefits that executives receive through retirement arrangements. Rulemakers should require public companies to include these amounts when disclosing executives' total compensation. Third, regulators now charged with overseeing banker incentives should closely examine the structure of retirement benefits before concluding that these payouts give bankers reason to manage their firms more carefully.

In addition, our study offers a framework for future research on retirement pay. Commentators evaluating whether retirement pay reflects incentive alignment or managerial influence should carefully distinguish benefits whose value is tied to the company's stock price from benefits of fixed amounts, and payouts with short duration from those with long duration. These distinctions will allow observers to assess the incentive effects of retirement pay—and the implications of these arrangements for broader debates on executive compensation—more precisely.

A. Regulation of Executive Retirement Pay

Our findings suggest that current disclosure rules should be amended to give investors the information they need to evaluate the structure and magnitude of executive retirement pay. Our evidence also shows that the financial regulators who supervise banker incentives should not assume that retirement pay will discourage bankers from pursuing risk.

1. Disclosure of the structure of retirement pay

Although SEC rules now require public companies to provide investors with some information about executive retirement pay, the rules do not require disclosure of the contractual structure of these benefits. Regulators should make two changes that would enable investors to evaluate the incentive implications of retirement pay.

First, public companies should have to disclose whether executive retirement benefits are invested in the company's stock.⁶⁷ Second, the

⁶⁷ Although some information about these investments is required to be disclosed in scattered securities rules, current law does not provide investors with a clear view of whether retirement payments are invested in company stock. See, e.g., SEC Rule 16b-3, 17 C.F.R. § 240.16b-3 (2013) (requiring some disclosure of purchases and sales of company stock through retirement arrangements); Sec. & Exch. Comm'n, Item 403 of Regulation S-K—

rules should require disclosure of the duration of executive retirement payouts. Without this information, investors cannot evaluate whether these benefits align executive and creditor interests. Moreover, disclosing these details will not be costly. Public companies administer investments of retirement benefits in company stock, so information about those investments is readily available to the firm. And because tax law requires that the timing of retirement pay be specified in advance,⁶⁸ companies should be able to provide this information to investors at low cost.

2. Disclosure of the magnitude of retirement pay

Until recently, executive retirement pay was completely excluded from the highly salient summary tables that investors use to evaluate pay levels. Current rules now require that companies include the value of retirement pay when disclosing executives' total compensation.⁶⁹ These rules do not, however, require that companies include the value of tax benefits that executives receive through supplemental retirement arrangements when calculating an executive's overall pay.⁷⁰ Because companies convey these benefits to executives by increasing the firm's tax burden, excluding these amounts from total compensation figures makes it difficult for investors to assess the costs of executive retirement pay. Moreover, excluding these benefits from disclosures of executive pay levels increases the likelihood that retirement pay will be used to camouflage compensation from investors.

Companies should be required to include tax benefits that executives receive through retirement pay in the total compensation amounts they disclose to investors. Calculating the value of these benefits, which are

Security Ownership of Certain Beneficial Owners and Management Question 2.02, <http://www.sec.gov/divisions/corpfin/guidance/execcomp403interp.htm> (last updated Mar. 13, 2007) (requiring disclosure of some, but not all, executive stock ownership through defined contribution arrangements).

⁶⁸ See *supra* text accompanying note 37 (noting that, to avoid tax penalties, companies and executives must specify the timing of retirement payouts in advance).

⁶⁹ 17 C.F.R. § 229.402(c) (2013). These rules, which require that companies include changes in the actuarial present value of retirement benefits in summary disclosure of the executive's total pay, correspond with disclosure proposals that one of us offered in previous work. See Bebhuk & Jackson, *supra* note 5, at 852–54.

⁷⁰ See *supra* text accompanying note 63; see also 17 C.F.R. § 229.402(c)(2)(viii) (requiring that these summary tables include changes in the present value of retirement payments in total pay calculations—but excluding tax benefits executives receive through supplemental retirement payments from total compensation figures).

approximately equal to the product of the executive's earnings on investment of her defined contribution benefits and her tax rate, will not be costly.⁷¹ Existing rules already require companies to calculate and disclose executive earnings on defined contribution benefits,⁷² and companies are generally able to estimate their executives' tax rates.

