THREE ESSAYS IN CORPORATE FINANCE

by

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ABSTRACT

XINXIN LI. Three essays in corporate finance. (Under the direction of DR. TAO-HSIEN DOLLY KING)

The first paper ("Human Capital and Investment Policy") investigates the interaction between investment policies and human capital cost. Employees may demand a higher pay to compensate for the potential job loss due to their firm's high investment risk. I find a positive and significant relation between a firm's human capital cost and investment riskiness. The findings suggest that risky investments, by contributing to an increase in human capital cost, may discourage subsequent investments. The second paper ("National Culture and Governance on Bondholder Wealth: Evidence from Joint Ventures and Strategic Alliances around the World") considers the impact of global business collaborations on the value of foreign bondholder wealth. Event study methodology reveals significant and positive abnormal returns for bondholders. Focusing on the determinants of this wealth effect, I identifies that country level governance and national culture are dominant drivers of bondholder gains. The third paper ("Capital Structure Persistency and Subsequent Equity Financing: Evidence from Zero Leverage and Levered Firms") studies financing decisions and capital structure evolution. I investigate the effects of a firm's initial and persistent all-equity or levered capital structure on its subsequent first equity financing decisions and outcomes. I find that SEOs offered by zero leverage firms may signal to the market that they are likely to maintain all-equity structure, which makes them attractive merger and acquisition target.

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"The world forgetting, by the world forgot. Eternal sunshine of the spotless mind!"

– Alexander Pope (1688 - 1744)

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DEDICATION

I would like to dedicate my work to my parents, Huaifu Li and Shujie Sun, who offer unconditional love and support without expectations, and who have always maintained the incredible vision; to my grandmother, Yufeng Zhang, for being my first strong and independent female role model; to my friends in Charlotte who make my long graduate student life enjoyable; and to my cat Rascal for being the warmest companion through all the working days and nights (which might've been less were it not for all the time spent petting).

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INTRODUCTION

In a series of related research, my dissertation investigates human capital and its influence on investment policy, bondholder wealth in international corporate restructuring, and financing decisions and capital structure evolutions.

My first essay "Human Capital and Investment Policy" investigates human capital and its influence on investment policy. The literature relates human capital cost to firm leverage (Berk, Stanton, and Zechner (2010) and Chemmanur, Cheng, and Zhang (2013)) and mergers and acquisitions (Lee, Mauer, and Xu (2017)). In this paper, I study the relation between a firm's human capital cost and investment policy. I argue that employees demand higher pay to compensate for the additional unemployment risk borne by firm's investment riskiness. I first present a simple theoretical setting to illustrate the positive effects of risky investment on average employee pay. I then empirically examine the relation. I find a significantly positive relation between investment riskiness (as proxied by cash flow volatility and unlevered stock return volatility) and human capital cost (as measured by CEO compensation and average employee pay). The effect is stronger in low-pay firms than high-pay firms, and in non-technology firms than technology firms. I further investigate four channels through which risky investment policy influences human capital cost: corporate diversification, R\&D expenditures, advertising expenditures, and total value of acquisitions. I find that while diversification negatively affects human capital cost, the rest of the three channels have positive effects. Lastly, we show that firms adjust their

investment policy based on labor intensity. Our results are robust after accounting for the endogeneity concerns. Overall, my research contributes to the nascent but growing literature on the impact of human capital on firm decisions.

In my second essay, "National Culture and Governance on Bondholder Wealth: Evidence from Joint Ventures and Strategic Alliances around the World", I examine bondholder wealth effects in global business collaborations with the form of cross-border joint ventures (JVs) and strategic alliances (SAs). Based on a sample of 1,898 event-firms from 2009 to 2015, I find significant and positive abnormal returns for bondholders. On average, bondholder value increases 14.4 basis points in a 3-month observation window. I find that country-level governance and national culture are dominant drivers of bondholder wealth effects. More specifically, bondholders benefit more from JVs and SAs if they are from countries with poorer institutional governance or greater regulatory governance in creditor protection (higher creditor rights and lower shareholder rights). In addition, bondholders gain more when they are from countries characterized with greater individualism, less power distance, a higher level of trust, or larger culture distance. Robustness tests and subsample analyses confirm the main findings. I find a positive impact of JVs and SAs on stockholder wealth, but little evidence for wealth transfer between stockholders and bondholders.

The third essay in my dissertation package "Capital Structure Persistency and Subsequent Equity Financing: Evidence from Zero Leverage and Levered Firms" studies

financing decisions and capital structure evolutions. I investigate the effects of a firm's initial and persistent all-equity or levered capital structure on its subsequent first equity financing decisions and outcomes. I suggest that market may not view SEOs offered by all-equity firms as an overvaluation signal, and therefore reacts less negatively. Overvaluation hypothesis as proposed by Myers and Majluf (1984) is built on the assumption that a firm will autonomously choose to raise capital by issuing equity or debt, whichever is more favorable. All-equity firms, especially firms that persistently maintain a zero leverage structure, signal to the market they undertake SEOs for reasons other than mispricing. Using a sample of firms going public over 1980 to 2014, I track their capital structure evolution following the IPO. I find support for the conjecture using the first SEOs by the IPO firms. I further explore channels that may account for favorably market reaction. I find that SEOs offered by zero leverage firms may signal to the market that they are likely to maintain all-equity structure, which makes them attractive merger and acquisition target. In addition, managers in all-equity firms may be more conservative and are less likely to pursue over-confident empire building such as mergers and acquisitions.

CHAPTER 1: HUMAN CAPITAL AND INVESTMENT POLICY

1. Introduction

Aggressive investment policy is often associated with high business risk: if successful, it benefits the firm in the long run; if not, it may hasten business failure. The literature identifies one of the causes of corporate failure, as summarized in Argenti (1976), is insufficient considerations for research and development cost. Further, Dambolena and Khoury (1980) indicate that a substantial instability in firm ratios is associated with corporation failure. When large investments fail, a firm faces a high possibility of operating at a loss, which ultimately leads to plant shutdowns. Thus, investment riskiness is undeniably one of the most important determinants of business failure. On the other hand, the labor economics literature (e.g., Clark and Oswald (1994) and Clark, Georgellis, and Sanfey (2001)) shows that employees' fear of job loss is a major worry, regardless of whether employees can find a replacement job. The more aggressive the firm's investment policy, the riskier the firm, and hence the higher the risk of the human capital loss borne by employees. As a result, rational employees will demand a higher wage to compensate for this additional human capital risk. We will later illustrate this line of motivation using a simple theoretical framework in the next section. In this sense, aggressive investment activities may be associated with larger human

capital cost for the firm. This is extremely important to the firm because if employees demand significantly higher pay to compensate for the human capital risk associated with risky investments, then discounted expected future cash flow will decrease while initial cash outlay stays the same. This will lead to a lower project NPV than what it would be with a less risky investment. Moreover, if the human capital cost of the investment increases significantly, firms will have a strong incentive to forego risky projects to reduce human capital cost. Our finding provides a potential explanation for the underinvestment problem apart from the established agency theory.

The labor economics literature has long established that workers require firms to provide a premium in wages or benefits as compensation for potential job loss (e.g., Abowd and Ashenfelter (1981), Topel (1984)). However, the relation between human capital cost and corporate policy is relatively novel in the corporate finance literature. One stream of literature has linked human capital to a firm's financing policy. Berk, Stanton, and Zechner (2010), and Chemmanur, Cheng, and Zhang (2013) study the relation between human capital cost and a firm's financing policy. Berk et al. (2010) argue that employees become entrenched under an optimal labor contract for a levered firm, and therefore face large human capital cost in bankruptcy.[1] Chemmanur et al. (2013) empirically support the predictions of Berk et al. (2010)'s and find that wages have significant explanatory power for firm leverage. In addition, Agrawal and Matsa (2013) adds to this line of research by arguing that firms choose conservative financial policies to mitigate workers' exposure to unemployment risk. They further find that lower unemployment benefits (higher unemployment risk) lead to lower corporate leverage.

[1] The only friction is the inability of employees to insure their human capital. In their model, entrenchment is the efficient response to this friction rather than an exogenously imposed inefficiency.

Lee, Mauer, and Xu (2017) has linked human capital to major corporate events: they examine whether human capital relatedness is a key factor in mergers and acquisitions. They find that mergers are more likely, and merger returns and post-merger performance are higher when firms have higher related human capital. They argue that mergers with high human capital relatedness give firms greater ability to layoff low quality and/or duplicate employees to reduce human capital cost.

Another line of research has examined and interpreted the direct relation between CEO compensation and a firm's investment policy, proxied mainly by R&D expenditures. However, the present literature mainly argues two driving factors of the relation: incentive alignment (e.g., Ryan and Wiggins (2001, 2002), Coles et al. (2006)), where riskier investment policy is driven by the higher sensitivity to stock volatility in compensation, and informational asymmetry (e.g., Bizjak et al. (1993)), where firm's opaqueness determines compensation scheme. The results, again, are mixed. Clinch (1991), Smith and Watts (1992), Baber et al. (1996), Gaver and Gaver (1998), Ryan and Wiggins (2002), and Coles et al. (2006), find positive relations between investment opportunity proxies and compensation tied to stock price performance. In contrast, Bizjak et al. (1993), Yermack (1995) and Lev and Sougiannis (1996) find negative relations associated with total compensation and cash compensation of CEOs. Matsunaga (1995) finds no significant association between R&D expenditures and the value of employee stock option grants. One possible reason for the mixed findings, as Cheng (2004) points out, is that, in general settings, it is unclear whether compensation committees should motivate more R&D expenditures because of the possibility of overinvestment in R&D. These studies use R&D expenditures as a proxy for growth opportunities or information

asymmetry. A few more studies also empirically examine the relation of CEO compensation and R&D expenditures, but for interpretations other than investment policy. For instance, Grundy and Li (2010) predict that corporate investment level increases with investor optimism. The positive relation they find between investment level and executive compensation is insignificant and depends on the investor's sentiment and other parameters. Fauver et al. (2015) examine whether an employee-friendly corporate culture increases firm financial value and efficiency. They find evidence that better employee treatment, proxied by level of compensation, fosters innovation and technical efficiency, proxied by R&D expenditures and capital expenditures. Gray and Cannella (1997) argue that a CEO who receives compensation based on a longer time horizon has incentives to behave differently. She can maximize her total compensation by engaging in strategies that build long run profitability for the firm by maintaining high levels of investment in R&D expenditures, capital expenditures, and advertising expenditures.

On the other hand, very few studies have focused on non-executive employees. Among the few, Clinch (1991) studies key employee compensation and firms' R&D activities. He claims that three well-known determinants of compensation practices are motivation-based concerns (moral hazard), information-based concerns (adverse selection), and tax issues. The results are difficult to interpret from the motivation, information, and tax-based perspectives, because there are various factors that can influence the compensation design in each setting. In many cases, particularly for large companies or administrative positions, non-executive employees may have little involvement in a firm's investment decisions. Clinch (1991) continues to argue that, if this is the case, it is not clear how to interpret any relation between risky investments

(R&D expenditures) and features of observed compensation relations for the average employee.

Our paper provides a novel explanation from a human capital cost perspective. We argue that the positive relation between investment risk and human capital cost is driven by human capital cost: both CEOs and non-executive (average) employees with under-diversified human capital risk will demand higher pay as additional compensation for potential job loss due to the risky investment policy. Consistently, we find a positive effect of investment riskiness on average employee pay. Our results indicate that total human capital cost is significantly positive in relation to the level of investment riskiness as measured by cash flow volatility and unlevered stock return volatility. We next examined how employees' sensitivity towards job losses affect the positive relation by comparing subsample results of lower-pay employees versus higher-pay employees. We find employee's sensitivity to job loss accentuates the positive relation between average employee pay and investment riskiness. Furthermore, we investigate the possible channels through which risky investments have influences on human capital cost. We examine corporate diversification, R&D expenditures, advertising expenditures, and acquisition. As diversification reduces total firm risk, we find that the greater the number of business segments with different four-digit SIC codes a firm has, the lower the human capital cost. On the other hand, R&D expenditures, advertising expenditures, and acquisition are considered to be the three channels for the level of investment riskiness. We observe a positive relation between each of the three channels and a firm's human capital cost, which is consistent with our hypotheses. Results apply to both the CEO sample and the employee sample. Lastly, we finish the loop by providing evidence on the

feedback effect of increased human capital cost on a firm's investment policy. We show that labor-intensive firms have significantly lower risky investments.

Our results are robust to our best attempt to address endogeneity. Our baseline regressions include firm-year fixed effect to control for firm specific and time invariant biases. The biggest endogeneity concern would be whether the results are driven by employee skills. To address this problem, we first include a high-tech dummy variable as a control for skill. We then use system GMM regressions to account for concerns of omitted variables. Furthermore, we separate our average employee sample into non-high-tech firms and high-tech firms. We still observe the positive relation between investment riskiness and human capital cost in the non-technology subsample (unskilled workers). Lastly, endogeneity could still rise in the CEO sample because of potential causal relations among CEO compensation, investment policy, and leverage. We further address this concern using Simultaneous Equations Model method. We continue to find results that are generally robust.

We contribute to the literature in the following ways. First, our study contributes to the nascent but growing literature on the impact of the human capital by establishing the importance of human capital cost for a firm's investment decisions. We provide added understanding of the determinants of employee wages. Second, we offer a novel explanation for the underinvestment problem apart from the established agency theory. We find that investment riskiness as measured by cash flow volatility and unlevered stock return volatility has a significantly positive impact on human capital cost as measured by both CEO compensation and average employee pay. In other words, employees will demand higher pay to compensate for the large human capital loss

associated with their firm's investment risk. The additional labor cost could be sufficiently large to offset the positive NPV of the risky projects.[2] If managers consider the large additional labor cost in the estimation process of NPV, it could be optimal to pass on the risky projects.

The rest of the paper is organized as follows. Section 2 describes a theoretical setting that motivates our study and testable hypotheses. Section 3 discusses variable construction, data collection, and sample descriptive statistics. Section 4 and 5 present the empirical results using a CEO sample and an average employee sample, and includes robustness tests for potential endogeneity issues, respectively. Section 6 presents results for channel tests. Section 7 shows results on the feedback effect of labor intensity on firm's investment policy. Section 8 concludes.

2. The conceptual model and hypotheses development

2.1. The model

Under the setting of employees' inabilities to insure their own human capital, Berk et al. (2010) endogenously derive managerial entrenchment as an optimal response to labor market competition. Their model predicts an inverse relation between entrenchment and leverage and provides evidence that bankruptcy costs borne by employees are large enough to offset the tax benefits of debt. One important implication of their model is that employees should care about the firm's likelihood of bankruptcy or shut down. Some variable such as credit rating can explicitly provide a link between

[2] The impact of investment riskiness on labor cost is economically significant, as we will show in Section 4.1 and 5.1.

firm's characteristics and probability of bankruptcy or shut down and serve as a reference to employees.

Different from Berk et al. (2010), we focus on the risk arising from the firm's expenditures on risky investments rather than assuming the firm earns the risk-free rate on all invested capital.[3] In this section, following Harris and Holmstrom (1982) and Berk et al. (2010), we present a simple conceptual model to motivate the potential positive relation between expenditures on risky investments and labor cost.

Assume an employee has a minimum reservation wage W_R. If a firm invests in risk-free investments only, then the equilibrium wage, W^*, must satisfy the condition

$$W^* = W_R$$

Consider a firm that makes risky investments, and assume the probability of failure (i.e., complete shutdown) is $P(I)$, where $P'(I) > 0$ and $P(0) = 0$.[4]

The equilibrium wage under these conditions must satisfy the condition:

$$E\left[\widetilde{W}\right] = P(0) + (1 - P)W^{**} = W_R$$

Or

$$W^{**} = \frac{W_R}{1 - P}$$

Using $P = P(I)$, we may compute that

[3] The only source of risk in their model is the volatility of employees' output.

[4] We assume the riskiness borne by the firm is positively related to the capital expenditures on risky investments. See section 2.1 in Grundy and Li (2010). If a firm does not have risky investments, it is free of any shocks to demand in our setting.

$$\frac{\partial W^{**}}{\partial I} = \frac{W_R P'(I)}{(1 - P(I))^2} > 0$$

The equilibrium wage increases with expenditures on risky investments. Thus, the labor cost is relatively higher in the firm with risky investments.

The critical assumption in this model is that the employee has firm-specific human capital that is not easily transferable to another firm. This means when an employee loses her job and returns to the job market, she would not be as highly compensated at another firm or would have to bear considerable expense re-tooling her human capital to match the needs of an alternative employer even if the new employer is willing to pay a similar wage as what she made at the previous firm. For example, labor market frictions exist and will translate to costs that are borne by the employee. She will not be able to find the same job without bearing non-trivial search and/or relocation costs. When the firm invests on risky projects, it increases the riskiness borne by the firm. As a result, the potential significant loss on human capital prompts the employee to demand higher compensation. The firm in turn may have to adopt conservative investment policy because of large labor cost associated with risky investments. We next motivate our hypotheses 1 and 2 based on the theoretical work.

2.2. Hypotheses development

As discussed earlier, employees may demand a higher wage to compensate for the potential job loss due to the level of risk their firm is taking. In this sense, high investment risk may cause high human capital cost. Based on our theoretical prediction discussed above, we have following testable hypotheses:

Hypothesis 1. CEO compensation increases with investment risk.

Hypothesis 2. Average employee pay increases with investment risk.

Since employees demand higher pay to compensate for the potential human capital loss induced by investment riskiness, an employee's sensitivity towards unemployment risk should be a crucial factor in determining the relation between investment riskiness and average employee pay. Marginal utility of wealth increases as wealth decreases, and this view should also hold, that the disutility from losing additional dollar would increase with wealth. In other words, the disutility from losing another dollar is highest for people with little wealth. Thus, wealthy people tolerate risk significantly more than others.[5] Hence, lower-pay workers should be associated with a higher sensitivity to job loss while higher-pay workers have a lower sensitivity to job loss. We formalize above discussion with the following testable hypothesis.

Hypothesis 3. Sensitivity to job loss accentuates the positive relation between average employee pay and investment risk.

