

Contents lists available at [ScienceDirect](#)

Journal of Financial Economics

journal homepage: www.elsevier.com/locate/finpecGolden hellos: Signing bonuses for new top executives[☆]Jin Xu^a, Jun Yang^{b,*}^a Virginia Tech, Pamplin College of Business, 880 West Campus Drive, Blacksburg, VA 24061, USA^b Indiana University, Kelley School of Business, 1309 E 10th Street, Bloomington, IN 47405, USA

ARTICLE INFO

Article history:

Received 24 October 2014

Revised 22 October 2015

Accepted 23 November 2015

Available online xxx

JEL classification:

J33

M52

Keywords:

Executive compensation

Signing bonus

Termination risk

Incentive device

ABSTRACT

We examine signing bonuses awarded to executives hired for or promoted to named executive officer (NEO) positions at Standard & Poor's 1500 companies during the period 1992–2011. Executive signing bonuses are sizable and increasing in use, and they are labeled by the media as “golden hellos.” We find that executive signing bonuses are mainly awarded at firms with greater information asymmetry and higher innate risks, especially to younger executives, to mitigate the executives' concerns about termination risk. When termination concerns are strong, signing bonus awards are associated with better performance and retention outcomes.

© 2016 Elsevier B.V. All rights reserved.

1. Introduction

Starting with [Lewellen \(1968\)](#), scholars have examined many facets of the executive compensation plan: salary, annual bonuses, stock and options, pensions, and, more recently, severance pay. In this study, we focus on a unique but largely overlooked component: the signing bonus. The signing bonus is typically awarded to an executive who is identified by the board of directors as having special skills that are critical for the firm's success.¹ It is a one-time, upfront award granted when an executive assumes a new

for her editorial help. We also thank Ted Fee, Charlie Hadlock, Dirk Jenter, Kai Li, and Florian Peters for providing the data on forced CEO turnover.

* Corresponding author. Tel.: +1 812 855 3395.

E-mail addresses: xujin@vt.edu (J. Xu), jy4@indiana.edu (J. Yang).

¹ For example, high-tech firms such as Hewlett-Packard, Yahoo!, and IBM are at the crossroads of selecting sustainable business models. Traditional retail stores such as JC Penney and Best Buy have been put into tough defensive positions by online competitors such as Amazon and eBay. The signing bonus has been awarded more often in the high-tech and retail industries in recent years.

[☆] We would like to thank the following for helpful comments and discussions: Bill Schwert (the editor), Tatiana Sandino (the referee), Marianne Bertrand, Utpal Bhattacharya, Matthew Billett, Ye Cai, Randy Campbell, Sid Chib, Naveen Daniel, Diane Denis, Phil Dybvig, Eric Edmonds, Mara Faccio, Michael Faulkender, Eitan Goldman (discussant), Itay Goldstein, Yaniv Grinstein, Craig Holden, Peggy Huang (discussant), Raymond Kan, Steven Kaplan, Simi Kedia, Daniel Kim, Charles Knoeber, Allison Koester, Alex Lee (discussant), Jongha Lim, Nan Lin, Ulrike Malmendier, Ron Masulis, John McConnell, Kevin Murphy, Amrita Nain (discussant), Darius Palia, James Reda, Stefano Rossi, Elliot Smith, Christopher Snyder, Xuan Tian, Chuck Trzcinka, Ed Van Wesep (discussant), David Yermack, and Xiaoyun Yu. We thank participants at the sixth Drexel Corporate Governance Conference, the 2013 National Bureau of Economic Research Summer Institute's Law and Economics workshop, the 2013 State of Indiana Finance Symposium, the 24th Financial Economics and Accounting annual conference, the 2014 Financial Intermediation Research Society annual conference, the 2015 Midwest Finance Association conference, and workshop participants at Georgia State University, Indiana University, Mississippi State University, North Carolina State University, Technological University of Sydney, Texas A&M University, University of Melbourne, University of Missouri, University of New South Wales, University of Sydney, Virginia Tech University, and Washington University in Saint Louis. We thank David Franco, Qizheng He, Hui Peng, Jialu Peng, Cong Wang, Jett Yu, and Zhenzi Zhao for excellent research assistance and Hannah Bolte

<http://dx.doi.org/10.1016/j.jfineco.2015.11.003>

0304-405X/© 2016 Elsevier B.V. All rights reserved.

Please cite this article as: J. Xu, J. Yang, Golden hellos: Signing bonuses for new top executives, Journal of Financial Economics (2016), <http://dx.doi.org/10.1016/j.jfineco.2015.11.003>

post and is arranged separately from the executive's annual compensation plan.

The signing bonus has become an important component for compensating top executives at large US companies in recent years. In 2011, 12.0% of new named executive officers (NEOs) at Standard & Poor's 1500 firms received a signing bonus. The average grant-date value of the signing bonus is \$2.5 million for all NEOs and \$7.1 million for chief executive officers (CEOs) over the period 1992–2011. This value is similar to total annual compensation and is larger than the widely discussed severance pay.

In contrast to annual compensation, the signing bonus is awarded on or immediately after the executive's starting date. Almost all (98.5%) executive signing bonuses include a cash payment that vests shortly, on average four months after signing. The average signing bonus award is 46% cash and 54% equity for CEOs and 59% cash and 41% equity for other NEOs. The equity portion of the signing bonus typically vests over a period of three to five years.

Two contrasting views exist of executive signing bonuses. Some consider them a manifestation of managerial power and an indication of governance failure. Lucian Bebchuk stated, "Investors should be skeptical of golden hellos, which represent pay decoupled from performance and provide no retention incentives." (Green, 2013) GMI Ratings Inc., a governance rating agency, flagged Best Buy and Chesapeake Energy for awarding signing bonuses to their new CEOs in 2013. Others view signing bonuses as an incentive device and a commitment mechanism that the boards of directors use to attract, motivate, and retain executives with the skills critical for a firm's success (e.g., Van Wesep, 2010). This optimal contracting view is supported by anecdotal evidence that signing bonuses are often awarded to capable executives who are able to make key contributions at firms facing challenges in their strategies and operations.²

To make the debate on executive signing bonuses more informative, we first describe the features of signing bonuses awarded to the new NEOs at large US companies between 1992 and 2011. We then examine various rationales for the propensity and size of the signing bonus award, focusing on its role in mitigating executives' concerns about termination risk. We further investigate the implications of the signing bonus award on firm performance and executive turnover. Lastly, we examine the relation between the signing bonus and severance pay. Overall, our empirical findings are consistent with the predictions of the optimal contracting theory.

Under optimal contracting, a risk-averse executive is compensated for exerting value-enhancing, costly effort and for bearing risk, conditional on the executive's reservation utility being satisfied. The risk premium increases with the level of risk perceived by the executive and with the executive's wealth loss upon turnover. Classic incentive models consider variations in compensation as the main source of risk. However, executives also bear termination risk (Jenter and Lewellen, 2013). While an executive can

be replaced at any point of his tenure because of poor performance (forced turnover), a new executive is especially concerned about whether he could leave the firm because of a bad fit (forced or voluntary turnover). Awarding the signing bonus at the outset helps alleviate the executive's initial concerns about his prospects at the firm.

Van Wesep (2010) describes a setting in which, at the time of signing, the board of directors is generally more knowledgeable than executives about the firm's opportunities and constraints, the dynamics between the board and executive suite, and whether the executive could fit in with the firm's culture. By awarding the signing bonus, the board signals its confidence in the hiring and its commitment to help the executive succeed. Holding total compensation constant, the upfront payment of the signing bonus (especially its cash portion) reduces an executive's income loss and increases the firm's cost of replacement should a turnover occur shortly after signing. Thus, the signing bonus award enables the firm to allure hard-to-get managerial talent and is especially useful when the executive knows very little about the firm (greater information asymmetry) and when the firm has higher innate risk.

Consistent with the empirical prediction about the effect of information asymmetry on the signing bonus award, we find that the signing bonus is more frequently awarded to executives hired from outside the firm, and especially to those hired from outside the industry who presumably know little about the environment in which the firm operates and the challenges the industry faces as a whole. In addition, opaque firms (Dechow and Dichev, 2002; Lee and Masulis, 2009; Billett and Yu, 2016), which are less transparent to outsiders, are more likely to award the signing bonus to new executives.

Comparing risk measures of firms awarding the signing bonus with those of firms not awarding it, we find that firms that previously fired the CEO, as well as those that have greater research and development (R&D) expenses and more volatile stock returns, are more likely to award the signing bonus, because the fate of a new executive at such firms is more unpredictable. In addition, firms with lower stock returns and sales growth tend to award the signing bonus, because surviving and succeeding in such firms is more difficult for new executives. To obtain clear constructs of innate risk, we conduct a principal component analysis among the proxies of innate risk and show that two factors, *unpredictability* and *performance*, are important determinants of the signing bonus award.

An executive loses some future income if termination occurs. This wealth loss affects the executive's expected utility. Thus, executives with greater wealth loss upon termination require larger signing bonuses. Younger executives who have more to lose upon termination are thus more concerned about termination, *ceteris paribus*. Hence, we predict and find that younger executives are more likely to receive the signing bonus and that the signing bonus tends to be larger.

Because outsiders are unlikely to capture the board when negotiating their compensation packages, it is difficult to interpret our results as managerial power causing governance failure. To further address such concerns, we separately examine the signing bonus awards for

² Successful high-profile examples include Hubert Joly at Best Buy, Alan Mulally at Ford Motor, and Diego Piacentini at Amazon.

external hires and internally promoted executives. Among external hires, in addition to opacity and innate risk being important determinants, executives who are connected to the board of directors (had served as a board member of the company or are socially connected to directors prior to signing) are less likely to receive the signing bonus. This evidence is consistent with the notion that connections to the board reduce the information asymmetry and mitigate the new hire's concerns about termination risk, contradicting the weak governance view that a friend serving on the board bargains a better deal for the new hire. This result is robust to controlling for the executive's physical proximity to the firm and relocation expenses.

For internally promoted executives, we examine how an executive's tenure at the firm affects the propensity and size of the signing bonus award. On one hand, executives who have worked at the firm longer know more about the firm's environment and are less concerned about termination risk when they get promoted. On the other hand, the weak governance camp argues that longer-tenured executives are more likely to have the power to influence the board's decisions and thus acquire larger signing bonuses for themselves. Our empirical findings are consistent with the predictions of the optimal contracting theory; i.e., executives who have worked at the firm for a longer period are less likely to receive signing bonuses, and signing bonuses for these executives tend to be much smaller. This result is robust to controlling for board and ownership characteristics. While the strength of corporate governance does not affect the propensity of the signing bonus award, we find that firms with a smaller board and firms with a more independent board tend to award larger signing bonuses.

The board's commitment revealed by both the award itself and the equity portion of the signing bonus provide incentives for managerial effort and executive retention. Interpreting the award of the signing bonus as an indication of a supportive environment, the executive exerts greater effort to improve the firm's situation. This is because the marginal output of managerial effort is higher in a more productive environment. Greater managerial effort, amplified by the high productivity of the firm, makes the firm much more valuable. As a result, an executive who receives the signing bonus is expected to perform better and to be less likely to leave. We find that, when termination concerns are strong, the stock performance of firms awarding the signing bonus outperform firms not awarding it and that executives receiving the signing bonus have a lower turnover rate than executives not receiving it.

Our research is the first empirical attempt to systematically examine executive signing bonuses.³ It analyzes the hitherto overlooked upfront award and provides more insight into executive employment contracts. Even though the signing bonus is given before performance is observed, awarding the signing bonus mitigates an executive's concerns about termination risk and motivates the executive

to exert value-enhancing effort.⁴ It helps attract talent, provide incentives, and improve retention.

Our research is related to the literature of severance pay agreements. Severance pay is provided to both new and incumbent executives and is paid upon an executive's departure ("for good reason" or "without cause"). While [Lys et al., \(2008\)](#) find mixed evidence on the link between firm risks and the severance agreements offered to new CEOs, [Rau and Xu \(2013\)](#) show that severance agreements are awarded to incumbent CEOs as firm performance deteriorates and termination risk increases.⁵ In contrast, the signing bonus is offered at the time of initial contracting. It reduces the executive's concerns about termination risk due to a bad fit and is used to attract executives with the skills critical for a firm's success. We show that signing bonuses are typically awarded to outside hires by opaque firms and firms with higher innate risk. The signing bonus and severance agreement can be used as substitutes or complements in an executive's compensation scheme. Our empirical results suggest that the board of directors is willing to award both to an executive who can make a difference at the firm.

Two existing papers mention the use of executive signing bonuses, but they do not characterize the bonuses or systematically examine the economic rationales of the awards. [Gillan et al., \(2009\)](#) show that explicit employment agreements are more frequently used than implicit ones when uncertainty about the sustainability of the employment relation is higher and when the CEO has more to lose if the firm fails to honor such agreements. They record that 18% of new CEOs of S&P 500 firms as of January 2000 received the signing bonus. [Fee and Hadlock \(2003\)](#) focus on the effect of firm performance on an executive's likelihood of becoming a CEO at another company. Their sample contains 126 initial signing awards for CEOs hired externally during 1993–1998.

