Labor unemployment risk and CEO incentive compensation

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Abstract

In this paper, we uncover the important role of a salient attribute of labor market frictions, i.e. labor unemployment risk, in the design of CEO incentive compensation. Utilizing state-level changes in unemployment insurance benefits as a source of variation in the unemployment costs faced by employees, we find that, after unemployment insurance benefits increase, boards adjust the compensation structure and provide managers with more stock option grants that result in more convexity payoffs. The increase in convexity payoff structures is more pronounced in labor-intensive industries and industries that have higher layoff propensity, but is significantly attenuated when strong labor unions are present. The results are also stronger when the human capital of the CEO is more closely tied to the firm or when the CEO is older. Finally, we show that the increase in convexity payoff from option-based compensation induces firms to undertake more risky investments that deliver improved operating performance after the increase in unemployment insurance benefits.

I. Introduction

Stock options promise executives all of the benefits of share price increases with none of the risk of share price declines. In other words, stock options provide executives with asymmetric incentives to shoot for the moon. …… Stock options can encourage excessive risk taking and prompt executives to pursue corporate strategies designed to promote short-term stock price gains to the detriment of long-term performance and stability.[1]

- American Federation of Labor and Congress of Industrial Organizations

The recent financial crisis has renewed public interest in the risk-taking incentives embedded in CEO compensation packages.[2] Accordingly, the Securities and Exchange Commission (the SEC) has approved new rules that will "require disclosure of a company's compensation policies and practices as they relate to company's risk management".[3] The option-based incentive compensation has long been suggested as a solution to the risk-related agency problem that undiversified and risk-averse managers tend to pass up risky but positive net present value projects that are desired by diversified shareholders (Jensen and Meckling, 1976; Amihud and Lev, 1981; Smith and Stulz, 1985; Guay, 1999; Heron and Lie, 2013). Consistent with the conjecture, most of the extant literature examined the ex-post economic consequences of the incentive compensation and found a positive association between the risk-taking incentives in managerial compensation and various proxies for firm risk (Agrawal and Mandelker, 1987; Guay, 1999; Rajgopal and Shevlin, 2002; Knopf, Nam, and Thornton, 2002; Coles, Daniel, and Naveen, 2006; Chava and Purnanandam, 2010; Gormley, Matsa, and Milbourn, 2013; Shue and Townsend,

[1] Comments provided by the "AFL-CIO" on the proposed rule on incentive-based compensation arrangements under Section 956 of the Dodd-Frank Wall Street Reform and Consumer Protection Act. See 'http://www.sec.gov/comments/s7-12-11/s71211-705.pdf'.
[2] Cari Tuna and Joann S. Lublin, "Risk vs. Executive Reward", the Wall Street Journal (June 15, 2009).
[3] See the SEC's press release on approval of enhanced disclosure about risk, compensation, and corporate governance at "http://www.sec.gov/news/press/2009/2009-268.htm".

2013).[4] However, few studies investigate the ex-ante factors that enter into directors' consideration when designing the optimal incentive pay (Guay, 1999; Hayes, Lemmon, and Qiu, 2012; Gormley, Matsa, and Milbourn, 2013) and even less is known on how the level of risk-taking incentives in managerial compensation packages is affected by the interests of other non-financial stakeholders, such as rank and file employees. In this paper, we aim to contribute to a more complete understanding of the issue by examining the impact of a prominent labor friction, i.e. labor unemployment risk, on the design of optimal CEO incentive compensation.

Although it is beneficial for shareholders to mitigate managerial risk aversion via the use of option-based compensation, the increased risk-taking behaviors and financial unstability induced by the convex payoff structure of stock options can be detrimental to a firm's rank and file employees who invest most of their human capital in the underlying firm (Titman, 1984). Workers bear substantial costs in the process of involuntary unemployment. Those who get laid-off experience reductions in personal consumption (Gruber, 1997), go through delays and costly searching before finding another job (Katz and Meyer, 1990), and fail to maintain previous wage level even after reemployment (Farber, 2005). Besides the monetary losses, unemployed workers also endure psychological and social costs (Kalil and Ziol-Guest, 2008). [5] Anticipating the significant costs during unemployment, employees care about unemployment risk and ex ante require a premium in the setting of wages or other benefits to compensate for the level of unemployment risk they take, i.e. the "compensating wage differentials" (Abowd and Ashenfelter, 1981; Topel, 1984; Chemmanur, Cheng, and Zhang, 2013). They also take the financial stability and unemployment risk into consideration when they screen the potential employers (Brown and Matsa, 2013).

[4] Although the vast majority of empirical studies highlight a positive relation between option-based risk-taking incentives and firm risk, the theoretic prediction on that relationship is ambiguous. See Lambert, Larcker, and Verrechia (1991), Carpenter (2000), and Ross (2004).

[5] See the comment letters from displaced workers filed with the SEC describing their losses and sufferings during the economic turmoil, part of which was attributed to the inappropriate risk-taking induced by incentive-based managerial compensation, 'http://www.citizen.org/documents/Public-Citizen-Comments-SEC-956.pdf'.

Given the increasing importance of employees' human capital and a firm's reliance on the specific investments made by labor forces (Zingales, 2000), firms bear non-trivial costs of exposing workers to significant unemployment risk. First, the labor costs represent a large proportion of a firm's total expenses and the premium wages a firm has to offer to compensate for the potential job losses increase with the risk environments of a firm's operations. The additional costs associated with the heightened labor unemployment risk are especially important for firms operating in industries characterized with higher degree of labor intensity in their production inputs. For example, Agrawal and Matsa (2013) and Chemmanur, Cheng, and Zhang (2013) empirically document that the substantial labor costs limit the use of debt and firms adopt conservative financial policies to mitigate workers' concern for unemployment risk, which are consistent with the theoretic predictions of Titman (1984) and Berk, Stanton, and Zechner (2010). Second, too much unemployment risk could reduce employees' willingness to undertake specific human capital investments and undermine firms' productivity to utilize assets in place and exploit future growth opportunities (Titman, 1984; Zingales, 2000). Acharya, Baghai, and Subramanian (2014) find that wrongful discharge laws in the US encourage employee efforts and spur innovative activities by protecting workers against unjust dismissal. Since the risk-taking incentives embedded in managerial incentive compensation have a crucial impact on a firm's risk environment (see Gormley, Matsa, and Milbourn (2013) for a review of the relevant literature), the board should weigh the benefits of providing risk-averse managers with proper incentives to take more risk and the costs of exposing employees to significant unemployment risk when designing the optimal compensation packages.[6]

Empirically verifying the above conjecture proves challenging due to the lack of appropriate proxy for labor unemployment risk and the difficulty in establishing causality. The hypothesis predicts that the boards will adjust the risk-taking incentives in CEO compensation when employees' unemployment risk changes. Based on this empirical identification strategy, we exploit the state-level

[6] In the United States, the Constituency laws extend the fiduciary duty of board of directors to consider the interests of non-shareholder stakeholders when making business decisions.

changes in unemployment insurance benefits used by Agrawal and Matsa (2013) as a source of variation in the costs borne by employees during unemployment. Then we study how the board of directors redesign the structure of CEO compensation and adjust the level of risk-taking incentives provided in response to the exogenous shock to labor unemployment risk.

State unemployment insurance (UI) benefit laws are enacted to provide temporary income to eligible workers who become involuntarily unemployed and are still actively looking for new job positions. Although the basic framework of the unemployment insurance provision is set up commonly across the nation, individual states have the autonomy to decide on the specific parameters of the program, such as the eligibility of the applicant, the duration for which the insurance is provided, and the maximum amount of weekly benefits paid. The state UI benefits have been documented in the literature to have a significant impact on workers' economic behaviors and the aggregate labor supply (Topel, 1984; Meyer, 1990, 1995; Hsu, Matsa and Melzer, 2014). More generous state unemployment benefits reduce workers' ex-post costs during unemployment and can partially mitigate their ex-ante concern and compensation for unemployment risk. Since the firm becomes less concerned over the workers' exposure to unemployment risk, the board of directors can reshape the risk environment of the firm by providing the managers with more risk-taking incentives in their compensation packages in a way to address the risk-related agency conflicts and better align the interests of executives with those of shareholders (Jensen and Meckling, 1976; Smith and Stulz, 1985).

We empirically test the hypothesis using a comprehensive sample of 33,850 firm-year observations between 1992 and 2013. Following the compensation literature (Guay, 1999), we measure the risk-taking incentives provided in the compensation packages by the sensitivity of CEO's wealth to a firm's stock return volatility (Vega). Specifically, we calculate the CEO's dollar change in wealth for a 0.01 increase in the annualized standard deviation of a firm's stock returns following Core and Guay (2002). We construct the measure based on the equity grants in the current fiscal year (Flow Vega) since they are under direct control of the board of directors (Hayes, Lemmon, and Qiu, 2012; Gormley, Matsa, and Milbourn, 2013).

We start the empirical tests with a simple univariate analysis designed on a treatment-control framework. Specifically, we construct the treatment firms as those headquartered in state-years that experience a large increase in the maximum amount of UI benefits. We accompany the treatment sample with a control group of firms headquartered in the neighboring state that does not change the unemployment insurance policy. A comparative analysis suggests that the board of directors raises the level of risk-taking incentives (Vega) provided in CEO compensation packages following the increase in the maximum amount of state-level UI benefits. A break-down analysis of the compensation structure indicates that the increase in the convexity of CEO's wealth-performance relation is due to a firm's increasing reliance on the option-based compensation and a decline in the usage of cash-component pay, such as salary. On the contrary, we observe no changes in both the level of risk-taking incentives provided and the composition of the overall pay packages for firms in the control group, which lend support to the conjecture that it is the reduced exposure to unemployment risk for workers in the treatment sample that leads to the change in compensation policy rather than the local economy conditions which are similar for geographically-proximate firms.

To further account for the effect of omitted variables, we conduct a multivariate regression analysis on the relationship between the levels of risk-taking incentives provided in the compensation packages on the lagged maximum UI benefits while controlling for a wide array of firm-specific characteristics and regional economic conditions. An additional inclusion of both the firm fixed effects and year fixed effects warrants that the results capture the within-firm adjustments in CEO compensation policy in response to the shock to labor's unemployment risk rather than some cross-sectional correlations or time-series trend due to economy conditions. Consistent with the results in the univariate analysis, we find that increases in maximum UI benefits are significantly associated with increases in the risk-taking incentives provided in the compensation packages. The positive impact of UI benefit generosity on the compensation risk-taking incentives is also significant economically. A one-standard-deviation increases in the logarithms of maximum UI benefits lead to a 19.3% (14.4%) increase in the risk-taking incentives provided in the annual (aggregate) compensation packages. A further examination on the channels of the

increase in the risk-taking incentives granted to the CEO indicates that the boards rely more on stock options (relative to restricted shares) in designing the incentive compensation following the increase in state-level maximum UI benefits. The results lend strong support to the conjecture that more generous unemployment policy reduces workers' concern for potential job losses and mitigate their demands for compensation premiums, which enable the directors to provide their executives with greater incentives for risk taking.