To further study the impact of investment policy on human capital cost, we examine the channels through which investment riskiness affects labor cost. Lewellen (1971) argues that the combined (more diversified) enterprise enhances lenders' safety and increases aggregate debt capacity. He attributes this additional debt capacity to a co-insurance effect, whereby combining firms' cash flows that are not perfectly correlated will, in general, reduce the overall variance of the combined firm's cash flows. Subsequent researchers, such as Berger and Ofek (1995) and Kuppuswamy and

[5] See Shilon (2015)

Villalonga (2015) find that diversified firms have higher leverage relative to comparable portfolios of stand-alone firms. We follow literature to argue that diversification (the opposite of specialization) level is a channel where risky investments operate, i.e., the less diversified a firm is, the riskier its investments. We use the number of business segments as a proxy for corporate diversification. R&D expenditures have long been established in literature as a popular measure for risky investment (e.g., Clinch (1991), Smith and Watts (1992), Baber et al. (1996), Gaver and Gaver (1998), and Ryan and Wiggins (2002)). Harris and Raviv (1991) argue that R&D expenditures and advertising expenditures can be interpreted as measuring the extent to which assets are intangible. Miller and Bromiley (1990) develop taxonomy of strategic risk that deals with the level of investment in physical capital and in the intangible resources that accrue from research and development and advertising expenditures. Following the literature, we adopt R&D expenditures and advertising expenditures as additional risky investment channels. Lastly, we adopt another possible channel for risky investment as total acquisition amount in a year (acquisition). Lubatkin and O'Neill (1987) study how mergers influence capital market risk and find that all types of mergers are associated with significant increases in unsystematic risk. May (1995) studies whether managers consider personal risk when making decisions that affect firm risk. He finds that expenditures on diversifying acquisition decrease when CEOs have higher level of personal wealth vested in firm equity. In summary, we implement corporate diversification, R&D expenditures, advertising expenditures, and acquisition as four possible channels through which risky investments affect human capital cost. As diversification reduces investment risk while the other three are contributors to investment risk, we hypothesize as follows:

Hypothesis 4. A lower number of business segments, higher R&D expenditures, higher advertising expenditures, or higher acquisition increase human capital cost.

3. Variable construction, data, and descriptive statistics

In this section, we provide details of variable construction, sample selection, and the descriptive statistics of the variables.

3.1. Variable construction

Our measures for investment riskiness are direct measures and are non-policy related: cash flow volatility for operational risk and unlevered stock return volatility for asset risk. Cash flow volatility and stock return volatility are two commonly used measures for investment related firm risks. Ryan and Wiggins (2001) argue that firms with risky investments or volatile operating cash flows will use incentive compensation with non-linear payoffs to limit a manager's downside risk. They find that high R&D firms have a cash flow volatility measure of 0.50 vs. 0.24 for low R&D firms. Gilchrist and Himmelberg (1995) include cash flow as one of the observable fundamentals in the forecasting system used to predict future investment opportunities. Coles et al. (2006) study managerial incentives and risk taking. They use stock return volatility as a proxy for firm risk. In addition, the literature finds that cash flow volatility is closely related to stock return volatility (e.g., Campbell et al. (2001), Irvine and Pontiff (2008), and Huang (2009)). Therefore, we use both cash flow volatility and stock return volatility (unlevered)

as proxies for risky investments. [6] Following Kuppuswamy and Villalonga (2015), cash flow volatility is calculated as the standard deviation of the ratio of operating income after depreciation to assets over the eight quarters (two years) ending in each fiscal year. [7] We follow Childs et al. (2005) and Schwert and Strebulaev (2014) to calculate the unlevered stock return. Then the volatility is calculated as the standard deviation of daily stock returns in past two years to be consistent with timeline of cash flow volatility.

For human capital cost, we adopt two measures: CEO compensation and average employee pay. CEO total compensation is the sum of salary, bonus, other annual, restricted stock grants, long-term incentive plan payouts (LTIP), all other, and value of option grants. We further examine equity-based compensation and cash compensation separately. Cash compensation is calculated as the sum of salary and bonus, and equity-based compensation is computed as the total compensation minus salary, bonus, other annual pay, and LTIP. For average employee pay, ideally, we would like to have detailed information on job titles, wages, and education level. Unfortunately, such data is not publicly available at firm level. We therefore follow Chemmanur et al. (2013) to use Compustat data to estimate average employee pay. We adopt two methods: 1. Staff expenses divided by the number of employees, and 2. Selling, general, and administrative expense (SGA) divided by the number of employees. We can use Compustat SGA as a proxy for wages since the correlation between SGA and staff expenses is very high at 0.9, and 78.8% of the whole sample has SGA (447,216 out of 567,376 observations), while

[6]We use unlevered volatility variables because leverage also increases stock return volatility. We follow Childs, Mauer, and Ott (2005), and Schwert and Strebulaev (2014) for empirical measures of unlevered risk.
[7] Alternatively, we used operating income before depreciation, the results still hold.

staff expenses only have 45.9% (260,571) observations. All variable definitions are specified in detail in Appendix A.

3.2. Sample selection

To construct our CEO sample, we gather information on CEO compensation from ExecuComp database. We collect detailed information on the CEO characteristics and compensation from 1992 to 2015. We then merge ExecuComp with Compustat. We delete firm-years with non-positive book value of equity and exclude financial and utilities companies. We require non-missing cash flow volatility, stock return volatility information, compensation information, and CEO and firm characteristics. A total of 17,688 firm-year observations has all of the necessary information to be included in the regressions of the CEO sample, covering 1992 to 2015. For the average employee pay sample, we use information from the Compustat database to calculate average employee pay. We exclude financial and utility companies and firms with fewer than one hundred employees. We drop firm-years with non-positive book values of equity. We require non-missing information on risky investment measures, SGA, and firm characteristics. A total of 72,427 firm-year observations has all of the necessary information to be included in our OLS regressions of average employee sample, covering 1976 to 2015.[8]

In addition, we use the number of segments with different four-digit SIC codes as a measure of corporate diversification level. This information is obtained from the Compustat Business Segment data files. We exclude firm-years in which at least one segment is classified as being in the financial sector. We obtain acquisition information

[8] We start from all Compustat firms dating back from 1950. Since we use acquisition (collected from SDC platinum) as a channel for risky investment and this data availability starts from 1976, our final sample for average employee pay covers from 1976 to 2015.

from the mergers and acquisitions database in SDC platinum. This data is available from 1976. All dollar amounts are adjusted to 1992 constant dollars using the consumer price index (CPI), which is collected from Bureau of Labor Statistics. Industry classifications are adopted from Fama-French 49 industry classification.

3.3. Descriptive statistics

Table 1 presents descriptive statistics for the variables used in our baseline regressions. Detailed variable definitions are in Appendix A. Panel A and B report variables used in the analysis of CEO compensation and average employee pay respectively.[9] The sample mean for total compensation is 3.75 million dollars. Cash compensation has a mean value of 0.86 million dollars, and equity-based compensation has a mean value of 2.42 million dollars. To control for the firm size effect, we scale compensation variables by total sales in the regressions. The means of cash flow volatility and unlevered stock return volatility in our sample are 0.012 and 0.023 respectively. The standard deviations for the two volatility variables are both relatively large at 0.012 and 0.011 compared to their means. Number of segments, R&D expenditures, advertising expenditures, and acquisition are variables of interest for channel testing. On average, a firm-year has about 2 segments in our sample. We report the scaled values by total sales for the other three channels for risky investments. The one-year shareholder return is a measure of firm performance and has a mean of 9.7%. For other CEO characteristics, about 3% of the CEOs in our sample are female, and 55.7%

[9] ExecuComp provides two measures of total compensation: one includes the value of the options granted, and the other includes the value of options exercised. For CEO total compensation reported in Panel A, we use total compensation including the value of options granted reported in ExecuComp. Our results remain similar when the value of options exercised is considered.

serve as chairman of the board. The average CEO age is 56. Our CEO sample statistics are generally comparable with previous studies.

Panel B reports variables used in the analysis of average employee pay. Using staff expenses to proxy for average employee pay leads to a smaller sample of 6,710 firm-year observations with a mean average employee pay of $34,403, while using SGA increases sample size to 72,427 firm-years with a mean average employee pay of $51,134. Similar to the CEO sample, the standard deviations of cash flow volatility and unlevered stock return volatility are relatively large (at 0.022 and 0.017 respectively) compared to their mean (at 0.020 and 0.030). Fixed asset ratio is computed as gross property, plant, and equipment scaled by total assets, and the sample mean is 24.9%.

Table 2 reports pairwise correlations for all variables of interest. We see that both of the scaled CEO compensation and scaled average employee pay variables are positively correlated with the risky investment measures, providing first evidence that there is a positive relation between human capital cost and investment riskiness. It also shows that the scaled CEO compensation and scaled average employee pay variables are negatively correlated with number of segments (corporate diversification), positively correlated with R&D expenditures, advertising expenditures, and acquisition, which is consistent with Hypothesis 4.

4. Empirical tests and results on investment riskiness and CEO compensation

In this section, we describe our empirical results of the impact of investment riskiness on CEO compensation. We start with our baseline regression of CEO

compensation. We then perform various robustness tests to address potential endogeneity problems.

4.1. Baseline regression

We model CEO compensation as:

$$CEOComp_{i,t} = \gamma_0 + \gamma_1 InvestmentRisk_{i,t} + \gamma_2 MktCap_{i,t} + \gamma_3 MktLev_{i,t} + \gamma_4 MtB_{i,t} + \gamma_5 Return_{i,t} + \gamma_6 Age_{i,t} + \gamma_7 Chair_{i,t} + \gamma_8 Male_{i,t} + \varepsilon_{i,t}$$

$CEOComp_{i,t}$ is the CEO compensation of firm i in year t, and it is measured in three ways: total, cash, and equity-based compensation. $InvestmentRisk_{i,t}$ is our measure for investment riskiness, i.e., cash flow volatility and unlevered stock return volatility. $MktCap_{i,t}$ is the logarithm of market capitalization. $MktLev_{i,t}$ is market leverage. $MtB_{i,t}$ is market to book ratio. $Return_{i,t}$ is the return to shareholders of firm i in year t. $Return_{i,t}$ is one-year return to shareholders. $Age_{i,t}$ is CEO age. $Chair_{i,t}$ is a dummy variable equal to one when the CEO serves as chairman of the board. $Male_{i,t}$ is a dummy variable equal to one when the CEO is male.

Table 3 reports the results of the baseline regression of CEO compensation. Panel A reports regression results with firm and year fixed effect controlled, and panel B as a robustness test, controls for CEO talent using High-tech dummy as a proxy with industry and year fixed effect. Across all regression models except for regression (2), we find positive significant results on investment riskiness measures. To be specific, both measures are positively correlated with total compensation at 1% significance level. This is consistent with our Hypothesis 1. Our results are also economically significant. If the cash flow volatility (unlevered stock return volatility) increases by one standard deviation

(0.012 and 0.011, as reported in Table 1), total CEO compensation increases by 7.14% (26.50%). We find a similar pattern for cash compensation and equity-based compensation.[10] Therefore, starting at the average firm sales of $5,710.2 million, the additional cost on total CEO compensation would be $1.223 million ($4.539 million). On average, being the chair has a positive and significant effect on CEO pay. The results in Panel B remain robust where industry fixed effect is controlled instead.

4.2. System GMM

Coles et al. (2006), Yermack (1995), Smith and Watts (1992) suggest that the decision on CEO compensation is endogenous. The CEO compensation in a given firm could be driven by the risky investment level simply because the risky projects require highly skilled managers to operate, thus generating a positive correlation between the amount of risky investments and compensation. On the other hand, literature in agency theory (Childs, Mauer and Ott (2005) and Mauer and Sarkar (2005)) argue that the impact of agency conflicts over the timing of investments is different across firms with different financing decisions. Moreover, Zhang (2009) finds that debt and executive stock options act as substitutes in attenuating a firm's free cash flow problem. In this section, we use system GMM estimator proposed by Arellano and Bover (1995) and Blundell and Bond (1998) to account for any omitted variable concerns. In our context, we use the lagged values of compensation, risky investment, as well as all other right-hand-variables (except for fixed dummies) as instruments for the current values of compensation and risky investment.

[10] One standard deviation increase on unlevered cash flow volatility (stock return volatility) will result in a 0.4% (6.55%) and 13.96% (51.73%) increase for cash compensation and equity-based compensation, respectively.

Table 4 reports the results of system GMM estimation for the effects of investment riskiness on CEO compensation. The regressions use one lag of compensation and deeper lags of all other right-hand-variables, except time and industry fixed dummies. All control variables are considered to be endogenous with the exception of the year and industry dummy variables. All regressions pass the AR(1) and AR(2) tests, along with the Hasen *J*-test and the difference-in-Hansen *J*-test proposed by Eichenbaum, Hansen, and Singleton (1988). As reported in the table, all AR(1) tests are statistically significant and all AR(2) tests are not statistically significant. It supports our exogeneity assumption on the deeper lags of right-hand-variables. Further, the Hansen *J*-test of over-identification for the equation in differences and the difference-in-Hansen *J*-test of over-identification for the equation in levels are rejected. This implies that we cannot reject the null hypothesis that the lagged level and lagged difference instruments are not correlated with the respective error terms.

We observe that except for cash compensation, both total compensation and equity-based compensation are positively correlated with investment risk proxied by cash flow volatility and unlevered stock return volatility. Overall, our results remain robust after accounting for possible omitted variable concerns. Consistent with Hypothesis 1, firms with higher investment riskiness pay more to CEOs in order to compensate for the corresponding employment risk.

4.3. Simultaneous equations model

Causality and simultaneous determination may be another concern. On one hand, our baseline regression provides evidence that investment riskiness has a significantly positive effect on CEO compensation. On the other hand, previous studies have shown

that CEO compensation has a significant effect on risky investment expenditures (e.g., Clinch (1991), Smith and Watts (1992), Baber et al. (1996), Gaver and Gaver (1998), and Ryan and Wiggins (2002)). Furthermore, Chemmanur et al. (2013) show that firm leverage has a positive effect on CEO compensation. Since Harris and Raviv (1991) find that in general leverage decreases with advertising expenditures and R&D expenditures, which are our two channels for risky investments. The positive relation between human capital cost and leverage found in Chemmanur et al. (2013) should not contribute to our results. To formally address the potential causal relations among CEO compensation, risky investments, and leverage, we follow Coles et al. (2006) and adopt a simultaneous equations model as a robustness test. To control for the potential endogeneity problem between leverage and CEO compensation, we follow Graham (1996a, 1996b), Graham et al. (1998), and Chemmanur et al. (2013) to use marginal tax rates as one instrument for leverage. The marginal tax rates based on income before interest is deducted (MTRB) from the database of marginal tax rates provided by John Graham. We employ another instrument for leverage as industry median market leverage. As for instrumental variables for risky investments, we adopt industry median volatility measures, along with industry median R&D expenditures. The simultaneous equations are specified as below.

$Equation$ 1.

$$CEOComp_{i,t} = \gamma_0 + \gamma_1 InvestmentRisk_{i,t} + \gamma_2 MktCap_{i,t} + \gamma_3 MktLev_{i,t} + \gamma_4 MtB_{i,t} + \gamma_5 Age_{i,t} + \gamma_6 Return_{i,t} + \gamma_7 Chair_{i,t} + \gamma_8 Male_{i,t} + \varepsilon_{i,t}$$

$Equation$ 2.

$$InvestmentRisk_{i,t}$$
$$= \alpha_0 + \alpha_1 CEOComp_{i,t} + \alpha_2 Industry\ median\ of\ RiskyInvestment_{i,t}$$
$$+ \alpha_3 Industry\ median\ of\ R\&D_{i,t} + \alpha_4 MktCap_{i,t} + \alpha_5 MktLev_{i,t}$$
$$+ \alpha_6 MtB_{i,t} + \alpha_7 Age_{i,t} + \alpha_8 Capex_{i,t} + \varepsilon_{i,t}$$

$Equation\ 3.$

$$MktLev_{i,t} = \beta_0 + \beta_1 CEOComp_{i,t} + \beta_2 Industry\ median\ of\ MktLev_{i,t} + \beta_3 MTRB_{i,t}$$
$$+ \beta_4 MktCap_{i,t} + \beta_5 MtB_{i,t} + \beta_6 Cash_{i,t} + \beta_7 Capex_{i,t} + \varepsilon_{i,t}$$

Equations 1 - 3 are estimated simultaneously using 3SLS. Results are presented in Table 5. Panel A, B, and C report results of Equation 1, 2, and 3, respectively. As shown in Panel A, we find both investment riskiness measures are positive significantly related to all three CEO compensation measures, which indicates that our results are robust after accounting for the endogeneity of CEO compensation, investment and financing policy. We also find from Panel B that CEO compensation is positively correlated with our two measures of investment riskiness, which is consistent with previous literature. From Panel A and Panel B, we show that CEO compensation and R&D expenditures are simultaneously determined. Note that in Panel C, we observe mix results of total CEO compensation on market leverage. To be specific, total compensation and equity compensation is positively correlated with market leverage, which is consistent with what Chemmanur et al. (2013) find, but cash compensation is negatively correlated with market leverage. One of the possible explanations could be that the true relation between CEO compensation and leverage might be non-linear (Cadenillas et al. (2004)).

5. Empirical tests and results on investment riskiness and average employee pay

In this section, we describe our empirical results of the impact of investment riskiness on average employee pay.

5.1. Baseline regression

Our baseline regression for average employee pay sample is specified as the following. Our objective is to estimate the effect of investment riskiness on average employee pay.

$$EmployeePay_{it} = \delta_0 + \delta_1 InvestmentRisk_{it} + \delta_2 MktCap_{it} + \delta_3 MtB_{it} + \delta_4 MktLev_{it} + \delta_5 AvgSale_{it} + \delta_6 PPE_{it} + \delta_7 ROA_{it} + \delta_8 ROE_{it} + \delta_9 Cash_{it} + \delta_{10} FirmAge_{it} + \varepsilon_{it}$$

where $AvgSale_{it}$ is average sales per employee, PPE_{it} is fixed assets ratio, and $Cash_{it}$ is ratio of cash and marketable securities to the book value of assets. Detailed definitions of each variable are in Appendix A.

Regression results are presented in Table 6 Panel A. Column 1 and 2 are regressions with our two investment riskiness measures with staff expense as the dependent variable, and column 3 and 4 use SGA as the dependent variable, respectively. In column (1) and (2) where staff expense is used to calculate average employee pay, we observe that cash flow volatility is positively significant at 5% level while unlevered stock return volatility is insignificant. When SGA is used to proxy for average employee pay in model (3) and (4), we observe both cash flow volatility and unlevered stock return volatility are significantly positive at 1% level. The results are consistent with Hypothesis

2. Economically, if the cash flow volatility increases by one standard deviation (0.022, as reported in Table1 panel B), average employee pay calculated by staff expenses increases by 10.56%.[11] Therefore, starting with the average value of firm's sales at $2,308.94 million, the additional cost on staff expense per employee would be $49,000. With an average of 10,250 employees per firm, that is about $490 million increase in human capital cost, a tremendously significant amount economically.[12]

5.2. Robustness tests

The biggest endogeneity concern in the average employee sample would be whether the results are driven by employee skills. To be specific, firms that invest more in risky projects (for example, pharmaceutical companies, high technology firms, etc.) may hire more skilled workers, and skilled workers are better paid than unskilled workers. To address this problem, we first included a High-tech dummy as a control for skill in our baseline regressions as showed in Panel B Table 6. With industry and year fixed effect, cash flow volatility remains at 5% significance level and unlevered stock return volatility is now positively significant at 10% level as observed in column (1) and (2). In column (3) and (4), we observe both cash flow volatility and unlevered stock return volatility are significantly positive at 1% level. To further address the potential endogeneity concern of "pay for skills", we divide our sample into non-technology firms and technology firms. We consider employees in non-technology firms as unskilled workers. If our "pay for risk"

[11] Using SGA instead, the economic effect is one standard deviation increase in cash flow volatility (unlevered stock return volatility) is associated with 11.88% (9.54%) increase in human capital cost.
[12] One of the reasons for the large economic significance is that the standard deviations of the two volatility variables are almost as large as their mean, if not larger, as showed and discussed in table 1.

argument is valid, we should observe the positive effect of investment riskiness on average employee pay still exists in the sample of non-technology firms. We follow Carpenter and Petersen (2002) to identify high-tech industries by using first three-digit SIC code of 283, 357, 361, 362, 366, 367, 382, 384, 386, and 387. Results are presented in Table 7. Panel A uses staff expenses to calculate the dependent variable, and panel B uses SGA. Results are generally consistent with what we expected. To be specific, Panel A (staff expenses) shows that cash flow volatility displays a 5% significance level in the non-technology firms. Panel B (SGA) shows that both investment riskiness measures are 1% significant in non-technology subsamples. In other words, the positive relation between investment riskiness and human capital cost still exists in the unskilled workers group. Results are very much in line with our expectation.