While some firms report cash signing bonuses under annual bonuses in their proxy filings in the year of signing, the literature of executive annual bonuses ([Murphy, 1985](#); [Murphy, 1999](#); [Ittner et al., 1997](#); [DeAngelis and Grinstein, 2015](#)) does not describe the characteristics of executive

⁴ For example, [Murphy \(2002\)](#), [Murphy and Zbojnik \(2004\)](#), [Oyer \(2004\)](#), [Gabaix and Landier \(2008\)](#), [Edmans, Gabaix, and Landier \(2009\)](#), [Core and Guay \(2010\)](#), [Kaplan and Rauh \(2010\)](#), [Baranchuk et al., \(2011\)](#), and [Subramanian \(2013\)](#) argue that the scarcity of managerial talent and increasing importance of managerial skills largely explain observed changes in level and dispersion of CEO pay. [Bertrand and Mullainathan \(2001\)](#), [Bebchuk and Fried \(2004\)](#), and [Morse et al., \(2011\)](#) argue that CEO entrenchment and ineffective board monitoring are the causes of increased CEO pay.

⁵ The literature provides mixed evidence on whether severance pay is an outcome of optimal contracting or weak corporate governance. [Almazan and Suarez \(2003\)](#) and [Rau and Xu \(2013\)](#) suggest that severance contracts are part of optimal contracting. [Lambert and Larcker \(1985\)](#) show that the adoption of golden parachutes is supported by significant and positive price reactions, and [Lefanowicz et al., \(2000\)](#) show that the presence of golden parachutes reduces managerial incentives to bargain on behalf of shareholders for higher acquisition prices. [Yermack \(2006\)](#), [Huang \(2011\)](#), and [Goldman and Huang \(2015\)](#) show that the market reacts negatively to separation agreements awarded upon (voluntary) CEO turnovers.

³ [Van Wesep \(2010\)](#) analyzes the signing bonuses of graduates at a top 20 US master of business administration (MBA) program during 2002–2008 and finds evidence supporting his signaling theory. Executive signing bonuses are not examined there.

signing bonuses or examine the economic determinants and implications of the awards.

The remainder of the paper is organized as follows. Section 2 discusses our empirical strategies and develops empirical hypotheses. Section 3 describes the data. Section 4 examines the determinants of the propensity and size of the signing bonus award. Section 5 analyzes the implications of the signing bonus award on subsequent firm performance and executive turnover. Section 6 investigates the relation between the signing bonus and severance pay, and Section 7 concludes.

2. Hypothesis development and empirical strategies

Our empirical analysis consists of four parts. First, we describe contractual features of the executive signing bonus. Second, we examine the economic determinants of the signing bonus award, focusing on termination risk mitigation. Third, we consider the implications of the signing bonus award on subsequent firm performance and executive turnover. Fourth, we relate the signing bonus to another important component of employment contracts, severance pay, to gain a better understanding of the overall executive compensation schemes.

In the first part of our empirical analysis, we describe the trend of the signing bonus award as well as contractual features of the signing bonus. The signing bonus is typically composed of cash and equity. The cash portion helps signal the board's commitment to the executive's success and thus insures the executive against termination risk, and the equity portion further strengthens incentives for effort and helps retention. Even though the signing bonus is awarded upfront, independent of services rendered or performance delivered, service-based requirements typically are placed on when the executive can cash out the initial award, which makes the value of the signing bonus dependent on stock performance at vesting. We describe the level, composition, and vesting feature of the signing bonus, contrasting external hires with internally promoted executives and CEOs with other NEOs.

In the second part of our empirical analysis, we examine the economic determinants of the signing bonus award; that is, which firms tend to award the signing bonus and which executives are likely to receive it. In the optimal contracting framework, an executive's compensation contract is designed to motivate managerial effort that maximizes shareholder value, conditional on the executive's reservation utility being satisfied. Holding constant the expected compensation level and the cost of effort, the executive's expected utility decreases with his risk aversion, the perceived level of termination risk, and wealth loss upon termination. The executive also requires compensation for the wealth loss for changing jobs.

We argue that, through two channels, the signing bonus can mitigate the executive's concerns about the termination risk involved in the new job. In the first channel, the signing bonus award helps mitigate an executive's concerns about the likelihood of termination by signaling a supportive environment. A new executive who has limited knowledge about the firm is more uncertain about his prospects at the firm. The signing bonus award signals a

productive environment and supportive board and, thus, lower termination risk. The signal is credible because, with a signing bonus, it is costly for the board to fire the executive too soon, while the executive has an option to leave if he finds he is a bad fit with the firm, in which case he pockets the upfront payment. Thus, we predict that the signing bonus is more likely to be awarded when greater information asymmetry exists between the board and the executive. For our empirical tests, we posit that executives hired from outside are more likely to receive the signing bonus and that opaque firms are more likely to award the signing bonus. A firm is opaque if the quality of its accounting information is low, as indicated by a high variation in abnormal accruals (Billett and Yu, 2016).

We also predict that the signing bonus is more likely to be awarded when the innate risk of the firm is higher. The greater is a firm's unpredictability in its business, the more concerned the new executive is about termination, especially for reasons outside his control. Following the literature (e.g., Coles et al., 2006; Low, 2009; Kini and Williams, 2012), we measure innate risk by R&D expenditure, stock return volatility, financial leverage, market-to-book ratio of assets, stock return, and sales growth.⁶ To capture termination risk not modeled by the economic variables, we further include an indicator for whether the firm fired its CEO in the previous three years.

In the second channel, the signing bonus helps limit the executive's wealth loss upon termination (loss of future income). Because the signing bonus is awarded before services are rendered and is not lost upon termination, younger executives who have more future income to lose upon termination are expected to receive larger signing bonuses.

To help assess the relevance of the two opposing views in the media, that is, whether the signing bonus is necessary to attract capable executives or is instead indicative of governance failure, we separately analyze the signing bonus awards for external hires and internally promoted executives, focusing on the effect of corporate governance. For external hires, we measure the strength of corporate governance by the connections between the executive and the board of directors via the executive's previous directorship at the firm and other social connections between the executive and board members. The optimal contracting theory predicts that connections to the board reduce information asymmetry and thus the executive's need for the signing bonus, while the governance failure camp argues that a friend serving on the board of directors bargains for a larger signing bonus (Hwang and Kim, 2009) for the new hire. To address the concern that the board-executive connections proxy for the executive's physical proximity to the firm, we further control for relocation distance.

For internally promoted executives, we examine how executive tenure at the firm affects the signing bonus award. The optimal contracting theory predicts that an executive who has worked at the firm for a longer time knows more about the firm's environment and is thus less

⁶ For example, R&D-intensive firms in general face greater uncertainty in future cash flows and are thus considered risky.

likely to require a signing bonus. Conversely, the governance failure camp argues that the board of directors can be captured by a long-tenured executive and thus satisfies his demand for a larger signing bonus. We also test the effect of corporate governance on the signing bonus award using conventional measures such as board size, board independence, and the percentage of institutional ownership (Yermack, 1996; Core et al., 1999). If the signing bonus reflects the board's effort to design an optimal employment contract, it should be used more often by firms with stronger corporate governance. Otherwise, the signing bonus should be more popular among firms with weaker corporate governance.

To further differentiate these two views on the signing bonus awards in the media, in the third part of our analysis we examine the effect of the signing bonus award on firm performance and executive turnover. The optimal contracting theory predicts that when the perceived level of termination risk is high, an executive who receives the signing bonus is more confident in a supportive board and a productive environment at the firm and, hence, is willing to exert greater effort to succeed. As a result, the firm should perform better subsequently, and the executive should be less likely to leave the firm.

We measure firm performance by buy-and-hold stock return and return on assets (ROA) over one-, two-, and three-year periods after signing and use the regression specification provided in Core et al., (1999). We predict the signing bonus award using the economic model developed in the second part of our empirical analysis, mainly including proxies of information asymmetry and innate risk. When an executive's concerns about termination risk are high, the signing bonus award helps attract and motivate the executive to exert effort. Thus, we expect to observe better subsequent firm performance at firms awarding the signing bonus than at similar firms not awarding it. We conduct similar analyses on executive turnover within one year and the overall turnover rate. Regarding turnovers, we use a Probit model first and then a Hazard model to address the right censoring problem for executives who are still in office at the end of our sample period.

In the fourth part of the paper, we investigate how the signing bonus relates to severance pay. The signing bonus is awarded upfront to mitigate a new executive's concerns about whether the firm is a good fit, while severance pay is payable in the event of an executive's departure to encourage risk taking. Half of the severance agreements are granted to new CEOs, and the other half to incumbent CEOs when firms' environments change (Rau and Xu, 2013). Rau and Xu (2013) and Lys et al., (2008) suggest that severance pay helps mitigate the concerns of incumbent CEOs about termination risk when firm performance deteriorates. The board could be willing to award both to an executive who has unique skills that are critical for a firm's success.

3. Data and summary statistics

The disclosure of the contractual terms of signing bonuses is regulated under Code of Federal Regulations (CFR) 229.402(e)(i). Under the Securities Act of 1933, pub-

licly traded companies are required to disclose "the material terms of each named executive officer's employment agreement or arrangement, whether written or unwritten," which include signing bonuses (and severance agreements). This disclosure rule applies to our entire sample period of 1992 through 2011.

We collect the signing bonus data for NEOs of the current and past S&P 1500 firms during the 1992–2011 period. For each firm, we search all Securities and Exchange Commission (SEC) filings using the keyword "signing bonus" and its variations, such as "sign-on bonus," "signing payment," and "sign-on payment."⁷ In most cases, the information can be found in employment agreements, often included in 8-K and 10-Q filings. When an employment agreement cannot be located, we search the footnotes to the Summary Compensation Table in definitive proxy statements (DEF 14A filings). We find 2468 cases of signing bonuses granted to 2352 executives at 1132 firms. Out of the 2468 signing bonuses, 2350 are granted to executives when they are hired or promoted to a NEO position.⁸ Our final sample consists of 36,527 executive-year observations involving 3190 firms and 2350 signing bonuses.

For each executive in our sample, we search the BoardEx database to identify the first year in which the executive appears at the firm. This information helps us identify whether an executive is hired from outside the firm or promoted internally from a lower rank. For the 28,740 executives for whom we are able to locate such information, 39.4% of the NEOs are hired from outside.⁹

Table 1 describes the trend of the signing bonus award. For all new NEOs matched with BoardEx in our sample period, 6.6% receive signing bonuses (6.4% before matching with BoardEx). The number of signing bonus awards has significantly increased in recent years and is more pronounced among external hires.¹⁰ For example, the fraction of external hires receiving signing bonuses increases from 2.5% in 1992 to 23.0% in 2011 with an average of 14.8%. Over the same period, the proportion of externally hired CEOs who receive signing bonuses increases from 10.0% to 42.1% with an average of 18.0%. Internally promoted executives also exhibit an increasing trend in receiving

⁷ To ensure that our keyword search is reasonably exhaustive, we also cross check with existing data from Gillan, Hartzell, and Parrino (2009). They collect employment agreements of CEOs of the S&P 500 firms as of January 2000, which show that 90 CEOs (18%) received signing bonuses when they were hired. This number is comparable to the fraction of CEOs receiving signing bonuses in our data (18% for outside CEOs; see Table 1).

⁸ For the remaining 118 observations, 31 instances represent signing bonuses awarded to executives who move from a NEO position to another NEO position not clearly as a promotion, and 87 instances occur when an executive's employment contract is renewed. These instances account for a small portion of the signing bonus pool (4.78%) and represent about a 0.07% probability of the occurrence of a signing bonus in a given executive-year. Thus, we choose to focus on the instances of signing bonuses awarded upon new hires or promotions.

⁹ BoardEx started covering public firms in the United States more extensively in 2000. It does not always contain information on firms that no longer exist after 1999, and it does not cover executives who no longer serve as officers or directors of large public companies after 1999. Our BoardEx data were last updated in April 2010.

¹⁰ Significant declines are evident in the number of newly hired NEOs in the ExecuComp database in 2004 and 2005. We already corrected some cases via checking each NEO's employment history recorded in BoardEx.

Table 1

Sample distribution by year.

The sample consists of all executives who are hired or promoted during 1992–2011 to a position of a named executive officer (NEO) in an ExecuComp (current and past Standard & Poor's 1500 index component) firm.