In ensuing analysis, we conduct a comprehensive array of tests for robustness checks and to speak to a causal interpretation of the results we document. First, we find that the significant relationship between the maximum amount of UI benefits and the compensation Vega is robust to alternative sampling strategies that include 1) excluding CEO turnover years when the CEO pay is significantly affected by the severance package and thus quite different from normal periods, 2) dropping firms in the financial and utility industries, and 3) excluding firms operating in industries characterized with geographically-dispersed workforce where the measurement error for UI benefits is more likely (Agrawal and Matsa, 2013). The results also survive a battery of tests using alternative measures for risk-taking incentives, such as logarithmic transformation of the compensation Vega (Low, 2009), compensation Vega scaled by the sensitivities of CEO's pay to changes in stock price (Delta) in the spirit of Dittmann and Yu (2010), and risk-taking incentives of the top management team (Armstrong, Larcker, Ormazabal, and Taylor, 2013).

Second, we address the endogeneity concerns that may affect the causal interpretation of the findings. Although we control for state-level GDP growth rate and unemployment conditions in the empirical design, some omitted and unobservable factors we fail to account for in the regressions, such as local investment opportunities, may drive both CEO compensation policy and the provisions of UI benefits and thus cloud the inference of our results. To alleviate the concerns, we conduct two falsification tests regarding the timing and location of the UI policy. An examination on the timing of the relationship between UI benefit changes and compensation Vega suggests that the board adjusts the level of risk-taking incentives provided in CEO compensation only *after* the change in the generosity of state

UI benefits. However, no contemporaneous or reverse patterns in timing are revealed in the data, which indicates that the significant relationship we document is not due to some omitted economic conditions or local investment opportunities that tend to be persistent and sticky over time. The omitted variable problem is further mitigated when we examine and find that the UI benefit provisions of a firm's bordering states, which are supposed to be affected by similar macroeconomic conditions and investment prospectus, do not have any significant impact on the design of CEO's incentive compensation. In all, the falsification tests we conduct mitigate the endogeneity concern and reinforce our ability to speak to a causal nature of the findings.

We next examine whether the positive relation between the generosity of state UI policy and compensation Vega exhibits any cross-sectional variations in terms of labor market characteristics as the hypothesis would predict. If more generous UI benefit provisions lead to an increase in the risk-taking incentives provided in CEO compensation through their impact on workers' unemployment risk, the effect should be more pronounced for firms that rely more on labor as an element of inputs in their productions and firms whose workers face greater expected unemployment risk. Consistent with the conjecture, we find that the positive effect is especially pronounced for firms operating in labor-intensive industries and in sectors that experience frequent layoffs. In additional analysis, we find that high union coverage with strong collective bargaining significantly attenuates the board's ability to reshape the risk environment of the firm through the provision of risk-taking incentives following the increase in maximum UI benefits, which is consistent with the divergence of interests between rank and file employees and shareholders (Agrawal, 2011).

The benefits of providing risk-averse CEOs with convex pay structures might also differ across firms since managers have different level of risk aversions. Knopf, Nam, and Thornton (2002) document that the manager's appetite for risk is significantly weaker if her compensation package is more sensitive to stock prices (Delta). The CEO's incentive to take risk also decreases with age as theoretically predicted by Prendergast and Stole (1996) and empirically verified in Serfling (2014). Consistent with the notion that option-based compensation is used to overcome managerial risk aversion, we find that the adjustment

in CEO incentive compensation after the UI benefit increase is more pronounced when the human capital of the CEO is more closely tied to the firm or when the CEO is relatively older.

Lastly, we examine whether the provision of more convexity in CEO compensation after the UI policy change has induced more corporate risk-taking behaviors in the future. Consistent with the positive effect of compensation Vega on corporate risk taking, we find that firms spend more money on R&D, invest less in capital expenditures and liquid assets, are less likely to conduct diversifying acquisitions, and thus increase the stock return volatility after the increase in the generosity of UI benefit policy. We also confirm the findings in Agrawal and Matsa (2013) that higher UI benefits result in higher leverage ratios. Interestingly, the engagement in these risk-taking behaviors is only observed in firms that have provided the CEO with relatively more risk-taking incentives after the policy change, suggesting that the provision of incentive compensation is an important mechanism for firms to adjust to their optimal risk environment after the shock to the labor unemployment risk. Our dynamic evidence complements prior studies on this issue (Rajgopal, and Shevlin, 2002; Coles et al., 2006) by bridging together the design of optimal incentive compensation and their impact on firm risk.

Our study makes two distinct contributions to the literature. First, we contribute to a growing literature on the optimal design of executive incentive contracts. Prior research uses market-to-book ratio to measure growth opportunities and document that the option-based compensation is used to provide managers with more incentives to take risk (Smith and Watts, 1992; Guay, 1999). Recent works exploit shocks to a firm's risk environment (Gormley, Matsa, and Milbourn, 2013; Angelis, Grullon, and Michenaud, 2013) or regulatory changes (Low, 2009; Hayes et al., 2012; Cohen, Dey, and Lys, 2013) to study how boards readjust CEO incentives accordingly. We contribute to a more complete understanding of the issue by incorporating the role of non-shareholder stakeholders, namely rank and file employees, in the provision of risk-taking incentives. Our findings suggest that workers' exposures to unemployment risk are important considerations for board of directors when designing the optimal incentive contract.

Second, we contribute to the extant literature that highlights the positive impact of risk-taking incentives on firm risk (Coles et al., 2006; Armstrong and Vashishtha, 2012). We document the adverse

effect of risk-taking activities on workers' exposure to unemployment risk and how that affects the design of managerial incentive compensation. Toward that end, we are able to bridge two important and connected questions together, namely the optimal design of incentive contracts and the economic consequences of managerial risk-taking incentives on corporate investment and financial policies.

The rest of the paper is organized as follows. Section II describes the sample selection procedure, the construction of key variables, and presents summary statistics for variables used in the paper. The empirical results are presented in Section III. Section IV concludes the paper.

II. Sample construction and variable definition

A. Sample construction

We obtain the executive compensation information from the COMPUSTAT ExecuComp database. Our sample period spans from 1992 to 2013 since ExecuComp starts providing the executive compensation data in 1992. We further require the firms to have disclosed non-missing information on the locations of their headquarters. Available financial statement information and stock return data are obtained from COMPUSTAT and Center for Research in Securities Prices (CRSP), respectively. We exclude firm-year observations with missing or non-positive book value of total assets. The above sampling strategy leaves us with a final sample consisting of 3,188 unique firms and 33,850 firm-year observations.

B. Measuring Unemployment Insurance (UI) benefits

We manually collect the amount of UI benefits for each state-year from the "Significant Provisions of State UI Laws" published by the U.S. Department of Labor[7]. Although the basic framework of the UI provision is set up by the joint federal-state system and quite similar across states, the specific program parameters and thus the generosity of a state's UI provision vary significantly across different states and time periods. Two upper bounds of the parameters specified by the state legislation are especially important in determining the generosity of the UI policy. Specifically, the amount of benefits

[7] http://workforcesecurity.doleta.gov/unemploy/statelaws.asp.

an eligible claimant can receive during the process of unemployment is capped by the allowed maximum amount of weekly benefit and the maximum benefit duration. Therefore, we measure the generosity of each state's UI system by the product of the maximum amount of weekly benefit and the maximum benefit duration (Agrawal and Matsa, 2013).

C. Measuring risk-taking incentives

To capture the risk-taking incentives inherent in CEO's compensation packages, we follow the existing literature (e.g., Guay, 1999; Core and Guay, 2002; Coles et al., 2006) and calculate the compensation Vega of the CEO's equity portfolio in the firm. Specifically, Vega measures the CEO's dollar change in wealth for a 0.01 increase in the annualized standard deviation of firm's stock returns. To the extent that Vega captures the convexity of the relation between CEO's wealth and the firm's stock performance, it provides a straightforward measure of the CEO's incentives to make financing and investment decisions that will increase the firm risk (Smith and Stulz, 1985; Guay, 1999). Since the current grants through annual compensation packages are under more direct control of the board, we focus on the newly granted equity incentives, i.e. Flow Vega, based on CEO's equity grants in the current fiscal year (Hayes et al., 2012; Gormley, Matsa, and Milbourn, 2013). Importantly, the risk-taking incentives through the current portion of outstanding compensation have been shown in the literature to be quickly adjusted in response to regulatory changes (Low, 2009) or exogenous shocks to the risk environments of the firm (Gormley, Matsa, and Milbourn, 2013; Angelis, Grullon, and Michenaud, 2013) and can have a significant impact on the overall incentive compensation package (Hayes et al., 2012).[8]

D. Summary statistics

We present the summary statistics for variables used in the empirical analysis in Table 1. Panel A of Table 1 reports the summary statistics for the compensation-related variables. The Vega of current annual CEO compensation for an average (median) firm in our sample is 26.710 (6.672). The statistics are

[8] In unreported results, we find that the results are robust to risk-taking incentive measures based on CEO's complete equity portfolios (current + prior grants) although the statistical significance level drops. The findings are consistent with the conjecture that the existing portion of CEO's outstanding incentive compensation is costly and thus slow to be modified by the board.

broadly consistent in magnitude with those (29.264 (9.866)) reported in Hayes et al. (2012) who focus on a different sample period from 2002 to 2008. A detailed break-down of the equity-based incentive compensation indicates that stock options are the largest component of CEO's equity holdings. The value-based (number-based) portion of stock options represents approximately 70.0% (75.3%) of the newly-granted equity awards. In dollar terms, cash-component of CEO compensation, usually in the form of salaries and bonuses, constitute about 44.4% (37.7%) for an average (median) sample firm.