3. Regulation of banker pay

In response to the recent financial crisis, Congress has directed federal regulators to monitor managerial incentives at the nation's largest banks.⁷³ It is now well-accepted that shareholders of large banks want executives to pursue socially excessive levels of risk. Shareholders capture the full upside from bank risk-taking, while some of the downside of bank failures is borne by the government through deposit insurance and bailout financing. Based on these insights, in the short time since the crisis, an extensive literature has emerged analyzing the optimal incentives for bank executives.⁷⁴ Although the details of proposals for regulating banker pay vary, most agree that it may be dangerous to require bank executives to hold significant amounts of company stock, because stock holdings might give bank executives, like shareholders, reason to prefer that the bank take too much risk.⁷⁵ Some have argued that providing executives with inside debt in the form of retirement pay might deter risk-taking of this kind.⁷⁶ Indeed, bank

⁷¹ See *supra* text accompanying note 65 (describing how to calculate the value of the tax benefits executives receive through supplemental defined contribution payments).

⁷² See *supra* Section III.A (noting that existing rules require disclosure of earnings on investment of executives' defined contribution payments).

⁷³ Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, § 956, 124 Stat. 1376, 1905 (2010) (codified as amended in scattered sections of 12 U.S.C. and 15 U.S.C.).

⁷⁴ See, e.g., Lucian A. Bebchuk & Holger Spamann, *Regulating Bankers' Pay*, 98 *Geo. L.J.* 247, 249 (2010); Richard Squire, *Shareholder Opportunism in a World of Risky Debt*, 123 *Harv. L. Rev.* 1151, 1202 (2010) ("In [firms that received federal bailouts during the financial crisis], the apparent problem was not that managers failed to serve shareholders, but rather that they served them too well, seeking to enrich them at the expense of creditors and taxpayers."); Frederick Tung, *Pay for Banker Performance: Structuring Executive Compensation for Risk Regulation*, 105 *Nw. U. L. Rev.* 1205, 1207 (2012).

⁷⁵ See, e.g., Bebchuk & Spamann, *supra* note 74, at 252; Squire, *supra* note 74, at 1203.

⁷⁶ See, e.g., Alex Edmans, *How To Fix Executive Compensation: For Starters, Don't Link Pay Packages Just to Stock. Tie Them to Debt As Well.*, *Wall St. J.* (Feb. 27, 2012), <http://online.wsj.com/news/articles/SB10001424052970203462304577138691466777460>.

regulators have expressly argued that retirement pay may serve this function.⁷⁷

Our findings suggest that regulators should proceed with caution when assuming that retirement pay will suppress bankers' appetite for risk. For one thing, a large proportion of executives invest their retirement benefits in company stock. These arrangements may therefore give bankers additional stock in the firm rather than inside debt—exacerbating, rather than dampening, their incentive to take risks. For another, bankers may receive their retirement payouts shortly after leaving the firm, giving them little reason to avoid risk-taking that may cause future losses.

After the recent crisis, Congress gave regulators the authority to require that banks report “the structures of all incentive-based compensation arrangements.”⁷⁸ Supervisors should use this authority to require banks to reveal whether executive retirement benefits are invested in company stock and the duration of retirement payouts. Financial regulators need this information to evaluate the effects of retirement pay on bankers' incentives to pursue risk.

B. Future Analysis of Executive Retirement Pay

Commentators are now engaged in the early stages of a spirited debate over whether executive retirement pay is a product of managerial influence or a device for aligning manager and creditor interests.⁷⁹ Our study provides two contributions to this research. First, we present evidence that is inconsistent with the view that many executives' arrangements reflect the optimal contracting view of retirement pay—and that, in many instances, the structure of such pay is more easily reconciled with the predictions of the managerial power hypothesis. Second, because our findings provide some support for both hypotheses, we show that future study of the incentive effects of retirement pay should take account of the structural detail identified in this Article.

⁷⁷ Incentive-Based Compensation Arrangements, 76 Fed. Reg. 21,170, 21,199 n.123 (proposed Apr. 14, 2011) (to be codified at 12 C.F.R. pt. 42), available at <http://www.gpo.gov/fdsys/pkg/FR-2011-04-14/pdf/2011-7937.pdf> (relying upon “one study [that] conclude[s] that bank CEOs with large amounts of inside debt in the form of pensions and deferred compensation exposed their firms to less risk and obtained greater performance during the recent financial crisis”).