Year	All executives		Executives matched with BoardEx		Percent of executives matched with BoardEx receiving signing bonuses			
	Number	Percent receiving signing bonuses	Number	Percent receiving signing bonuses	Outside executives	Outside CEOs	Internally promoted executives	Internally promoted CEOs
1992	329	1.5	144	1.4	2.5	10.0	0.0	0.0
1993	1,643	1.3	713	1.7	4.5	5.6	0.2	0.0
1994	1,763	1.7	882	1.1	3.1	2.8	0.2	0.0
1995	1,966	2.6	1,082	2.3	6.0	11.8	0.5	0.0
1996	2,125	2.6	1,222	2.4	5.6	7.3	0.4	0.7
1997	2,272	3.9	1,465	3.0	6.4	8.1	1.0	0.0
1998	2,458	4.8	1,810	4.3	9.6	14.5	0.5	1.1
1999	2,004	5.2	1,611	4.8	9.8	13.9	0.7	1.1
2000	2,047	5.7	1,794	5.4	11.1	16.0	1.1	1.3
2001	2,176	5.5	2,008	5.1	10.8	20.5	0.9	1.3
2002	1,886	7.3	1,755	7.4	14.9	17.9	1.4	0.0
2003	1,866	7.4	1,779	7.2	16.2	22.2	0.8	1.7
2004	1,485	7.8	1,434	7.6	16.0	11.6	1.6	1.2
2005	1,331	10.4	1,304	10.2	26.9	22.0	2.9	3.9
2006	2,545	7.0	2,432	7.0	17.7	17.3	1.0	1.7
2007	2,556	8.8	2,291	9.3	20.3	23.1	2.0	1.7
2008	1,958	10.9	1,818	11.1	24.1	28.7	2.0	2.7
2009	1,648	12.6	1,512	13.1	25.8	23.9	3.5	3.6
2010	1,264	11.4	1,012	10.0	23.3	21.8	1.8	4.7
2011	1,205	12.0	672	5.5	23.0	42.1	1.1	2.5
Total	36,527	6.4	28,740	6.6	14.8	18.0	1.2	1.6

signing bonuses, but the overall fraction is much smaller (1.2% during 1992–2011; 1.6% for internally promoted CEOs).¹¹ The disproportionate awards of signing bonuses to external hires are consistent with the information asymmetry explanation for signing bonuses. In addition, external hires could need compensation for relocation expenses incurred when switching employers (“make-whole”).¹²

Below is an excerpt from the signing bonus agreement that Alan Mulally received on September 1, 2006, when he was hired as CEO and president of Ford Motor Co.

As part of the hiring arrangement, the Company also agreed to pay Mr. Mulally, no later than September 15, 2006, \$7,500,000 as a hiring bonus and \$11,000,000 as an offset for forfeited performance and stock option awards at his former employer.

¹¹ Based on the signaling and incentive models, the increasing usage of signing bonuses occurs if executives become more concerned about termination risk over time. Even though we do not test these conjectures, prior research provides evidence that sheds light on this. Gabaix and Landier (2008) and Edmans, Gabaix, and Landier (2009) suggest that the dramatic increase in CEO pay can be explained by firms becoming larger and harder to manage. The popular view is that technological innovations and the increasing importance of general managerial skills have shifted the US economy to one of winner-take-all, in which talent becomes overwhelmingly important (Rajan, 2013). Moreover, Bates, Kahle, and Stulz (2009) argue that firms' cash flows have become riskier as they adopt more aggressive inventory and investment strategies. The increasing risk involved in firm management is consistent with the increasing usage of signing bonuses.

¹² Untabulated, we find that the use of signing bonuses varies across industry sectors. Most notably, firms in the retail trade (e.g., Best Buy and JC Penney) and high-tech industries (e.g., Hewlett-Packard) are more likely to award signing bonuses.

Effective September 1, 2006, the Company granted Mr. Mulally (i) 3,000,000 ten-year nonqualified options that vest 33% one year after the grant date, 33% two years after the grant date and 34% three years after the grant date and (ii) 1,000,000 five year non-qualified performance-based options that vest based on the regular way trading closing price of Ford common stock on the New York Stock Exchange reaching certain thresholds that are maintained for a period of at least 30 consecutive trading days.

In addition, effective September 1, 2006, the Company granted Mr. Mulally 600,000 restricted stock units. The units vest as to 200,000 units one year after the grant date, 200,000 units two years after the grant date and 200,000 units three years after the grant date.

As shown in Mulally's contract, the signing bonus given to an executive typically consists of cash and stock or options or both. We collect the dollar value of all three components. For Mulally, the cash portion of the signing bonus is \$18.5 million with a vesting period of 14 days. The award contains 3,000,000 stock options and 600,000 restricted stock units that vest in equal installment over three years starting one year after signing, as well as 1,000,000 options that vest equally based on progressive stock price hurdles. The grant-date value of the signing bonus was estimated by Ford as \$38.1 million, of which \$26.8 million vests in one year.¹³

Among the 2350 signing bonuses in our sample, 98.5% include cash payment, 31.6% include stock, and 37.6%

¹³ Estimated values of stock options and restricted stock units are obtained from the proxy statement of Ford Motor Co., filed on April 5, 2007.

Table 2

Descriptive statistics of signing bonuses.

The sample consists of all executives who are hired for or promoted to named executive officer (NEO) positions in ExecuComp firms during the period 1992–2011. For executives receiving signing bonuses, we report the average size of the total signing bonus in thousands of dollars, its ratio to the total annual compensation in the year after signing, the fraction of vested value within one year, and the fraction of each component of the signing bonus: cash, stock, and stock options. An executive is defined as an outside hire if the year he becomes a NEO according to ExecuComp is also the year he is first hired by the firm according to BoardEx. CEO denotes the chief executive officer.

	All executives (N=2350)	CEO (N=348)	Non-CEO (N=2002)	By source of hire	
				Outside hire (N=1680)	Internal promotion (N=215)
<i>Total</i> (in thousands of dollars)	2,509	7,130	1,705	2,757	2,112
<i>Total/second year annual pay</i>	0.76	1.08	0.70	0.78	0.69
<i>Vested within one year/Total</i>	0.76	0.69	0.78	0.75	0.77
<i>Cash/Total</i>	0.58	0.46	0.59	0.56	0.61
<i>Stock/Total</i>	0.14	0.19	0.14	0.15	0.14
<i>Option/Total</i>	0.28	0.35	0.27	0.29	0.25

include stock options. Some firms impose service-based vesting requirements, in which case firms either pay the cash signing bonus in equal installments or reserve the right to recoup part of the payments if the executive leaves the firm before a prespecified date. In our sample, 72.5% of cash signing bonuses vest within one month and 91.1% within one year (not tabulated). Cash signing bonuses are always reported in dollars.

Stock and options are typically reported in number of shares. We collect the stock price on the grant date to compute the dollar value of the stock awards. For stock options, we also collect information on the options' time to maturity, firms' stock return volatility, and dividend yield to compute their fair value at the grant date. When the fair values of the stock awards and the option grants are reported by the firms in the employment agreements (192 out of the 743 signing stock awards and 74 out of the 884 signing option grants), we use the reported values. Equity signing bonuses typically vest over three years; that is, one third of the equity grant vests upon each anniversary of the grant.¹⁴ Because we are particularly interested in the signing payment that the executive can retain if he leaves the firm shortly after signing, we record the amount of the signing bonus vested within one year in addition to the total amount.

Table 2 reports the averages size, composition, and vesting schedule of the signing bonus award, by executive title and the source of hire. CEOs receive larger signing bonuses, are given a greater fraction in equity, and have less award vesting within one year than other NEOs. Conditional on award, the average value of the signing bonus is \$7.130 million and \$1.705 million, the ratio of the signing bonus to the annual total compensation in the year after signing is 1.08 and 0.7, the equity fraction is 0.54 and 0.41, and fraction vesting in one year is 0.69 and 0.78,

respectively, for CEOs and other NEOs. Moreover, outside hires receive larger signing bonuses (\$2.757 million versus \$2.112 million) and a greater fraction in equity (0.44 versus 0.39) than do internally promoted executives, consistent with the notion that external hires are less certain about their success, are subject to greater wealth loss for changing jobs, and need larger equity awards to align their interest with that of shareholders'.

4. Economic determinants of the signing bonus award

In this section, we examine economic determinants of the signing bonus award. First, we analyze whether the signing bonus is more likely to be awarded and to be larger when the information asymmetry between the board and the executive is greater and when the innate risk involved in the new job is higher. For measures of information asymmetry, we include an indicator for an outside hire and a measure of firm opacity. The definition of opacity follows Billett and Yu (2016). For each Fama and French 49 industry with at least 20 firms in a given year, we run five separate regressions for each of years $t-4$ to year t . In each regression, total current accruals of a firm is regressed on lagged, contemporaneous, and leading cash flows from operations; change in sales; and property, plant, and equipment. Total current accruals equals change in current assets minus change in current liabilities minus change in cash and short-term investments plus change in current debt. For each firm-year, opacity is the standard deviation computed across the residuals of total current accruals from the five industry-year regressions.

For measures of innate risk, we include an indicator for whether the firm had fired the CEO previously and firm characteristics including R&D, stock return volatility, financial leverage, market-to-book ratio, stock returns, and sales growth. Executive age is included to measure wealth loss upon termination. Our regressions further include the logarithm of book assets, cash-to-assets, and the CEO dummy as control variables. In the following analyses, we restrict the sample to observations with no missing values in any

¹⁴ In rare cases, signing stock and options vest based on performance. Due to difficulty in estimating the values of these awards, we treat them as if there were no vesting conditions unless the firm reports their values in its proxy statement. Of the 2,350 executives receiving signing bonuses, the contracts of 29 executives include one or more option awards with performance-based vesting conditions and 83 signing bonus contracts include one or more stock awards with performance-based vesting conditions.

Table 3

Summary statistics by the incidence of the signing bonus award.

The sample consists of all executives who are hired for or promoted to named executive officer positions in ExecuComp firms during the period 1992–2011, with non-missing values in key firm and executive characteristic variables including the outside hire indicator. Panel A compares measures of information asymmetry between firms and executives with signing bonuses and those without. Panel B compares measures of innate risk between firms paying signing bonuses and those not paying signing bonuses. Performance and unpredictability are the first and second principal components of a list seven variables related to firm risk. *Unpredictability* equals $[0.4534 * D(\text{Firm fired CEO previously})] + (0.4656 * R\&D/Assets) + (0.5170 * Stock\ return\ volatility) - (0.1864 * Debt/Assets) - (0.0298 * M/B) - (0.3926 * Stock\ return) - (0.3472 * Sales\ growth)$, and *Performance* equals $[-0.1091 * D(\text{Firm fired CEO previously})] + (0.4060 * R\&D/Assets) + (0.1891 * Stock\ return\ volatility) - (0.3641 * Debt/Assets) + (0.5950 * M/B) + (0.4095 * Stock\ return) + (0.3650 * Sales\ growth)$. Panel C compares control variables between firms and executives with signing bonuses and those without. All firm variables are lagged by one year. All variables are winsorized at the 1st and 99th percentiles.

Variable	Is signing bonus granted?				Difference (yes minus no)	
	Yes		No		Mean	t-statistic
	N	Mean	N	Mean		
<i>Panel A: Information asymmetry</i>						
<i>D(Outside hire)</i>	1,369	0.877	17,374	0.346	0.531	55.46
<i>Opacity</i>	1,369	0.057	17,374	0.050	0.007	5.37
<i>Panel B: Innate risk</i>						
<i>D(Firm fired CEO previously)</i>	1,369	0.252	17,374	0.148	0.104	8.61
<i>R&D/Assets</i>	1,369	0.045	17,374	0.035	0.010	5.28
<i>Stock return volatility</i>	1,369	0.323	17,374	0.272	0.050	5.35
<i>Debt/Assets</i>	1,369	0.216	17,374	0.217	0.000	-0.08
<i>M/B</i>	1,369	2.079	17,374	2.110	-0.031	-0.77
<i>Stock return</i>	1,369	0.071	17,374	0.156	-0.085	-5.18
<i>Sales growth</i>	1,369	0.093	17,374	0.111	-0.018	-2.42
<i>Unpredictability</i>	1,369	0.343	17,374	-0.027	0.370	10.20
<i>Performance</i>	1,369	-0.035	17,374	0.003	-0.038	-0.98
<i>Panel C: Other variables</i>						
<i>Executive age</i>	1,369	47.930	17,374	48.499	-0.569	-3.25
<i>D(CEO)</i>	1,369	0.156	17,374	0.163	-0.007	-0.65
<i>Ln(Book assets)</i>	1,369	7.343	17,374	7.111	0.232	5.41
<i>Cash-to-assets</i>	1,369	0.193	17,374	0.154	0.039	7.23

of these explanatory variables. This criterion reduces the final sample to 18,743 executive-year observations.¹⁵

Second, we examine the relation between (the propensity and size of) the signing bonus and the strength of corporate governance. Managerial power for outside hires is constructed based on the executive's connections to the board of directors. These connectedness measures also reflect information asymmetry between the executive and the board. For outside hires whose employment history is known in BoardEx, we further identify whether the executive was hired from outside the firm's industry and use this as an additional proxy for information asymmetry. For internally promoted executives, we measure managerial power by executive tenure at the firm, board size, board independence, and ownership of top five institutions. A long-tenured insider is also expected to know more about the firm and thus have less information asymmetry.

4.1. Univariate analysis

We examine how information asymmetry and innate risk affect the signing bonus award and report the results of univariate analysis in Table 3. Panel A compares measures of information asymmetry, Panel B compares proxies

for innate risk, and Panel C compares executive age and control variables between firms and executives with signing bonuses and those without. Definitions of all variables are in the Appendix.