We also account for a comprehensive list of firm-specific characteristics and report their summary statistics in Panel B of Table 1. The firm size in our sample, measured with the book value of total assets, is relatively large with a sample mean (median) of $11,697 million ($1,438 million) since ExecuComp mostly covers large firms that are or have been the constituents of S&P 1500 index. The average (median) firm in our sample has a leverage ratio of 22.4% (20.2%), a market-to-book ratio of 1.989 (1.478), a return on assets (ROA) of 0.032 (0.043), and a tangible-to-total assets ratio of 0.272 (0.202). CEOs on average have served their company for 7.5 years and 56.2% of them are also the chairman of the board. We also follow the literature (Coles et al., 2006; Chava and Purnanandam, 2010) to measure a firm's investment and financing decisions which are related to their risk-taking behaviors. Specifically, an average firm invests 2.8%, 5.4%, and 14.2% of their total assets in research and development (R&D), capital expenditures, and liquid assets (cash holdings), and 74.1% of them engage in acquisitions of target firms from a different industry. The overall equity risk, measured with the annualized standard deviation of a firm's daily stock returns, is 42.6% (37.7%) for an average (median) firm in the sample.

Descriptive statistics for the state-level characteristics are presented in Panel D of Table 1. Regarding our key variable of interest, i.e. the generosity of the UI policy, an average state in our sample period permits a maximum amount of wage benefit of approximately $367 per week and that benefit allowance can be received by an eligible claimant for as long as 26 weeks. After taking the logarithm transformation, the mean (median) of *Log max total benefit*, which is calculated as the natural logarithm

of the product of the maximum amount of weekly benefit and the maximum benefit duration, is 9.117 (9.107) during the sample period of 1992 to 2013.

To account for local economic conditions that may be correlated with the evolution of state UI benefits, we calculate and control for GDP growth rate and unemployment rate in each state-year. The state in our sample period experiences an average (median) growth rate of 4.808% (4.922%) in GDP and suffers a mean (median) unemployment rate of 6.019% (5.400%).

III. Empirical results

A. Univariate analysis

A.1. Cross-sectional correlation

We start the empirical analysis with an exploration of the cross-sectional correlation between the provision of risk-taking incentives in CEO compensation contracts and several proxies for the labor unemployment risk at the industry or state level. Firms across different sectors might display a significant cross-industry difference in their propensity to dismiss workers. Their reliance on labor as a major input could also vary with technology vectors. If the board trades off the benefit of incentivizing managers to take risk and the cost of exposing workers to high unemployment risk, we should observe a lower level of risk-taking incentives provided in CEO compensation in those industries characterized with higher layoff propensity and labor intensity. We construct the proxy for layoff propensity as the long-run layoff separation rates from the US Bureau of Labor Statistics "Mass Layoff Statistics" following Agrawal and Matsa (2013). Specifically, the proxy is calculated as the ratio of workers affected by a mass layoff to total industry employment at the two-digit NAICS level. We also measure labor intensity by calculating the median ratio of total labor expenses (XLR) to sales (SALE) for all COMPUSTAT firms in each two-digit NAICS industry. Then we plot the industry average Vega, which is measured based on the CEO's complete equity portfolios, against these two industry characteristics in 2002, the middle year of the sample period. The results are presented in Figure 1 and 2.

Consistent with our prediction, we find a negative correlation between industry average Vega and layoff separation rate in Figure 1, suggesting that the board tends to provide less risk-taking incentive when the firm operates in sectors that face high layoff propensities that will expose workers to significant unemployment risk. The negative pattern is also observed in Figure 2 when we use labor intensity to capture the importance of labor in the technology inputs. The graphical evidence lends support to the argument that firms weigh the pros and cons when designing CEO incentive compensation and they tend to use less option-based compensation when the unemployment concern for workers is nontrivial.

Besides the industry-specific characteristics, a worker's exposure to unemployment risk is also affected by the generosity of state-level UI policy. A generous UI provision can to a large extent reduce the ex-post costs that workers experience during unemployment. Similar to Figure 1 and 2, we plot the average compensation Vega for firms operating in each state against its UI generosity in Figure 3A. We observe an obviously positive association between compensation Vega and state UI generosity measured by the natural logarithm of the maximum total unemployment insurance benefit under the state's unemployment insurance system. The positive correlation is consistent with the argument that more generous unemployment protections reduce workers' concern for unemployment risk and enable the firms to provide more risk-taking incentives for their managers. To ensure that the positive association between state average Vega and state UI benefit is not driven by omitted geographical factors, such as regional economic conditions, in Figure 3B we plot state mean Vega against the "placebo" UI generosity in the bordering states, which are presumably experiencing similar macroeconomic conditions. Interestingly, we observe no clear patterns in Figure 3B which reinforce our interpretation of the positive correlation observed in Figure 3A as the effect of labor unemployment risk on CEO incentive compensation.

A.2. Event study

To provide more dynamic evidence on how UI benefit affects the design of CEO incentive compensation, we conduct an event study designed on a treatment-and-control framework. Specifically, we define an event as state-year that experiences a large increase (15%) in the maximum amount of UI benefits and identify the treatment firms as those headquartered in the event state. To account for local

economic conditions that can affect both the UI provisions and the firms' compensation policy, we accompany the treatment firms with a control group of companies that are headquartered in states that are bordering to the event state but do not change their UI policy. The above identification strategy yields 19 state-years as events and 40 state-years as controls since multiple control states are matched in some cases. To the extent that regional economic conditions are similar among geographically-proximate states, the difference in the change of CEO compensation policy between the two groups around the regulatory change of UI policy can be only attributed to the reduced exposure to unemployment risk faced by workers in the treatment firms.

Table 2 presents the means of CEO compensation characteristics for firms in the treatment and control groups around the regulatory change of state UI policy. After the large increase in the generosity of UI provisions, firms headquartered in the event states significantly increase the level of risk-taking incentives (Vega) provided in the compensation package. The increase in pay convexity is not accompanied by an adjustment in the slope of relation between CEO pay and stock performance as it is evidenced by the insignificant change in compensation Delta. A further investigation on the source of increase in compensation Vega suggests that treatment firms reduce the use of fixed-claim component (salaries) as the method of payment and rely more on stock options in the design of CEO compensation. Interestingly, we observe no significant changes in both the level of incentives and the structure of compensation packages for the control firms. These results lend support to the conjecture that firms grant more risk-taking incentives in response to the reduced costs borne by workers in the treatment firms.

B. Baseline regressions

Although the event study analysis is straightforward and informative on how the generosity of state UI policy affects CEO compensation, it fails to account for firm-specific characteristics, such as growth opportunities and other attributes that are related to the demand for risk-taking, which could also have a significant impact on the provision of incentive compensation (Guay, 1999). To address the concern, we use standardized panel regression analysis to examine the relation between state UI generosity and the provision of risk-taking incentives in CEO compensation at the firm-level. Following

the previous literature on the design of CEO incentive compensation (Guay, 1999; Hayes et al., 2012; Gormley et al., 2013), we regress the level of risk-taking incentives (Vega) provided on the logarithm of state-level maximum UI benefits in the previous year while controlling for a comprehensive array of firm-, CEO-, and state-specific characteristics. Specifically, we estimate the following firm-panel regression:

$$Incentive_{i,s,t} = \alpha_1 Log\ max\ total\ benefit_{s,t-1} + X_{i,s,t}\beta + Y_{s,t}\gamma + v_i + w_t + \varepsilon_{i,s,t} \qquad (1)$$

where $Incentive_{i,s,t}$ represents the level of risk-taking incentives provided by the current compensation at firm *i* in state *s* and year *t* and *Log max total benefit*$_{s,t-1}$ denotes the logarithm of maximum UI benefits in the previous year. We also control for a bunch of contemporaneous firm-specific attributes ($X_{i,s,t}$) and state-level characteristics ($Y_{s,t}$) that may be correlated with CEO compensation policy. A further inclusion of firm fixed effects (v_i) in the regression accounts for those omitted firm-specific but time-invariant attributes and the year fixed effects (w_t) can capture economic-wide trends, such as macroeconomic conditions.

The baseline regression results estimating equation (1) are reported in Table 3. The results in Table 3 suggest that increases in the generosity of UI benefit are positively associated with *Flow Vega*. The magnitude of the coefficient estimates indicates that the adjustment in the convexity of CEO compensation after the change in UI policy is both statistically significant and economically meaningful. Using the coefficient estimates in column (2), we find that a one-standard-deviation increases in the logarithms of maximum UI benefits lead to a 19.3% increase in the risk-taking incentives provided in the current annual compensation packages. In all, the results from multivariate regressions confirm the findings from event study that the board raises the level of risk-taking incentives in CEO's annual compensation package in response to workers' reduced exposure to the unemployment risk due to the increased generosity of state UI policy.

C. Compensation structure

In this section, we explore the shift in CEO compensation structure that results in the change of risk-taking incentives provided in the annual compensation after the UI policy change. Traditional

literature emphasize the crucial role of stock options characterized with convex payoff structure in mitigating CEO risk aversion and inducing greater risk-taking behaviors (Jensen and Meckling, 1976; Smith and Stulz, 1985; Guay, 1999). Recent work by Kadan and Swinkels (2008) examines the trade-off between options and stocks in inducing CEO efforts at different levels of nonviability risk. We focus on the differentiated impact of option and stock awards on managerial risk attitudes by examining the structure of new equity grants awarded to the CEO after the UI policy change. Specifically, we calculate the proportion (both number- and value-based) of stock options in the newly-granted equity packages. If the convexity payoff structure of stock options is utilized to encourage more risk-taking activities, we should observe a significant shift toward the use of stock options in new equity awards after the decrease in workers' unemployment risk. The regression results testing the above conjecture are presented in Table 4.

The result using the value-based portion of stock options in the new equity awards as dependent variable is presented in column (1) of Table 4 while the result based on the number-based measure is reported in column (2). We find a significant and positive coefficient on the key variable of interest, i.e. the generosity of state-level UI provision in the previous year. The board tends to rely more on stock options when designing the equity award after an increase in state UI benefits. The results in Table 4 are in parallel with the baseline findings and suggest that a significant shift toward stock options in the composition of new equity awards contributes to the increase in the risk-taking incentives provided in the annual CEO compensation package after more generous UI policy is approved.

D. Robustness checks

So far, we have established a positive link between the generosity of state UI policy and the convex payoff structure and composition of CEO's annual compensation. In this section, we conduct a comprehensive list of sensitivity tests to warrant that our findings are robust to different sampling strategies and alternative risk-taking incentive measures. Specifically, we re-estimate the baseline regressions on samples excluding fiscal years when a CEO turnover is experienced so that the CEO pay is significantly affected by the severance package and not comparable with normal periods. We also run the

robustness test by dropping firms in the financial and utility industries since these firms are regulated. To further alleviate the concern that the UI provision is based on the location of workplace and a firm might have workers in different states, we exclude firms operating in industries characterized with geographically-dispersed workforce where the proxy for UI benefits is more likely to suffer measurement error (Agrawal and Matsa, 2013).