⁷⁸ Dodd-Frank Wall Street Reform and Consumer Protection Act § 956, 124 Stat. at 1905.

⁷⁹ See *supra* text accompanying notes 25–32.

Much of the evidence presented here is difficult to reconcile with the view that retirement pay aligns executive and creditor interests at most firms. Retirement benefits are often invested in company stock, producing payouts that vary with stock returns instead of fixed amounts. The payouts tend to be made relatively quickly after the executive leaves the firm, permitting managers to receive payment before the company's creditors. Even executives who receive retirement pay over a long duration retain some freedom to accelerate those payments. And current law obscures the full costs of retirement pay, consistent with the view that these arrangements allow directors to camouflage excessive compensation. Nevertheless, previous work has also identified important evidence suggesting that retirement pay plays a meaningful role in aligning executive and creditor interests, and our data confirm that payouts for some executives are structured in a way that is consistent with the incentive-alignment theory.⁸⁰ Since the competing explanations for executive retirement pay are not mutually exclusive, it is hardly surprising that empirical study has so far yielded mixed results.

More importantly, the debate over retirement pay has ignored whether the contractual structure of the payouts actually aligns managers' and lenders' interests. By taking account of these details, future research should be able to assess the incentive effects of retirement pay with more precision. Researchers should, for example, distinguish between retirement benefits whose value is tied to the company's stock and payouts of fixed amounts when assessing executives' relative holdings of equity and debt. Future scholarship should also distinguish retirement payouts of short duration from payouts likely to be made over a longer time horizon when evaluating whether these arrangements give executives reason to protect the interests of the company's creditors.

Our study identifies, and provides a preliminary empirical assessment of, key contractual features relevant to the incentive effects of executive retirement pay. We hope that, by doing so, we have provided researchers with a framework for future work in this area.

⁸⁰ See, e.g., Sundaram & Yermack, *supra* note 3, at 1552; see also Tung & Wang, *supra* note 23, at 3–4 (finding that banks with CEOs who were owed more retirement pay enjoyed stronger performance during the financial crisis); Wei & Yermack, *supra* note 23, at 3814 (finding, based upon an event study of early disclosures of CEO retirement arrangements, that bond prices rose at firms that revealed larger amounts of retirement pay).

CONCLUSION

Retirement benefits for public company executives are extremely generous. There are two main theories for why companies pay so much in the form of retirement benefits rather than regular salary and bonuses. One theory is that retirement pay, which represents unsecured promises that the company will make certain payments in the future, aligns executive and creditor interests. The competing theory is that retirement pay simply allows public companies to camouflage pay from investors. The resolution of this debate depends on whether retirement pay actually places executives in a contractual position comparable to that of the company's creditors.

In this Article, we have provided the first comprehensive empirical study of the structural features of executive retirement benefits at large public companies. The evidence reveals that—while some executives' arrangements are structured in a manner that is compatible with the optimal contracting hypothesis—retirement benefits cannot be expected to serve an incentive-alignment function for many executives. And our findings show that retirement pay obscures the full amount and form of top executive pay.

First, our study shows that a large proportion of retirement benefits are invested in the company's own stock. Although retirement arrangements have long been thought to provide executives with holdings of company debt, these benefits are actually equivalent to equity holdings instead. Thus, these benefits strengthen, rather than curb, executives' tendency to pursue risk.

Second, the Article has shown that retirement payouts often have a short duration—that is, executives receive the bulk of their payouts immediately after they leave the firm. The median executive in our study received all of her retirement payouts less than three years after her departure. Because many executives receive their payments before long-term creditors do, the promise of these payments does not align executives' interests with those of the company's long-term creditors. And the evidence shows that, as we might expect, executives typically choose to receive their payouts more quickly when their firm's default risk increases. Moreover, even executives who choose to receive their pay over time often retain the option to accelerate their payouts if bankruptcy looms.

Our study also shows that, as managerial power theorists predict, retirement arrangements allow executives to camouflage pay. SEC rules

do not require companies to reveal the full costs of retirement pay to shareholders. And, more importantly, companies are not required to reveal the duration of retirement payouts, allowing executives to avoid the company's insolvency risk without disclosing that fact to investors.

The Article has also described the implications of our study for regulators. Disclosure rules should be revised to give investors the information they need to evaluate the structure and magnitude of retirement pay. And bank regulators should not rely on retirement benefits to rein in risk-seeking without understanding the actual incentive effects of these arrangements.