Consistent with the prediction that the signing bonus is more likely to be used in situations of greater information asymmetry, we show in Panel A that outside hires are much more likely to receive the signing bonus and that opaque firms grant the signing bonus more frequently. For example, for executives who receive the signing bonus 87.7% are hired from outside the firm, while for those who do not receive the signing bonus only 34.6% are hired from outside. Outside hire status and greater opacity correspond to greater information asymmetry and, thus, greater propensity to award the signing bonus.¹⁶

Consistent with the prediction that firms with higher innate risk award the signing bonus, we show in Panel B that firms that fired the CEO in the previous three years are more likely to award the signing bonus. We also find that firms with greater R&D expenditure, higher stock return volatility, poorer stock performance, and lower sales growth tend to award the signing bonus. To create clear constructs to measure innate risk, we conduct factor analyses to extract the most important factors among these

¹⁵ Starting from 36,527 executive-year observations, the sample loses 7,787 executive-years not covered in BoardEx. Another 5,174 observations are lost due to missing *Opacity*. Requiring non-missing values in innate risk measures and other variables further reduces the sample by 4,823 observations.

¹⁶ We obtain very similar results using analysts' forecast dispersion (Duchin, Matsusaka, and Ozbas, 2010) to replace opacity as a proxy for information asymmetry.

risk variables (Schmidt, 2015).¹⁷ We use three methods—eigenvalues of the principal component analysis (PCA), the Scree Plot, and the exploratory factor analysis—and decide to retain two principal component factors of the PCA instead of using seven individual variables, to simplify the interpretation of the results.¹⁸

One principal component factor of the PCA equals $[0.4534 * D(\text{Firm fired CEO previously}) + (0.4656 * R\&D/Assets) + (0.5170 * \text{Stock return volatility}) - (0.1864 * Debt/Assets) - (0.0298 * M/B) - (0.3926 * \text{Stock return}) - (0.3472 * \text{Sales growth})$, and it explains 20.4% of the total variation among the seven risk measures. We name this factor *unpredictability* based on the most important loadings (value greater than $\frac{1}{\sqrt{7}} = 0.38$, which is the loading of each variable if all seven variables are equally important for a factor). Greater values of *unpredictability* correspond to a history of firing a CEO, higher R&D, greater stock return volatility, and lower stock returns. Consistent with the results using individual variables, *unpredictability* is significantly higher for firms awarding the signing bonus than for firms not awarding it.

The other principal component factor of the PCA equals $[-0.1091 * D(\text{Firm fired CEO previously}) + (0.4060 * R\&D/Assets) + (0.1891 * \text{Stock return volatility}) - (0.3641 * Debt/Assets) + (0.5950 * M/B) + (0.4095 * \text{Stock return}) + (0.3650 * \text{Sales growth})$, and it explains 26.4% of the total variation. We name this factor *performance* based on the most important loadings. Greater performance corresponds to higher R&D, market-to-book ratio (M/B), and stock returns. Interpreting low *performance* as high termination risk, we would expect a negative correlation between performance and signing bonus awards. However, as shown in Panel B, we find no significant difference in *performance* between firms awarding the signing bonus and firms not awarding it in the univariate analysis for the whole sample. We further explore this relation in Section 4.2.

In Panel C, we show that younger executives are more likely to receive the signing bonus, consistent with the view of compensating executives' wealth loss upon termination, because younger executives have more at stake if termination occurs. The likelihood of receiving the signing bonus is comparable for CEOs and other

top executives. Finally, larger firms and firms with more cash holdings are more likely to award the signing bonus.

4.2. Regression analysis

We next examine the determinants of the propensity and size of the signing bonus award in multivariate regressions and report our results in Table 4. We use both Probit and ordinary least squares (OLS) regression models for examining the propensity of the signing bonus award (Columns 1–2) and report the marginal effects of the coefficients for the Probit model (Column 1). For the value of the signing bonus, we use total value of the signing bonus in millions of dollars (Column 3), logarithm of (1+ total value of the signing bonus in thousands of dollars) (Column 4), and the ratio of the signing bonus value to the executive's second-year total pay (Column 5). We further include the value of the signing bonus vested in one year in millions of dollars (Column 6), because this part reflects the upfront feature of the signing bonus. Given that size variables are bounded from below at zero (when the signing bonus is not granted), we use the Tobit regression model in Columns 3–6. Throughout the paper, industry fixed effects at the two-digit standard industrial classification (SIC) level are included to control for cross-industry differences in the use of the signing bonus. We further include year fixed effects to control for general time trends in the data. Standard errors are clustered at the firm level to account for serial correlations in the data. Column 3 of Table 4 is the baseline specification to which we refer throughout the paper.

The regression results are largely consistent with those of the univariate analyses, further supporting our predictions. Consistent with higher information asymmetry requiring larger signing bonuses, the outside hire indicator and firm opacity are significantly positively related to the propensity and size of the signing bonus award. Moreover, we find that *unpredictability* is significantly positively related to the propensity and size of the signing bonus award. The results are robust to the regression model used (Probit or OLS) for the propensity of the signing bonus and to different measures of the signing bonus value, both in absolute and relative terms, and with and without logarithmic transformation.

While *performance* is unrelated to the propensity to award the signing bonus, it is positively correlated with the size of the signing bonus. This result may seem to contradict our prediction of a negative correlation between *performance* and signing bonus awards based on termination concerns. However, when a firm performs poorly, the board is less willing to approve generous compensation packages including large signing bonuses, anticipating stronger resistance from executive directors and active shareholders. This argument implies a positive correlation between *performance* and signing bonus awards. The net effect of performance on signing bonus awards depends on which of the two effects dominates.

Consistent with the notion that younger executives have more to lose if terminated, we find that executive age is negatively correlated with the propensity of the award

¹⁷ We use Bartlett's test of sphericity, a special case of the Chi-squared test (Anderson, 1963; Trzcinka, 1986), to determine whether it is appropriate to use a data reduction technique such as principal component or factor analyses given the common variation across seven risk variables. The null hypothesis that the correlation matrix of the seven variables is an identity matrix was rejected, and thus a data reduction technique is appropriate to be applied to our risk measures (untabulated).

¹⁸ First, we compare the eigenvalue of each principal component with one and retain two principal component factors of the PCA with eigenvalues greater than one (suggesting that the component explains an above-average amount of total variation). Second, we use the Scree Plot to identify principal components above the "elbow." The Scree Plot is a two-dimensional graph with factors on the X-axis and eigenvalues on the Y-axis. We find that the first two principal components are above the elbow, beyond which the slope of the eigenvalue becomes much flatter. Third, we conduct an exploratory factor analysis to let the factors with greatest common variation emerge. The exploratory factor analysis also suggests two important factors for these risk variables.

Table 4

Incidence and magnitude of signing bonuses, multivariate regression analysis.

In Columns 1–2, the dependent variable is an indicator that takes the value of one if an executive receives a signing bonus and zero otherwise. In Column 3, the dependent variable is the dollar value of signing bonuses in millions of dollars. In Column 4, the dependent variable is the logarithmic 1 plus the value of signing bonuses in thousands of dollars. In Column 5, the dependent variable is the value of signing bonuses, scaled by the executive's total compensation in the second year of taking office. In Column 6, the dependent variable is the dollar value of signing bonuses vested within one year in millions of dollars. *Unpredictability* and *performance* are as defined in Table 3. Column 1 uses the Probit model, Column 2 uses the ordinary least squares (OLS) regression model, and Columns 3–6 use the Tobit model. When Probit and Tobit models are used, the marginal effects of the coefficients are reported. All regressions include industry fixed effects and year fixed effects. We report *t*-statistics based on heteroskedasticity robust standard errors adjusted for firm clusters in parentheses below the corresponding regression coefficients. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively. Pseudo R^2 is reported for Probit models and adjusted R^2 is reported for the OLS model.

Variable	D(Signing bonus)		Signing bonus in	Ln(1+Signing bonus in	Signing bonus/second	Signing bonus, vested in
	Probit	OLS	millions of dollars	thousands of dollars)	year total pay	one year in millions of dollars
	(1)	(2)	Tobit	Tobit	Tobit	Tobit
	(1)	(2)	(3)	(4)	(5)	(6)
<i>D(Outside hire)</i>	0.137*** (25.44)	0.151*** (26.37)	3.422*** (101.81)	12.530*** (103.72)	1.904*** (101.23)	1.636*** (102.85)
<i>Opacity</i>	0.111*** (3.48)	0.180*** (3.04)	3.436*** (9.50)	14.120*** (11.13)	2.013*** (10.01)	1.812*** (10.66)
<i>Unpredictability</i>	0.006*** (4.62)	0.010*** (3.97)	0.209*** (26.85)	0.817*** (28.78)	0.120*** (26.89)	0.097*** (26.21)
<i>Performance</i>	0.0004 (0.32)	0.0006 (0.24)	0.065*** (10.06)	0.092*** (3.97)	0.021*** (5.89)	0.027*** (8.86)
<i>Executive age</i>	-0.001*** (-5.04)	-0.001*** (-4.75)	-0.031*** (-38.33)	-0.117*** (-41.11)	-0.017*** (-38.08)	-0.015*** (-39.21)
<i>D(CEO)</i>	0.011*** (2.67)	0.015*** (2.86)	0.798*** (30.86)	1.740*** (18.85)	0.346*** (23.94)	0.383*** (31.13)
<i>Ln(Book assets)</i>	0.010*** (8.62)	0.015*** (7.95)	0.442*** (88.82)	1.378*** (78.10)	0.201*** (71.88)	0.212*** (90.45)
<i>Cash-to-assets</i>	0.016 (1.59)	0.026 (1.36)	0.772*** (8.16)	2.185*** (6.57)	0.364*** (6.88)	0.324*** (7.25)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	18,743	18,743	18,743	18,743	18,730	18,743
Pseudo/Adjusted R^2	0.220	0.105	0.163	0.130	0.182	0.192

and the size of the signing bonus, statistically significant at the 1% level in all six specifications. For the control variables, not surprisingly, the CEO dummy and firm size are significantly positively related to the propensity and size of the signing bonus award, and cash-to-assets (less cash-constrained) is significantly positively correlated with only the size of the signing bonus.

We also assess the economic significance of the main determinants of the signing bonus in this panel using Columns 2 and 3. Outside hires are 15.1% more likely to receive signing bonuses and the signing bonuses are \$3.4 million higher on average. An increase of one standard deviation in opacity (about 0.043) corresponds to an increase of 0.8% (i.e., $0.043 * 0.180$) in the propensity and \$147,000 in the value of the signing bonus. In comparison, an increase of one standard deviation in *unpredictability* (about 1.22) is associated with an increase of 1.2% in the probability and \$254,000 in the value of the signing bonus. A decrease of one standard deviation in executive age (about 6.95) is associated with an increase of 0.7% in the probability and \$215,000 in the value of the signing bonus. Thus, outside hire status is the most important determinant among these factors.

Overall, the results of univariate and regression analyses presented in Sections 4.1 and 4.2 support the hypotheses that a signing bonus is more likely to be granted and is larger when information asymmetry is greater and

when innate risk is higher.¹⁹ We next examine the determinants of the signing bonus awards separately for outside hires and internal promotions. Through this separation, we are able to define more appropriate governance measures and identify additional measures of information asymmetry, which help us distinguish the optimal contracting view from the managerial power view.

4.3. Determinants of signing bonuses for outside hires

In this subsection, we conduct additional analyses on outside hires to confront the alternative view of managerial power. Because outside hires have little power over directors at signing, we do not use conventional corporate

¹⁹ Although we focus on the termination risk versus managerial power hypotheses of the signing bonus award, other possible determinants exist. Incentive alignment can also play an important role in the signing bonus award decision. For example, outside hires tend to receive a greater fraction of the signing bonus in equity (44% for outside hires versus 39% for internally promoted executives; see Table 2). In untabulated regressions, we find that outside hires are more likely to receive both cash and equity in signing bonuses. More important, conditional on a signing bonus award being made, the equity fraction is larger for outside hires but not affected by opacity or unpredictability. These results are in line with the notion that signing equity bonuses awarded to outside hires also help build equity ownership to align the interests of new executives with those of shareholders.

governance measures (e.g., board characteristics and ownership structures) in testing the managerial power hypothesis. Instead, we consider two types of preexisting connections between the incoming executive and the board of directors, which have implications on both managerial power and information asymmetry.

One possibility is that the executive had previously served as a non-executive director at the firm. Although classified as an outsider, such an executive is connected to the board and can influence the board's decision regarding his pay. The managerial power camp thus predicts a positive correlation between the ex-director indicator and the propensity and size of the signing bonus award. However, such an outside insider knows the firm reasonably well and does not need the signing bonus according to the optimal contracting theory. Another possibility is the existence of social ties between the incoming executive and directors of the firm. On one hand, a connected executive could influence the board's decision on his pay through a friend sitting on the board, and thus the managerial power camp predicts a positive correlation between board connections and the propensity and size of the signing bonus award. On the other hand, a connected executive knows more about the firm and is thus less concerned about being a bad fit. Thus, managerial power and optimal contracting hypotheses have opposite predictions on the relation between the signing bonus award and the executive's connections to the board. We use BoardEx to identify previous directorship and pre-existing connections between the incoming executive and the firm's directors through previous work (e.g., executive and director serving on the same board previously) or educational relation.²⁰

For outside hires, signing bonuses could be used for compensating an executive's wealth loss for changing jobs. We consider two types of wealth loss: forfeiture of unvested equity at the executive's prior employer and direct relocation expenses. We extract the information on the dollar value of the executive's unvested stock and options from ExecuComp for executives whose previous employers are S&P 1500 firms and collect the data from proxy statements (and, occasionally, from 10-Ks) filed with the SEC at the Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system for executives whose previous employers are other public US companies. We assume the value of forfeited equity to be zero if the executive was not employed by another public company in the United States in the two years prior to signing (according to BoardEx).