Lastly, we use system GMM regressions to further account for concerns of omitted variables. Results are reported in Table 8. The regressions use one lag of average labor costs and deeper lags of all other right-hand-side variables. All regressions pass the AR(1) and AR(2) tests, along with the Hansen *J*-test and the difference-in Hansen *J*-test proposed by Eichenbaum, Hanse, and Singleton (1988). If our exogeneity assumptions are valid, then the residuals in first differences should be correlated, but the residuals in second differences should not be correlated. This is what is observed in the table. Further, the Hansen *J*-test of over-identification for the equation in differences and the difference-in-Hansen *J*-test of over-identification for the equation in levels are not rejected. This implies that we cannot reject the hypothesis that the lagged level and lagged difference instruments in the system GMM are exogenous. In all regressions, there is a statistically significant positive relation between proxies for risky investments and average employee

pay. This effect is also economically significant compared to the coefficient estimates in panel B of Table 6. In comparison, when SGA is the proxy for average employee pay, the significance level on coefficients of risky investments reduces to 10%. This suggests that the endogeneity concern is more of a problem when SGA serves as the proxy for average employee pay. This makes sense because SGA (Selling, general, and administration fees) is noisier than staff expenses when it comes to proxy for average employee pay.

Overall, we continue to find a strong positive relation between average employee pay and investment riskiness after accounting for unobserved omitted variable concerns.

5.3. Average employee's sensitivity to job loss

As discussed in the hypothesis section, employee's sensitivity towards unemployment risk should be a crucial factor in determining the relation between risky investment expenditures and average employee pay. Lower-pay employees should be more sensitive to unemployment risk than higher-pay employees because the disutility of losing a dollar is highest for people with little wealth. In addition, higher-pay employees possess more resources and therefore would have more choices once unemployed. Our Hypothesis 3 is based on this notion. We classify high-pay firms as those whose average employee pay is higher than sample median grouped by each fiscal year, whereas low-pay firms are those whose average employee pay is lower than sample median grouped by each fiscal year. Results are presented in Table 9. Panel A and B use staff expenses and SGA to calculate the dependent variable, respectively. Results are generally consistent with what we expected. To be specific, Panel A (staff expenses) shows that cash flow volatility only displays significance for low-pay firms, while it is insignificant in the high-pay firms. Panel B (SGA) shows that similar results are found for low-pay

and high-pay subsamples. Both volatility measures are significantly positive at 1% level. However, the economic significances are higher in low-pay firms than in high-pay firms. Results are consistent with hypothesis 3.

6. Risky investment channels

To further study the impact of investment policy on human capital cost, we continue to examine the possible channels through which investment riskiness affects human capital cost. Following the literature we discussed before, we investigate four possible channels for investment riskiness: corporate diversification, R&D expenditures, advertising expenditures, and acquisition. We next test the direct relation between the four identified channels and firms' investment riskiness. We expect to see R&D expenditures, advertising expenditures, and acquisition as contributors to investment risk; diversification, on the other hand, reduces risk. The results are presented in Table 10. Panel A and Panel B reports results from the CEO sample and average employee sample, respectively. The signs for each channel are generally consistent with what we expected.

Now that the possible channels are identified and empirically verified, we move forward to test our last hypothesis. Since diversification reduces investment risk, and R&D expenditures, advertising expenditures, and acquisition increase investment risk, we expect to see that the more diversified the firm, the less human capital cost; the higher level of R&D expenditures, advertising expenditures, or acquisition, the more human capital cost. Table 11 and Table 12 report the results for each channel within the CEO sample and average employee sample separately. In table 11, columns 1-4 report CEO

total compensation regressed on each channel. We observe that except for column 1, all other channels are consistent with our expectation. To be specific, R&D expenditures and acquisition are significantly positive at the 1% level. Advertising expenditures is positively significant at the 10% level. The results provide evidence that is consistent with Hypothesis 4. Column 1 presents results using the diversification level as a channel. We included a squared variable of the number of segments in the regression because literature suggests the level of diversification could have a nonlinear relation with compensation (e.g., Rose and Shepard (1994) and Duru and Reeb (2002)). We see that the coefficient on the number of segments is insignificant, but negative as expected.

For the average employee sample in table 12, we report results in two panels. Panel A reports the results using staff expense to calculate the dependent variable. We observe that the number of segments is significantly negative at 10%, and R&D expenditures are positively significant at 1%, which is consistent with Hypothesis 4. However, neither advertising expenditures nor acquisition show any significance. Panel B reports the results using SGA to calculate the dependent variable, and we observe significance in all four specifications. In particular, the coefficient on the number of segments is negative significantly at 1% level, while coefficients on R&D expenditures, advertising expenditures, and acquisition are all positively significant at 1% level, which are all consistent with Hypothesis 4.

7. Labor intensity's feedback effect

To this point, we have completed both a theoretical and an empirical examination of the positive relation between human capital cost and a firm's investment riskiness. There is still one important and intriguing question left to answer: how will the relation eventually feedback to the firm's investment policy? Specifically, once the human capital cost is raised because of the increased investment riskiness, how would the firm's future investment policy react to the increased human capital cost? More labor-intensive firms face greater aggregate human capital cost from increasing investment risk, therefore, firms with higher labor intensity would reduce risky investments in order to reduce human capital cost. As a result, we expect to see the feedback effect of increased human capital cost to reduce the amount of risky investments, i.e., more labor-intensive firms are expected to be associated with less risky investments. Following Dewenter and Malatesta (2001) and Agrawal and Matsa (2013), we construct the labor intensity variable as the ratio of labor and pension expenses to total assets. We next empirically test this prediction by regressing labor intensity on each of the four risky investment channels. To be specific, we expect to see that labor intensity is positively related to the number of business segments, and negatively related to R&D expenditures, advertising expenditures, and acquisition. Results are reported in Table 13. Panel A and Panel B presents firm-level results and industry-level results, respectively. We see from Panel A that labor intensity is negatively and significantly associated with R&D expenditures, advertising expenditures, and acquisition. Panel B shows that labor intensity is positively and significantly associated with the number of business segments and negatively and significantly associated with R&D expenditures. The feedback effect shows that firms do

adjust their investment policy according to the costs of human capital, and the results are generally consistent with our prediction.

8. Conclusion

A few recent financial studies start to pay attention to the role of human capital cost in corporate policies. In this paper, we argue that employees bear large human capital loss because of the risky investments that the firm is taking. In our theoretical framework, we consider the risk borne by the firm (so as employees) arising from the decision on risky investments, and we conduct empirical tests on the relation between investment riskiness and human capital cost. Our results indicate that increased human capital cost due to investment riskiness can significantly discourage firms' decisions on valuable investments, resulting in a potential underinvestment problem.

Using two measures for investment riskiness, cash flow volatility and unlevered stock return volatility, we find that investment riskiness is significantly positively correlated to both CEO compensation and average employee pay. In a panel sample of CEO information from 1992 to 2015, and a panel sample of average employee information from 1976 to 2015, we show that the positive relation is both statistically and economically significant. For example, we document that for one standard deviation increase in cash flow volatility, total compensation of an average CEO increases 7.14%, and average employee pay increases 10.56%. Our results are evident after we try our best attempts to control for endogeneity. We further show that average workers who are more sensitive to unemployment risk have a stronger effect in the compensation and investment riskiness relation.

Next, we explore four possible channels for investment riskiness: corporate diversification, R&D expenditures, advertising expenditures, and acquisition. We find further support for the positive relation between investment riskiness and human capital cost. In particular, we find a firm's R&D expenditures, advertising expenditures, and acquisition are positively related to human capital cost, while diversification level is negatively related. Lastly, we finish the loop by providing evidence on the feedback effect of increased human capital cost on a firm's investment policy. We show that labor-intensive firms have significantly lower risky investments. Overall, our study contributes to the nascent but growing literature of the impact of the human capital on a firm's investment policy.

REFERENCES

Abowd, J.M. and Ashenfelter, O.C., 1981. Anticipated unemployment, temporary layoffs, and compensating wage differentials. In Studies in labor markets (pp. 141-170). University of Chicago Press.

Agrawal, A.K. and Matsa, D.A., 2013. Labor unemployment risk and corporate financing decisions. *Journal of Financial Economics*, *108*(2), pp.449-470.

Arellano, M. and Bover, O., 1995. Another look at the instrumental variable estimation of error-components models. *Journal of econometrics*, *68*(1), pp.29-51.

Argenti, J. 1976. Corporate Collapse: The Causes and Symptoms (London, UK: McGraw-Hill Book Company (UK) Ltd.,).

Baber, W.R., Janakiraman, S.N. and Kang, S.H., 1996. Investment opportunities and the structure of executive compensation. *Journal of Accounting and Economics*, *21*(3), pp.297-318.

Berger, P.G. and Ofek, E., 1995. Diversification's effect on firm value. *Journal of Financial Economics*, *37*(1), pp.39-65.

Berk, J.B., Stanton, R. and Zechner, J., 2010. Human capital, bankruptcy, and capital structure. *The Journal of Finance*, *65*(3), pp.891-926.

Bizjak, J.M., Brickley, J.A. and Coles, J.L., 1993. Stock-based incentive compensation and investment behavior. *Journal of Accounting and Economics*, *16*(1-3), pp.349-372.

Blundell, R. and Bond, S., 1998. Initial conditions and moment restrictions in dynamic panel data models. *Journal of econometrics*, *87*(1), pp.115-143.

Cadenillas, A., Cvitanić, J. and Zapatero, F., 2004. Leverage decision and manager compensation with choice of effort and volatility. *Journal of Financial Economics*, *73*(1), pp.71-92.

Campbell, J.Y., Lettau, M., Malkiel, B.G. and Xu, Y., 2001. Have individual stocks become more volatile? An empirical exploration of idiosyncratic risk. *The Journal of Finance*, *56*(1), pp.1-43.

Chemmanur, T.J., Cheng, Y. and Zhang, T., 2013. Human capital, capital structure, and employee pay: An empirical analysis. *Journal of Financial Economics*, *110*(2), pp.478-502.

Cheng, S., 2004. R&D expenditures and CEO compensation. *The Accounting Review*, *79*(2), pp.305-328.

Childs, P.D., Mauer, D.C. and Ott, S.H., 2005. Interactions of corporate financing and investment decisions: The effects of agency conflicts. *Journal of financial economics*, *76*(3), pp.667-690.

Clark, A., Georgellis, Y. and Sanfey, P., 2001. Scarring: The psychological impact of past unemployment. *Economica*, *68*(270), pp.221-241.

Clark, A.E. and Oswald, A.J., 1994. Unhappiness and unemployment. *The Economic Journal*, *104*(424), pp.648-659.

Clinch, G., 1991. Employee compensation and firms' research and development activity. *Journal of Accounting Research*, pp.59-78.

Coles, J.L., Daniel, N.D. and Naveen, L., 2006. Managerial incentives and risk-taking. *Journal of Financial Economics*, *79*(2), pp.431-468.

Cronqvist, H., Heyman, F., Nilsson, M., Svaleryd, H. and Vlachos, J., 2009. Do entrenched managers pay their workers more?. *The Journal of Finance*, 64(1), pp.309-339.

Dambolena, I.G. and Khoury, S.J., 1980. Ratio stability and corporate failure. *The Journal of Finance*, *35*(4), pp.1017-1026.

Dewenter, K.L. and Malatesta, P.H., 2001. State-owned and privately owned firms: An empirical analysis of profitability, leverage, and labor intensity. The American Economic Review, 91(1), pp.320-334.

Duru, A. and Reeb, D.M., 2002. Geographic and industrial corporate diversification: The level and structure of executive compensation. *Journal of Accounting, Auditing & Finance*, *17*(1), pp.1-24.

Eichenbaum, M.S., Hansen, L.P. and Singleton, K.J., 1988. A time series analysis of representative agent models of consumption and leisure choice under uncertainty. *The Quarterly Journal of Economics*, *103*(1), pp.51-78.

Fauver, L., McDonald, M.B. and Taboada, A., 2015. Does it Pay to Treat Employees Well? International Evidence on the Value of an Employee-Friendly Culture. Working paper

Gaver, J.J. and Gaver, K.M., 1998. The relation between nonrecurring accounting transactions and CEO cash compensation. *Accounting Review*, pp.235-253.

Gerlach, K. and Stephan, G., 1996. A paper on unhappiness and unemployment in Germany. *Economics Letters*, *52*(3), pp.325-330.

Gilchrist, S. and Himmelberg, C.P., 1995. Evidence on the role of cash flow for investment. *Journal of Monetary Economics*, *36*(3), pp.541-572.

Gompers, P., Ishii, J. and Metrick, A., 2003. Corporate governance and equity prices. *The Quarterly Journal of Economics*, 118(1), pp.107-156.

Graham, J.R., 1996a, Debt and the marginal tax rate, *Journal of Financial Economics* 41, 41-73.

Graham, J.R., 1996b, Proxies for the corporate marginal tax rate, *Journal of Financial Economics* 42, 187-221

Graham, J.R., Lemmon, M.L. and Schallheim, J.S., 1998. Debt, leases, taxes, and the endogeneity of corporate tax status. *The Journal of Finance*, 53(1), pp.131-162.

Gray, S.R. and Cannella, A.A., 1997. The role of risk in executive compensation. *Journal of Management*, *23*(4), pp.517-540.

Grundy, B.D. and Li, H., 2010. Investor sentiment, executive compensation, and corporate investment. *Journal of Banking & Finance*, *34*(10), pp.2439-2449.

Guay, W.R., 1999. The sensitivity of CEO wealth to equity risk: an analysis of the magnitude and determinants. *Journal of Financial Economics*, *53*(1), pp.43-71.

Harris, M. and Holmstrom, B., 1982. A theory of wage dynamics. *The Review of Economic Studies*, 49(3), pp.315-333.

Harris, M. and Raviv, A., 1991. The theory of capital structure. *The Journal of Finance*, *46*(1), pp.297-355.

Huang, A.G., 2009. The cross section of cashflow volatility and expected stock returns. Journal of Empirical Finance, 16(3), pp.409-429.

Irvine, P.J. and Pontiff, J., 2008. Idiosyncratic return volatility, cash flows, and product market competition. *The Review of Financial Studies*, *22*(3), pp.1149-1177.

Kuppuswamy, V. and Villalonga, B., 2015. Does diversification create value in the presence of external financing constraints? Evidence from the 2007–2009 financial crisis. Management Science, 62(4), pp.905-923.

Lee, K.H., Mauer, D.C., and Xu, Q.Y., 2017. Human Capital Relatedness and Mergers and Acquisitions. *Journal of Financial Economics, 2017.*

Lev, B. and Sougiannis, T., 1996. The capitalization, amortization, and value-relevance of R&D. *Journal of Accounting and Economics*, *21*(1), pp.107-138.

Lewellen, W.G., 1971. A pure financial rationale for the conglomerate merger. *The Journal of Finance*, *26*(2), pp.521-537.

Lubatkin, M. and O'Neill, H.M., 1987. Merger strategies and capital market risk. *Academy of Management Journal*, *30*(4), pp.665-684.

Matsunaga, S.R., 1995. The effects of financial reporting costs on the use of employee stock options. *Accounting Review*, pp.1-26.

Mauer, D.C. and Sarkar, S., 2005. Real options, agency conflicts, and optimal capital structure. *Journal of banking & Finance*, *29*(6), pp.1405-1428.

May, D.O., 1995. Do managerial motives influence firm risk reduction strategies?. *The Journal of Finance*, *50*(4), pp.1291-1308.

Miller, K.D. and Bromiley, P., 1990. Strategic risk and corporate performance: An analysis of alternative risk measures. *Academy of Management Journal*, *33*(4), pp.756-779.

Rajgopal, S., Shevlin, T. and Venkatachalam, M., 2003. Does the stock market fully appreciate the implications of leading indicators for future earnings? Evidence from order backlog. *Review of Accounting Studies*, *8*(4), pp.461-492.

Rose, N.L. and Shepard, A., 1994. *Firm diversification and CEO compensation: Managerial ability or executive entrenchment?* (No. w4723). National Bureau of Economic Research.

Ryan Jr, H.E. and Wiggins III, R.A., 2002. The interactions between R&D investment decisions and compensation policy. *Financial Management*, pp.5-29.

Ryan Jr, H.E. and Wiggins, R.A., 2001. The influence of firm-and manager-specific characteristics on the structure of executive compensation. *Journal of Corporate Finance*, *7*(2), pp.101-123.

Schwert, Michael and Strebulaev, Ilya A., Capital Structure and Systematic Risk (April 6, 2014). Rock Center for Corporate Governance at Stanford University Working Paper No. 178. Available at SSRN: https://ssrn.com/abstract=2421020

Shilon, N., 2015. CEO Stock Ownership Policies-Rhetoric and Reality. Ind. LJ, 90, p.353.

Smith, C.W. and Watts, R.L., 1992. The investment opportunity set and corporate financing, dividend, and compensation policies. *Journal of Financial Economics*, *32*(3), pp.263-292.

Topel, R.H., 1984. Equilibrium earnings, turnover, and unemployment: New evidence. Journal of Labor Economics, 2(4), pp.500-522.

Yermack, D., 1995. Do corporations award CEO stock options effectively? *Journal of Financial Economics*, *39*(2), pp.237-269.

Zhang, Y., 2009. Are debt and incentive compensation substitutes in controlling the free cash flow agency problem?. *Financial Management*, *38*(3), pp.507-541.