Although a great deal has been written about the potential explanations for executive retirement pay, previous work has failed to closely examine the contractual structure of these arrangements. This Article has offered the first assessment of the contractual considerations that influence whether retirement arrangements actually align executive and creditor interests. Study of those considerations shows that, for many executives, retirement benefits cannot be expected to serve an incentive-alignment function. Policymakers and academics should take careful account of the structural nuances identified here. Without understanding those details, this Article has shown, lawmakers and researchers cannot know whether retirement pay aligns the interests of public company executives with those of creditors—or, to the contrary, gives top managers even more reason to pursue risk.

APPENDIX

The evidence described in this Article was assembled primarily from three separate databases.⁸¹ Information on executive compensation, including retirement pay, was drawn from Compustat's Execucomp database, which contains compensation data for executives of all of the public companies included in the S&P Composite 1500 Index. Data on firm characteristics were separately drawn from Compustat's Fundamentals Annual database, which contains annual accounting data from securities filings. Finally, information on stock prices was drawn

⁸¹ Memorandum from Robert J. Jackson, Jr., Assoc. Professor of Law and Milton Handler Fellow, Columbia Law Sch. & Colleen Honigsberg, Ph.D. Candidate, Columbia Bus. Sch. to the Va. Law Review (Apr. 15, 2014) (on file with the Virginia Law Review Association) (describing the assembly of the datasets used in this Article and providing instructions for replicating the multivariate regression analysis described in the Appendix).

from the Center for Research in Security Prices, which contains daily and monthly closing prices for all equities listed on the New York Stock Exchange, American Stock Exchange, and NASDAQ. All of the data are available from the authors upon request.

I. DATA

A. Dataset Assembly

1. Executive compensation and retirement pay

Our data begin in 2006 because, as explained in the Article, before then public companies were not required to disclose much information about executive retirement benefits. Thus, our dataset includes information on executive compensation and retirement pay between 2006 and 2011. Our data include information on the total value of defined contribution pay owed to each executive, the earnings each executive obtained through investment of those defined contribution benefits, the total value of defined benefit pay owed to each executive, and the amount of any defined benefit payment made to each executive during the sample period.

2. Executive characteristics

In addition to information on executive compensation, the dataset includes detail on executive-specific characteristics, including each executive's age, equity ownership, and title.

3. Firm characteristics

We combined the information on executives' retirement benefits, compensation, and characteristics with detailed accounting data describing each firm in our sample. The accounting information includes detail on each firm's level of current debt, long-term debt, assets, market value, and industry, along with information on each company's stock returns during the sample period.

4. Firm risk

Finally, to assess each company's level of risk over time, we added five different variables frequently used to measure risk to the dataset. First, we included information on the volatility of the company's stock price, a standard measure of firm-specific risk. Second, we drew

information from Compustat to calculate the firm's leverage, or the ratio of its total debt to total equity, as of the end of each calendar year. Third, because some researchers argue that it is more accurate to calculate leverage at the end of each fiscal year, we separately calculated the ratio of each firm's total debt to total equity as of that date.⁸² Fourth, we separately drew information on the price of CDS, or insurance against the possibility that the firm will default on its debt. We obtained these prices from the Bloomberg terminal at the Columbia Business School library. CDS prices were available for approximately 23% of the firms in our sample. Because CDS may not be traded daily, we identify the year-end CDS price as the price of the final trade for each company in each year, provided that a trade occurred on December 20th or later. To normalize the distribution and control for outliers, we used the natural log of each CDS price in the analysis described below. Finally, as a fifth measure of firm risk, we calculated the Altman Z-Score for each firm in our dataset, and we created a dummy variable equal to one if the firm's Z-Score indicated that the firm was in distress and otherwise equal to zero.