We also conduct a battery of sensitivity tests utilizing alternative measures for risk-taking incentives. In particular, we transform the dependent variable into logarithmic form (Low, 2009) and also scale annual Vega with the sensitivities of CEO's pay to changes in stock price (Delta) since Delta may have different implications for managerial risk attitude (Dittmann and Yu, 2010). At last, we alternatively measure the risk-taking incentives among the top management team instead of focusing only on individual CEOs (Armstrong, Larcker, Ormazabal, and Taylor, 2013). The robustness check results utilizing different sampling methods and alternative incentive measures are presented in Panel A and Panel B of Table 5 respectively.

The regression results in Panel A of Table 5 indicate that our findings are not sensitive to sampling methodologies as evidenced by the similar coefficient estimates of *Log max total benefi*$_{t-1}$ in both statistical significance and economic magnitude. Furthermore, the positive relation between UI generosity and Flow Vega survives measuring risk-taking incentive in alternative ways. Specifically, the results in Panel B suggest that the positive relationship documented above is still highly significant when we measure Flow Vega in log forms, scale it with Flow Delta, or calculate the measure among the top managerial teams. In all, the results from these sensitivity tests help us identify a clear and robust link between workers' exposure to unemployment risk and the level of risk-taking incentives provided in annual CEO compensation package.

E. Falsification tests

Another important concern with our findings is whether the positive relation between UI generosity and annual compensation Vega we documented above can be interpreted as causality or is merely spurious association due to endogeneity. One possibility of such endogeneity concern is that some

unobservable factors, such as local investment opportunities or regional unemployment conditions, can result in changes in both state UI laws and the design of managerial incentive compensation. We take several steps to address the above issue. First, it is not clear that poor investment opportunities and high unemployment rate, which are common reasons for adoption of more generous UI policy, should lead to more provision of risk-taking incentives in CEO compensation packages. Second, we have included state-level GDP growth rate and unemployment rate as control variables in all regressions. Nonetheless, we further address the issue by conducting two falsification tests. Specifically, we utilize the different timing of UI policy change and the change of UI policy in bordering states and use them as "false identification" for our experiments. If the adjustment of compensation Vega is *caused* by the change of workers' exposure to unemployment risk, then we should only observe a significant relationship between Flow Vega and maximum UI benefits in previous years, not contemporaneous or leading values of UI benefits. Moreover, the UI policy of a firm's bordering states, which are supposed to suffer from similar economic conditions, will have a similar impact on the provision of risk-taking incentives if the results are simply driven by omitted local economic conditions. The regression results examining the above conjecture are presented in Table 6.

Column (1) of Table 6 reports the result from regression that includes the maximum amount of UI benefits in previous year, contemporaneous year, and one year forward. We find that only the lagged UI benefits have a significantly positive impact on Flow Vega, which is consistent with the conjecture that the adjustment of CEO incentive compensation is made only *after* the change in state UI policy rather than in a reverse manner. Moreover, we further show that the provision of UI benefits in a firm's bordering states does not have any significant impact on its annual Vega no matter we include the values of UI benefits in bordering states together with that of a firm's headquartered state (column (2)) or in a separate manner (column (3)). The findings rule out alternative interpretations that some omitted local economic factors are responsible for the change in both UI policy and the design of CEO compensation since geographically-proximate states tend to have quite similar economic conditions. In all, the results from these falsification tests reinforce our ability to interpret the findings as causality.

F. Cross-sectional variation

So far, we have identified a positive link between Flow Vega and lagged UI generosity and have conducted several additional tests to reinforce a robust and causal interpretation of the findings. In subsequent analysis, we aim to explore the hypothetical mechanisms of the findings, i.e. workers' exposure to unemployment risk. We try to explore whether the positive relation we have documented displays any cross-sectional variations regarding a firm's labor market characteristics and its relationship with the labor as our hypothesis would predict. By doing so, we contribute to a better understanding of the issue by identifying the specific channels through which the provision of UI generosity affects CEO incentive compensation.

F.1. Labor market characteristics

According to our hypothesis, more generous UI provisions should lead to an upward adjustment in the provided risk-taking incentives through their effects on employees' exposure to unemployment risk. Specifically, the reduction in expected costs during unemployment for workers enables the board to grant more risk incentives to the CEO and to better align the interests between shareholders and managers. If the conjecture is correct, we should expect the effect to be more pronounced for firms operating in industries in which the unemployment concern is more salient or the labor expenses represent a crucial portion of operational costs. We empirically evaluate the hypothesis by utilizing some labor market characteristics to proxy for the expected layoff concern and the importance of labor in a firm's production technology. Following Agrawal and Matsa (2013), we measure layoff propensity by the ratio of workers affected by a mass layoff to total industry employment based on three-digit NAICS industries. As for labor intensity, we compute the median ratio of total labor expenses (XLR) to sales (SALE) for all COMPUSTAT firms based on three-digit NAICS industries in the whole sample period. Then we re-estimate the baseline regressions by including an additional interaction term between the labor market characteristic proxy and *Log max total benefit*$_{t-1}$. It is worth noting that the labor market measure is estimated for each industry over the whole sample period. Therefore, the inclusion of firm fixed effects in

the regression would subsume the dummy indicator for both labor market proxies. The regression results are reported in Columns (1) and (2) of Table 7.

As we can see from the results, the loadings of both interaction terms are positive and highly significant, which indicates that the positive link between lagged generosity of UI provisions and newly provided Vega is stronger in firms that experience more frequent layoffs or in which the labor force is relatively more important. The cross-sectional variation results related to labor market characteristics reinforce our argument that the provision of UI benefits affects CEO incentive pay through their impact on labor-related factors, i.e. the expected unemployment costs faced by employees.

Another prominent feature of labor relations is the presence of collective bargaining, usually in the form of labor unions. Unionized workers can significantly improve their bargaining power with the firm and thus have a crucial impact on major corporate decisions, such as leverage (Matsa, 2010), cash holdings (Klasa, Maxwell, and Ortiz-Molina, 2009), and earning management (Bova, 2013). As indicated in previously mentioned comment letters to the SEC by AFL-CIO, the largest labor federation in the US, labor unions strongly oppose the use of stock options as a form of incentive-based compensation to the CEOs, mostly due to their impact on the risk environment and financial stability of the firm. Agrawal (2012) also highlights the divergent objective functions of labor union pension funds to pursue worker interests, rather than maximize shareholder value. Accordingly, we hypothesize that unionized workers represented by collective bargaining agreements could mitigate the board's ability to make prompt and significant adjustment in the newly provided risk incentive for the CEOs after the UI policy change. To evaluate the above conjecture, we collect the industry-level unionization rates from the Union Membership and Coverage Database and measure the presence of labor unions by the average percentage of total workers in each three-digit Census Industry Classification industry that are represented by collective bargaining agreements over the whole sample period. Based on the continuous measure, we create a dummy indicator, *High labor union*, which equals 1 if the industry unionization rates are above the sample median and 0 otherwise. We include the interaction term between *Log max total benefit*$_{t-1}$ and *High labor union* in the regression and present the results in column (3) of Table 7.

The regression results suggest that strong labor unions can attenuate the positive relationship between *Flow Vega* and *Log max total benefit*$_{t-1}$, as evidenced by the significantly negative coefficient estimates of the interaction term. The results uncover the impact of labor unions on another important corporate policy, i.e. the design of managerial incentive-based compensation, and highlight the conflicted preference between diversified shareholders and rank-and-file employees over the optimal risk environment of the firm. It also points out the externality of the risk-taking incentives inherent in CEO's incentive compensation on the interests of other non-financial stakeholder that interact with the firm, such as labor forces.

F.2. CEO risk aversion

The demand for incentivizing CEOs through option-based compensation might also vary across firms since managers could exhibit different level of risk aversions. Undiversified CEOs who invest most of their human capital in the underlying firm tend to pass up risky but positive-NPV investments. The risk aversion is exaggerated when the manager's wealth is also sensitive to the stock prices (Delta) as documented in Knopf, Nam, and Thornton (2002). The CEO's appetite for risky investments is also reduced when the CEO becomes older as theoretically predicted by Prendergast and Stole (1996) and empirically verified in Serfling (2014). Therefore, we expect the adjustment in CEO incentive compensation after the UI benefit increase to be more pronounced when the human capital of the CEO is more closely tied to the underlying firm or when the CEO is relatively older.

To capture the extent to which a CEO's wealth is tied to the underlying firm, we calculate the compensation Delta, which is measured as the CEO's dollar change in wealth for a 0.01 increase in the firm's stock price based on the complete equity portfolios held by the CEO. Accordingly, we construct a *High Delta* indicator, which equals 1 if the continuous *Delta* measure is above the sample median and 0 otherwise, and then interact the dummy variable with *Log max total benefit*$_{t-1}$ in the baseline regression. Similarly, we construct an *Old CEO* dummy variable which is equal to 1 if the CEO age is above the sample median and 0 otherwise and its interaction term with UI benefits. The regression results are reported in Table 8.

We find that the adjustment in CEO incentive compensation after the UI benefit increase is more pronounced when the human capital of the CEO is more closely tied to the firm or when the CEO is relatively older, as evidenced by the positive and significant coefficient of the interaction term in columns (1) and (2) of Table 8. These results are consistent with the notion that option-based compensation that provides more risk-taking incentives is used to overcome managerial risk aversion after the increase in UI benefits and such adjustment in CEO incentive compensation is stronger when the benefits of incentivizing the CEO is higher.

G. Further discussion

Two questions immediately arise from the positive effect of UI benefits on the provision of risk-taking incentives in CEO compensation. The first one is whether firms respond to the change by investing in more risky projects afterwards. And if so, whether the upward adjustment in risk-taking activities helps the firm deliver superior operating performance would be another worthwhile investigation. We aim to examine these issues in this section.