Relocation expenses are expected to be greater if the difference in housing prices between the executive's current and previous employers' states is higher and if the executive relocates over a longer distance. We extract data on the average house price in each of the 50 states from the Federal Housing Finance Agency (FHFA) and match to the headquarters states of the executive's current and previous employers. In addition, we collect information on the geographical distance between each pair of states from <http://www.distancefromto.net/united-states.php> and

<http://www.50states.com/distance/>. While the unvested equity variable and house price in current employer's state are available for all outside hires, the difference in house price and the geographic distance between the executives' current and previous employers are available only for executives whose previous employers are public firms in the United States and covered by BoardEx.

For this subset of executives, we construct additional measures of information asymmetry based on an executive's prior work experience. We obtain information on the previous employer's industry, firm size (previous employer relative to the current firm), and the executive's job title while employed there. Because information asymmetry is likely to be greater for executives hired from a different industry and for those hired from a non-CEO to a CEO position, we predict greater propensity and size of the signing bonus award for those executives.

Panel A of Table 5 reports the summary statistics of these new variables for outside hires, comparing firms and executives with signing bonuses with those without. We find that executives receiving signing bonuses are significantly less likely to be a former director of the firm or to have social ties with the board of directors at the time of signing. These results are in line with the hypothesis that connections reduce information asymmetry and thus mitigate the executive's demand for the signing bonus, contradicting the managerial power hypothesis. Moreover, we find support for the hypothesis that the signing bonus compensates for the wealth loss related to job changes. Compared with executives not receiving the signing bonus, those executives receiving signing bonuses tend to have unvested equity, relocate to places with higher house prices, and move over a longer distance.

In the multivariate regressions for outside hires, we examine the determinants of both the propensity (Columns 1–3, Probit model) and size (Columns 4–6, Tobit model) of the signing bonus award. The regressions use all variables from the baseline specification including fixed effects (from Table 4). We find that opacity, unpredictability, and performance remain important determinants of the signing bonus award for outside hires, consistent with the results presented in Table 4. Performance and signing bonus awards are positively correlated for external hires. This is because when a firm performs poorly, the board is reluctant to award large compensation packages including controversial signing bonuses. In addition, for external hires, a selection effect partially offsets the demand effect; that is, when stock performance is low, capable and confident executives sign up even though the sign-on packages are not valued highly on the grant date (in anticipation of larger realizable pay given his confidence in turning the firm around). Jointly, these two factors dominate executives' termination concerns in determining the relation between performance and signing bonus awards for external hires.

In Columns 1 and 4 of Panel B in Table 5, we examine the effect of relocation expenses on signing bonus awards for all external hires and find that signing bonuses are larger when the house price in the state of the executive's current employer is higher. Column 4 suggests that an executive with unvested equity at the previous

²⁰ The social connection measure is available only in 1999–2010 due to the limited availability of director information in our BoardEx data set.

Table 5

Incidence and magnitude of signing bonuses granted to outside hires.

In Columns 1–3 of Panel B, the dependent variable is an indicator that takes the value of one if an executive receives a signing bonus and zero otherwise. In Columns 4–6, the dependent variable is the dollar value of signing bonuses in millions of dollars. *Unpredictability* and *performance* are as defined in Table 3. Columns 1–3 use the Probit model, and Columns 4–6 use the Tobit model. The marginal effects of the coefficients are reported. All regressions include industry fixed effects and year fixed effects. We report *t*-statistics based on heteroskedasticity robust standard errors adjusted for firm clusters in parentheses below the corresponding regression coefficients. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Summary statistics						
Variable	Is signing bonus granted?				Difference (yes minus no)	
	Yes		No		Mean	<i>t</i> -statistic
	<i>N</i>	Mean	<i>N</i>	Mean		
<i>D</i> (Executive was director previously)	1,201	0.011	6,014	0.018	−0.007	−2.16
<i>D</i> (Executive is connected to board)	1,062	0.198	4,564	0.229	−0.031	−2.24
<i>D</i> (Has unvested equity)	1,201	0.076	6,014	0.051	0.025	3.05
House price (in millions of dollars, current employer state)	1,201	0.256	6,014	0.227	0.029	7.55
Difference in house prices (current minus previous states)	546	0.008	1,989	−0.002	0.010	1.84
Distance between previous and current employers (in thousands of kilometers)	546	1.380	1,989	1.192	0.187	3.24
<i>D</i> (Hired from a different industry)	546	0.778	1,989	0.750	0.028	1.39
<i>D</i> (CEO hired from a non-CEO post)	546	0.136	1,989	0.129	0.007	0.41
Relative Ln(Previous employer book assets)	546	1.061	1,989	1.102	−0.041	−0.49
Panel B: Regressions						
Variable	<i>D</i> (Signing bonus)			Signing bonus (in millions of dollars)		
	(1)	(2)	(3)	(4)	(5)	(6)
Opacity	0.365*** (3.15)	0.349** (2.51)	0.235 (0.85)	3.484*** (9.12)	2.922*** (7.09)	2.054*** (3.11)
Unpredictability	0.017*** (3.49)	0.016*** (2.76)	0.029** (2.55)	0.154*** (18.37)	0.127*** (13.83)	0.201*** (14.04)
Performance	0.005 (0.96)	0.011* (1.81)	0.019* (1.69)	0.108*** (14.97)	0.157*** (20.65)	0.214*** (17.43)
Executive age	−0.004*** (−5.77)	−0.004*** (−4.89)	−0.006*** (−3.63)	−0.041*** (−46.58)	−0.037*** (−40.29)	−0.041*** (−29.34)
<i>D</i> (CEO)	0.043*** (2.82)	0.045** (2.45)	−0.125*** (−2.80)	0.998*** (35.78)	0.983*** (32.15)	−0.696*** (−8.16)
Ln(Book assets)	0.040*** (9.40)	0.048*** (9.54)	0.076*** (7.83)	0.536*** (98.18)	0.570*** (99.39)	0.688*** (81.72)
Cash-to-assets	0.026 (0.69)	0.038 (0.87)	0.026 (0.32)	0.478*** (4.59)	0.489*** (4.53)	0.479*** (2.80)
House price (in millions of dollars, current employer state)	0.072 (1.33)	0.060 (0.96)	0.016 (0.13)	0.893*** (6.75)	0.631*** (4.71)	0.087 (0.43)
<i>D</i> (Has unvested equity)	0.022 (1.10)	0.007 (0.31)	−0.018 (−0.67)	0.285*** (10.38)	0.176*** (6.04)	0.007 (0.15)
<i>D</i> (Executive was director previously)		−0.080*** (−2.65)	−0.102 (−1.54)		−0.708*** (−19.13)	−0.576*** (−8.60)
<i>D</i> (Executive is connected to board)		−0.042*** (−3.31)	−0.057*** (−2.59)		−0.385*** (−12.73)	−0.501*** (−11.25)
Difference in house prices (current minus previous states)			0.158 (1.52)			1.667*** (27.23)
Distance between previous and current employer			0.018** (2.12)			0.112*** (4.97)
<i>D</i> (Hired from a different industry)			0.014 (0.61)			0.134** (2.35)
<i>D</i> (CEO hired from a Non-CEO post)			0.179** (2.23)			1.424*** (16.25)
Relative Ln(Previous employer book assets)			0.018** (2.46)			0.120*** (9.02)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	7,215	5,626	2,032	7,215	5,626	2,032
Pseudo <i>R</i> ²	0.085	0.072	0.100	0.067	0.058	0.078

employer receives a signing bonus that is \$285,000 larger.²¹ In Columns 2 and 5, we examine how the connections between the executive and the board affect the signing bonus award. We find that connected executives are less likely to receive the signing bonus and the signing bonus tends to be smaller. For example, when an executive was a non-executive director of the firm, he is 8.0% less likely to receive a signing bonus, and his signing bonus is \$708,000 smaller. One could argue that the connectedness measures can be proxies for the executive's physical proximity to the firm. Thus, we further control for the relocation distance, as well as the difference in house prices between the current and previous employers' states, for the subsample of executives whose previous employer is a public firm (Columns 3 and 6 of Panel B). We find that the connectedness measures remain negatively correlated with the propensity and size of the signing bonus award.

Consistent with the termination risk explanation, executives hired from outside the industry receive \$134,000 more in signing bonuses. Moreover, CEOs hired from a non-CEO post are significantly more likely to receive the signing bonus and the signing bonus tends to be larger (Columns 3 and 6 of Panel B). For example, a first-time CEO is 5.3% (= 0.179–0.125) more likely to receive the signing bonus than a non-CEO top executive. The economic effects are large compared with the unconditional probability of receiving the signing bonus for an outside CEO (18%, given in Table 1). Lastly, we find that an executive hired from a large firm is more likely to receive the signing bonus and the signing bonus tends to be larger. Given that working for a large firm is an indication of superior managerial ability (Gabaix and Landier, 2008), this result can be interpreted as suggesting that an executive with superior skills and higher reservation utility is more likely to receive the signing bonus.

4.4. Determinants of signing bonuses for internally promoted executives

In this subsection, we analyze the subsample of internally promoted executives. We examine the relevance of corporate governance in determining the signing bonus award using executive tenure upon promotion, board size, board independence, and top-five institutions' ownership. Panel A of Table 6 summarizes these additional variables based on whether or not a signing bonus is awarded. It shows that executives receiving signing bonuses at promotion have been with the firm in a NEO position for a shorter period of time. The tenure result is consistent with the information asymmetry explanation, because an executive with a shorter tenure is more uncertain about the firm's prospects and more concerned about termination and thus requires the signing bonus. These shorter-tenured

executives are less likely to be able to influence the board's decision on compensation-related issues. Moreover, firms paying signing bonuses tend to have a smaller board, a higher fraction of independent directors, and greater ownership by top-five institutional investors. These results suggest that signing bonuses are more likely to be awarded to internally promoted executives when corporate governance, not managerial power, is strong.

Panel B of Table 6 reports the regression results. Opacity and unpredictability remain important determinants of the propensity and size of the signing bonus award for internal promotions, although the coefficient on opacity is statistically insignificant for the propensity of the signing bonus. Performance is negatively and significantly related to the size of the signing bonus, consistent with the prediction that firms with poor performance (and therefore greater termination risk) use large signing bonuses as a commitment mechanism. For internally promoted executives at poorly performing firms, their equity-contingent wealth is also adversely affected by performance, aggravating their need for signing bonuses.²² Consistent with the univariate evidence, executives with shorter tenure at the firm are more likely to receive signing bonuses and their signing bonuses tend to be larger. The coefficient on executive age becomes positive once executive tenure is accounted for.²³

Board characteristics do not significantly affect the propensity of the signing bonus award. However, firms with a smaller board are more likely to award a larger signing bonus, perhaps because the controversial nature of a large signing bonus makes directors reluctant to approve it even though such an award could be value enhancing. In other words, it could be harder to convince all directors of a large board than those of a small board. Furthermore, we find that firms with a more (less) independent board tend to award a larger (smaller) signing bonus. Perhaps executive directors, who could also be candidates for a top-ranked position, protect their own turfs by approving only a small signing bonus, even though a larger signing bonus can be necessary to attract and incentivize the right person. Moreover, we find that top-five institutions' ownership is positively associated with the award and size of the signing bonus, but neither association is statistically significant.

²¹ In untabulated tests, we replace the unvested equity dummy by the dollar amount in Column 4 and find that an increase of one dollar in unvested equity corresponds to an increase of 15.9 cents in the signing bonus, of which 5.7 cents are vested in 12 months and 3.3 cents are paid in cash. Without controlling for any other determinants of the signing bonus award, we find that for one dollar of forfeited unvested equity, an outside hire receives 94 cents in total signing bonuses, of which 46.1 cents are vested in 12 months and 14.5 cents are paid in cash.

²² A promotion is typically accompanied by an increase in base salary and enhanced ownership requirement. For example, a promotion from president to CEO could double the executive's salary and increase the ownership requirement from three to five times of salary. The promoted executive thus needs equity awards to meet the enhanced ownership requirement. At a poorly performing firm, the value of the executive's existing ownership is lower and, thus, the demand for equity award at signing is higher. We thank James Reda for sharing this insight.

²³ In unreported tests, we find that internally promoted executives who were directors of the firm are more likely to receive signing bonuses and the awards are larger. Given that directorship is unlikely a proxy for information asymmetry for internal hires, this finding can be consistent with two notions: (1) executive directors are more capable managers: for example, 13 out of the 25 promoted executive directors became the CEO; and (2) executive directors influence board decisions on their signing packages.

Table 6

Incidence and magnitude of signing bonuses granted to internally promoted executives.