B. Estimated Variables

1. Return on defined contribution balances

We calculated each executive's return on investment of her defined contribution balance using the data described above. The data include information on the total value of the defined contribution payments owed to each executive, the earnings each executive obtained through investment of those defined contributions, and the annual company and executive contributions to the executive's defined contribution plan. We estimated the executive's defined contribution balance at the beginning

⁸² Some argue that the value of the firm's total equity should be calculated at the end of the fiscal year because this approach ensures that the calculations of both debt and equity values occur on the same date; others contend that equity value should be calculated at the end of the calendar year because fiscal year calculations ignore important stock-market dynamics at the end of each calendar year. Compare Philip G. Berger, Eli Ofek & David L. Yermack, *Managerial Entrenchment and Capital Structure Decisions*, 52 *J. Fin.* 1411, 1416 (1997) (calculating leverage using the market value of equity at the end of each fiscal year), with Miguel A. Ferreira & Pedro Matos, *The Colors of Investors' Money: The Role of Institutional Investors Around the World*, 88 *J. Fin. Econ.* 499, 504 (2008) (calculating market capitalization as of the end of each calendar year). Since both arguments have merit, we include both metrics in our analysis.

of the year by subtracting all contributions and earnings from the year-end balance.⁸³ We then calculated the executive's return on her investment by dividing her earnings by her defined contribution balance at the beginning of the year.⁸⁴

2. Duration of defined benefit payouts

We separately identified the group of executives who received defined benefit pay during our sample period. We then divided the amount the executives were owed under these arrangements by the total amount owed to the executive before distributions to obtain the percentage of the total payouts made to the executive in the year she left the firm. This percentage allowed us to estimate the duration of the executive's retirement pay—that is, the number of years it will take until the executive receives the entire amount she is owed. For example, an executive who receives 50% of her defined benefit pay in the year she retires is assumed to receive the entire amount in two years.⁸⁵

⁸³ This calculation is necessarily imprecise because, for example, some executives contribute continually throughout the year, rather than solely at the end of the year. This imprecision, however, biases our results away from finding significant correlation between returns on retirement pay and stock returns, making our findings of such correlation in a substantial proportion of our sample particularly striking.

⁸⁴ As we note in the Article, see *supra* note 43, executives with nearly perfect correlation between the returns on their retirement pay and the returns on their company's stock are likely to have invested those payments in stock. However, such a correlation might also arise if the executive has invested her retirement pay in a broader stock market index and the executive is employed by a bellwether firm—that is, a company with stock returns that are similar to market returns.

To address this possibility, we re-estimated the number of executives who invested their retirement pay in the company's stock by identifying *both* the correlation between the return on each executive's retirement pay and her company's stock as well as the correlation between the return on the executive's retirement pay and the return on the value-weighted market index as a whole. We then removed any executive for whom there was a stronger correlation between the returns on her retirement pay and the market index than between the returns on her retirement pay and the company's stock.

Using this approach, we found that, for 21% of the executives in our sample, there was nearly perfect correlation between the returns on their retirement pay and the returns on their company's stock *and* that link was stronger than the link between the returns on the executive's retirement pay and the broader market. The analysis suggests, as indicated in the Article, that a substantial proportion of the executives in our sample invested their retirement pay directly in the company's stock. We are grateful to Bobby Bartlett and Fabrizio Ferri for suggesting this alternative analysis.

⁸⁵ We exclude from the sample any observations in which this value is less than 1%, because these payments are likely to reflect rebalancing in the executive's defined benefit account rather than actual retirement payments.

3. Executive tax benefits from supplemental defined contribution plans

As noted in the Article, executives receive substantial tax benefits through supplemental defined contribution plans that shift some of the tax burden associated with retirement pay from the executive to the company. No previous study has attempted to estimate the value of this benefit for executives, but we do so here. The value of the benefit is roughly equivalent to the earnings the executive receives from the investment of her defined contribution benefits multiplied by her tax rate. To see why, consider the below examples in which an executive defers \$100 in compensation, generates a 50% return on this amount, and then receives the payment. For these purposes, assume that the executive and the company face a 40% tax rate, including on capital gains.

First, suppose that the executive is paid \$100 and saves that amount on her own. The executive pays taxes of \$40 and invests her after-tax income of \$60, generating gains of \$30 ($\$60 \times 50\%$). Then, when she withdraws her savings, she pays \$12 in taxes on these gains ($\$30 \times 40\%$), receiving a total of \$78 (\$60 in savings plus after-tax gains of \$18). The company deducts \$100 from its taxable income at the time the executive receives the pay, reducing its taxes by \$40 ($\$100 \times 40\%$). This \$40 can be invested, generating returns of \$20 ($\$40 \times 50\%$). The company pays taxes of \$8 on these returns ($\$20 \times 40\%$), resulting in a gain of \$12 after taxes.