Regarding the first question, we re-visit the relationship between CEO incentive compensation and corporate risk-taking behaviors in the context of the paper. Although a comprehensive literature have documented a positive impact of compensation risk-taking incentives on corporate risk, early studies examining static and cross-sectional evidence are plagued by endogeneity concerns and recent works attempt to establish causality by utilizing exogenous shocks to a firm's risk environment or regulatory regimes (see Gormley, Matsa, and Milbourn (2013) for a comprehensive review of the relevant literature). In additional analysis, we empirically evaluate whether CEOs response to the upward adjustment of risk-taking incentives provided in their annual compensation packages by making riskier investment and financing decisions after the increased generosity of UI policy. Specifically, we follow the literature (Coles, Daniel, and Naveen, 2006) and use several proxies to measure a firm's risk-taking behaviors in the future. The specific measures include a firm's investment decisions (R&D, capital expenditures, and acquisitions), liquidity policy (cash holdings), and equity risk (stock return volatility). We also borrow the insights from Agrawal and Matsa (2013) and use corporate leverage ratio as an additional outcome

variable. We then regress those one-year forward risk-taking proxies on lagged UI generosity measure in two subsamples based on whether the currently-provided risk-taking incentives (Flow Vega) is above the sample median or not. The regression results are presented in Table 9.

Panel A (B) of Table 9 presents the results in subsamples where Flow Vega is above (below) the sample median. An increase in firms' risk-taking behaviors is observed following the increase in state maximum UI benefits, but the increase is only statistically significant when the newly-provided incentive is relatively high. Specifically, when the board grants higher risk-taking incentives in the annual compensation arrangements, the results in Panel A indicate that the firms significantly increase R&D expenses, reduce capital expenditures, cash holdings, and the engagement in diversifying acquisitions. All these risky investment and financing policies lead to a surge in the firm's equity risk as evidenced by the significantly positive coefficient estimate of *Log (Stock return volatility)*$_{t+1}$. However, none of these patterns are significantly observed when the newly-granted incentives are relatively low, as indicated by the insignificant coefficient estimates of the UI generosity measure in Panel B. In column (6) of Table 9, we confirm the findings in Agrawal and Matsa (2013) that higher unemployment benefits lead to increased corporate leverage ratios, but again the increase in leverage ratios is more pronounced when more risk-taking incentives have been granted to the CEO.

The results from these additional analyses have two important implications. First, it points out that the provision of incentive compensation is an important mechanism for firms to adjust to their optimal risk environment after the shock to the labor unemployment risk. The results confirm the hypothetical motivation by showing that firms do make riskier corporate decisions after the regulatory shock. Second, the results together with those findings described above enable us to bridge two important and connected questions together, namely the optimal design of incentive contracts and the economic consequences of managerial risk-taking incentives on corporate investment and financial policies.

Lastly, we speak to the value implication of the adjustment in CEO incentive compensation by examining the firm's operating performance in the future. If the provision of incentives in CEO compensation helps the firm adjust to its optimal risk environment, we should observe an improvement in

firm's operating performance in the future. We empirically test the prediction by regressing future operating performance on state UI benefits. To evaluate the important role of CEO incentive compensation, we split the sample based on whether the newly provided Vega is above the sample median or not. The regression results are reported in Table 10. Consistently, we find that firms experience a significant improvement in future operating performance, measured either by raw ROA or industry-adjusted ROA, even after we control for contemporaneous performance measure. Similar to previous findings on future risk-taking activities, the improvement in future operating performance is more pronounced for firms that have provided their CEOs with more risk-taking incentives, suggesting that the restructured incentive compensation structure after the UI benefit change help the firm deliver improved operating performance by inducing desired level of risky investments.

IV. Conclusions

In this paper, we uncover the important impact of a salient attribute of labor market frictions, i.e. labor unemployment risk, on the design of CEO's incentive compensation. We hypothesize the trade-off in the usage of option-based compensation to mitigate managerial risk aversion, align interests and its negative effect to expose employees to significant unemployment risk.

Utilizing state-level changes in unemployment insurance benefits as a source of variation in the unemployment costs faced by employees, we find that, after unemployment insurance benefits increase, boards adjust the compensation structure and provide managers with more stock option grants that result in more convexity payoffs. The increase in convexity payoff structures is more pronounced in labor-intensive industries and industries that have higher layoff propensity, but is significantly attenuated when strong labor unions are present. The results are also stronger when CEO's wealth is more closed tied to the underlying firm or when the CEO is older. Finally, we show that the increase in convexity payoff from option-based compensation induces firms to engage in more risk-taking activities that deliver improved operating performance after the increase in unemployment benefits. Our study fills the gap in

the relevant literature by incorporating the role of an important group of a firm's non-financial stakeholders, i.e. rank and file employees, in the design of optimal managerial compensation.

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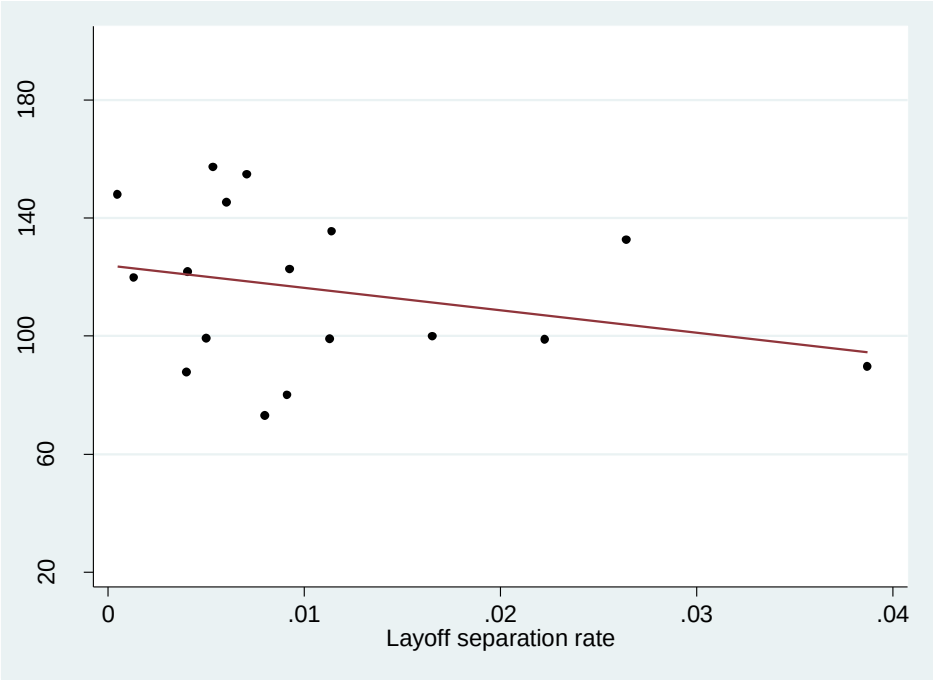

Figure 1. Industry average Vega and layoff separation rate

This figure plots the cross-sectional correlation between industry average Vega and long-run layoff separation rate at the two-digit NAICS level in 2002. Vega is calculated as the CEO's dollar change in wealth for a 0.01 increase in the annualized standard deviation of firm's stock returns based on the CEO's complete equity portfolios. Layoff separation rate is the ratio of workers affected by a mass layoff to total industry employment following Agrawal and Matsa (2013).

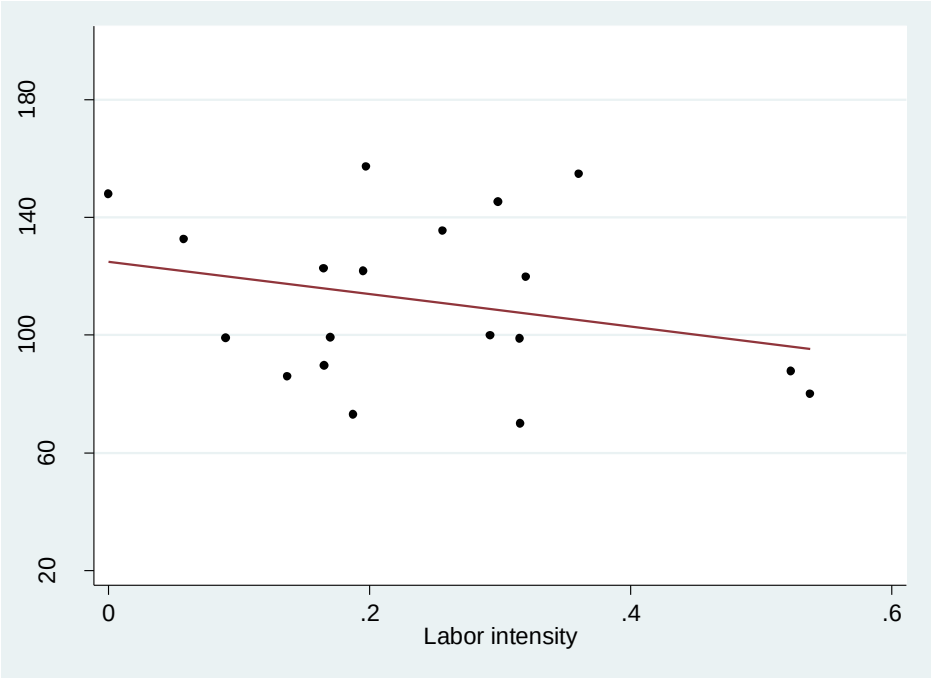

Figure 2. Industry average Vega and labor intensity

This figure plots the cross-sectional correlation between industry average Vega and long-run labor intensity at the two-digit NAICS level in 2002. Vega is calculated as the CEO's dollar change in wealth for a 0.01 increase in the annualized standard deviation of firm's stock returns based on the CEO's complete equity portfolios. Labor intensity is measured as the median ratio of total labor expenses (XLR) to sales (SALE) for all COMPUSTAT firms in each two-digit NAICS industry.