Appendix: Variable Definitions

Variable	Description (source of data)
CEO characteristics	
Total compensation	(Salary + Bonus + Other Annual + Restricted Stock Grants + LTIP Payouts + All Other + Value of Option Grants) divided by total sales. (ExecuComp/Compustat)
Cash compensation	Sum of salary and bonus divided by total sales. (ExecuComp/Compustat)
Equity-based comp.	(Total compensation − Cash compensation − Other Annual − LTIP payouts) divided by total sales. (ExecuComp)
Age	Age of the CEO. (ExecuComp)
Male	Dummy variable equal to one when the CEO is male. (ExecuComp)
Chairman	Dummy variable equal to one when the CEO serves as chairman of the board. (ExecuComp)
Employee characteristics	
Staff expense per employee	Labor expense per employee divided by total sales. (Compustat)
SGA per employee	Selling, general, and administrative expense per employee divided by total sales. (Compustat)
Number of employees	Total number of employees in a firm-year. (Compustat)
Proxies for risky investments	
Cash flow volatility	Standard deviation of the ratio of operating income after depreciation to assets over the eight quarters ending in each fiscal year. (Compustat)
Unlevered stock return volatility	Standard deviation of unlevered daily stock returns in past 2 years. (CRSP/Compustat)
No. of segments	Number of segments with different four-digit SIC code. (Compustat/Segment)
R&D	Ratio of research and development expense to total sales. (Compustat)
Advertisement	Ratio of advertisement expenditures to total sales. (Compustat)
Acq. amount	Ratio of total value of acquisition in a year to total sales. (SDC/Compustat)
Proxies for labor intensity	
Labor intensity	Ratio of labor and pension expenses to total asset. Measure is based on the three digit North American Industry Classification System (NAICS). (Compustat)
Control variables	
Market Capitalization	Logarithm of market capitalization in constant dollars using the CPI with base year 1992. (Compustat)
Average sales per employee	Amount of total sales divided by number of employees. (Compustat)
Market leverage	Total debt divided by the market value of assets (book value of assets – book value of equity + market value of equity). (Compustat)
Market-to-book ratio	Ratio of book assets plus the difference between the market and book values of equity to the book value assets. (Compustat)
Marginal tax rate	Present value of current and expected future taxes paid on an additional dollar earned today. Come from the database of marginal tax rates provided by John Graham.
CAPEX	Ratio of capital expenditures to sales. (Compustat)
Fixed assets ratio	Ratio of net property, plant, and equipment to the book value of assets. (Compustat)
ROA	Ratio of operating income before depreciation to the book value of assets. (Compustat)
ROE	Ratio of operating income before depreciation to the book value of equity. (Compustat)
Cash	Ratio of cash and marketable securities to the book value of assets. (Compustat)

Firm age	Number of years from the first year recorded on the database to year t. (Compustat)
One-year return to	Ratio of difference between stock price at year t plus dividend per share and stock price shareholder at year t-1 to stock price at year t-1. (Compustat)
High-tech dummy	Defined as an indicator variable which takes a value of one if a firm is involved in high-tech industries, and zero otherwise. We follow Carpenter and Petersen (2002) to identify high-tech industries by using first three-digit SIC code of 283, 357, 361, 362, 366, 367, 382, 384, 386, and 387.
Governance index	Gompers, Ishii, and Metrick (2003) governance index.

Table 1. Descriptive Statistics

We report descriptive statistics for both CEO sample (Panel A) and average employee sample (Panel B). In the CEO sample, we require non-missing information on cash flow volatility, stock return volatility, and firm data. The full CEO sample covers period from 1992 to 2015. In the employee sample, we require firm-years to be on the Compustat database and have cash flow volatility, unlevered stock return volatility, SGA (Selling, General and Administrative expense), and firm data. The full employee sample covers period from 1976 to 2015. All continuous variables are winsorized at the 1% and 99% percentiles of their distributions. All variables are defined in the Appendix A.

	N	Mean	Std Dev	Min	Median	Max
Panel A. CEO sample						
Total Compensation $mm	17,688	3.750	4.303	0.193	2.334	25.680
Total compensation	17,688	0.003	0.005	0.000	0.001	0.032
Cash compensation $mm	17,688	0.865	0.762	0.051	0.624	4.716
Cash compensation	17,688	0.001	0.001	0.000	0.000	0.007
Equity-based compensation $mm	9,129	2.416	4.246	0.000	0.912	27.070
Equity-based compensation	9,129	0.002	0.005	0.000	0.001	0.037
Cash flow volatility	17,688	0.012	0.012	0.001	0.008	0.065
Unlevered stock return volatility	17,688	0.023	0.011	0.008	0.021	0.062
No. of segments	13,264	1.682	1.083	1.000	1.000	8.000
CAPEX	17,586	0.072	0.118	0.002	0.038	0.809
R&D	11,703	0.071	0.107	0.000	0.027	0.714
Advertisement	7,022	0.030	0.037	0.000	0.015	0.194
Acq. amount	17,688	0.048	0.177	0.000	0.000	1.264
Sales $mm	17,688	5,710	12,769	64.538	1,490	88,050
High-tech dummy	17,688	0.208				
Age	17,688	55.930	7.454	29.000	56.000	96.000
Male	17,688	0.976				
Chairman	17,688	0.557				
Market Capitalization	17,688	7.275	1.568	4.021	7.098	11.567
Market leverage	17,688	0.139	0.133	0.000	0.111	0.563
Market to book	17,688	3.312	3.159	0.497	2.381	20.985
One year shareholders' return	17,688	0.097	0.438	-0.758	0.062	1.823
Panel B. Employee sample						
Staff expense per employee $thousand	6,710	34.403	19.593	1.553	34.737	93.166
Staff expense per employee	6,710	0.0002	0.0004	0.000	0.0002	0.003
SGA per employee $thousand	72,427	51.134	45.172	1.849	36.302	236.586
SGA per employee	72,427	0.0008	0.002	0.000	0.0002	0.010
Cash flow volatility	72,427	0.020	0.022	0.002	0.013	0.128
Unlevered stock return volatility	72,427	0.030	0.017	0.008	0.026	0.090
No. of segments	61,042	1.498	0.996	1.000	1.000	10.000
CAPEX	71,771	0.065	0.085	0.003	0.040	0.589
R&D	72,427	0.126	4.933	0.000	0.026	976.500
Advertisement	32,516	0.031	0.042	0.000	0.016	0.256
Acq. amount	72,427	0.037	0.167	0.000	0.000	1.285
Sales $mm	72,427	2,308	7,318	6.232	215.886	53,674
High-tech dummy	72,427	0.312				
Average sales per employee $thousand	72,427	173.063	147.578	20.433	134.491	967.888
Market leverage	72,427	0.148	0.153	0.000	0.105	0.629

Market-to-book	72,427	1.905	1.402	0.601	1.437	8.872
Fixed asset ratio	72,427	0.249	0.180	0.014	0.210	0.806
Market capitalization	72,427	5.440	2.108	1.147	5.292	10.863
ROA	72,427	0.103	0.137	-0.484	0.122	0.378
ROE	72,427	0.237	0.389	-1.451	0.250	1.908
Cash	72,427	0.181	0.191	0.001	0.108	0.794
Firm age	72,427	10.954	8.809	1.000	8.000	46.000
Number of employees thousands	72,427	10.250	25.064	0.107	1.520	165.000

Table 2. Correlations Matrix

We report Pearson correlation coefficients between human capital cost and proxies of risky investments for both CEO sample (Panel A) and employee sample (Panel B). In the CEO sample, we require firm-years to be on the ExecuComp database and have cash flow volatility, unlevered stock return volatility and firm data. The full CEO sample covers period from 1992 to 2015. In the employee sample, we require firm-years to be on the Compustat database and have cash flow volatility, unlevered stock return volatility, SGA (Selling, General and Administrative expense) and firm data. The full employee sample covers period from 1976 to 2015. ***, **, * indicates significance at the 1%, 5%, and 10% levels, respectively.

Panel A. CEO sample	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Total compensation	1								
(2) Cash compensation	0.677***	1							
(3) Equity-based compensation	0.947***	0.465***	1						
(4) Cash flow volatility	0.201***	0.212***	0.200***	1					
(5) Unlevered Stock return volatility	0.393***	0.363***	0.413***	0.375***	1				
(6) No. of segments	-0.168***	-0.157***	-0.155***	-0.151***	-0.203***	1			
(7) R&D	0.544***	0.473***	0.504***	0.251***	0.380***	-0.235***	1		
(8) Advertisement	0.053***	0.057***	0.053***	0.185***	0.005	0.007	0.004	1	
(9) Acq. amount	0.149***	0.100***	0.154***	0.022***	0.044***	-0.049***	0.132***	0.026**	1
Panel B. Employee sample	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
(1) Staff expense per employee	1								
(2) SGA per employee	0.758***	1							
(3) Cash flow volatility	0.329***	0.439***	1						
(4) Unlevered Stock return volatility	0.446***	0.468***	0.438***	1					
(5) No. of segments	-0.199***	-0.196***	-0.177***	-0.273***	1				
(6) R&D	0.087***	0.077***	0.024***	0.015***	-0.010**	1			
(7) Advertisement	0.131***	0.207***	0.221***	0.098***	-0.027***	0.135***	1		
(8) Acq. amount	0.023*	0.082***	0.055***	0.090***	-0.044***	0.002	0.064***	1	

Table 3. Effect of Investments Risk on CEO Compensation

The dependent variables are three measures of CEO compensation: Total compensation/sales, Cash compensation/sales and Equity-based compensation/sales of CEO. Regressions in Panel A include firm fixed effects and year fixed effects, regressions in Panel B include a dummy variable for technology firms and year fixed effects. We use cash flow volatility and unlevered stock return volatility as two proxies for risky investments. The coefficients are reported in terms of percentage. All continuous variables are winsorized at the 1% and 99% percentiles of their distributions. *T*-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. ***, **, * indicates significance at the 1%, 5%, and 10% levels, respectively.

	Total comp. (1)	Cash comp. (2)	Equity-based comp. (3)	Total comp. (4)	Cash comp. (5)	Equity-based comp. (6)
Panel A. Firm-year fixed effects						
Cash flow volatility	1.784***	0.033	2.327**			
	(2.70)	(0.23)	(2.02)			
Unlevered stock return volatility				7.226***	0.595***	9.406***
				(6.79)	(3.28)	(5.66)
Market Capitalization	-0.024**	-0.021***	0.029*	-0.008	-0.020***	0.043***
	(-2.01)	(-8.69)	(1.77)	(-0.66)	(-8.17)	(2.64)
Market Leverage	-0.423***	-0.116***	-0.324***	-0.202***	-0.097***	-0.014
	(-6.90)	(-9.38)	(-3.04)	(-3.04)	(-7.64)	(-0.13)
Market-to-book	0.014***	0.002***	0.012**	0.012***	0.002***	0.012**
	(5.34)	(4.67)	(2.57)	(5.00)	(4.27)	(2.51)
One-year return to shareholders	0.003	0.013***	-0.036**	-0.002	0.013***	-0.039***
	(0.40)	(9.78)	(-2.47)	(-0.24)	(9.51)	(-2.73)
Age	-0.003***	-0.000	-0.003***	-0.003***	0.000	-0.003***
	(-4.33)	(-0.03)	(-2.82)	(-4.19)	(0.08)	(-2.65)
Chairman	0.023**	0.005***	0.034**	0.021**	0.005***	0.033**
	(2.50)	(3.01)	(2.43)	(2.36)	(2.94)	(2.36)
Male	-0.041	-0.008	-0.124*	-0.048	-0.009	-0.128*
	(-0.89)	(-1.13)	(-1.75)	(-1.10)	(-1.23)	(-1.79)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.614	0.781	0.557	0.620	0.782	0.562
Number of observations	17,688	17,688	9,129	17,688	17,688	9,129

Panel B. Year fixed effects						
Cash flow volatility	4.277***	0.843***	4.902***			
	(6.12)	(5.28)	(5.16)			
Unlevered stock return volatility				14.921***	1.908***	18.871***
				(12.87)	(8.19)	(12.17)
Market Capitalization	-0.075***	-0.032***	-0.042***	-0.048***	-0.029***	-0.009*
	(-16.79)	(-24.39)	(-7.57)	(-10.56)	(-23.30)	(-1.65)
Market Leverage	-0.439***	-0.129***	-0.402***	-0.031	-0.081***	0.237***
	(-10.06)	(-10.27)	(-6.86)	(-0.64)	(-6.02)	(3.54)
Market-to-book	0.022***	0.004***	0.022***	0.022***	0.004***	0.020***
	(8.07)	(7.91)	(5.66)	(8.47)	(8.28)	(5.89)
One-year return to shareholders	0.012	0.013***	-0.028*	-0.004	0.011***	-0.032**
	(1.13)	(6.75)	(-1.74)	(-0.40)	(5.53)	(-2.04)
Age	-0.004***	0.000	-0.007***	-0.003***	0.001**	-0.004***
	(-4.87)	(1.30)	(-5.93)	(-3.10)	(2.11)	(-3.54)
Chairman	0.026**	0.006**	0.028	0.029**	0.007**	0.030*
	(2.18)	(2.19)	(1.62)	(2.49)	(2.30)	(1.85)
Male	-0.035	-0.011	-0.072	-0.053	-0.014	-0.126
	(-0.87)	(-0.99)	(-0.83)	(-1.36)	(-1.26)	(-1.61)
High-tech dummy	0.218***	0.046***	0.224***	0.160***	0.038***	0.099***
	(9.04)	(8.21)	(7.03)	(7.24)	(7.22)	(3.35)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.184	0.326	0.131	0.231	0.336	0.200
Number of observations	17,688	17,688	9,129	17,688	17,688	9,129

Table 4. System GMM Estimation of the Effects of Investments Riskiness on CEO Compensation

The table reports the results of system GMM estimation of the effects of risky investments on CEO compensation. The dependent variables are three measures of CEO compensation: Total compensation/sales, Cash compensation/sales and Equity-based compensation/sales of CEO. All control variables are considered to be endogenous with the exception of the year and industry dummy variables. We also include first lag of dependent variable in the dynamic GMM model. AR(1) and AR(2) are tests for first-order and second-order serial correlation in the first differenced residuals with the null hypothesis of no serial correlation. The null hypothesis of the Hansen test of overidentification is that all instruments are valid. The null hypothesis of the difference-in- Hansen test of exogeneity is that the instruments used for the equations in levels are exogenous. The coefficients are reported in terms of percentage. All continuous variables are winsorized at the 1% and 99% percentiles of their distributions. *T*-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Total comp. (1)	Cash comp. (2)	Equity-based comp. (3)	Total comp. (4)	Cash comp. (5)	Equity-based comp. (6)
Adjusted compensation (one lag)	0.472***	0.101***	0.380***	0.444***	0.638***	0.342***
	(8.82)	(9.57)	(5.10)	(6.76)	(17.29)	(4.43)
Cash flow volatility	2.938***	0.313	4.865*			
	(3.22)	(1.17)	(1.65)			
Unlevered stock return volatility				5.047***	0.052	13.440***
				(3.47)	(0.24)	(4.24)
Market Capitalization	-0.048***	-0.029***	-0.076**	-0.053***	-0.011***	-0.030
	(-3.27)	(-7.89)	(-2.19)	(-4.31)	(-5.14)	(-1.30)
Market Leverage	0.019***	-0.152***	-0.979***	-0.114	-0.063***	0.137
	(2.66)	(-4.69)	(-2.75)	(-1.37)	(-4.40)	(0.56)
Market-to-book	-0.251***	0.002	0.029*	0.013*	0.002**	0.014
	(-3.15)	(1.30)	(1.81)	(1.94)	(2.20)	(0.74)
One-year return to shareholders	0.052**	0.011***	-0.006	0.030	0.001	-0.009
	(2.04)	(2.67)	(-0.08)	(1.16)	(0.15)	(-0.14)
Age	0.000	0.001	0.001	-0.000	-0.000	0.005
	(0.05)	(0.80)	(0.07)	(-0.11)	(-0.32)	(0.68)
Chairman	0.019	-0.003	0.034	0.036	-0.005	0.070
	(0.61)	(-0.46)	(0.30)	(1.31)	(-0.86)	(1.03)

Male	0.008	-0.014	-0.034	-0.029	-0.002	-0.069
	(0.12)	(-0.58)	(-0.10)	(-0.47)	(-0.16)	(-0.16)
High-tech dummy	-0.091	-0.004	0.432	-0.295	-0.026	-0.084
	(-0.42)	(-0.05)	(0.88)	(-1.02)	(-0.54)	(-0.28)
AR(1) test (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
AR(2) test (p-value)	0.105	0.102	0.480	0.141	0.204	0.748
Hansen J-statistic (p-value)	1.000	1.000	0.165	0.989	0.705	0.152
Diff-in-Hansen J-statistic (p-value)	1.000	0.127	0.735	0.253	0.743	0.456
Number of observations	14,765	14,765	7,093	14,765	14,765	7,093

Table 5. Simultaneous Regressions: Effects of Investment Risk on CEO Compensation

The table reports the results obtained from a set of three simultaneous regressions:

1. $CEOComp_{i,t} = \gamma_0 + \gamma_1 RiskyInvestment_{i,t} + \gamma_2 MktCap_{i,t} + \gamma_3 MktLev_{i,t} + \gamma_4 MtB_{i,t} + \gamma_5 Age_{i,t} + \gamma_6 Return_{i,t} + \gamma_7 Chair_{i,t} + \gamma_8 Male_{i,t} + \varepsilon_{i,t}$
2. $RiskyInvestment_{i,t} = \alpha_0 + \alpha_1 CEOComp_{i,t} + \alpha_2 Ind\ med\ of\ RiskyInvestment_{i,t} + \alpha_3 Ind\ med\ of\ R\&D_{i,t} + \alpha_4 MktCap_{i,t} + \alpha_5 MktLev_{i,t} + \alpha_6 MtB_{i,t} + \alpha_7 Age_{i,t} + \alpha_8 Capex_{i,t} + \varepsilon_{i,t}$
3. $MktLev_{i,t} = \beta_0 + \beta_1 CEOComp_{i,t} + \beta_2 Industry\ median\ of\ MktLev_{i,t} + \beta_3 MTRB_{i,t} + \beta_4 MktCap_{i,t} + \beta_5 MtB_{i,t} + \beta_6 Cash_{i,t} + \beta_7 Capex_{i,t} + \varepsilon_{i,t}$

Panel A presents the results of Equation 1, penal B presents the results of Equation 2, and Panel C presents the results of Equation 3. *RiskyInvestment* is cash flow volatility in Column (1) – (3) and unlevered stock return volatility in Column (4) – (6) of Panel A. *CEOComp* are three measures of CEO compensation: total compensation/sales, cash compensation/sales and equity-based compensation/sales. *MTRB* is marginal tax rates based on income before interest is deducted. The coefficients are reported in terms of percentage. All regressions include year fixed effects. All continuous variables are winsorized at the 1% and 99% percentiles of their distributions. *T*-statistics (in parentheses) are computed using robust standard errors clustered at the firm level. ***, **, * indicates significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Regression 1