Now consider the after-tax payoffs if the executive invests through a tax-advantaged arrangement like a 401(k). The company deducts \$100 from its taxable income at the time the executive defers the compensation, reducing its taxes at that point by \$40 ($\$100 \times 40\%$). The executive then withdraws \$150 in total from the account, paying a tax of \$60 ($\$150 \times 40\%$)—leaving the executive with \$90, or \$12 more than if she saved this amount on her own. The additional \$12 the executive receives does not, however, come at the expense of the company, which has still reduced its taxable income by \$40 when the executive defers her pay, and therefore can generate investment returns on those savings.

Now suppose that the executive instead defers \$100 through a supplemental defined contribution retirement arrangement that is not tax-advantaged. The company sets aside \$100 for the executive, which grows to \$150 by the time she receives her payout. The executive receives the same treatment as she did in the 401(k): she receives \$150 in total, paying a tax of \$60, leaving her with \$90. But the company does

not receive the same treatment as it does in the 401(k). When the executive receives the payment, the company may deduct \$150 from its taxable income, but this deduction is partially offset by the \$50 in gains the company generated to boost the executive's payment. Thus, the company's taxes are reduced by \$40 $((\$150 - \$50) \times 40\%)$ when the executive receives the payment. But the company is worse off than in the 401(k) case, because there the company reduced its taxes by the same amount at the time the executive deferred the compensation—rather than when she received her pay.

The company gives the executive tax-advantaged treatment of defined contribution benefits above the federal statutory limit by increasing the company's own tax burden. To see this, note that the company defers \$40 in tax savings when the executive defers pay through a "supplemental" arrangement. Like the executive's savings, those savings could have been invested and generated a 50% return, providing the company with an extra \$20 before taxes and \$12 after paying \$8 in taxes $(\$20 \times 40\%)$. The company reduces its own expected payoff by \$12 in order to increase the executive's payoff by an equivalent amount.

Because our dataset includes each executive's earnings on the investment of defined contribution pay, we can estimate the total value of these tax benefits by multiplying these earnings by the average executive tax rate. To be conservative, we assume an average rate of 20%. The resulting estimates of the tax benefits are presented in the Article.

II. ANALYSIS

Below we present the results of multivariate regressions explaining the relationships described in the Article. All regressions include year and industry fixed effects; the latter are estimated using the 48 Fama-French industry classifications.⁸⁶ Additionally, all models control for firm size, as measured by the log of firm assets, and for a number of additional controls specific to each regression.⁸⁷ The standard errors in

⁸⁶ Eugene F. Fama & Kenneth R. French, *Industry Costs of Equity*, 43 *J. Fin. Econ.* 153, 179–81 (1997). Kenneth French's online library identifies Fama-French industry codes for each Standard Industry Classification code. Kenneth R. French, *Detail for 48 Industry Portfolios* (last visited Mar. 19, 2014), http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_48_ind_port.html.

⁸⁷ To address outliers, throughout our analysis all continuous control variables are winsorized at the first and ninety-ninth percentiles.

all regressions in Table IV are clustered by firm; in Table V, standard errors are clustered by executive. In the tables below, significance levels of 1, 5, and 10 percent are indicated by ***, **, and *, respectively.

A. Retirement Pay and Stock Returns

Below we present the results of two multivariate regressions in which each executive's annual return on her defined contribution benefits is the dependent variable. The variable of interest is the firm's idiosyncratic risk, and the regressions capture the effect of an isolated change in the company's stock return on the return on each individual executive's defined contribution benefits.⁸⁸ We estimate a firm's idiosyncratic risk as the residual error from a market model, following the general intuition that error remaining after accounting for the relationship between the firm's returns and the market's returns reflects idiosyncratic risk.⁸⁹ In the models below, we estimate the residual errors after application of a rolling sixty-month model based on the capital asset pricing model, and present the results from a regression of those residuals on the executive's return on investment of her retirement pay. Model (a) includes observations from all firms in our sample; model (b) includes only firms in the S&P 500. Each model controls for the executive's age, the size of her deferred compensation balance at the beginning of the year, the size of the firm, and the risk-free rate. The mean values of the dependent variable for each sample are presented in parentheses.