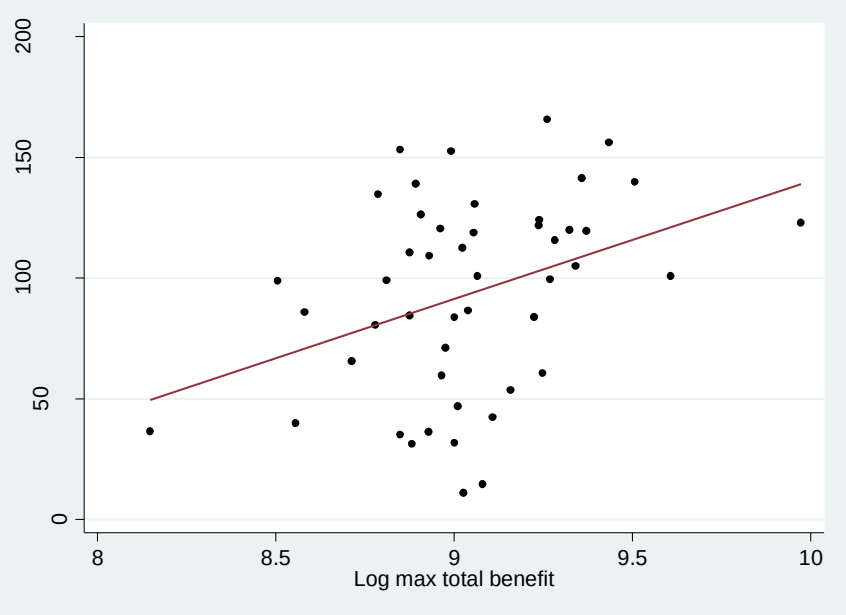

Figure 3A. State average Vega and maximum UI benefits

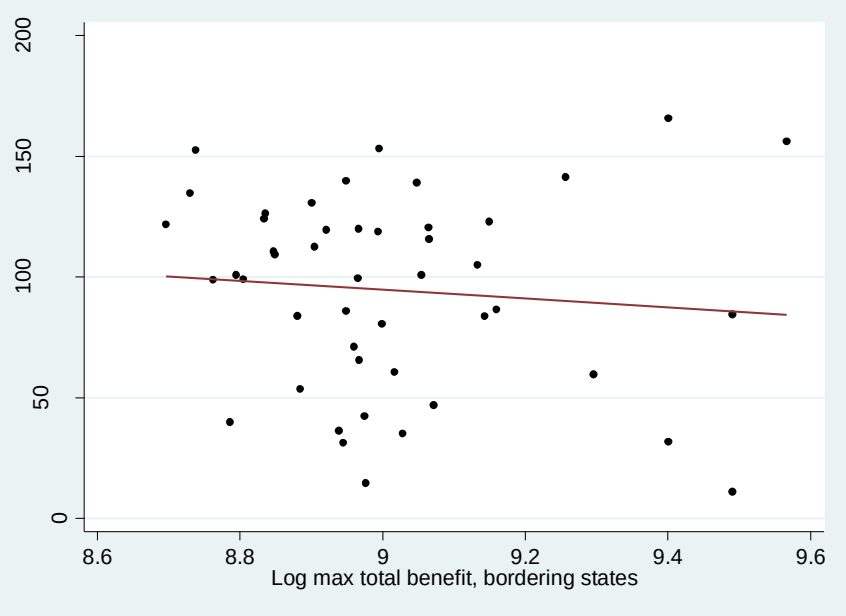

Figure 3B. State average Vega and maximum UI benefits: placebo

This figure plots the cross-sectional correlation between state average Vega and the logarithm of state maximum UI benefits in 2002. Figure 3A and 3B plots the state average Vega against the UI policy in the headquarter state and its bordering states, respectively. Vega is calculated as the CEO's dollar change in wealth for a 0.01 increase in the annualized standard deviation of firm's stock returns based on the CEO's complete equity portfolios. Log max total benefit is the natural logarithm of the maximum total unemployment insurance benefit under the state's unemployment insurance system.

Table 1. Summary statistics

The table presents the summary statistics for variables used in the paper. The sample consists of 33,850 firm-year observations covered by the COMPUSTAT ExecuComp database from 1992 to 2013. Panel A, B, and C presents the summary statistics for the CEO compensation variables, firm-, and state-level characteristics, respectively. Variable definitions are in Appendix A.

Panel A: CEO compensation

	N	Mean	Std	Q1	Median	Q3
Flow Vega	33850	26.710	52.149	0.000	6.672	27.399
Options/Equity (value)	27068	0.700	0.391	0.399	1.000	1.000
Options/Equity (number)	27068	0.753	0.370	0.645	1.000	1.000
Cash compensation	33850	0.444	0.297	0.192	0.377	0.661

Panel B: Firm-level characteristics

	N	Mean	Std	Q1	Median	Q3
Size (in $mil)	33850	11697	65780	459	1438	5191
Log(Size)	33850	7.416	1.783	6.131	7.271	8.555
Leverage	33850	0.224	0.201	0.057	0.202	0.338
MB ratio	33850	1.989	1.919	1.135	1.478	2.174
ROA	33850	0.032	0.157	0.012	0.043	0.082
Tangibility	33850	0.272	0.239	0.077	0.202	0.415
Tenure	33850	7.500	7.280	2.000	5.000	10.000
CEO chairman	33850	0.562	0.496	0.000	1.000	1.000
R&D	31093	0.028	0.053	0.000	0.000	0.030
CAPEX	29783	0.054	0.053	0.019	0.039	0.071
Cash	31079	0.142	0.167	0.022	0.071	0.202
Stock return volatility	33468	0.426	0.208	0.278	0.377	0.521
Diversifying acquisitions	10338	0.741	0.438	0.000	1.000	1.000

Panel C: State-level characteristics

	N	Mean	Std	Q1	Median	Q3
Max weekly benefit (in $)	33850	366.928	127.952	275	347	438
Max duration (in weeks)	33850	26.207	0.955	26	26	26
Max total benefit (in $)	33850	9679.641	3749.975	7150	9022	11388
Log max total benefit	33850	9.117	0.339	8.875	9.107	9.340
GDP growth rate	33850	4.808	2.850	3.441	4.922	6.631
Unemployment rate	33850	6.019	2.005	4.600	5.400	6.900

Table 2. Labor unemployment risk and CEO incentive compensation: event study

The table presents the means of CEO compensation characteristics for firms in the treatment and control groups. The treatment firms are those headquartered in state-years that experience a large increase (15%) in the maximum amount of UI benefits. The control firms are those headquartered in the neighboring state that does not change the unemployment insurance policy. Panel A and B present the change in CEO compensation characteristics for the treatment and control firms, respectively. Salary, bonus, cash, option, stock, and equity are the proportion of each compensation-category in the CEO pay packages. Other variable definitions are in Appendix A. ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% level, respectively.

Panel A: Treatment firms

	Before the increase		After the increase		
	N	Mean	N	Mean	Differences
CEO compensation incentives					
Flow Vega	748	38.416	737	49.251	-10.834** (0.049)
Flow Delta	748	73.425	737	75.296	-1.871 (0.845)
CEO compensation structure					
Salary	746	0.305	737	0.279	0.026** (0.046)
Bonus	746	0.165	737	0.158	0.007 (0.403)
Cash	746	0.470	737	0.437	0.033** (0.034)
Option	746	0.407	737	0.440	-0.033** (0.028)
Stock	746	0.047	737	0.049	-0.001 (0.772)
Equity	746	0.455	737	0.490	-0.035** (0.038)

Panel B: Control firms

	Before the increase		After the increase		
	N	Mean	N	Mean	Differences
CEO compensation incentives					
Flow Vega	804	25.510	844	22.661	2.848 (0.221)
Flow Delta	804	34.155	844	34.003	0.152 (0.959)
CEO compensation structure					
Salary	803	0.328	843	0.322	0.005 (0.627)
Bonus	803	0.152	843	0.144	0.008 (0.335)
Cash	803	0.480	843	0.467	0.013 (0.333)
Option	803	0.316	843	0.325	-0.009 (0.538)
Stock	803	0.090	843	0.086	0.004 (0.612)
Equity	803	0.406	843	0.411	-0.004 (0.741)

Table 3. Labor unemployment risk and CEO incentive compensation: baseline regressions

The table presents the results from regressions of CEO risk-taking incentives on the natural log of the maximum UI benefits in the previous year. The dependent variable is the Flow Vega defined as the CEO's dollar change in wealth for a 0.01 increase in the annualized standard deviation of firm's stock returns based on the CEO's equity grants in the current fiscal year. Other variable definitions are in Appendix A. In parentheses are p-values based on standard errors adjusted for heteroskedasticity (White, 1980) and clustering at the state level (Petersen, 2009). ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% level, respectively. We control for firm and year fixed effects in all regressions, whose coefficient estimates are suppressed.

	(1)	(2)
Dependent variables	Flow Vega	Flow Vega
Log max total benefit$_{t-1}$	14.124***	15.212***
	(0.009)	(0.005)
Log(Size)	10.865***	10.851***
	(0.000)	(0.000)
Leverage	-6.910**	-6.823**
	(0.031)	(0.033)
MB ratio	2.369***	2.346***
	(0.000)	(0.000)
ROA	3.118**	3.098**
	(0.032)	(0.029)
Tangibility	-14.640**	-14.428**
	(0.013)	(0.016)
Tenure	0.066	0.067
	(0.208)	(0.209)
CEO chairman	0.026	0.052
	(0.972)	(0.943)
Cash compensation	-59.491***	-59.682***
	(0.000)	(0.000)
GDP growth rate		0.349*
		(0.063)
Unemployment rate		0.165
		(0.654)
Intercept	-154.645***	-167.319***
	(0.001)	(0.001)
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	34,057	33,850
Adjusted R-squared	0.484	0.484

Table 4. Labor unemployment risk and CEO compensation structure

The table presents the results from regressions of CEO equity-based compensation structure on the natural log of the maximum UI benefits in the previous year. The dependent variable in column (1) is the value of stock options granted to the CEO scaled by the total value of equity grants in the current fiscal year. The dependent variable in column (2) is the number of stock options granted to the CEO scaled by the total number of equity grants in the current fiscal year. Other variable definitions are in Appendix A. In parentheses are p-values based on standard errors adjusted for heteroskedasticity (White, 1980) and clustering at the state level (Petersen, 2009). ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% level, respectively. We control for firm and year fixed effects in all regressions, whose coefficient estimates are suppressed.

	(1)	(2)
Dependent variables	Options/Equity (value)	Options/Equity (number)
Log max total benefit$_{t-1}$	0.110***	0.098***
	(0.000)	(0.000)
Log(Size)	-0.001	0.004
	(0.853)	(0.277)
Leverage	0.029*	0.035**
	(0.072)	(0.024)
MB ratio	0.005***	0.002
	(0.001)	(0.246)
ROA	0.013	0.013
	(0.402)	(0.376)
Tangibility	-0.000	-0.042
	(0.987)	(0.132)
Tenure	0.001	-0.000
	(0.161)	(0.631)
CEO chairman	-0.000	0.001
	(0.933)	(0.796)
Cash compensation	-0.014	-0.065***
	(0.210)	(0.000)
GDP growth rate	0.001	0.001
	(0.248)	(0.290)
Unemployment rate	-0.002	-0.002
	(0.314)	(0.496)
Intercept	-0.079	0.053
	(0.691)	(0.784)
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	27,068	27,068
Adjusted R-squared	0.539	0.514

Table 5. Labor unemployment risk and CEO incentive compensation: robustness checks

The table presents the results from robustness checks. Panel A and B present the results from robustness checks using alternative sampling methods and alternative risk-taking measures, respectively. CEO turnover years are defined as firm-years when a CEO turnover is observed. Dispersed industries are defined as those industries in which the workforce is likely to be geographically dispersed, namely retail, wholesale, and transport. Flow Vega Team is the flow-based risk-taking incentive measures for the top management team. Other variable definitions are in Appendix A. In parentheses are p-values based on standard errors adjusted for heteroskedasticity (White, 1980) and clustering at the state level (Petersen, 2009). ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% level, respectively. We control for firm and year fixed effects in all regressions, whose coefficient estimates are suppressed.