In Columns 1–2 of Panel B, the dependent variable is an indicator that takes the value of one if an executive receives a signing bonus and zero otherwise. In Columns 3–4, the dependent variable is the dollar value of the signing bonus in millions of dollars. *Unpredictability* and *performance* are as defined in Table 3. Columns 1–2 use the Probit model and Columns 3–4 use the Tobit model. The marginal effects of the coefficients are reported. All regressions include industry fixed effects and year fixed effects. We report *t*-statistics based on heteroskedasticity robust standard errors adjusted for firm clusters in parentheses below the corresponding regression coefficients. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Summary statistics							
Variable	Is signing bonus granted?				Difference (yes minus no)		
	Yes		No		Mean	<i>t</i> -statistic	
	<i>N</i>	Mean	<i>N</i>	Mean			
<i>Executive tenure upon promotion</i>	123	1.732	7,707	2.341	–0.609	–3.01	
<i>Board size</i>	123	8.821	7,707	9.389	–0.568	–2.50	
<i>Board independence</i>	123	0.748	7,707	0.722	0.026	2.00	
<i>Top-five institutions' ownership</i>	123	0.278	7,707	0.252	0.026	2.82	

Panel B: Regressions				
Variable	D(Signing bonus)		Signing bonus (in millions of dollars)	
	(1)	(2)	(3)	(4)
<i>Opacity</i>	0.0328 (1.11)	0.0321 (1.11)	3.925*** (3.80)	3.932*** (3.67)
<i>Unpredictability</i>	0.0049*** (4.00)	0.0047*** (3.88)	0.574*** (23.07)	0.559*** (22.33)
<i>Performance</i>	–0.0018 (–1.58)	–0.0018 (–1.60)	–0.195*** (–8.67)	–0.201*** (–8.88)
<i>Executive age</i>	–0.0000 (–0.01)	0.0000 (0.06)	0.006*** (3.14)	0.007*** (3.34)
<i>D(CEO)</i>	0.0131** (2.33)	0.0131** (2.35)	1.282*** (14.09)	1.292*** (14.12)
<i>Ln(Book assets)</i>	0.0007 (0.78)	0.0013 (1.49)	0.128*** (10.28)	0.195*** (14.48)
<i>Cash-to-assets</i>	0.0102 (1.28)	0.0097 (1.22)	1.443*** (5.75)	1.410*** (5.40)
<i>Executive tenure upon promotion</i>	–0.0025*** (–3.05)	–0.0025*** (–3.07)	–0.294*** (–13.41)	–0.294*** (–13.12)
<i>Board size</i>		–0.0008 (–1.44)		–0.077*** (–7.29)
<i>Board independence</i>		0.0036 (0.52)		0.257* (1.88)
<i>Top-five institutions' ownership</i>		0.0046 (0.43)		0.495 (1.55)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Number of observations	7,830	7,830	7,830	7,830
Pseudo <i>R</i> ²	0.119	0.121	0.121	0.122

5. Signing bonus, firm performance, and executive turnover

In this section, we investigate the implications of the signing bonus award on subsequent firm performance and executive turnover.

5.1. Signing bonus and subsequent firm performance

The optimal contracting theory predicts that for an executive who has the proper skills and is uncertain about his prospects at the new firm, awarding the signing bonus mitigates the executive's concerns about termination and motivates him to exert greater effort. This in turn improves firm performance and lowers the likelihood of executive turnover. The boards consider benefits and costs when de-

terminating whether to award the signing bonus. Awarding the signing bonus is costly, because, at the very least, the firm must pay the executive before he starts working, partially in cash and mostly upfront. The benefits of awarding the signing bonus are greater when the executive is more concerned about termination risk; that is, when the predicted propensity and size of the signing bonus award are high. Thus, when information asymmetry and innate risk are sufficiently high, the benefit of the signing bonus award dominates its cost, and the signing bonus award is expected to be associated with better subsequent performance and a lower rate of executive turnover. On the other hand, if concerns about termination are not strong, the cost of awarding the signing bonus dominates the benefit of such an award. For the intermediate range of termination concerns, the benefit and cost of the signing bonus

award are comparable and no clear prediction can be made on the effect of the signing bonus award on subsequent firm performance and executive turnover.

To test these predictions, we differentiate cases in which the signing bonus is predicted (sufficiently high termination concerns) from other cases when the signing bonus is not predicted by high termination risk. We first calculate the predicted amount of the signing bonus using Model 3 of Table 4. We then construct an indicator, $D(\text{Predicted signing bonus})$, assigning one if the predicted amount of the signing bonus is in the top 6.4% and zero otherwise, to match the unconditional percentage of new executives receiving the signing bonus in our sample. The interaction term of the predicted signing bonus award and the actual signing bonus award indicators, $D(\text{Predicted signing bonus}) * D(\text{Signing bonus})$, represents an executive who is highly concerned about termination risk and who receives the signing bonus.

Performance measures include the buy-and-hold stock return and ROA. We follow Core et al., (1999) in testing subsequent firm performance and use three testing periods: the fiscal year in which the executive receives the signing bonus (*one year*), the year of signing bonus award and the following year (*two years*), and the year of signing bonus award and the subsequent two years (*three years*). The regression model for stock returns takes into account other economic determinants – return volatility, market equity, market-to-book value of assets, industry fixed effects, and year fixed effects:

$$\begin{aligned} \text{Stock return}_i &= \alpha + \beta_1 D(\text{Predicted signing bonus})_i \\ &+ *D(\text{Signing bonus})_i + \beta_2 D(\text{Predicted signing bonus})_i \\ &+ \beta_3 D(\text{Signing bonus})_i + \beta_4 \text{Stock return volatility}_i \\ &+ \beta_5 \ln(\text{Market equity})_i + \beta_6 M/B_i \\ &+ \lambda \text{Industry controls}_i + \theta \text{Year controls} + \varepsilon_i \quad (1) \end{aligned}$$

Results presented in Panel A of Table 7 show that, among firms predicted to award the signing bonus, those that make the award outperform those that do not by 3.1–4.2% ($\beta_1 + \beta_3 > 0$; p -value ranges from 0.09 to 0.19). $\beta_1 + \beta_3$ captures the effect of awarding the signing bonus on performance relative to that of not awarding it, conditional on the signing bonus being predicted, because the effect of awarding the signing bonus when it is predicted is $(\beta_1 + \beta_2 + \beta_3)$ and the effect of not awarding the signing bonus when it is predicted is β_2 . This result suggests that when termination concerns are strong, awarding the signing bonus is beneficial for managerial incentives and firm stock performance. Among cases with milder termination concerns, the stock returns of those awarded signing bonuses are lower than those that did not make such awards by 1.0–5.5% ($\beta_3 < 0$).

To correct possible biases in the estimated standard errors of the regression coefficients due to the high skewness of the stock return distribution and the inclusion of a predicted value from the first-stage regression, we re-compute the standard errors using the bootstrapping method and find similar statistical significance for the coefficients. Moreover, our conclusion is the same if we redefine the indicator of the predicted signing bonus award as

one if the predicted amount of the signing bonus is in the 92nd or 96th percentiles instead of the 93.6th percentile or the predicted probability of the signing bonus award (using Column 1 of Table 4) is greater than 0.25 or 0.5 and zero otherwise.

We next test the link between the signing bonus award and subsequent ROA performance using the regression model

$$\begin{aligned} \text{ROA}_i &= \alpha + \beta_1 D(\text{Predicted signing bonus})_i \\ &+ *D(\text{Signing bonus})_i + \beta_2 D(\text{Predicted signing bonus})_i \\ &+ \beta_3 D(\text{Signing bonus})_i + \beta_4 \text{Lagged ROA}_i \\ &+ \beta_5 \text{Industry cash flow volatility}_i + \beta_6 \ln(\text{Sales})_i \\ &+ \lambda \text{Industry controls}_i + \theta \text{Year controls} + \varepsilon_i, \quad (2) \end{aligned}$$

where cash flow volatility is the industry median of the standard deviation of firms' cash flows, estimated over the past 24 quarters.

Regression results are presented in Panel B of Table 7. We find that, when termination concerns are strong, awarding the signing bonus is associated with better ROA ($\beta_1 + \beta_3 > 0$), but this relation is not significantly different from zero. In contrast, when termination concerns are not strong, firms awarding the signing bonus have subsequent performance lower than firms not awarding the signing bonus ($\beta_3 < 0$). Overall, the results reported in Table 7 corroborate the predictions of the optimal contracting theory.

5.2. Signing bonus and executive turnover

In this subsection, we link the signing bonus award to executive turnover, starting with univariate analysis of executive turnover within one year. As in Section 5.1, we sort executives based on whether they are predicted to receive the signing bonus and whether they receive the signing bonus. In Panel A of Table 8, we report for each group the percentage of executives who leave their firms within one year of their hire or promotion. As the panel shows, among executives who are more concerned about termination risk ($D(\text{predicted signing bonus})=1$), those receiving it are 5.8% less likely to leave the firm within one year than those not receiving it (11.0% vs. 16.8%). This difference is statistically significant at the 1% level (t -statistic is -2.81). In contrast, when a signing bonus is not predicted, receiving or not receiving it does not affect the early departure probability (10.0% versus 10.7%). Collectively, the univariate analysis results suggest that when signing bonuses are predicted, the signing bonus award is associated with better retention outcomes.

We next conduct regression analyses on executive turnover in one year. To avoid a potential misspecification problem using a nonlinear model with an interaction term, we run two separate regressions for the subsamples of $D(\text{Predicted signing bonus})=1$ and $D(\text{Predicted signing bonus})=0$. For each subsample, we regress executive turnover dummy on the signing bonus award, controlling for firm performance, size, executive characteristics, and industry and year fixed effects (Parrino, 1997; Weisbach, 1988). We report the marginal effects of the coefficients in all specifications reported in Panel B.

Table 7

Signing bonus awards and subsequent performance.

The dependent variable in Panel A is the annualized buy-and-hold stock return over a period of one year, two years, and three years since executive hire or promotion. The dependent variable in Panel B is average return on assets (ROA) over a period of one year, two years, and three years since executive hire or promotion. Ordinary least squares regressions of the following models are used in the two panels, respectively:

$$\text{Stock return}_i = \alpha + \beta_1 D(\text{Predicted signing bonus})_i * D(\text{Signing bonus})_i + \beta_2 D(\text{Predicted signing bonus})_i + \beta_3 D(\text{Signing bonus})_i + \beta_4 \text{Stock return volatility}_i + \beta_5 \text{Ln}(\text{Market equity})_i + \beta_6 M/B_i + \lambda \text{Industry controls}_i + \theta \text{Year controls} + \varepsilon_i$$

and

$$\text{ROA}_i = \alpha + \beta_1 D(\text{Predicted signing bonus})_i * D(\text{Signing bonus})_i + \beta_2 D(\text{Predicted signing bonus})_i + \beta_3 D(\text{Signing bonus})_i + \beta_4 \text{Lagged ROA}_i + \beta_5 \text{Industry cash flow volatility}_i + \beta_6 \text{Ln}(\text{Sales})_i + \lambda \text{Industry controls}_i + \theta \text{Year controls} + \varepsilon_i$$

Predicted signing bonus is the predicted dollar amount of the signing bonus based on Column 3 of Table 4. *D(Predicted signing bonus)* is an indicator that takes the value of one if the predicted signing bonus value is in the top 6.4 percentile and zero otherwise. We report *t*-statistics based on heteroskedasticity robust standard errors adjusted for firm clusters in parentheses below the corresponding regression coefficients. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Stock returns			
Variable	Average stock return over		
	One year (1)	Two years (2)	Three years (3)
<i>D(Predicted signing bonus)</i>	0.097***	0.061**	0.041*
* <i>D(Signing bonus)</i>	(2.63)	(2.21)	(1.91)
<i>D(Predicted signing bonus)</i>	-0.041*	-0.028*	-0.033***
	(-1.90)	(-1.87)	(-2.69)
<i>D(Signing bonus)</i>	-0.055***	-0.025*	-0.010
	(-3.22)	(-1.93)	(-0.97)
<i>Stock return volatility</i>	0.009	0.028	0.037
	(0.26)	(1.05)	(1.58)
<i>Ln(Market equity)</i>	-0.049***	-0.043***	-0.038***
	(-9.36)	(-10.45)	(-10.58)
<i>M/B</i>	0.010*	0.002	0.002
	(1.81)	(0.44)	(0.63)
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Number of observations	18,386	18,243	17,378
Adjusted R ²	0.190	0.168	0.148
<i>p</i> -value (H ₀ : β ₁ + β ₃ = 0)	0.19	0.13	0.09

Panel B: ROA			
Variable	ROA over		
	One year (1)	Two years (2)	Three years (3)
<i>D(Predicted signing bonus)</i>	0.014***	0.011*	0.009
* <i>D(Signing bonus)</i>	(2.65)	(1.91)	(1.46)
<i>D(Predicted signing bonus)</i>	-0.012***	-0.010**	-0.009**
	(-3.35)	(-2.56)	(-2.30)
<i>D(Signing bonus)</i>	-0.009***	-0.008***	-0.006**
	(-3.06)	(-2.67)	(-1.98)
<i>Lagged ROA</i>	0.710***	0.609***	0.543***
	(34.10)	(24.97)	(21.63)
<i>Industry cash flow volatility</i>	-0.001	-0.001	-0.003
	(-0.52)	(-0.41)	(-0.70)
<i>Ln(Sales)</i>	0.003**	0.003**	0.003**
	(2.57)	(2.49)	(2.35)
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Number of observations	18,397	17,513	16,349
Adjusted R ²	0.633	0.567	0.523
<i>p</i> -value (H ₀ : β ₁ + β ₃ = 0)	0.21	0.58	0.61

The regression model is

$$+ \beta_{10} D(\text{Retirement age})_i + \beta_{11} D(\text{Outside hire})_i + \lambda \text{Industry controls}_i + \theta \text{Year controls} + \varepsilon_i. \quad (3)$$

*Executive turnover*_{*i*}

$$= \alpha + \beta_1 D(\text{Signing bonus})_i + \beta_2 \text{ROA}_i + \beta_3 \text{Lag}d\text{ROA}_i + \beta_4 \text{Lag}2d\text{ROA}_i + \beta_5 \text{StockRet}_i + \beta_6 \text{LagStockRet}_i + \beta_7 \text{Lag}2\text{StockRet}_i + \beta_8 \text{Ln}(\text{Sales})_i + \beta_9 D(\text{CEO})_i$$

We report marginal effects of the regression coefficients and focus our interpretations on the estimate of β₁. We conduct Probit regressions on executive turnover within one year of hire or promotion. The results presented in

Table 8

Signing bonus awards and executive turnover.