⁸⁸ While the results described below reflect models including all executives in our dataset, the results were virtually unchanged when we ran the models for CEOs only.

⁸⁹ See Eric Zivot & Jiahui Wang, *Modeling Financial Time Series with S-PLUS 187* (2d ed. 2006).

Table IV: Retirement Pay and Stock Returns⁹⁰

	All Firms (a)	S&P 500 (b)
Idiosyncratic Risk	0.082*** (0.032)	0.23*** (0.051)
Controls for Executive and Firm Characteristics?	Yes	Yes
Industry Fixed Effects?	Yes	Yes
Year Fixed Effects?	Yes	Yes
Observations	10,175	4,470
R-squared	0.05	0.05

B. The Duration of Retirement Pay and Firm Risk

To examine the relationship between the duration of executives' defined benefit payouts and firm risk, we constructed multivariate regression models in which the percentage of the total amount of an executive's defined benefit pay that is received in the year the executive leaves the firm is the dependent variable.⁹¹

In each of the models below, the variable of interest is one of five measures of firm risk: the firm's equity volatility (model (a)), leverage as calculated on a calendar-year basis (model (b)), leverage as calculated

⁹⁰ In addition to the model described in Table IV, as a further check, in unreported analysis we separately modeled the relationship between returns on executives' defined contribution retirement pay and the company's stock returns by estimating abnormal returns from a model based on the Fama-French factors commonly used in the finance literature. See Eugene F. Fama & Kenneth R. French, *The Cross-Section of Expected Stock Returns*, 47 *J. Fin.* 427 (1992). To do so, we first created four hypothetical portfolios based on the correlation between the executive's return on her defined contribution retirement pay and the company's stock returns, see *supra* text accompanying note 44 (describing this measure), as well as four hypothetical portfolios based on the executive's returns on her defined contribution retirement pay, to create sixteen total stock portfolios. Then, we calculated the abnormal returns in each of the sixteen portfolios using the four Fama-French factors, including market momentum. See Fama & French, *supra*; see also Mark Carhart, *On Persistence in Mutual Fund Performance*, 52 *J. Fin.* 57 (1997). Consistent with the results described in Table IV, the magnitude and significance of abnormal returns was higher in portfolios based upon stronger correlation between the executive's return on her defined contribution retirement pay and the company's stock returns.

⁹¹ Because our dependent variable has a lower bound of zero and an upper bound of one, in unreported analysis we also ran bounded Tobit regressions. The statistical significance of our results is strengthened under this alternate specification. We thank Darius Palia for this suggestion.

2014] *Hidden Nature of Executive Retirement Pay* 521

on a fiscal-year basis (model (c)), the price of CDS on the firm's debt (model (d)), and a dummy variable equal to one if the firm's Altman Z-Score is less than 1.81, indicating that the firm is in financial distress (model (e)).⁹² In addition to the controls described above, all five models include controls for the value of the executive's total defined benefit pay, the executive's age, the executive's total compensation, the firm's research-to-assets ratio, and the total value of the executive's equity holdings.⁹³

⁹² Although we include models evaluating the relationship between the duration of defined benefit payments and CDS prices, we note that the sample of firms with CDS prices is necessarily limited. CDS contracts are available only for firms carrying debt, and they are not traded daily. Thus, many of the firms in our sample do not have CDS prices. Overall, the firms for which we have CDS prices available are more debt-laden, larger, and riskier than the average firms in our broader sample. Nevertheless, it is notable that, even in this limited sample, we find a statistically significant relationship between the duration of executives' defined benefit payments and the level of firm risk.

⁹³ In unreported analysis, we separately control for the executive's tenure and the value of the firm's assets squared. Our results remain significant.

Table V: Duration of Executive Retirement Pay and Firm Risk

	Percentage Received in Retirement Year (Mean: 0.46)				
	(a)	(b)	(c)	(d)	(e)
Equity Volatility	4.546*** (1.598)				
Calendar Year Leverage		0.0268*** (0.008)			
Fiscal Year Leverage			0.0406* (0.0242)		
Log (CDS Price)				0.118*** (0.0393)	
Altman Z-Score Dummy					0.100** (0.0468)
Controls for Executive and Firm Characteristics?	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects?	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects?	Yes	Yes	Yes	Yes	Yes
Observations	412	411	384	189	412
R-squared	0.40	0.40	0.39	0.54	0.40