	Total comp. (1)	Cash comp. (2)	Equity-based comp. (3)	Total comp. (4)	Cash comp. (5)	Equity-based comp. (6)
Cash flow volatility	15.320***	3.288***	21.530***			
	(17.94)	(18.18)	(15.62)			
Unlevered stock return volatility				24.161***	3.553***	28.356***
				(29.12)	(19.11)	(25.10)
Market Capitalization	-0.056***	-0.027***	-0.017***	-0.025***	-0.024***	0.008*
	(-19.26)	(-43.55)	(-3.45)	(-8.40)	(-36.27)	(1.76)
Market Leverage	-1.421***	-0.309***	-1.249***	-0.411***	-0.197***	0.355***
	(-21.63)	(-21.62)	(-11.83)	(-5.67)	(-12.05)	(2.93)
Market-to-book	0.008***	0.002***	0.001	0.015***	0.003***	0.015***
	(5.50)	(5.69)	(0.45)	(11.81)	(10.87)	(7.13)
One-year return to shareholders	-0.003***	0.001***	-0.003***	-0.001	0.001***	-0.001
	(-5.26)	(5.63)	(-4.03)	(-1.47)	(7.90)	(-1.10)
Age	-0.017***	0.001	-0.018**	0.009**	0.004***	-0.002
	(-2.80)	(0.61)	(-2.43)	(2.04)	(3.98)	(-0.39)
Chairman	-0.007	-0.002	-0.008	-0.014***	-0.004***	-0.009**
	(-1.42)	(-1.44)	(-1.27)	(-4.17)	(-4.47)	(-2.30)
Male	0.001	-0.001	-0.011	0.018	0.006*	0.034**
	(0.07)	(-0.25)	(-0.40)	(1.59)	(1.87)	(1.97)

Panel B. Regression 2						
	Cash flow volatility			Unlevered stock return volatility		
	(1)	(2)	(3)	(4)	(5)	(6)
Total comp.	0.0350***			0.030***		
	(42.99)			(57.50)		
Cash comp.		0.145***			0.144***	
		(41.86)			(57.44)	
Equity-based comp.			0.033***			0.030***
			(32.05)			(39.53)
Industry median of risky investment	0.622***	0.689***	0.448***	0.362***	0.581***	0.234***
	(25.80)	(27.67)	(13.14)	(26.42)	(35.97)	(12.02)
Industry median of R&D.	-0.034***	-0.030***	-0.025***	-0.022***	-0.029***	-0.016***
	(-16.64)	(-16.25)	(-9.40)	(-16.67)	(-19.06)	(-7.72)
Market Capitalization	0.001***	0.003***	0.000	0.000***	0.003***	-0.000***
	(11.80)	(22.45)	(0.17)	(3.25)	(25.40)	(-4.66)
Market Leverage	0.034***	0.028***	0.033***	0.009***	0.023***	-0.010***
	(14.79)	(12.69)	(10.00)	(5.21)	(12.17)	(-3.35)
Market-to-book	-0.000**	-0.000	0.000*	-0.000***	-0.000***	-0.000***
	(-2.30)	(-1.33)	(1.80)	(-13.44)	(-12.05)	(-7.44)
Age	0.000***	-0.000***	0.000***	0.000	-0.000***	0.000**
	(5.21)	(-7.71)	(4.12)	(1.16)	(-13.34)	(1.99)
CAPEX/sales	-0.002***	-0.002**	-0.003**	-0.004***	-0.007***	-0.004***
	(-2.83)	(-2.04)	(-2.47)	(-8.99)	(-11.59)	(-5.84)

Panel C. Regression 3						
	Market leverage					
	(1)	(2)	(3)	(4)	(5)	(6)
Total comp.	0.222***			0.212***		
	(8.84)			(8.69)		
Cash comp.		-0.411***			-0.507***	
		(-5.23)			(-6.90)	
Equity-based comp.			0.278***			0.247***
			(8.85)			(8.10)
Industry median of market leverage	0.594***	0.422***	0.637***	0.603***	0.398***	0.668***
	(29.07)	(29.31)	(22.90)	(29.77)	(27.65)	(25.19)
Marginal tax rate	-0.063***	-0.135***	-0.019	-0.084***	-0.173***	-0.041*
	(-3.75)	(-10.61)	(-0.78)	(-5.08)	(-13.65)	(-1.83)
Market Capitalization	0.007***	-0.019***	-0.001	0.007***	-0.021***	-0.002
	(4.06)	(-8.14)	(-0.71)	(3.94)	(-9.74)	(-1.16)
Market to book	-0.009***	-0.002***	-0.010***	-0.008***	-0.002***	-0.010***
	(-13.81)	(-5.13)	(-13.51)	(-13.79)	(-4.60)	(-13.01)
Cash	-0.460***	-0.191***	-0.510***	-0.438***	-0.174***	-0.452***
	(-17.23)	(-9.88)	(-14.29)	(-16.82)	(-9.59)	(-13.00)
CAPEX.	-0.096***	0.071***	-0.085***	-0.071***	0.082***	-0.024
	(-4.65)	(4.55)	(-3.07)	(-3.51)	(5.48)	(-0.92)
Number of observations	13,121	13,121	6,982	13,121	13,121	6,982

Table 6. Effects of Investment Riskiness on Average Employee Pay

The dependent variables are two proxies for average employee pay: staff expense per employee and SGA (Selling, General and Administrative expense) per employee. Regressions in Panel A include firm fixed effects and year fixed effects, regressions in Panel B include a dummy variable for technology firms and year fixed effects. We use cash flow volatility and unlevered stock return volatility as two proxies for risky investments. The coefficients are reported in terms of percentage. All continuous variables are winsorized at the 1% and 99% percentiles of their distributions. *T*-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Staff expense per employee		SGA per employee	
	(1)	(2)	(3)	(4)
Panel A. Firm-year fixed effects				
Cash flow volatility	0.096**		0.432***	
	(2.41)		(9.56)	
Unlevered stock return volatility		-0.009		0.449***
		(-0.12)		(6.71)
Market Capitalization	-0.005***	-0.006***	-0.018***	-0.018***
	(-4.84)	(-4.80)	(-16.82)	(-15.96)
Market-to-book	0.003***	0.003***	0.014***	0.015***
	(3.20)	(3.61)	(17.30)	(18.18)
Market leverage	-0.026***	-0.027***	-0.104***	-0.092***
	(-3.85)	(-3.57)	(-16.80)	(-14.12)
Average sales per employee	0.000	0.000	-0.000***	-0.000***
	(0.34)	(0.29)	(-3.46)	(-3.28)
Fixed asset ratio	0.006	0.006	-0.014	-0.012
	(0.78)	(0.78)	(-1.48)	(-1.27)
ROA	-0.066***	-0.070***	-0.393***	-0.406***
	(-4.22)	(-4.37)	(-27.71)	(-28.84)
ROE	0.002	0.003	0.029***	0.028***
	(1.37)	(1.44)	(11.18)	(11.02)
Cash	0.035***	0.036***	0.133***	0.134***
	(3.35)	(3.43)	(17.24)	(17.38)
Firm age	0.000	0.000	0.005***	0.005***
	(0.06)	(0.03)	(3.55)	(3.62)
Year fixed effect	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes
Adjusted R-squared	0.906	0.905	0.824	0.823
Number of observations	6,710	6,710	72,427	72,427
Panel B. Industry-year fixed effects				
Cash flow volatility	0.149**		0.678***	
	(2.10)		(13.67)	
Unlevered stock return volatility		0.284**		0.410***
		(2.16)		(5.16)
Market Capitalization	-0.007***	-0.007***	-0.016***	-0.016***

	(-13.13)	(-11.49)	(-30.25)	(-28.08)
Market-to-book	0.007***	0.007***	0.020***	0.022***
	(6.22)	(6.14)	(23.33)	(25.40)
Market leverage	-0.047***	-0.040***	-0.136***	-0.132***
	(-6.00)	(-4.92)	(-21.98)	(-19.51)
Average sales per employee	0.000***	0.000***	0.000*	0.000**
	(5.72)	(5.73)	(1.89)	(2.20)
Fixed asset ratio	0.005	0.004	0.011**	0.012**
	(1.15)	(0.97)	(2.12)	(2.44)
ROA	-0.169***	-0.166***	-0.606***	-0.629***
	(-8.87)	(-8.42)	(-43.28)	(-44.41)
ROE	0.006**	0.005**	0.044***	0.043***
	(2.17)	(2.12)	(15.62)	(15.15)
Cash	0.044***	0.044***	0.133***	0.131***
	(2.88)	(2.89)	(19.93)	(19.54)
Firm age	-0.000	-0.000	-0.000***	-0.001***
	(-0.36)	(-0.07)	(-4.54)	(-4.85)
High-tech dummy	0.004	0.004	0.018***	0.016***
	(1.36)	(1.30)	(8.20)	(7.21)
Ind. & year fixed effect	Yes	Yes	Yes	Yes
Adjusted R-squared	0.450	0.450	0.537	0.531
Number of observations	6,710	6,710	72,427	72,427

Table 7: Robustness test on Non-high-tech vs. High-tech

The dependent variables are two proxies for average employee pay: staff expense per employee (Panel A) and SGA (Selling, General and Administrative expense) per employee (Panel B). We separate full sample into high-tech firms and non-high-tech firms by high-tech dummy. Regressions include firm fixed effects and year fixed effects. The coefficients are reported in terms of percentage. All continuous variables are winsorized at the 1% and 99% percentiles of their distributions. *T*-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Non-high-tech firms		High-tech firms	
	(1)	(2)	(3)	(4)
Panel A. Dependent variable = Staff expense per employee				
Cash flow volatility	0.107**		0.100	
	(2.34)		(1.19)	
Unlevered stock return volatility		0.031		-0.074
		(0.42)		(0.32)
Controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.904	0.903	0.913	0.912
Number of observations	5,471	5,471	1,239	1,239
Panel B. Dependent variable = SGA per employee				
Cash flow volatility	0.473***		0.374***	
	(9.17)		(4.54)	
Unlevered stock return volatility		0.505***		0.400***
		(6.28)		(3.28)
Controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.823	0.822	0.823	0.822
Number of observations	49,860	49,860	22,567	22,567

Table 8. System GMM Estimation of the Effects of Investments Riskiness on Average Employee Pay

The table reports the results of system GMM estimation of the effects of investment riskiness on average employee pay. The dependent variables are staff expense per employee and SGA per employee. All control variables are considered to be endogenous with the exception of the year and industry dummy variables. We also include first lag of dependent variable in the dynamic GMM model. AR(1) and AR(2) are tests for first-order and second-order serial correlation in the first differenced residuals with the null hypothesis of no serial correlation. The null hypothesis of the Hansen test of overidentification is that all instruments are valid. The null hypothesis of the difference-in- Hansen test of exogeneity is that the instruments used for the equations in levels are exogenous. The coefficients are reported in terms of percentage. All continuous variables are winsorized at the 1% and 99% percentiles of their distributions. *T*-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Staff expense per employee		SGA per employee	
	(1)	(2)	(3)	(4)
Adjusted labor costs (one lag)	0.505***	0.584***	0.565***	0.423***
	(3.85)	(3.63)	(14.33)	(6.56)
Cash flow volatility	0.335***		0.619**	
	(2.59)		(2.24)	
Unlevered stock return volatility		0.240*		0.648**
		(1.91)		(2.18)
Market Capitalization	-0.001	-0.004	0.008*	-0.005
	(-0.10)	(-1.49)	(1.69)	(-0.98)
Market-to-book	0.001	0.003	-0.017***	-0.006
	(0.31)	(1.64)	(-4.24)	(-1.04)
Market leverage	-0.012	0.005	-0.020	-0.027
	(-0.53)	(0.38)	(-0.73)	(-0.71)
Average sales per employee	0.000	0.000	-0.000	-0.000
	(0.82)	(0.71)	(-0.70)	(-1.01)
Fixed asset ratio	0.003	0.037	-0.037	-0.008
	(0.08)	(1.43)	(-0.57)	(-0.08)
ROA	-0.122*	-0.046*	-0.236***	-0.143***
	(-1.85)	(-1.66)	(-2.88)	(-2.67)
ROE	0.005	0.002	0.001	-0.000
	(0.28)	(0.53)	(0.09)	(-0.00)
Cash	0.003	0.022**	0.056	0.068
	(0.11)	(2.29)	(1.46)	(1.39)
Firm age	-0.000	-0.000	0.000	0.000
	(-0.34)	(-0.25)	(1.29)	(0.75)
High-tech dummy	-0.037	-0.075	-0.203	-0.830*
	(-0.13)	(-1.26)	(-1.01)	(-1.73)
AR(1) test (p-value)	0.010	0.018	0.000	0.000
AR(2) test (p-value)	0.922	0.488	0.115	0.192
Hansen J-statistic (p-value)	1.000	1.000	0.107	0.292
Diff-in-Hansen J-statistic (p-value)	1.000	1.000	0.155	0.883
Number of observations	5,642	5,642	62,748	62,748

Table 9. Sensitivity to Job Loss Subsample Analysis

The dependent variables are two proxies for average employee pay: staff expense per employee (Panel A) and SGA (Selling, General and Administrative expense) per employee (Panel B). We compute the median values of staff expense per employee and SGA per employee by year, and separate the full sample into high pay (above-median) and low pay (below-median) groups using the median value of staff expense per employee and SGA per employee, respectively. Regressions include firm fixed effects and year fixed effects. The coefficients are reported in terms of percentage. All continuous variables are winsorized at the 1% and 99% percentiles of their distributions. *T*-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Low-pay firms		High-pay firms	
	(1)	(2)	(3)	(4)
Panel A. Dependent variable = Staff expense per employee				
Cash flow volatility	0.125**		0.066	
	(2.51)		(1.10)	
	[17.29%]			
Unlevered stock return volatility		-0.006		-0.154
		(-0.08)		(-0.94)
Controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.883	0.881	0.934	0.934
Number of observations	3,544	3,544	3,166	3,166
Panel B. Dependent variable = SGA per employee				
Cash flow volatility	0.166***		0.449***	
	(4.26)		(7.61)	
	[12.28%]		[9.45%]	
Unlevered stock return volatility		0.165***		0.498***
		(2.90)		(5.13)
		[9.99%]		[7.78%]
Controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.812	0.812	0.831	0.831
Number of observations	29,749	29,749	42,678	42,678

Table 10. Channels for Investment Riskiness

We test four possible channels for investment riskiness within the CEO sample. The channels we investigate are number of segments, R&D expenditures, advertising expenditures and total value of all acquisition deals in a year. Panel A reports results from CEO sample and Panel B reports results from average employee sample. The coefficients are reported in in terms of percentage. All continuous variables are winsorized at the 1% and 99% percentiles of their distributions. *T*-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Cash flow volatility	Unlevered stock return volatility
	(1)	(2)
Panel A: CEO sample		
No. of segments	-0.0004	-0.0004*
	(-1.01)	(-1.76)
R&D	0.027***	0.011***
	(4.11)	(3.72)
Advertisement	0.085***	0.014**
	(5.33)	(2.06)
Acq. amount	-0.002	0.001**
	(-1.33)	(2.16)
Market Capitalization	-0.002***	-0.002***
	(-6.91)	(-16.20)
Market leverage	-0.015***	-0.035***
	(-5.25)	(-18.56)
Market-to-book	0.0004***	0.0004***
	(3.84)	(6.44)
ROA	0.008	-0.020***
	(1.40)	(-7.20)
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Adjusted R-squared	0.170	0.619
Number of observations	3,885	3,885
Panel B: Average employee sample		
No. of segments	-0.001***	-0.00001
	(-3.69)	(-0.11)
R&D	0.008**	0.001
	(2.35)	(0.67)
Advertisement	0.071***	0.005
	(10.24)	(1.55)
Acq. amount	-0.0004	0.002***
	(-0.44)	(5.14)
Market Capitalization	-0.003***	-0.003***
	(-19.77)	(-34.77)
Market leverage	-0.017***	-0.035***
	(-10.99)	(-36.96)

Market-to-book	0.004***	0.001***
	(19.86)	(14.10)
ROA	-0.049***	-0.027***
	(-21.04)	(-23.26)
Fixed asset ratio	0.001	0.001
	(0.30)	(0.51)
Cash	0.001	0.004***
	(0.52)	(4.75)
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Adjusted R-squared	0.330	0.613
Number of observations	27,428	27,428

Table 11. Effect of Investment Risk Channels on CEO Compensation

We test four channels through which investment riskiness may affect CEO's total compensation. The channels we investigate are number of segments, R&D expenditures, advertising expenditures and total value of all acquisition deals in a year. The dependent variable is total compensation of CEO. All regressions include firm fixed effects and year fixed effects. The coefficients are reported in in terms of percentage. All continuous variables are winsorized at the 1% and 99% percentiles of their distributions. *T*-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Total compensation			
	(1)	(2)	(3)	(4)
No. of segments	-0.022			
	(-1.26)			
No. of segments square	0.003			
	(1.19)			
R&D		0.885***		
		(3.43)		
Advertisement			1.582*	
			(1.80)	
Acq. amount				0.101***
				(3.76)
Market Capitalization	-0.028*	-0.014	-0.010	-0.024**
	(-1.76)	(-0.94)	(-0.68)	(-2.01)
Market Leverage	-0.482***	-0.450***	-0.370***	-0.410***
	(-6.31)	(-6.35)	(-4.48)	(-6.66)
Market-to-book	0.017***	0.016***	0.012***	0.014***
	(4.52)	(5.03)	(3.13)	(5.33)
One-year return to shareholders	-0.005	0.003	0.005	0.001
	(-0.43)	(0.27)	(0.38)	(0.09)
Age	-0.003***	-0.004***	-0.003***	-0.003***
	(-3.73)	(-3.83)	(-3.19)	(-4.37)
Chairman	0.028**	0.024**	0.030*	0.023**
	(2.31)	(2.12)	(1.95)	(2.50)
Male	-0.030	-0.005	-0.067	-0.038
	(-0.43)	(-0.09)	(-0.79)	(-0.86)
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.616	0.640	0.577	0.615
Number of observations	13,264	11,703	7,022	17,688

Table 12. Effects of Investment Risk Channels on Average Employee Pay

We test four channels through which investment riskiness may affect average employee pay. The channels we investigate are number of segments, R&D expenditures, advertising expenditures and total value of all acquisition deals in a year. The dependent variable in Panel A is staff expense per employee, in Panel B is SGA per employee. All regressions include firm fixed effects and year fixed effects. The coefficients are reported in terms of percentage. All continuous variables are winsorized at the 1% and 99% percentiles of their distributions. *T*-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Panel A. Dep. Var = Staff expense per employee				
No. of segments	-0.004*			
	(-1.87)			
No. of segments square	0.0005*			
	(1.87)			
R&D		0.0003***		
		(59.16)		
Advertisement			0.081	
			(1.15)	
Acquisition				-0.002
				(-0.75)
Market Capitalization	-0.008***	-0.006***	-0.006***	-0.006***
	(-4.73)	(-5.01)	(-4.06)	(-4.89)
Market-to-book	0.003***	0.003***	0.003**	0.003***
	(3.36)	(3.68)	(2.48)	(3.66)
Market leverage	-0.037***	-0.026***	-0.023**	-0.027***
	(-4.02)	(-4.00)	(-2.45)	(-3.90)
Average sales per employee	-0.000	0.000	0.000	0.000
	(-0.66)	(1.07)	(1.25)	(0.27)
Fixed asset ratio	0.013	0.007	0.005	0.006
	(1.21)	(0.92)	(0.43)	(0.79)
ROA	-0.075***	-0.068***	-0.071***	-0.070***
	(-3.82)	(-4.33)	(-2.87)	(-4.40)
ROE	0.003	0.003	0.004*	0.003
	(1.12)	(1.44)	(1.70)	(1.44)
Cash	0.044***	0.036***	0.029**	0.036***
	(3.11)	(3.40)	(2.34)	(3.43)
Firm age	0.000	0.001	0.000	0.000
	(0.17)	(0.46)	(0.10)	(0.04)
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.896	0.910	0.908	0.905
Number of observations	4,580	6,710	2,975	6,710