In Panel A, we report the percentage of new executives departing the firms within one year of hire or promotion. In Columns 1–2 of Panel B, the dependent variable is an indicator that takes the value of one if the executive leaving the firm within one year of hire or promotion and zero otherwise. Models 3–6 are estimated in a panel data set of the entire employment history during the period 1992–2011 for the executives in our sample. The dependent variable is executive turnover, which takes the value of one if the executive leaves the firm in that year and zero otherwise. The Probit regression model is used in Columns 1–4, and the hazard model is used in Columns 5–6. In all columns, the marginal effects of the regression coefficients are reported based on the following model, separately for subgroups of firms and executives divided by whether predicted signing bonus amount is in the top 6.4 percentile (Yes) or not (No):

$$\begin{aligned} \text{Executive turnover}_i = & \alpha + \beta_1 D(\text{Signing bonus})_i + \beta_2 \text{ROA}_i + \beta_3 \text{LagdROA}_i + \beta_4 \text{Lag2dROA}_i \\ & + \beta_5 \text{StockRet}_i + \beta_6 \text{LagStockRet}_i + \beta_7 \text{Lag2StockRet}_i + \beta_8 \text{Ln}(\text{Sales})_i + \beta_9 D(\text{CEO})_i \\ & + \beta_{10} D(\text{Retirement age})_i + \beta_{11} D(\text{Outside hire})_i + \lambda \text{Industry controls}_i + \theta \text{Year controls}_i + \varepsilon_i. \end{aligned}$$

Predicted signing bonus amount is the predicted dollar amount of the signing bonus based on Column 3 of Table 4. $D(\text{Retirement age})$ is a dummy variable that takes the value of one when the executive is between 64 and 66 years of age and zero otherwise. We report t -statistics based on heteroskedasticity robust standard errors adjusted for firm clusters in parentheses below the corresponding regression coefficients. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Percentage of new executives departing within one year

Is signing bonus granted?	Is signing bonus predicted?	
	Yes	No
Yes		
Percent in total	11.0	10.0
Total number of observations	374	982
No		
Percent in total	16.8	10.7
Total number of observations	808	16,579
Difference (yes minus no)	–5.8%	–0.7%
t -statistic	–2.81	–0.74

Panel B: Regressions

Variable	New hire years		1992–2011 panel			
	D(Depart in one year)		D(Executive turnover)			
	Probit		Probit		Hazard	
	Predicted signing bonus		Predicted signing bonus		Predicted signing bonus	
	Yes	No	Yes	No	Yes	No
	(1)	(2)	(3)	(4)	(5)	(6)
$D(\text{Signing bonus})$	–0.067*** (–3.13)	–0.006 (–0.69)	–0.037** (–2.54)	0.017* (1.88)	–0.154* (–1.89)	0.344*** (6.03)
ROA	–0.216* (–1.75)	–0.102*** (–3.84)	–0.283*** (–3.13)	–0.220*** (–7.76)	–0.568 (–1.19)	–1.154*** (–5.91)
Change in ROA, one year lagged	–0.140 (–0.90)	–0.054 (–1.63)	–0.031 (–0.25)	–0.030 (–0.80)	–0.069 (–0.13)	0.053 (0.26)
Change in ROA, two years lagged	0.160 (0.84)	–0.055 (–1.62)	0.150 (1.34)	0.035 (0.88)	–0.554 (–1.14)	0.212 (1.06)
Stock return	–0.029 (–1.45)	–0.016*** (–3.32)	–0.015 (–0.93)	–0.029*** (–6.15)	–0.011 (–0.12)	–0.133*** (–4.53)
Stock return, one year lagged	0.002 (0.11)	–0.017*** (–3.73)	–0.028 (–1.63)	–0.022*** (–4.98)	–0.182* (–1.91)	–0.109*** (–4.22)
Stock return, two years lagged	0.029 (1.41)	–0.002 (–0.46)	0.014 (0.84)	–0.011*** (–2.69)	–0.103 (–1.27)	–0.043** (–2.43)
$\text{Ln}(\text{Sales})$	0.014* (1.89)	–0.001 (–0.88)	0.002 (0.39)	0.005*** (2.91)	–0.064** (–2.16)	–0.028** (–2.44)
$D(\text{CEO})$	0.023 (0.92)	0.027*** (4.01)	–0.052*** (–3.61)	–0.047*** (–10.11)	–0.563*** (–6.96)	–0.655*** (–22.14)
$D(\text{Retirement age})$	0.419** (2.42)	0.107*** (3.42)	0.164* (1.89)	0.197*** (11.39)	0.070 (0.39)	0.158*** (2.77)
$D(\text{Outside hire})$		–0.021*** (–5.04)		0.024*** (6.06)		0.108*** (3.76)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1,049	15,682	3,191	67,732	2,552	54,605
Pseudo R^2	0.114	0.102	0.046	0.245		

Columns 1–2 of Panel B in Table 8 are consistent with those reported in Panel A. When the signing bonus is predicted, the executive is 6.7% less likely to depart within one year of hire or promotion ($\beta_1 < 0$ in Column 1, statistically significant at the 1% level). When the signing bonus is not predicted, the signing bonus award does not affect executive turnover within one year (β_1 in Column 2 is indistinguishable from zero).

Several control variables are significant determinants of executive turnover within one year. For example, an executive is more likely to depart within one year if ROA and stock returns are lower and when the executive is near retirement. In addition, when the signing bonus is not predicted, immediate departures are more likely when the lagged stock returns are low and if the executive is the CEO or is internally promoted.

The signing bonus awards can affect executive turnover beyond the first year. Thus, we construct a panel data set including the entire employment history (1992–2011) of each top executive in our sample. We define executive turnover as an indicator that takes the value of one when the executive leaves the firm (voluntarily or involuntarily) and zero otherwise. We first use a Probit model and then perform a hazard analysis of the likelihood that an executive leaves his firm given the time elapsed from his first year of service to the current year. The hazard model allows the likelihood of turnover to vary with executive tenure (Jenter and Lewellen, 2013). For these non-linear models, we continue to conduct subsample analyses and present regression results separately for the subsamples of $D(\text{Predicted signing bonus})=1$ and $D(\text{Predicted signing bonus})=0$. We find $\beta_1 < 0$ for both Probit model (at the 5% level) and Hazard model (at the 10% level) in the $D(\text{Predicted signing bonus})=1$ subsample, indicating that, when termination concerns are strong, awarding the signing bonus reduces executive turnover. In addition, we find that $\beta_1 > 0$ under both models in the $D(\text{Predicted signing bonus})=0$ subsample, suggesting that when the signing bonus is not predicted, awarding it is associated with greater turnover.²⁴

²⁴ We should interpret this result with caution. Firms with $D(\text{Predicted signing bonus})=0$ and $D(\text{Signing bonus})=1$ [henceforth group (0,1)] have greater termination concerns than firms with $D(\text{Predicted signing bonus})=0$ and $D(\text{Signing bonus})=0$ [henceforth group (0,0)] on average. The predicted probability of the signing bonus award is greater for the former than for the latter group (0.15 versus 0.05). Executives are more likely to be outside hires (0.83 versus 0.31); opacity is greater (0.059 versus 0.053); and so is unpredictability (0.232 versus -0.065). If we match each firm in group (0,1) with a firm in group (0,0) based on the closest predicted amount of the signing bonus, we find no differences in stock or accounting performance or in the turnover rates between the two groups within one year, two years, and three years. Thus, the negative β_3 in performance regressions and negative β_1 in turnover regressions are likely to have resulted from the difference in termination concerns. More important, when we apply the same matching approach to firms with $D(\text{Predicted signing bonus})=1$, we find that firms with $D(\text{Signing bonus})=1$ outperform firms otherwise similar but with $D(\text{Signing bonus})=0$ in ROA over all three horizons and have a lower turnover rate within one year. In unreported tests, we show that if the signing bonus is predicted, awarding it is associated with a longer executive tenure (by 2.3 months; p -value=0.28). If the signing bonus is not predicted, awarding it is associated with a shorter executive tenure (by 4.8 months; p -value=0.01).

6. Signing bonus and severance pay

In this section, we examine the relations between the signing bonus and severance pay, another compensation component that is used for mitigating concerns about termination risk. While signing bonus is paid upon or shortly after an executive's signing, severance pay is given upon departure. In most cases, severance agreement is payable only if the executive's departure is for "good reason" (such as a change of duty, diminution of pay, and relocation) or "without cause" (not a result of the executive's misconduct or failure to perform his duty). If the executive voluntarily leaves the firm shortly after signing, he is unlikely to be eligible for severance pay. Thus, while signing bonus and severance pay can substitute for each other to mitigate concerns about termination risk, they can also be complements that are useful for different situations.

We extract data on severance pay from ExecuComp, which collects the dollar amount of estimated payments to executives in the event of termination with good reason or without cause, for 2006–2011. The severance pay data are available for approximately one third of our sample (11,787 new executives). Approximately 50% of the new NEOs have an ex ante severance agreement (identified by a positive amount of estimated severance pay), and the average value of severance pay is \$2.2 million for all NEOs and \$5.0 million for CEOs, conditional on a severance agreement (not tabulated). Our results reported in Panel A of Table 9 show a positive correlation between the signing bonus award and severance pay. Executives receiving severance pay are more likely to receive the signing bonus (0.112 versus 0.074), and the amount of the signing bonus is also higher for these executives than for executives not receiving severance pay (\$145,000 versus \$86,000).

To further understand the circumstances under which the signing bonus, severance pay, or both are awarded, we compare firm and executive characteristics in a univariate analysis, double sorting firm executives based on whether severance pay and signing bonus are awarded. We find that controlling for whether severance pay is awarded, $D(\text{outside hire})$, opacity, and unpredictability are significantly greater for firms awarding the signing bonus than for those not awarding it. In contrast, controlling for whether the signing bonus is awarded, firms awarding severance pay and those not awarding it differ only in performance; that is, poorly performing firms tend to award severance pay (untabulated). These results suggest that firms tend to use the signing bonus to mitigate executives' termination concerns due to information asymmetry and unpredictability at the time of signing and use severance pay when performance deteriorates to compensate the executive's loss explicitly, should termination occur.

We next examine the relations between the signing bonus and severance pay in a regression setting. We use Model 1 (Model 3) in Panel B of Table 4 to examine the link between the award (amount) of the signing bonus and the award (amount) of the severance pay. Regression results presented in Panel B of Table 9 are consistent

Table 9

Signing bonus awards and severance pay.

Panel A presents summary statistics for the signing bonus dummy and its value, separately for executives receiving and not receiving severance pay. Panel B reports results from a Probit regression of the signing bonus award indicator (Model 1 in Table 4) and a Tobit regression of the value of the signing bonus (Model 3 in Table 4). The values of signing bonus and severance pay are in millions of dollars. We report *t*-statistics based on heteroskedasticity robust standard errors adjusted for firm clusters in parentheses below the corresponding regression coefficients. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Differences between executives receiving and not receiving severance pay						
Variable	Is severance pay granted?				Difference (yes minus no)	
	Yes		No		Mean	<i>t</i> -statistic
	<i>N</i>	Mean	<i>N</i>	Mean		
<i>D</i> (Signing bonus)	3,492	0.115	3,361	0.079	0.036	5.02
Signing bonus (in thousands of dollars)	3,492	153	3,361	93	61	4.31
Panel B. Regressions						
Variable	<i>D</i> (Signing bonus) (1)		Signing bonus (in millions of dollars) (2)			
<i>D</i> (Severance pay)	0.019*** (3.30)					
Severance pay (in millions of dollars)					0.065*** (11.44)	
<i>D</i> (Outside hire)	0.211*** (19.65)				3.209*** (82.76)	
Opacity	0.080 (1.12)				1.554*** (3.23)	
Unpredictability	0.007** (2.04)				0.144*** (13.03)	
Performance	0.005 (1.52)				0.154*** (18.35)	
Executive age	−0.001*** (−2.71)				−0.022*** (−22.72)	
<i>D</i> (CEO)	0.019** (2.03)				0.762*** (21.00)	
<i>Ln</i> (Book assets)	0.013*** (5.39)				0.387*** (63.99)	
Cash-to-assets	0.011 (0.54)				0.461*** (4.06)	
Industry fixed effects	Yes				Yes	
Year fixed effects	Yes				Yes	
Number of observations	6,853				6,853	
Pseudo <i>R</i> ²	0.225				0.166	

with those of univariate comparisons. Executives who have severance agreements are 1.9% more likely to receive the signing bonus, after controlling for other economic determinants of the signing bonus award. The increase in the propensity of the signing bonus award is substantial given the unconditional probability of 6.4%. Moreover, an increase of \$1 million in severance pay is associated with an average increase of \$65,000 in the signing. In summary, our empirical evidence suggests that the signing bonus and severance pay are complementary in mitigating executives' concerns about termination risk.