Panel A: alternative sampling methods

	(1)	(2)	(3)
Sample	Exclude CEO turnover years	Exclude financial and utility	Exclude dispersed industries
Dependent variables	Flow Vega	Flow Vega	Flow Vega
Log max total benefit$_{t-1}$	15.507***	15.154***	15.288***
	(0.000)	(0.008)	(0.006)
Log(Size)	11.665***	11.151***	10.920***
	(0.000)	(0.000)	(0.000)
Leverage	-5.446*	-8.104***	-7.033**
	(0.095)	(0.003)	(0.023)
MB ratio	3.170***	2.414***	2.316***
	(0.000)	(0.000)	(0.000)
ROA	3.178	1.763	3.191**
	(0.109)	(0.262)	(0.030)
Tangibility	-12.224	-16.398***	-16.043**
	(0.121)	(0.009)	(0.020)
Tenure	0.138**	0.014	0.050
	(0.030)	(0.872)	(0.390)
CEO chairman	1.671*	-0.043	0.320
	(0.073)	(0.963)	(0.646)
Cash compensation	-60.995***	-58.893***	-59.502***
	(0.000)	(0.000)	(0.000)
GDP growth rate	0.212	0.296**	0.488**
	(0.152)	(0.028)	(0.016)
Unemployment rate	0.229	-0.046	0.457
	(0.590)	(0.924)	(0.421)
Intercept	-200.815***	-163.095***	-171.498***
	(0.000)	(0.002)	(0.001)
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	27,119	27,229	29,711
Adjusted R-squared	0.512	0.488	0.485

Panel B: alternative incentive measures

	(1)	(2)	(3)
Dependent variables	LN(1+Flow Vega)	Flow Vega/Flow Delta	Flow Vega Team
Log max total benefit$_{t-1}$	0.479***	0.171***	9.230**
	(0.000)	(0.001)	(0.025)
Log(Size)	0.284***	0.088***	7.163***
	(0.000)	(0.000)	(0.000)
Leverage	-0.085	0.179**	-4.022**
	(0.348)	(0.049)	(0.027)
MB ratio	0.021***	-0.014**	1.458***
	(0.000)	(0.017)	(0.000)
ROA	0.134**	0.032	1.453
	(0.017)	(0.615)	(0.124)
Tangibility	-0.351	0.014	-7.757**
	(0.125)	(0.884)	(0.017)
Tenure	-0.004*	-0.002*	0.135**
	(0.061)	(0.070)	(0.037)
CEO chairman	-0.001	0.007	-1.456*
	(0.981)	(0.590)	(0.091)
Cash compensation	-3.428***	0.598***	-22.493***
	(0.000)	(0.000)	(0.000)
GDP growth rate	0.005	-0.003	0.263***
	(0.279)	(0.184)	(0.005)
Unemployment rate	0.000	-0.006	0.430
	(0.980)	(0.315)	(0.216)
Intercept	-2.652***	-1.596***	-116.847***
	(0.003)	(0.001)	(0.004)
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	33,850	27,068	33,850
Adjusted R-squared	0.643	0.327	0.372

Table 6. Labor unemployment risk and CEO incentive compensation: falsification tests

The table presents the results from falsification tests. Column (1) presents the results from regressions of CEO's risk-taking incentives on the 1-year lagged, contemporaneous, and 1-year forward values of the natural log of the maximum UI benefits. Columns (2) and (3) present results from regressions of CEO's risk-taking incentives on the natural log of the maximum UI benefits in the previous year and/or the average of the natural log of the maximum UI benefits in the bordering states. Other variable definitions are in Appendix A. In parentheses are p-values based on standard errors adjusted for heteroskedasticity (White, 1980) and clustering at the state level (Petersen, 2009). ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% level, respectively. We control for firm and year fixed effects in all regressions, whose coefficient estimates are suppressed.

	(1)	(2)	(3)
Dependent variables	Flow Vega	Flow Vega	Flow Vega
Log max total benefit$_{t-1}$	13.598***	15.153***	
	(0.007)	(0.006)	
Log max total benefit$_{t}$	-7.046		
	(0.291)		
Log max total benefit$_{t+1}$	10.780		
	(0.236)		
Log max total benefit$_{t-1}$, bordering states average		-11.702	-12.106
		(0.318)	(0.342)
Log(Size)	11.171***	10.846***	10.867***
	(0.000)	(0.000)	(0.000)
Leverage	-7.928**	-6.813**	-6.616**
	(0.015)	(0.034)	(0.040)
MB ratio	2.331***	2.347***	2.291***
	(0.000)	(0.000)	(0.000)
ROA	3.051**	3.131**	3.319**
	(0.021)	(0.025)	(0.018)
Tangibility	-13.818**	-14.399**	-14.422**
	(0.015)	(0.016)	(0.017)
Tenure	0.060	0.066	0.062
	(0.294)	(0.214)	(0.246)
CEO chairman	-0.083	0.042	0.045
	(0.906)	(0.954)	(0.951)
Cash compensation	-60.316***	-59.672***	-59.568***
	(0.000)	(0.000)	(0.000)
GDP growth rate	0.334*	0.342*	0.290
	(0.076)	(0.070)	(0.131)
Unemployment rate	0.102	0.099	0.059
	(0.775)	(0.791)	(0.887)
Intercept	-187.246***	-64.379	72.739
	(0.002)	(0.533)	(0.508)
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	32,724	33,850	33,850
Adjusted R-squared	0.487	0.484	0.483

Table 7. Labor unemployment risk and CEO incentive compensation: labor market characteristics

The table presents the results from regressions of CEO risk-taking incentives on the natural log of the maximum UI benefits in the previous year. Layoff propensity is the ratio of workers affected by a mass layoff to total industry employment based on three-digit NAICS industries following Agrawal and Matsa (2013). Labor intensity is measured as the median ratio of total labor expenses (XLR) to sales (SALE) for COMPUSTAT firms based on three-digit NAICS industries. Labor union is calculated as the percentage of total workers in a 3-digit Census Industry Classification (CIC) industry that are represented by unions in collective bargaining agreements. Other variable definitions are in Appendix A. In parentheses are p-values based on standard errors adjusted for heteroskedasticity (White, 1980) and clustering at the state level (Petersen, 2009). ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% level, respectively. We control for firm and year fixed effects in all regressions, whose coefficient estimates are suppressed.

	(1)	(2)	(3)
Dependent variables	Flow Vega	Flow Vega	Flow Vega
Log max total benefit$_{t-1}$	7.991**	11.962***	17.107***
	(0.041)	(0.000)	(0.000)
Log max total benefit$_{t-1}$*High layoff propensity	10.448***		
	(0.000)		
Log max total benefit$_{t-1}$*High labor intensity		8.272***	
		(0.002)	
Log max total benefitt-1*High labor union			-5.674**
			(0.045)
Log(Size)	11.005***	10.813***	10.730***
	(0.000)	(0.000)	(0.000)
Leverage	-6.867***	-6.579***	-7.789***
	(0.000)	(0.000)	(0.000)
MB ratio	2.369***	2.306***	2.325***
	(0.000)	(0.000)	(0.000)
ROA	3.235**	3.133**	3.277**
	(0.038)	(0.039)	(0.030)
Tangibility	-14.004***	-15.085***	-14.491***
	(0.000)	(0.000)	(0.000)
Tenure	0.024	0.061	0.054
	(0.644)	(0.216)	(0.284)
CEO chairman	0.272	0.143	0.010
	(0.668)	(0.815)	(0.988)
Cash compensation	-59.883***	-59.528***	-58.986***
	(0.000)	(0.000)	(0.000)
GDP growth rate	0.371***	0.363***	0.327***
	(0.002)	(0.002)	(0.007)
Unemployment rate	0.334	0.219	0.304
	(0.265)	(0.456)	(0.319)
Intercept	-164.277***	-176.682***	-158.535***
	(0.000)	(0.000)	(0.000)
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	32,174	33,631	31,703
Adjusted R-squared	0.483	0.485	0.484

Table 8. Labor unemployment risk and CEO incentive compensation: CEO risk aversion

The table presents the results from regressions of CEO risk-taking incentives on the natural log of the maximum UI benefits in the previous year. High Delta is a dummy variable, which equals 1 if the compensation Delta based on the CEO's complete equity portfolios is above the sample median and 0 otherwise. Old CEO is a dummy variable, which equals 1 if the CEO age is above the sample median and 0 otherwise. Other variable definitions are in Appendix A. In parentheses are p-values based on standard errors adjusted for heteroskedasticity (White, 1980) and clustering at the state level (Petersen, 2009). ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% level, respectively. We control for firm and year fixed effects in all regressions, whose coefficient estimates are suppressed.

	(1)	(2)
Dependent variables	Flow Vega	Flow Vega
Log max total benefit$_{t-1}$	14.165***	12.954**
	(0.008)	(0.035)
Log max total benefit$_{t-1}$*High Delta	6.158*	
	(0.074)	
High Delta	-50.292	
	(0.109)	
Log max total benefit$_{t-1}$*Old CEO		5.576*
		(0.076)
Old CEO		-52.035*
		(0.072)
Log(Size)	10.876***	11.605***
	(0.000)	(0.000)
Leverage	-5.032	-6.147*
	(0.108)	(0.064)
MB ratio	3.334***	2.325***
	(0.000)	(0.000)
ROA	2.069*	2.253
	(0.097)	(0.115)
Tangibility	-12.992*	-12.594**
	(0.065)	(0.045)
Tenure	-0.021	0.093*
	(0.709)	(0.099)
CEO chairman	0.466	1.725**
	(0.600)	(0.045)
Cash compensation	-61.920***	-62.187***
	(0.000)	(0.000)
GDP growth rate	0.365*	0.336*
	(0.060)	(0.081)
Unemployment rate	0.611	0.171
	(0.209)	(0.660)
Intercept	-186.097***	-137.522**
	(0.001)	(0.013)
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	30,012	30,754
Adjusted R-squared	0.502	0.495

Table 9. Labor unemployment risk, CEO incentive compensation and firms' risk taking

The table presents results from regressions of several risk-taking measures on the natural log of the maximum UI benefits in the previous year. The dependent variables in columns (1) to (6) are R&D to assets ratio, capital expenditures to assets ratio, cash holdings to assets ratio, an indicator for diversifying acquisitions, the natural log of annualized stock return volatility, and leverage ratio, respectively. Panel A and B present regression results for subsamples based on whether the Flow Vega is above or below the sample median for each year, respectively. Other variable definitions are in Appendix A. In parentheses are p-values based on standard errors adjusted for heteroskedasticity (White, 1980) and clustering at the state level (Petersen, 2009). ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% level, respectively. We control for firm and year fixed effects in all regressions, whose coefficient estimates are suppressed.