Panel B. Dep. Var = SGA per employee				
No. of segments	-0.012***			
	(-5.12)			
No. of segments square	0.002***			
	(5.07)			
R&D		0.001***		
		(4.32)		
Advertisement			0.659***	
			(7.93)	
Acquisition				0.017***
				(4.86)
Market Capitalization	-0.020***	-0.019***	-0.020***	-0.019***
	(-17.28)	(-17.58)	(-12.50)	(-17.44)
Market-to-book	0.015***	0.015***	0.015***	0.015***
	(18.69)	(19.18)	(12.16)	(18.76)
Market leverage	-0.115***	-0.109***	-0.104***	-0.108***
	(-17.84)	(-17.54)	(-12.31)	(-17.38)
Average sales per employee	-0.000***	-0.000***	-0.000	-0.000***
	(-4.07)	(-3.01)	(-0.17)	(-3.08)
Fixed asset ratio	-0.007	-0.013	0.018	-0.013
	(-0.69)	(-1.28)	(1.36)	(-1.33)
ROA	-0.408***	-0.414***	-0.356***	-0.415***
	(-27.54)	(-29.30)	(-18.27)	(-29.30)
ROE	0.030***	0.029***	0.028***	0.029***
	(10.36)	(11.36)	(8.06)	(11.38)
Cash	0.140***	0.135***	0.133***	0.132***
	(17.72)	(17.39)	(13.58)	(17.02)
Firm age	0.004**	0.005***	0.005*	0.005***
	(2.57)	(3.69)	(1.94)	(3.60)
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.828	0.823	0.855	0.823
Number of observations	61,042	72,427	32,516	72,427

Table 13. Effect of Labor intensity on Investment Riskiness Channels (Feedback Effect)

We test the feedback effect of investment riskiness on human capital cost, in particular, effect of investment riskiness channels on labor intensity. The channels we investigate are number of segments, R&D expenditures, advertising expenditures and total value of all acquisition deals in a year. The variable of interest in Panel A is labor intensity at firm level, in Panel B is labor intensity at industry level by NAICS 3 digit. The coefficients are reported in terms of percentage. All continuous variables are winsorized at the 1% and 99% percentiles of their distributions. *T*-statistics (in parentheses) are computed using robust standard errors corrected for clustering of observations at the firm level. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

	No. of segments	R&D	Advertisement	Acq. amount
	(1)	(2)	(3)	(4)
Panel A: Labor intensity at firm level using staff expense				
Labor intensity	0.305	-0.031*	-0.013**	-0.026**
	(1.02)	(-1.78)	(-2.38)	(-2.54)
Log(sales)	0.199***	-0.000	0.001	-0.006***
	(3.96)	(-0.26)	(0.49)	(-2.71)
Market-to-book	-0.145**	0.004	0.004**	0.010**
	(-2.44)	(1.47)	(2.17)	(2.14)
Book leverage	-0.021	-0.000	0.005	-0.009
	(-0.10)	(-0.00)	(0.45)	(-0.46)
Surplus cash	-1.021**	-0.017	-0.024**	0.132**
``	(-2.72)	(-0.63)	(-2.11)	(2.26)
Sales growth	0.023	0.043	-0.001	-0.027**
	(0.20)	(1.34)	(-0.12)	(-2.20)
Annual stock return	0.111**	0.006	-0.006***	-0.005**
	(2.13)	(1.07)	(-2.94)	(-2.25)
Free cash flow	-0.107	-0.036	0.006	-0.312**
	(-0.37)	(-0.78)	(0.42)	(-2.24)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.372	0.038	0.427	0.518
Number of observations	1,846	3,130	1,192	3,130
Panel B: Labor intensity at industry level using NAICS 3-digit				
Labor intensity	0.717***	-0.066***	-0.013	-0.017
	(2.76)	(-2.75)	(-0.86)	(-0.75)
Log(sales)	0.124***	-0.008***	0.001***	-0.004***
	(12.72)	(-16.58)	(2.86)	(-8.48)
Market-to-book	-0.040***	0.014***	0.003***	0.015***
	(-8.41)	(16.43)	(6.30)	(12.86)
Book leverage	0.130**	-0.069***	-0.013***	0.004
	(2.53)	(-11.34)	(-3.01)	(0.76)

Surplus cash	-0.524***	0.290***	-0.026***	0.002
	(-10.78)	(26.52)	(-5.06)	(0.17)
Sales growth	-0.113***	0.024***	0.011***	0.053***
	(-8.04)	(7.12)	(5.43)	(11.41)
Annual stock return	0.049***	-0.010***	-0.003***	0.006***
	(7.80)	(-11.28)	(-5.99)	(3.30)
Free cash flow	0.264***	-0.586***	-0.046***	0.003
	(4.85)	(-42.13)	(-8.22)	(0.27)
High-tech dummy	-0.092***	0.051***	-0.012***	-0.000
	(-4.07)	(19.84)	(-7.90)	(-0.18)
Year fixed effects	Yes	Yes	Yes	Yes
Adjusted R-squared	0.114	0.440	0.096	0.043
Number of observations	45,562	54,499	23,292	54,499

CHAPTER 2: NATIONAL CULTURE AND GOVERNANCE ON BONDHOLDER WEALTH: EVIDENCE FROM JOINT VENTURES AND STRATEGIC ALLIANCES AROUND THE WORLD[1]

1. Introduction

Literature suggests that ownership restructuring activities, such as mergers and acquisitions, spin-offs, and privatizations, play an important role in business operations. A growing line of research focuses on another type of organizational restructuring, namely joint ventures (JV) and strategic alliances (SA), which have been recognized to exert substantial impacts on firm performance and create significant value. JV are established through formal arrangements involving equity ties (Amici et al., 2013), resulting a separate legal entity. On the other hand, SA are voluntary arrangements involving exchanges, sharing, or co-development of products, technologies, or services (Gulati, 1998). Both forms of collaboration allow firms to utilize resources from cooperative partners without giving up control of their own operations (Chan et al., 1997). The motivations for international JV and SA, similar to those for capital flows

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between countries, are to obtain higher returns than returns that could have been obtained in the domestic markets and to reduce risk through international diversification. While past research has advanced the notion that national culture and country-level governance matter in corporate financing and operation policies (e.g., LaPorta et al., 1997, 1998; Stulz and Williamson, 2003), what remains unknown is whether and how these country-level mechanisms play a role in JV and SA. In this paper, we empirically examine how national culture and country-level governance affect the value creation of JV and SA activities around the world.

A substantial body of previous research focuses on shareholder wealth effects in domestic JV and SA. Literature suggests that JVSA benefit shareholders of domestic firms.[2] In the studies of international JV and SA, Merchantt and Schendel (2000) examine the conditions under which the announcements of international JV lead to increases in shareholder value of U.S. participants. They find that partner-venture business relatedness, the pursuit of R&D-oriented activity, greater equity ownership, and larger firm size have a positive impact on value creation. However, no support is found for the hypothesized effect of cultural relatedness and political risk. On the contrary, Owen and Yawson (2013) find information costs and country familiarity drive

[2] McConnell and Nantell (1985) and Johnson and Houston (2000) document positive stockholder wealth effects associated with JV announcements. Chan et al. (1997) find that SA create shareholder value at the announcement and that the participants experience an improvement in operating performance afterwards. Allen and Phillips (2000) demonstrate that SA, JV, and other product market relationships, in conjunction with block ownership lead to a significant increase in stock price, profitability, and operating performance. Krishnaswami et al. (2012) show that SA alleviate the capital constraints of small, high-growth firms and that the partnership announcements lead to significantly positive market reactions. Ivanov and Lewis (2008) find that IPO firms with alliances that commence before the offering tend to obtain greater IPO valuations, invest more, and have higher growth than other IPO firms.

international finance and business activities (others include Buch, 2005; Portes and Rey, 2005; Weitzel and Berns, 2006). Chang et al. (2008) investigate the wealth impacts for Japanese and US firms in SA and find that on average, both Japanese and U.S. shareholders benefit from the formation of international alliances. They also find that shareholders earn larger abnormal returns when the partnering firms are smaller in size, have higher growth opportunities, or are less profitable. Chiou and White (2005) examine the shareholder wealth effects of SA for financial institutions and present evidence of value creation, especially for smaller partners. However, they do not find a significant difference in abnormal return between domestic-foreign alliances and domestic-domestic alliances. Interestingly, Amici et al. (2013) find that international SA tend to destroy shareholder value. Using a sample of European and US banks, they find that the abnormal stock returns associated with these JV and SA vary: only JV involving non-financial partners or those allowing banks to expand abroad are able to create shareholder value.

In addition to examining the impact on shareholder value, it is important to study the wealth effects of bondholders not only because bondholders represent one of the major claimholders, but also the value creations for shareholders and bondholders may be related. As a stark contrast, only two papers have focused on bondholder wealth associated with JV and SA deals. Chou et al. (2014) examine the relationship between SA and the cost of debt. They show that corporate alliance activity is valued outside the equity market and creates additional benefits that result in lower cost of debt financing. Chen et al. (2015) focus on domestic bondholder wealth effects and find positive and significant bond price reactions to JV and SA announcements, suggesting an increase in

bondholder wealth. They find that bond abnormal returns can be explained by synergy, alleviation of financial constraints, and real option effects.

In this study, we focus on the bondholder wealth effects for non-U.S. companies through global collaborative activities of JV and SA. To our knowledge, we are the first to explore the bondholder wealth effects of non-U.S. participants in JV and SA. Bondholders represent one of the claimholders and determine firm value together with shareholders. By studying bondholder and stockholder wealth gain at the same time, one can better understand firm wealth creation during JV and SA announcements. Furthermore, with the inclusion of foreign-foreign deals in addition to foreign-U.S. deals where current literature has only looked at the latter, we are able to conduct a comprehensive study of global business collaborations by examining their impacts on claimholder returns and the channels of such value creation, in particular, country-level governance and national culture. In addition, we explore a sample of companies that span across various industries, rather than specific sectors. To our knowledge, very few studies have examined the wealth effects of non-U.S. participants using a comprehensive sample in terms of industry and claimholders. Amici et al. (2013) use U.S. and European banks data, while Chiou and White (2005) use the data from Japanese financial sector. In this study, we explore the following research questions: 1) Do international joint ventures and strategic alliances create value for investors, especially, for bondholders? 2) If there are significant wealth effects, what are the determinants? 3) What are the roles that country-level governance and culture dimensions play in the value creation of joint ventures and strategic alliances in a global setting?

We first document significantly positive abnormal returns for bondholders and

stockholders of foreign companies following the announcements of global JV and SA. For example, the average 2-month and 3-month abnormal returns are 10.5 and 14.4 basis points for bondholders, and 48.1 and 38.2 basis points for stockholders, respectively. Next, we focus on bondholder reaction and its determinants. We test two main determinants: country-level governance using the World Governance Index and investor protection indices, and national culture using two Hofstede's cultural dimensions and trust. We find that country-level governance and cultural dimensions explain a significant portion of bondholder gains. More specifically, bondholders benefit more from JV and SA if they are from countries with poorer institutional governance, stronger creditor protection, or weaker shareholder rights. In addition, bondholders gain more when they are from countries with the culture characterized with greater Individualism, less Power Distance, a higher level of trust, and a larger cultural distance among participants. Subsample analyses suggest that country-level governance has stronger effects in firms who are infrequent participants of JV and SA or speculative grade issuers. Results of the robustness tests confirm our main findings. Lastly, we find a significantly positive correlation between bondholder and stockholder abnormal returns, indicating little support for a wealth redistribution effect between these two claimholders.

We contribute to the literature in the following ways. First, this paper is the one of first studies to employ a large sample of JV and SA activities spanning across 22 countries and multiple industries to examine the bondholder wealth effects for non-U.S. participants. Second, with a rising globalization of international portfolios and direct investments, our findings highlight the critical, but not yet well-explored, topics: the impact of JV and SA on participants from non-U.S. countries and the value impacts on

bondholders through such cooperative activities. Third, our study provides strong evidence that institutional environment, i.e., culture and country-level governance, matters in major corporate restructuring activities.

The remainder of the paper is structured as follows. In Section 2, we propose the testable hypotheses. Section 3 describes the sample collection, variable construction, and model specification. Section 4 presents the empirical findings. Section 5 concludes.

2. Hypotheses development

In this section, we discuss our two main hypotheses: country-level governance and national culture. In the seminal paper on institutional environment, Williamson (2000) discusses four levels of social analysis. Our variables of interests are related to three out of the four levels. The first level is informal institutions, which evolve very slowly over centuries or millennia. National culture, which relates to social customs, traditions, norms, etc., belongs to this level. The next level is formal institutions, including the executive, legislative, judicial, and bureaucratic functions of government, and may change over decades or centuries, which we regard as institutional governance. The third level is regulatory governance, especially contracts that directly affect investor wealth. We form our hypotheses on country-level governance based on the second and third levels of social analysis, and the hypotheses on national culture based on the first level.

2.1. Country-level corporate governance

According to North (1990), institutions and norms are the rules of the game in social interactions and exchanges, whereas individuals and organizations are players who maximize and protect their interests by adjusting the strategies according to the rules. Classical law and finance literature has established that countries with a better legal system reflected by legal rules and quality of enforcement are associated with larger capital markets (LaPorta et al., 1997, 1998). Claimholders are better protected from insiders' expropriation and granted with superior opportunities for external finance. As a result, a greater synergy gain may be achieved in JVSA under stronger institutional governance than those under weaker one. This effect mainly applies to speculative grade bondholders: Synergy value accrues to the firm. As bondholders expect to receive the promised payment, the addition of synergy value to firm value is of little or no concern to bondholders in a financially healthy firm when firm value exceeds the promised payment to bondholders. Synergy value matters most to bondholders facing a high probability of default (i.e., speculative grade issuers) as the promised payment may depend on the synergy value. We conjecture that if the institutional governance is effective, a participant from a poor institutional governance can benefit from achieving a higher synergy value when the JVSA are established in a country with a strong institutional governance than in a country with the same or lower level of institutional governance.

On the other hand, literature has shown that when it comes to societies where institutional governance is weak, the connections of business entities are particularly important. For example, Li and Filer (2007) argue that when rule-based system is weak,

an alternative system (private channels or connections) must exist to serve as a substitute. Xin and Pearce (1996) use survey data to study executives' personal connections in China. They argue that connections substitute for the formal institutional structure. In countries with poor institutional governance, executives develop close personal connections to obtain resources and protections not otherwise available. Such personal connections are critical in countries without a stable legal or regulatory environment. For instance, firms in countries with extremely poor or no institutional governance may need connections to help gain resources controlled by the government or to protect them from expropriation by governmental entities. Parsley and Faccio (2009) show that connections are more important to those firms headquartered in highly corrupt countries. They find that the sudden death of a politician yields a 2% decline in market value of the connected companies. Faccio (2006) suggests that politically connected firms are rather common in highly corrupted countries. She finds a significant increase in corporate value following the announcements that officers or large shareholders are entering politics. Claessens et al. (2008) show that Brazilian firms making major contributions to elected federal deputies around the 1998 and 2002 elections experience higher stock returns than firms that do not. The benefit of connections can take different forms.[3] For example, Claessens et al. (2008) find that access to bank finance is an important channel through which connections operate. Faccio et al. (2006) find that politically connected firms are more likely to be bailed out during a crisis than the non-connected peers. As discussed above,

[3] For literature on better access to credit by government-owned banks, see Backman (1999), Ding (2005), Yeh et al. (2013); for financial bailout see Faccio et al. (2006); for lighter taxation see De Soto (1989); and for relaxed regulatory oversight see Stigler (1971) and De Soto (1989).

connections function as a substitute for formal institutional governance, and have positive impacts on corporate value especially in weak institutional governance countries. JVSA participants can pool their resources (e.g., information or connections) to facilitate the execution and successful outcomes of the investment.[4] Similarly, we expect the effect of connections on synergy value mainly applies to speculative bondholders. We conjecture that if connections are effective, a participating firm in JVSA benefits from realizing a higher synergy value due to the combined connections of the partners. This effect is especially prevalent for firms from a country with very limited institutional governance, where connections serve as the alternative governance system. Therefore, we form the first hypothesis as follows:[5]

H1. *Bondholder abnormal returns around the JVSA announcements are greater (lower) for participants from countries with a higher level of institutional governance than those from countries with a lower level of institutional governance if the rule-based governance outweighs (exerts less influence than) the relation-based governance. The effect is more pronounced for speculative grade firms.*

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[4] Two or more parties working together will pool more resources (e.g., information and connections) together than working alone, e.g., literature in underwriting syndicates shows that more underwriters/co-managers are associated with more analyst coverage and more market makers (Corwin and Schulz, 2005; Yasuda, 2005; Ljungqvist et al., 2009)

[5] Note that we do not focus on the differences between the institutional governance of the participating firms since the above-discussed opposite effect of rule-based governance and relation-based governance might offset each other, or work on top of each other. Consequently, one cannot make clear predictions of which governance is in effect. Thus, we only include the difference variable as a control variable in the regressions.

Literature has shown that country-level creditor protection is beneficial to bondholders in many ways, e.g., Djankov et al. (2007) find that creditor protection is associated with a higher ratio of private credit to gross domestic product (GDP). Qian and Strahan (2007) show that under stronger creditor protection, banks charge lower interest rates, and suggest that foreign banks appear especially sensitive to the legal institutional environment. Using a sample of bank mergers, Ongena and Penas (2009) find that bondholders experience higher abnormal returns when the country of the partner bank has stricter regulations than its own country. JVSA activities have been shown to create bondholder value (Chen et. al., 2015), but they are inherently risky investments. If a JVSA activity fails, it will negatively affect the participating firms' cash flows and consequently the wealth of major claimholders including stockholders and bondholders. As creditor rights protect bondholders from significant downside risk, bondholders from a country with stronger creditor rights are better protected in the event of business failure than those from a country with poorer creditor rights. Essen et al. (2013) find that in a crisis the general quality of creditor rights protection is positively related to firm performance. Furthermore, creditor protection in the context of JVSA is analogous to the exercise price in a put option held by bondholders. Stronger protection reflects a higher exercise price, and therefore a higher put option value. As a result, we expect bondholders to act more favorably in countries with higher creditor rights protection.