7. Conclusion

This paper describes the features of the signing bonus awards for new top executives of large US companies during 1992–2011. We find that a signing bonus award is effective at attracting executives who are concerned about termination risk. This is the first comprehensive study on this initial award in executive employment contracts, examining its economic rationale, its consequences, and its relations with severance pay. We hope to shed light on the debate over the rationality of the observed pattern in executive compensation and, further, on the optimal design of managerial incentive contracts.

Appendix. Variable definitions

A.1. Firm characteristics

Cash-to-assets

Debt/Assets

D(Firm fired CEO previously)

Industry cash flow volatility

Ln(Book assets)

Ln(Market equity)

Ln(Sales)

M/B

Opacity

R&D/Assets

ROA

Sales growth

Stock return

Stock return volatility

A.2. Executive variables

D(CEO)

D(Depart within one year)

D(Executive turnover)

D(Outside hire)

D(Retirement age)

Executive age

Severance pay

A.3. Outside hires

D(CEO hired from a non-CEO post)

D(Executive is connected to board)

D(Executive was director previously)

D(Has unvested equity)

D(Hired from a different industry)

Difference in house prices (Current minus previous states)

Distance between previous and current employers

House price

Relative *Ln*(Previous employer book assets)

A.4. Internally promoted executives: Board independence

Board size

Executive tenure upon promotion

Top-five institutions' ownership

Cash divided by total book assets.

Sum of long-term debt and debt in current liabilities divided by total book assets.

Indicator that takes the value of one if the firm fired at least one CEO over the last three years and zero otherwise. Whether a CEO is forced out is determined based on Parrino (1997) and Jenter and Kanaan (2015). For more details about the turnover data, see Fee and Hadlock (2003), Gao et al., (2015), Jenter and Kanaan (2015), and Peters and Wagner (2014).

Industry median cash flow volatility. Cash flow volatility is the standard deviation of quarterly operating cash flows in the previous six fiscal years.

Logarithm of total book assets. Total book assets are in millions of dollars.

Logarithm of the product between fiscal year-end stock price and shares outstanding.

Logarithm of net sales. Net sales are in millions of dollars.

Sum of the market value of equity and total book assets minus total common equity, all divided by total book assets. The market value of equity is the fiscal year end stock price multiplied by total number of shares outstanding.

For each Fama and French 49 industry with at least 20 firms in a given year, we run five separate regressions for each of year $t-4$ to year t . In each regression, total current accruals of a firm is regressed on lagged, contemporaneous, and leading cash flows from operations; change in sales; and property, plant, and equipment. Total current accruals equals change in current assets minus change in current liabilities minus change in cash and short-term investments plus change in current debt. For each firm-year, opacity is the standard deviation computed across the residuals of total current accruals from the five industry-year regressions. The definition follows Billett and Yu (2016).

Research and development expenditure divided by total book assets.

Operating income before depreciation, divided by total book assets.

Logarithm of the ratio between sales and lagged sales.

Annual stock return as reported in ExecuComp.

Standard deviation of daily stock returns in each year.

Indicator that takes the value of one if the executive is CEO and zero otherwise.

Indicator that takes the value of one if the executive leaves the firm within one year of hire or promotion and zero otherwise.

Indicator that takes the value of one if the executive leaves the firm in the year and zero otherwise.

Indicator that takes the value of one if the executive is hired from outside the firm; i.e., not internally promoted and zero otherwise.

Indicator that takes the value of one if the executive's age is between 64 and 66 years and zero otherwise.

Age of the executive.

Estimated dollar amount (in thousands of dollars) of severance pay if the executive's employment is terminated involuntarily. This variable is available only for the period 2006–2011.

Indicator that takes the value of one if the CEO was not a CEO at his previous employer and zero otherwise.

Indicator that takes the value of one if the new externally hired executive is connected to one or more directors on the board through prior work (for profit or nonprofit) or education and zero otherwise.

Indicator that takes the value of one if the new externally hired executive was a non-executive director of the firm previously and zero otherwise.

Indicator that takes the value of one if the amount of the executive's unvested stock and stock options is positive when he left his previous employer and zero otherwise.

Indicator that takes the value of one if the executive's previous employer was in an industry (based on three-digit SIC codes) different from his current employer and zero otherwise.

House price in the state of the executive's current employer minus that in the state of his previous employer.

Distance between the centers of two corresponding states. Distance is in thousands of kilometers. This information is collected from <http://www.distancefromto.net/united-states.php> and <http://www.50states.com/distance/>.

Estimated mean house prices for one-unit, non-condominium properties as reported by Federal Housing Finance Agency, averaged over four quarters. House price is in millions of dollars.

Logarithm of total book assets of the executive's previous employer minus the logarithm of his current employer's book assets.

Percentage of independent board members. Independent directors are directors who are not affiliated with the company according to the RiskMetrics definition.

Total number of members on the board.

Number of years elapsed between the year of first becoming a NEO at the firm and the year of promotion.

Total ownership by the top-five institutions with the most holdings of the firm.

All variables (except indicators) are winsorized at the 1st and 99th percentiles.

References

- Almazan, A., Suarez, J., 2003. Entrenchment and severance pay in optimal governance structures. *Journal of Finance* 58, 519–548.
- Anderson, T.W., 1963. Asymptotic theory for principal component analysis. *Annals of Mathematical Statistics* 34, 122–148.
- Baranchuk, N., MacDonald, G., Yang, J., 2011. The economics of super managers. *Review of Financial Studies* 24, 3321–3368.
- Bates, T., Kahle, K.M., Stulz, R.M., 2009. Why do US firms hold so much more cash than they used to? *Journal of Finance* 64, 1985–2021.
- Bebchuk, L., Fried, J., 2004. *Pay Without Performance: The Unfulfilled Promise of Executive Compensation*. Harvard University Press, Cambridge, MA.
- Bertrand, M., Mullainathan, S., 2001. Are CEOs rewarded for luck? The ones without principals are. *Quarterly Journal of Economics* 116, 901–932.
- Billett, M.T., Yu, M., 2016. Asymmetric information, financial reporting, and open market share repurchases. *Journal of Financial and Quantitative Analysis*.
- Coles, J., Daniel, N.D., Naveen, L., 2006. Managerial incentives and risk-taking. *Journal of Financial Economics* 79, 431–468.
- Core, J., Guay, W., 2010. Is CEO pay too high and are incentives too low? A wealth based contracting framework. *Academy of Management Perspectives* 24, 5–19.
- Core, J., Holthausen, R., Larcker, D., 1999. Corporate governance, chief executive officer compensation, and firm performance. *Journal of Financial Economics* 51, 371–406.
- DeAngelis, D., Grinstein, Y., 2015. Performance terms in CEO compensation contracts. *Review of Finance* 19, 619–651.
- Dechow, P., Dichev, I., 2002. The quality of accruals and earnings: the role accruals estimation errors. *The Accounting Review* 77, 35–59.
- Duchin, R., Matsusaka, J., Ozbas, O., 2010. When are outside directors effective? *Journal of Financial Economics* 96, 195–214.
- Edmans, A., Gabaix, X., Landier, A., 2009. A calibratable model of optimal CEO incentives in market equilibrium. *Review of Financial Studies* 22, 4881–4917.
- Fee, C.E., Hadlock, C.J., 2003. Raids, rewards, and reputations in the market for managerial talent. *Review of Financial Studies* 16, 1315–1357.
- Gabaix, X., Landier, A., 2008. Why has CEO pay increased so much? *Quarterly Journal of Economics* 123, 49–100.
- Gao, H., Harford, J., Li, K., 2015. CEO turnover–performance sensitivities in private firms Unpublished working paper. Nanyang Technological University, Singapore.
- Gillan, S., Hartzell, J., Parrino, R., 2009. Explicit vs. implicit contracts: evidence from CEO employment agreements. *Journal of Finance* 64, 1629–1655.
- Goldman, E., Huang, P., 2015. Contractual versus actual severance pay following CEO departure. *Management Science* 61, 1108–1120.
- Green, J., 2013. Golden hellos surge as CEOs get jumbo signing bonuses, Bloomberg, November 19. <http://www.bloomberg.com/news/articles/2013-11-19/golden-hellos-surge-as-ceos-get-signing-jumbo-bonuses>
- Huang, P., 2011. Marital prenups? A look at CEO severance agreements Unpublished working paper. Tulane University, New Orleans, LA.
- Hwang, B., Kim, S., 2009. It pays to have friends. *Journal of Financial Economics* 93, 138–158.
- Itnner, C.D., Larcker, D.F., Rajan, M.V., 1997. The choice of performance measures in annual bonus contracts. *Accounting Review* 72, 231–255.
- Jenter, D., Kanaan, F., 2015. CEO turnover and relative performance evaluation. *Journal of Finance* 70, 2155–2183.
- Jenter, D., Lewellen, K., 2013. Performance-induced CEO turnover Unpublished working paper. Stanford University and Dartmouth College, Stanford, CA, and Hanover, NH.
- Kaplan, S.N., Rauh, J.D., 2010. Wall Street and Main Street: what contributes to the rise in the highest incomes? *Review of Financial Studies* 23, 1004–1050.
- Kini, O., Williams, R., 2012. Tournament incentives, firm risk, and corporate policies. *Journal of Financial Economics* 103, 350–376.
- Lambert, R.A., Larcker, D.F., 1985. Golden parachutes, executive decision-making, and shareholder wealth. *Journal of Accounting and Economics* 7, 179–203.
- Lee, G., Masulis, R., 2009. Seasoned equity offerings: quality of accounting information and expected flotation costs. *Journal of Financial Economics* 92, 443–469.
- Lefanowicz, C.E., Robinson, J.R., Smith, R., 2000. Golden parachutes and managerial incentives in corporate acquisitions: evidence from the 1980s and 1990s. *Journal of Corporate Finance* 6, 215–239.
- Lewellen, W., 1968. *Executive Compensation in Large Industrial Corporations*. National Bureau of Economic Research, Cambridge, MA.
- Low, A., 2009. Managerial risk-taking behavior and equity-based compensation. *Journal of Financial Economics* 92, 470–490.
- Lys, T., Rusticus, T., Sletten, E., 2008. Motives for and risk-incentive implications of CEO severance Unpublished working paper. Northwestern University, Chicago, IL.
- Morse, A., Nanda, V., Seru, A., 2011. Are incentive contracts rigged by powerful CEOs? *Journal of Finance* 66, 1779–1821.
- Murphy, K., 1985. Corporate performance and managerial remuneration: an empirical analysis. *Journal of Accounting and Economics* 7, 11–42.
- Murphy, K., 1999. Executive compensation. In: Ashenfelter, O.C., Card, D. (Eds.), *Handbook of Labor Economics*. Elsevier, Amsterdam, pp. 2485–2563.
- Murphy, K., 2002. Explaining executive compensation: managerial power versus the perceived cost of stock options. *University of Chicago Law Review* 69, 847–869.
- Murphy, K., Zabojnik, J., 2004. CEO pay and appointments: a market-based explanation for recent trends. *American Economic Review Papers and Proceedings* 94, 192–196.
- Oyer, P., 2004. Why do firms use incentives that have no incentive effects? *Journal of Finance* 59, 1619–1649.
- Parrino, R., 1997. CEO turnover and outside succession: a cross-sectional analysis. *Journal of Financial Economics* 46, 165–197.
- Peters, F.S., Wagner, A.F., 2014. The executive turnover risk premium. *Journal of Finance* 69, 1529–1563.
- Rajan, R., 2013. Will programmers rule? Project Syndicate. <http://www.project-syndicate.org/commentary/the-winner-take-all-economy-of-software-by-raghuram-rajana>.
- Rau, R., Xu, J., 2013. How do ex ante severance pay contracts fit into optimal executive incentive schemes? *Journal of Accounting Research* 51, 631–671.
- Schmidt, B., 2015. Costs and benefits of friendly boards during mergers and acquisitions. *Journal of Financial Economics* 117, 424–447.
- Subramanian, A., 2013. Product market competition, managerial compensation and firm size in market equilibrium. *Management Science* 59, 1612–1630.
- Trzcinka, C., 1986. On the number of factors in the arbitrage pricing model. *Journal of Finance* 41, 347–368.
- Van Wesep, E., 2010. Pay (be)for(e) performance: the signing bonus as an incentive device. *Review of Financial Studies* 23, 3812–3848.
- Weisbach, M., 1988. Outside directors and CEO turnover. *Journal of Financial Economics* 20, 431–460.
- Yermack, D., 1996. Higher market valuation of companies with a small board of directors. *Journal of Financial Economics* 40, 185–212.
- Yermack, D., 2006. Golden handshakes: separation pay for retired and dismissed CEOs. *Journal of Accounting and Economics* 41, 237–256.