Panel A: High incentive compensation

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variables	$R\&D_{t+1}$	$CAPEX_{t+1}$	$Cash_{t+1}$	Diversifying acquisitions indicator	Log(Stock return volatility)$_{t+1}$	$Leverage_{t+1}$
Log max total benefit$_{t-1}$	0.011**	-0.010***	-0.036**	-0.194**	0.151***	0.021**
	(0.049)	(0.004)	(0.012)	(0.023)	(0.000)	(0.011)
Log(Size)	-0.003***	-0.002***	-0.035***	0.093***	-0.054***	0.006***
	(0.000)	(0.005)	(0.000)	(0.000)	(0.000)	(0.005)
Leverage	-0.025***	-0.033***	-0.057***	-0.110	0.144**	0.543***
	(0.000)	(0.000)	(0.000)	(0.373)	(0.017)	(0.000)
MB ratio	0.002**	0.001**	0.003**	-0.001	0.005	-0.003**
	(0.045)	(0.040)	(0.034)	(0.904)	(0.236)	(0.047)
ROA	-0.059***	0.026***	-0.058***	0.133	-0.138***	-0.046***
	(0.000)	(0.000)	(0.000)	(0.508)	(0.000)	(0.002)
Tangibility	-0.016***	0.035***	-0.165***	-0.638**	-0.195**	0.007
	(0.001)	(0.000)	(0.000)	(0.014)	(0.015)	(0.561)
Tenure	0.000	0.000	-0.000	-0.011**	-0.002**	-0.000
	(0.422)	(0.283)	(0.165)	(0.012)	(0.039)	(0.974)
CEO chairman	-0.003**	0.000	0.001	0.105	0.016	0.005***
	(0.038)	(0.757)	(0.786)	(0.162)	(0.141)	(0.002)
Cash compensation	-0.015***	-0.011***	-0.018**	0.154	-0.001	0.004
	(0.000)	(0.000)	(0.026)	(0.290)	(0.955)	(0.378)
GDP growth rate	0.000*	0.000**	0.000	-0.014*	-0.003***	-0.000
	(0.053)	(0.041)	(0.137)	(0.093)	(0.002)	(0.268)
Unemployment rate	0.003***	-0.001*	-0.002	-0.023	0.017***	0.001
	(0.009)	(0.057)	(0.164)	(0.180)	(0.000)	(0.312)
Intercept	-0.048	0.174***	0.777***	7.382***	-1.957***	-0.137*
	(0.288)	(0.000)	(0.000)	(0.000)	(0.000)	(0.059)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	15,542	14,884	15,534	5,124	16,737	16,304
Adjusted (Pseudo) R-squared	0.586	0.740	0.808	0.615	0.716	0.817

Panel B: Low incentive compensation

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variables	$R\&D_{t+1}$	$CAPEX_{t+1}$	$Cash_{t+1}$	Diversifying acquisitions indicator	Log(Stock return volatility)$_{t+1}$	$Leverage_{t+1}$
Log max total benefit$_{t-1}$	0.005	-0.005	0.004	-0.078	0.013	0.005
	(0.334)	(0.464)	(0.712)	(0.354)	(0.719)	(0.647)
Log(Size)	-0.004***	-0.004**	-0.024***	0.056***	-0.066***	0.013***
	(0.000)	(0.013)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	-0.012***	-0.027***	-0.077***	0.081	0.146***	0.513***
	(0.000)	(0.000)	(0.000)	(0.576)	(0.001)	(0.000)
MB ratio	0.002***	0.002*	0.001	-0.000	0.009***	-0.002
	(0.004)	(0.086)	(0.397)	(0.950)	(0.000)	(0.143)
ROA	-0.063***	0.009	-0.016**	0.349**	-0.249***	-0.047**
	(0.000)	(0.103)	(0.040)	(0.042)	(0.000)	(0.014)
Tangibility	-0.018***	0.013	-0.216***	-0.438**	-0.340***	0.072***
	(0.007)	(0.172)	(0.000)	(0.020)	(0.000)	(0.000)
Tenure	-0.000	0.000	0.000	-0.001	-0.002***	-0.000**
	(0.552)	(0.190)	(0.866)	(0.732)	(0.009)	(0.048)
CEO chairman	-0.002	0.001	-0.003	0.086*	0.016	0.004
	(0.236)	(0.347)	(0.243)	(0.059)	(0.104)	(0.144)
Cash compensation	-0.009***	-0.007***	-0.005	0.132**	-0.261***	-0.001
	(0.000)	(0.007)	(0.148)	(0.039)	(0.000)	(0.850)
GDP growth rate	0.001***	0.000	0.000	0.009	-0.005***	0.001*
	(0.000)	(0.532)	(0.428)	(0.335)	(0.000)	(0.071)
Unemployment rate	0.003**	-0.001*	0.000	-0.010	0.011***	0.002
	(0.026)	(0.080)	(0.974)	(0.442)	(0.000)	(0.127)
Intercept	-0.006	0.149**	0.345***	6.400***	-0.533*	-0.068
	(0.881)	(0.013)	(0.002)	(0.000)	(0.072)	(0.525)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	15,551	14,899	15,545	5,119	16,731	16,315
Adjusted (Pseudo) R-squared	0.568	0.681	0.789	0.529	0.684	0.835

Table 10. Labor unemployment risk, CEO incentive compensation and operating performance

The table presents results from regressions of operating performance measures on the natural log of the maximum UI benefits in the previous year. The dependent variable in columns (1) and (3) is the raw Return on Assets (ROA) in T+1. The dependent variable in columns (2) and (4) is the industry-adjusted Return on Assets (Ind-adj ROA) in T+1. High (Low) incentive compensation is the subsample where the Flow Vega is above (below) the sample median in a given year. Other variable definitions are in Appendix A. In parentheses are p-values based on standard errors adjusted for heteroskedasticity (White, 1980) and clustering at the state level (Petersen, 2009). ***, **, and * stand for statistical significance based on two-sided tests at the 1%, 5%, and 10% level, respectively. We control for firm and year fixed effects in all regressions, whose coefficient estimates are suppressed.

	(1)	(2)	(3)	(4)
	High incentive compensation		Low incentive compensation	
Dependent variables	ROA_{t+1}	Ind-adj ROA_{t+1}	ROA_{t+1}	Ind-adj ROA_{t+1}
Log max total $benefit_{t-1}$	0.025***	0.024***	0.008	0.009
	(0.007)	(0.009)	(0.482)	(0.448)
Log(Size)	-0.015***	-0.015***	-0.020***	-0.019***
	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	-0.002	-0.002	0.014	0.013
	(0.809)	(0.800)	(0.172)	(0.210)
MB ratio	0.014***	0.014***	0.014***	0.015***
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.252***	0.251***	0.310***	0.310***
	(0.000)	(0.000)	(0.000)	(0.000)
Tangibility	0.006	0.006	-0.009	-0.009
	(0.668)	(0.666)	(0.528)	(0.528)
Tenure	0.000	0.000	0.000	0.000*
	(0.452)	(0.470)	(0.103)	(0.080)
CEO chairman	-0.002	-0.002	-0.004*	-0.004*
	(0.268)	(0.264)	(0.051)	(0.057)
Cash compensation	-0.011**	-0.013**	-0.010**	-0.010***
	(0.031)	(0.016)	(0.011)	(0.009)
GDP growth rate	-0.000	0.000	0.000	-0.000
	(0.797)	(0.697)	(0.861)	(0.867)
Unemployment rate	0.000	0.001	0.000	0.001
	(0.630)	(0.257)	(0.924)	(0.364)
Intercept	-0.111	-0.138*	0.057	0.015
	(0.183)	(0.094)	(0.566)	(0.878)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	16,302	16,302	16,316	16,316
Adjusted (Pseudo) R-squared	0.485	0.490	0.519	0.513

Appendix A. Variable definitions

Variable	Definitions
CEO compensation	
Flow Vega	CEO's dollar change in wealth for a 0.01 increase in the annualized standard deviation of firm's stock returns following Core and Guay (2002). Calculated using only CEO's equity grants in the current fiscal year.
Flow Delta	CEO's dollar change in wealth for a 0.01 increase in the firm's stock price following Core and Guay (2002). Calculated using only CEO's equity grants in the current fiscal year.
Options/Equity (value)	The value of stock options granted to the CEO scaled by the total value of equity grants in the current fiscal year.
Options/Equity (number)	The number of stock options granted to the CEO scaled by the total number of equity grants in the current fiscal year.
Cash compensation	The sum of salary and bonus scaled by CEO's total compensation.
Firm-level characteristics	
Log(Size)	Natural logarithm of firm's total assets (at).
Leverage	The sum of long-term debt (dltt) and current liability (dlc) scaled by firm's total assets (at).
MB ratio	Market value of firm's assets (at – ceq + csho*prcc_f) scaled by book value of total assets (at).
ROA	Income before extraordinary items (ib) scaled by firm's total assets (at).
Tangibility	Net PPE (property, plant and equipment) (ppent) scaled by firm's total assets (at).
Tenure	Number of years a manager has been CEO of the firm.
CEO chairman	A dummy variable: 1 if the CEO of the firm is also the board chairman, 0 otherwise.
R&D	Research and development expense (xrd) scaled by firm's total assets (at).
CAPEX	Capital expenditures (capx) scaled by firm's total assets (at).
Cash	Cash and short-term investments (che) scaled by firm's total assets (at).
Diversifying acquisitions	Dummy variable: 1 if the acquirer and target do not share a four-digit SIC industry, 0 otherwise.
Stock return volatility	Annualized standard deviation of firm's daily stock returns.
State-level characteristics	
Log max total benefit	Natural logarithm of the maximum total unemployment insurance benefit under the state's unemployment insurance system.
GDP growth rate	State-level growth rate of GDP.
Unemployment rate	State-level unemployment rate.