H2. Bondholder abnormal returns around JVSA announcements are positively associated with country-level creditor rights protection.

As to the effects of shareholder protection on bondholder wealth, empirical studies (Bhojraj and Sengupta, 2003; Anderson et al., 2003) using U.S. firms suggest that

strong shareholder rights harm bondholders by increasing the likelihood of wealth transfers to shareholders. In addition, Klock et al. (2005) find that strong shareholders rights at the firm level are associated with a higher cost of debt. Cremers et al. (2007) and Li and Wang (2016) investigate the effects of shareholder governance on bond returns and find that without bond covenants shareholder and bondholder interests diverge. As a result, contrary to creditor rights, we expect stronger shareholder protection to be associated with lower bondholder returns.

H3. Bondholder abnormal returns around JVSA announcements are negatively associated with country-level shareholder protection.

2.2. National culture

A growing body of research shows that national culture has a strong impact on corporate decisions and exhibits a causal link to economic outcomes of such decisions (e.g., Stulz and Williamson, 2003; Ferris et al. 2013; Bryan et al. 2015; Ahern et al. 2015; Pevzner et al. 2015; Li et al. 2013).[6] To better understand the influence of national culture on JVSA activities, our study focuses on the cultural dimensions that directly affect claimholder wealth, especially bondholders. Literature suggests that three main

[6] Zheng et al. (2012) investigate the influence of national culture on the structure of corporate debt maturity and find robust evidence that firms located in countries with high levels of uncertainty avoidance, collectivism, power distance, or masculinity tend to use more short-term debt. In other words, they show that national culture helps explain the cross-country variation in debt maturity structure. Bryan et al. (2015) focus on how national culture can be linked to the cross-country differences in the structure of executive compensation contracts. They suggest that culture is a significant determinant of the structure of executive compensation.

dimensions of national culture play an important role in determining bondholder wealth in JVSA collaborations: Individualism, Power Distance, and Trust.

The impact of culture dimensions on the functioning of an international team depends on the management process. Adler and Gundersen (2007) argue that a culturally diversified team is only able to achieve its productivity potential when it is well managed. Naturally, international collaborations such as JVSA activities are subject to execution risk, as synergy gain from JVSA requires significant ex-post coordination among the employees of all participating firm.[7] Shore and Cross (2005) find that different national cultures (e.g., Individualism/Collectivism) can explain why individuals from one country prefer one management structure over another. Employees who are from the culture of Collectivism or high Power Distance are more likely to commit to the plan and are easier to manage. In other words, they are more cooperative in a work environment. For example, Cox et al. (1991) examine whether differences in the cultural norms are drivers of peoples' behaviors when completing a group task. They find that groups consisting of individuals from collectivist culture display more cooperative behavior than those of people from individualistic culture. Furthermore, Ahern et al. (2015) study the effect of national culture on cross-border mergers from the aspect of Power Distance. They suggest that workers are more likely to follow instructions from superiors in hierarchical cultures (more power distance). Workers in egalitarian cultures (less power distance), in contrast, are more likely to think of themselves as equals to their superiors. Since people

[7] The execution risk lies in not being able to execute the project smoothly in order to realize full synergy gains, e.g., inefficiency caused by communication difficulty. Ahern et al. (2015) refer it to "post-merger integration" process.

from Collectivism or high Power Distance culture are more likely to conform to leadership and behave cooperatively, we expect these cooperative cultures to be associated with less risk in terms of integration/execution of the project.[8] In addition, as Geringer and Hebert (1989) argue, JVSA involve two or more legally distinct organizations, each of which actively participates in the decision-making activities of the jointly owned entity or project. Therefore establishing JVSA can enhance the monitoring of a joint project or investment (Geringer and Hebert 1989; Kumar and Seth, 1998). Literature has shown that monitoring is essential in project management. For example, Pich et al. (2002) develop a model to show that planning, coordination, and monitoring are important policies to maximize the expected payoff of a project.[9] We conjecture that greater monitoring from forming JVSA helps reduce the execution or integration risk of the project. We formulate our hypothesis on national culture as follows:

H4. Bondholder abnormal returns around JVSA events are higher (lower) for participants from countries characterized as Collectivism or greater Power Distance than those from countries characterized as Individualism or less Power Distance, if the cooperation effect of the partnership outweighs (exerts less influence than) the monitoring effect.

Our next hypothesis regarding national culture focuses on culture distance. Finance research documents that cultural differences between countries impact an array

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[8] Hofstede specifies additional culture dimensions, however, the majority of existing empirical evidence points to Collectivism and Power Distance as primary dimensions in business collaborations.

[9] Other researches that illustrate the importance of monitoring include Ford and Randolph (1992), Kerzner (2013), and Meredith and Mantel (2011).

of financial outcomes in markets worldwide. For instance, cultural differences affect foreign direct investment (Guiso et al., 2008), portfolio investment (Bottazzi et al., 2010), syndicated loan interest rates (Giannetti and Yafeh, 2012). On a similar note, cultural differences are likely to be particularly important for international JVSA activities as well since people from different culture backgrounds have to coordinate with each other. To be specific, Kogut and Singh (1988) is the first to find that national culture influences a firm's decision on the type of cross-border partnerships: The greater the cultural differences, the more likely a firm chooses JVSA than mergers. However, cultural distance may also have negative impact. Through a theoretical discussion, Merchant and Schendel (2000) argue that cultural similarity, as opposed to cultural difference, facilitates better JV execution because it harmonizes the partners' approach towards their JV, but they did not find empirical support. Giannetti and Yefeh (2012) find that larger cultural distance leads banks to offer borrowers smaller loans at a higher interest rate and are more likely to require third-party guarantees. They attribute to the reason that cultural distance makes negotiations more cumbersome and thus increases contracting costs, and it increases the cost of information gathering or makes information gathering less efficient.

Following these studies, we expect cultural distance to have three possible impacts on bondholder wealth in JVSA. First, employees who do not share similar cultural values (hence, large culture distance) makes post-JVSA coordination more difficult and the realization of stable cash flows less likely. If this is the case, we expect bondholder wealth gain to be negatively associated with culture distance. Second, on the contrary to this, culture distance can lead to more effective and profitable firms, rather

than imposing costly impediments to integration (Ely and Thomas, 2001; Page, 2007; Carrillo and Gromb, 2007; Morosini et al., 1998). For example, employees from Individualism culture can learn better teamwork skills from those from Collectivism culture. Likewise, Collectivism culture can nurture how to better manage work without a group setting. Consequently, we expect bondholder wealth gain to be positively associated with culture distance. Third, if the economic rationale of an investment is sound enough, cultural differences would play only a minor role in the success of JVSA. Management should have strong incentives to overcome any obstacles in realizing potential synergy gains. In this case, we expect little or no impact of culture distance on JVSA. We present the hypotheses on culture distance below:

H5. Culture distance may have a negative, positive or no effect on bondholder wealth gains around JVSA announcement.

Another aspect of the national culture is Trust. Guiso et al. (2008) indicate that lack of trust is an important factor in explaining the puzzle of limited participation in cross-country collaborations. Duarte et al. (2012) find that borrowers appearing more trustworthy have a higher probability of loan financing, better credit scores, and lower default risk. They suggest that the impression of trustworthiness matters in financial transactions as they predict borrower behaviors. Additionally, Pevzner et al. (2015) examine whether the level of trust in a country affects investors' perception through financial disclosure. They investigate the effect of societal trust on investor reactions to corporate earnings announcements, and find that investor reaction to earnings announcements is significantly higher in more trusting countries. They posit that this is because corporate earnings announcements are perceived as more credible by investors in

more trusting societies and, therefore, elicit stronger investor reactions. In spirit of Pevzner et al. (2015), we posit that bondholders perceive announcements of JVSA as more credible in more trusting societies and, therefore, produce more favorable bondholder reactions. Our final hypothesis is stated as follows:

H6. Bondholders will achieve greater gains in JVSA activities when participating firms are from more trusting countries than those from less trusting countries.

3. Sample selection, variable construction, and model specification

3.1. Sample selection

We employ multiple databases in this research. Joint venture and strategic alliance announcements, deal information, and deal characteristics are from Security Data Company (SDC) platinum. For foreign firms, bond prices, bond characteristics, benchmark indices, and equity prices are collected from Datastream and financial information is collected from Bloomberg. We retrieve all JV and SA for the period from 2009 to 2015 to arrive at an initial sample of 21,113 deals.[10] Given the fact that a JVSA deal may be established by multiple firms (participants), we have 30,897 event-firm observations of joint ventures from 176 countries, and 14,583 event-firm observations of strategic alliances from 131 countries. Panel 1 in Appendix A shows the distribution of JVSA at the event level by announcement year, and Panels 2 and 3 show the distribution of event-firm observations of JV and SA by country, respectively. By requiring valid 91-day (3-month) bond abnormal returns around announcements, valid information on total

[10] Since foreign bond data are not readily available and need to be hand-collected, we've collected seven years of data going back to 2009.

assets, market to book, leverage, and credit rating, we arrive at 1,690 JV and SA deals, which are associated with 1,898 event-firm observations of 610 unique firms from 22 countries.[11] To give an overview of participating firms involved in JVSA, Table 1 shows the distribution of firms and the associated cooperative deals that are examined as our final empirical sample. Panel A reports the number of events by year, and Panel B shows the number of event-firms by country.

3.2. Variable construction

Following the literature discussed previously, we adopt three measures for country level governance. We first use World Governance Index (WGI) published by the World Bank (Kaufmann et al., 2011) to proxy for institutional environment. WGI consists of six estimates: control of corruption, government effectiveness, regulatory quality, rule of law, political stability and absence of violence/terrorism, and voice and accountability. Each estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e., ranging from -2.5 to 2.5. We average these six estimates for a given country and given year to form our proxy. The higher WGI, the better the country's institutional governance. Then Strength of Legal Rights Index (SLRI) from the World Bank is used as a proxy for creditor right protection. SLRI measures the

[11] We choose a sample of countries that is representative of the whole participating countries around the world. We start with a pilot study using year 2012 data. We first screen out countries with less than 50 JVSA announcements. Then using the participants' company names, we hand search in Thomson Reuters Datastream to collect corresponding foreign bond prices and bond characteristics. If there's no information of bond issued by the deal participants, we search if parent companies have available bond information. We next screen out countries with low ratio of available bond information to number of event firms observations.

degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders. The index ranges from 0 to 12, with higher scores indicating that these laws are better designed to expand access to credit. In addition, we adopt the corrected Anti-director Rights Index (ADRI) introduced by Spamann (2010) for shareholder right protection. It is based on the "anti-director rights index" introduced by La Porta et al. (1998) with improved data collection, coding, and documentation. The index ranges from 0 to 6, with higher value representing higher shareholder rights protection.

Following the literature, we adopt three measures for national culture: Individualism and Power Distance from Hofstede's culture dimensions, and Trust from World Values Survey. According to Hofstede (2001), Individualism (IDV) stands for a society in which the ties among individuals are loose. Collectivist (as opposed to Individualism) societies emphasize strong informal ties among in-groups and rely on informal networks and relationships rather than formal institutions to protect against opportunism (Li and Zahra, 2012). Power Distance (PDI) is defined as the extent to which the less powerful institutions and organizations within a society expect and accept that power is distributed unequally. Both indices range from 0 to 100, with higher value indicating more individualistic or more power distance. Trust is from a survey question in World Values Survey. The survey question asks, "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" The percentage of people answering "yes" is the measure of trust for a country. In addition, we follow Ahern et al. (2015) to calculate culture distances for Individualism and Power Distance respectively. We define IDV Culture Distance (PDI Culture Distance) to be the log value of 1 plus absolute difference of Individualism (Power

Distance) between participating nation and JVSA host nations. If there are more than two JVSA host nations, the average value is used.

3.3. Model specification

We apply the event study methodology to calculate the cumulative abnormal returns around JVSA announcements for foreign firms, and define the risk-adjusted abnormal return for bond *i* as:

$$AR_i = R_i - R_{bm}$$

And cumulative abnormal return for *n* days is:

$$CAR_n = \sum_{i=1}^{n} AR_i$$

where AR_i is the risk-adjusted abnormal return of bond i, R_i is the raw bond return, and R_{bm} is the return of a bond index matched by country. We estimate R_i as follows:

$$R_i = \frac{P_i - P_{i-1} + C}{P_{i-1}}$$

where $P_i \; and \; P_{i-1}$ are bond prices at day *i* and day *i*-1 with accrued interest incorporated; *C* is the coupon payment. Similarly, we calculate the bond index return, R_{bm}, using the returns of Barclays' global corporate aggregate bond indices reported in Datastream. For firms with multiple bonds outstanding, *AR* at the firm level is the average of *ARs* of individual bonds weighted by amount outstanding. Eight event windows are used: (0, 0), (-1, 0), (-1, 1), (-2, +2), (-5, +5), (-15, +15), (-30, +30), and (-45, +45) where date 0 is the announcement date. For comparison purpose, we also calculate abnormal stock returns in the same windows. For stocks, abnormal returns are calculated using the market model

estimated from 210 to 11 days prior to the announcement date. The MSCI country-level market indices from Datastream are used to calculate ARs for foreign firms.

In addition to two primary hypotheses relevant to the international deals, we include other potential determinants from prior literature for bondholder wealth effects in JV and SA: synergy effect, alleviation of financial constraints, and real option. *Synergy effect:* Previous literature has documented that synergy is attributable to positive shareholder value (McConnell and Nantell, 1985; Johnson and Houston, 2000; Chan et al., 1997). On the bondholders' side, Chen et al. (2015) find that financial synergy is a main driver of bondholder wealth effects in joint ventures, while operating synergy is a dominant factor in strategic alliances. To test whether synergy influences bondholders gain in international JVSA activities, we adopt two measures: business proximity and geographical distance. [12] We posit that the synergy effect from JVSA should create value for bondholders. To be specific, greater business proximity or shorter geographic distance should lead to larger abnormal bond returns. *Alleviation of financial constraints:* Literature indicates that financial constraints are one of the major reasons for corporate restructuring activities. Boone and Ivanov (2012) suggest that one of the benefits of JVSA is the alleviation of financial constraints. Through such activities, partner firms share resources and have a lighter burden in raising external financing, resulting in an alleviation of financial constraints. The financial flexibility embedded in JVSA is valuable to bondholders because participating firms can refrain from issuing additional

[12] We also use stock market reaction to JVSA activities as a proxy for synergy effect, and the results remain the same. But stock cumulative abnormal returns (CARs) in the bondholders' regression serve as a proxy for the test of wealth transfer, thus in order to differentiate the control of synergy from wealth transfer effect, we follow Chen et al. (2015) to adopt business proximity and geographical distance as proxies.

debt to finance investments, which is especially valuable for financially constrained companies. In this study, we use low dividend payout and Altman's Z score as proxies for financial constraints, and we posit that the abnormal bond returns due to joint ventures and strategic alliances are positively related to the extent of financial constraints. [13] *Real option effect:* Chen et al. (2015) identify JVSA as real options as they offer firms with the opportunity to explore potential investments involving high uncertainty with no upfront cost and low termination cost. Such managerial flexibility embedded in the cooperative activities "grants the participating firms a real option to delay, expand, contract, or abandon their investments in an efficient way," therefore the real option feature of JVSA creates value for bondholders of participating firms. With such real option, JV and SA participants can take part in risky investments without increasing downside risk. Mansi and Reeb (2002) suggest that a reduction in downside risk decreases cost of the shareholder's opportunism and thereby preserves the bondholder value. We test real option hypothesis using two measures that are positively related to the value of real options: industry investment uncertainty and industry concentration.[14]

In the multivariate regressions, we focus on abnormal bond returns for foreign participants and include hypotheses variables, deal characteristics (number of participants, horizontal dummy, and high-tech dummy), firm characteristics (total assets,

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[13] We thank an anonymous referee for the suggestion of including alternative measures, such as distance to default, however, the adoption of those measures is restrained by very limited financial information reported by our foreign firms.

[14] We do not argue that JVSA make the industry riskier, rather, the riskier the industry in which the JVSA enters, the more valuable it is to join because of the flexibility benefits associated with real option effect.

leverage, and market to book), bond characteristics (bond size, junk dummy, coupon, and time to maturity), and other control variables (market factor, multiple participation dummy, JV dummy, and WGI difference). The model is formulated as follows:

$$CAR_{i,t} = \alpha + \beta_1 * (Governance)_{i,t} + \beta_2 * (Culture)_{i,t} + \beta_3 * (Synergy)_{i,t} + \beta_4 * (Allieviation\ of\ Financial\ Constraints)_{i,t} + \beta_5 * (Real\ Option)_{i,t} + \gamma * DealChar + \delta * FirmChar + \theta * BondChar + \mu * OtherControls + \varepsilon_{i,t}$$

where $CAR_{i,t}$ is the 3-month cumulative abnormal bond return of firm *i* at time *t*.

4. Empirical analyses

In this section, we first present univariate results of abnormal bond returns and abnormal stock returns for foreign participants. We then show the main results for bondholder wealth effect through baseline regressions, subsample analyses, and various robustness tests. Lastly, we present baseline regression for stockholder wealth effect and discuss results for wealth transfer effect.

4.1. Abnormal bond and stock returns for foreign participants

Table 2 reports the CARs of claimholders at the announcements of JV and SA deals. Panels A and B present the results for firm level and bond level, respectively. At firm level, the mean values of CARs for bondholders are significantly positive across four event windows (10-day, 31-day, 61-day, and 91-day) while medians are significantly positive across seven out of eight event windows. At bond level, both means and medians are significantly positive across all eight event windows. For example, the average 91-

day (three-month) CAR is 0.144% at firm level and 0.41% at bond level. For stockholder returns, we observe significantly positive abnormal returns from seven event windows for both means and medians. For instance, in full sample the average 2-day CAR and 3-day CAR are 0.137% and 0.198% respectively, and the 61-day CAR and 91-day CAR are 0.481% and 0.382% respectively. Our findings are generally consistent with prior literature on JVSA, e.g., Amici et al. (2013) report that the mean stock CAR over the 31-day window of (-15, 15) for the U.S. and European banks is 0.36%, which is comparable to 0.421% in our study. Their 2-day window CAR is 0.13%, which is similar to what we find.

4.2. Multivariate results: Baseline regressions

For the multivariate regressions, we require firms to have valid information on total assets, market to book, leverage, and credit rating. Table 3 reports the descriptive statistics of the variables for our regression sample. Details of variable definitions are provided in Appendix B. We see that the average of WGI is 1.28, which means our sample nations on average have better institutional governance than the average.[15] The sample firms are characterized with slightly more individualism (a value of 61.68). On average, 36.56% believe that most of people can be trusted. These results are consistent with our sample since majority of the nations are developed countries. Furthermore, a closer look at JV and SA samples separately reveals that SA activities have longer

[15] Since WGI from the World Bank ranges from -2.5 to 2.5, the world average WGI is 0. In our sample, the lowest WGI belongs to Russia in 2009 which is -0.74, while the highest WGI (1.83) is from Switzerland in 2014.

geographic distance between participants than JV activities and high technology firms tend to also choose SA over JV. In addition, firms in SA have a higher market-to-book ratio than those in JV, which are consistent with the literature.

Given that our main hypotheses of the link between country-level governance and cultural dimensions and bondholder return, we focus on the foreign participants in multivariate regressions. There are additional two reasons for excluding the U.S. participants. First, we want to minimize the possible bias that could be introduced by including a large sample of U.S. firms with the same country-level governance and cultural measures. Second, daily abnormal returns, as the dependent variable, cannot be calculated for US participants due to data limitation. [16] To avoid potential multicollinearity concern, we scrutinize the correlation matrix for all hypotheses and control variables. The results reported in Table 4 show that the country-level governance measures and some of culture proxies have relatively high correlations, though this is consistent with LaPorta et al. (1997, 1998). For example, SLRI is highly correlated with culture dimension measures, and Trust is highly correlated with WGI. Thus, we first orthogonalize SLRI by regressing SLRI on the two culture dimensions, and then use the residual of SLRI in the regressions. The same method is applied to the variable of Trust. In addition, we employ six regression models with each containing a different set of proxies.

Table 5 reports results of baseline regressions of abnormal bond returns for foreign participants in JV and SA activities. The dependent variable is three-month

[16] Bond pricing information for U.S. firms is based on the transaction data from Mergent FISD and TRACE, which is not available on a daily basis.

cumulative abnormal bond return. Reg 1 through Reg 4 adopt creditor right protection proxy (SLRI), while Reg 5 and Reg 6 use shareholder right protection (ADRI). For the country-level governance hypothesis, we find strong evidence from all regression models to support our predications. Specifically, in Reg 1, 2, 5, and 6 where WGI is included, we find significant and negative coefficients on the interaction term of WGI and Junk dummy, and insignificant on WGI itself. This provides evidence for hypothesis H1, suggesting that the benefit of the relationship-based institutional governance outweighs the rule-based institutional governance, and the majority benefit applies to speculative bondholders only. To further examine whether the benefit of the relationship-based governance is due to the increased connections of joining JVSA, we use the interaction of number of participants and low WGI dummy in Reg 3 and 4, where the number of participants serve as a proxy for connections. We observe significantly positive coefficients on the interaction terms, indicating that for low WGI countries, bondholder wealth increases with more connections created by joining JV or SA. For creditor protection hypothesis and shareholder protection hypothesis, we see significantly positive coefficients of SLRI in Reg 1 through 4, and significantly negative coefficients of ADRI in Reg 5 and Reg 6, which supports our hypotheses H2 and H3, respectively. These results imply that the more protection bondholders have in the JVSA participating nation, the more favorable bondholder reactions are associated with JVSA announcements. By contrast, the more protection shareholders have, the less favorable bondholder reactions are.

As to national culture hypotheses, we first observe a significantly positive coefficient on Individualism and a negative significantly coefficient on Power Distance in

Reg 5 and 6. These results show that a less cooperative culture is associated with higher abnormal returns around the JVSA announcements, which supports our hypothesis H4 that bondholders expect the influence of the increased monitoring effect from establishment of JVSA project to outweigh the cooperation effect. IDV culture distance are all insignificant in Reg 1, 3, 5, while in Reg 2 and 4 we observe that PDI culture distance is positive at 10% significance level. This is consistent with no-effect prediction of H5, which implies that culture distance in general plays a minor role in creating bondholder wealth. Although team members from different cultures in JVSA may pick up strong suit from each other and overcome their shortcomings, the practical impact on organizational effectiveness and profitability is not significant. Lastly, we see positive and significant coefficients of Trust in Reg 1, 2, and 3, indicating that bondholders from more trusting countries gain more in JV and SA, which is in line with our hypothesis H6.

Regarding the synergy effect, alleviation of financial constraint effect, and real option effect, however, after considering the influence of governance and culture, we find little explanatory power of these factors for the abnormal bond returns of foreign participants. The only exception is the positive impact of synergy measured by Business Proximity which is close to 10% significance level. The signs on firm characteristics are consistent with literature that bondholders experience larger abnormal returns if the firms are smaller in size or have higher growth opportunities. The results suggest that for foreign firms in JV and SA deals, bondholder wealth effects are mainly driven by country-level governance and national culture.

4.3. Subsample analyses

In this section, we divide the sample into a set of subgroups based on the following: frequent versus infrequent participants and speculative-grade versus investment-grade firms.

Frequent versus infrequent participants: A common phenomenon in JV and SA activities is that some firms are frequent players who participate in cooperative activities multiple times. The median number of participation in either JV or SA is 6 in our sample. Merchant and Schendel (2000) argue that previous JV experience will be reflected favorably in the next JV operation. We therefore conjecture that motives of the frequent participants may be different from those of the infrequent participants. As a result, the determinants for bondholder wealth effects could vary between these two groups. We define the frequent participants as the firms that appear in more than six deals (median value) during our sample period, and the remaining firms are regarded as the infrequent participants. For frequent participants, their country governance may not be as influential as for the infrequent participants who are novice in the JV and SA markets. On the other hand, culture distance may exert a strong influence on frequent participants as learning process has been established from past participation. With learning from each other's strength, team members may be able to adapt to the culture differences easily. Therefore, we expect that country-level governance measures have a more pronounced impact on infrequent participants, while culture distance acts more positively for frequent

participants. Table 6 presents results that provide supportive evidence for these predictions. In particular, three measures (WGI × Junk Dummy, SLRI, and ADRI) for country-level governance are significant for infrequent participants but not for frequent participants. Both culture distance proxies play a significantly positive role in determining bondholder gain for frequent participants but not for infrequent participants. We also observe that culture dimensions are significant in Reg 3 and 4 in the less-frequent participants sample, specifically, the coefficient of IDV (0.030) is positively significant under 1% in Reg 3, and that of PDI (-0.038) is negatively significant under 1% in Reg 4. This indicates that for less frequent participants, the monitoring effect is prominent.

Speculative- versus investment-grade: Bond rating has been well documented to have influence on bond value (e.g., Kliger and Sarig, 2000; Elliott et al., 2009). It serves as an important measure of credit quality. We hypothesize that country-level governance matters more in speculative grade than investment grade firms because speculative grade bondholders benefit more from the additional protection from country-level governance, while trust should be associated with a stronger effect in investment grade firms because the better rated firms are perceived more credible to investors. Table 7 reports the results for the speculative-grade bonds and investment-grade bonds separately. We see that WGI is significantly negative in speculative-grade sample, but insignificant in investment-grade sample. This is also consistent with our institutional governance hypothesis that only speculative-grade bondholders will benefit from the increased expected cash flow, as well as what we have found in the baseline regression (Table 5). Trust is significant in Reg 1 of the investment grade sample but have little effect across models of speculative

grade sample. These findings are consistent with our predictions stated above. However, SLRI and ADRI show significance in investment-grade subsample instead. One of the possible reasons is, as argued by Billett et al. (2004) and Klock et al. (2005), non-investment grade bond has less of a downside loss but unlimited upside potential, while investment grade bond has limited upside potential, but considerable downside risk. As a result, the protection that creditor rights provide will have a more significant effect in investment grade bonds. Another possible reason could be that 85% of our sample firms are rated with investment-grade and the results may be driven by statistical power.

4.4. Robustness tests

We conduct several robustness tests of bondholder wealth effects around the announcements of JV and SA. First, considering that in the above analysis average of the WGI is used to measure country-level governance, as a robustness check, we extract the first principal component (Prin1) of the six estimates of WGI and replace the initial WGI measure with Prin1. Panel A of Table 8 reports the results very similar to those of the baseline regressions in Table 5. We also use average of three estimates as an alternative measure, which consists of three out of six estimates in the WGI reported by the World Bank. These three estimates (Government Effectiveness, Regulatory Quality, and Rule of Law) are chosen as we conjecture them to be most relevant to bondholder wealth effects. The results remain robust. Second, in the baseline regression, we use the bond information of the parent company if the bonds issued by participants have missing return data. Panel B reports the baseline regressions after excluding the observations using parent companies, which comprise about 25% of our full sample. We find that the results

on the two main hypotheses generally remain robust. Third, the baseline regressions are estimated with standard error clustered at country level. Panel C reports the regressions using standard errors clustered at the firm level and the results remain robust across models.

4.5. Stockholder reaction and wealth transfer between bondholders and shareholders

To test wealth transfer effect, we finally conduct a cross-sectional regression analysis for stockholder abnormal returns and present the results in Table 9. We observe some significant evidence in Reg 3 and 4 that institutional governance has positive impact on stockholder wealth. In particular, low WGI country has smaller stockholder gain around JVSA announcement, which means that the rule-based institutional governance outweighs relation-based governance for stockholders. Furthermore, the significantly positive coefficients on the interaction term between the number of participants and low WGI dummy indicate that for low WGI countries increased connections by joining a JVSA create stockholder wealth. The other two country-level governance measures do not seem to be important drivers on stockholder wealth. This is in the line with Merchant and Schendel (2000). For the culture measures, Trust is the only measure that matters in determining stockholders' abnormal returns. Stockholders of firms from more trusting countries experience larger abnormal returns. To test the possible wealth transfer effect, we also check correlations between the cumulative abnormal bond returns and cumulative abnormal stock returns for each of the event windows. The correlations show positive and significant across all event windows and

samples, indicating that wealth redistribution is not likely to be a factor for bondholder gains through JV and SA deals.

5. Conclusion

In this paper, we empirically examine the bondholder wealth effects associated with international business collaborations in the form of joint ventures and strategic alliances. We explore the determinants of value creation for bondholders, and investigate them further in sub-groups. Based on a comprehensive sample of international JV and SA deals from 2009 to 2015, we show that JVSA deals create significant value for bondholders and these wealth effects are mainly driven by country level governance and cultural dimensions. JVSA are more valuable for bondholders when participants are from a country with poorer institutional governance, stronger creditor protection, or less shareholder rights. In addition, bondholder wealth effects are larger for participants from more individualistic or less power distant countries. After performing a variety of robustness checks and subsample analyses, our main findings remain robust. We find little evidence for wealth redistribution between stockholders and bondholders.

To the best of our knowledge, this paper is the one of first studies to explore bondholder wealth effects of non-U.S. companies based on a large sample of global JV and SA activities spanning across 22 countries and multiple industries. Our findings contribute to the literature on international cooperative agreements, country-level governance, and national culture. This study provides new and important insights into the impacts of joint ventures and strategic alliances on claimholders and the determinants of value creation through global joint ventures and strategic alliances.

REFERENCES

Adams, J.C. and Mansi, S.A., 2009. CEO turnover and bondholder wealth. Journal of Banking & Finance, 33(3), pp.522-533.

Adler, N.J. and Gundersen, A., 2007. *International dimensions of organizational behavior*. Cengage Learning.

Ahern, K.R., Daminelli, D. and Fracassi, C., 2015. Lost in translation? The effect of cultural values on mergers around the world. *Journal of Financial Economics*, *117*(1), pp.165-189.

Allen, J.W. and Phillips, G.M., 2000. Corporate equity ownership, strategic alliances, and product market relationships. *The Journal of Finance*, *55*(6), pp.2791-2815.

Amici, A., Fiordelisi, F., Masala, F., Ricci, O. and Sist, F., 2013. Value creation in banking through strategic alliances and joint ventures. *Journal of Banking & Finance*, *37*(5), pp.1386-1396.

Anderson, R., S. Mansi, and D. Reeb. 2003. Founding Family Ownership and the Agency Cost of Debt. *Journal of Financial Economics* 68(2):263-85.

Backman, M., 2001. *Asian Eclipse: Exposing the Dark Side of Business in Asia*. Wiley.

Bhojraj, S. and Sengupta, P., 2003. Effect of corporate governance on bond ratings and yields: The role of institutional investors and outside directors. *The Journal of Business*, *76*(3), pp.455-475.

Billett, M.T., King, T.H.D. and Mauer, D.C., 2004. Bondholder wealth effects in mergers and acquisitions: New evidence from the 1980s and 1990s. *The Journal of Finance*, *59*(1), pp.107-135.

Boone, A.L. and Ivanov, V.I., 2012. Bankruptcy spillover effects on strategic alliance partners. *Journal of Financial Economics*, *103*(3), pp.551-569.

Bottazzi, G., Dosi, G., Jacoby, N., Secchi, A. and Tamagni, F., 2010. Corporate performances and market selection: some comparative evidence. *Industrial and Corporate Change*, 19(6), pp.1953-1996.

Bryan, S., Nash, R. and Patel, A., 2015. The effect of cultural distance on contracting decisions: The case of executive compensation. *Journal of Corporate Finance*, *33*, pp.180-195.

Buch, C.M., 2005. Distance and international banking. Review of International Economics, 13(4), pp.787-804.

Carpenter, R.E. and Petersen, B.C., 2002. Capital market imperfections, high-tech investment, and new equity financing. *The Economic Journal*, *112*(477), pp.F54-F72.

Carrillo, J.D. and Gromb, D., 2006. Cultural inertia and uniformity in organizations. *The Journal of Law, Economics, & Organization*, 23(3), pp.743-771.

Chan, S.H., Kensinger, J.W., Keown, A.J. and Martin, J.D., 1997. Do strategic alliances create value? *Journal of Financial Economics*, *46*(2), pp.199-221.

Chang, S.C., Chen, S.S. and Lai, J.H., 2008. The wealth effect of Japanese-US strategic alliances. *Financial Management*, *37*(2), pp.271-301.

Chen, J., King, T.H.D. and Wen, M.M., 2015. Do joint ventures and strategic alliances create value for bondholders? *Journal of Banking & Finance*, *58*, pp.247-267.

Chiou, I. and White, L.J., 2005. Measuring the value of strategic alliances in the wake of a financial implosion: Evidence from Japan's financial services sector. *Journal of Banking & Finance*, *29*(10), pp.2455-2473.

Chou, T.K., Ou, C.S. and Tsai, S.H., 2014. Value of strategic alliances: Evidence from the bond market. *Journal of Banking & Finance*, *42*, pp.42-59.

Claessens, S., Feijen, E. and Laeven, L., 2008. Political connections and preferential access to finance: The role of campaign contributions. *Journal of Financial Economics*, *88*(3), pp.554-580.

Corwin, S.A. and Schultz, P., 2005. The role of IPO underwriting syndicates: Pricing, information production, and underwriter competition. *The Journal of Finance*, 60(1), pp.443-486.

Cox, T.H., Lobel, S.A. and McLeod, P.L., 1991. Effects of ethnic group cultural differences on cooperative and competitive behavior on a group task. *Academy of Management Journal*, *34*(4), pp.827-847.

Cremers, K.M., Nair, V.B. and Wei, C., 2007. Governance mechanisms and bond prices. *Review of Financial Studies*, *20*(5), pp.1359-1388.

De Soto, H., 1989. *The Other Path* (pp. 202-202). New York: Harper & Row.

Dinç, I.S., 2005. Politicians and banks: Political influences on government-owned banks in emerging markets. *Journal of Financial Economics*, 77(2), pp.453-479.

Djankov, S., McLiesh, C. and Shleifer, A., 2007. Private credit in 129 countries. *Journal of Financial Economics*, *84*(2), pp.299-329.

Duarte, J., Siegel, S. and Young, L., 2012. Trust and credit: the role of appearance in peer-to-peer lending. *Review of Financial Studies*, *25*(8), pp.2455-2484.

Elliott, W.B., Prevost, A.K. and Rao, R.P., 2009. The announcement impact of seasoned equity offerings on bondholder wealth. *Journal of Banking & Finance*, *33*(8), pp.1472-1480.

Ely, R.J. and Thomas, D.A., 2001. Cultural diversity at work: The effects of diversity perspectives on work group processes and outcomes. *Administrative science quarterly*, 46(2), pp.229-273.

Essen, M., Engelen, P.J. and Carney, M., 2013. Does "Good" Corporate Governance Help in a Crisis? The Impact of Country-and Firm-Level Governance Mechanisms in the European Financial Crisis. *Corporate Governance: An International Review*, *21*(3), pp.201-224.

Faccio, M., 2006. Politically connected firms. *The American Economic Review*, *96*(1), pp.369-386.

Faccio, M., Masulis, R.W. and McConnell, J., 2006. Political connections and corporate bailouts. *The Journal of Finance*, *61*(6), pp.2597-2635.

Ferris, S.P., Jayaraman, N. and Sabherwal, S., 2013. CEO overconfidence and international merger and acquisition activity. *Journal of Financial and Quantitative Analysis*, 48(01), pp.137-164.

Ford, R.C. and Randolph, W.A., 1992. Cross-functional structures: A review and integration of matrix organization and project management. *Journal of Management*, *18*(2), pp.267-294.

Geringer, J.M. and Hebert, L., 1989. Control and performance of international joint ventures. *Journal of International Business Studies*, *20*(2), pp.235-254.

Giannetti, M. and Yafeh, Y., 2012. Do cultural differences between contracting parties matter? Evidence from syndicated bank loans. *Management Science*, 58(2), pp.365-383.

Guiso, L., Sapienza, P. and Zingales, L., 2008. Trusting the stock market. *Journal of Finance*, *63*(6), pp.2557-2600.

Gulati, R., 1998. *Alliances and Networks*. *Strategic Management Journal*, *19*(4), pp.293-317.

Hofstede, G.H., 2003. *Culture's consequences: Comparing Values, Behaviors, Institutions and Organizations across Nations*. Sage Publications.

Ivanov, V. and Lewis, C.M., 2008. The determinants of market-wide issue cycles for initial public offerings. *Journal of Corporate Finance*, *14*(5), pp.567-583.

Johnson, S.A. and Houston, M.B., 2000. A Reexamination of the Motives and Gains in Joint Ventures. *Journal of Financial and Quantitative Analysis*, *35*(01), pp.67-85.

Kaufmann, D., Kraay, A. and Mastruzzi, M., 2011. The worldwide governance indicators: methodology and analytical issues. *Hague Journal on the Rule of Law*, *3*(02), pp.220-246.

Kerzner, H., 2013. *Project Management: A Systems Approach to Planning, Scheduling, and Controlling*. John Wiley & Sons.

Kliger, D. and Sarig, O., 2000. The information value of bond ratings. *The Journal of Finance*, *55*(6), pp.2879-2902.

Klock, M.S., Mansi, S.A. and Maxwell, W.F., 2005. Does corporate governance matter to bondholders? *Journal of Financial and Quantitative Analysis*, *40*(4), p.693-719.

Kogut, B. and Singh, H., 1988. The effect of national culture on the choice of entry mode. *Journal of International Business Studies*, 19(3), pp.411-432.

Krishnaswami, S., E. Pablo, and V. Subramaniam, 2012, When Is Equity More Than Just Financing? Evidence from Strategic Alliances, Working Paper, https://ssrn-com/abstract=2154659

Kumar, S. and Seth, A., 1998. The design of coordination and control mechanisms for managing joint venture-parent relationships. *Strategic Management Journal* 19(6), pp.579-599.

LaPorta, R., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R.W., 1998. Law and finance. *Journal of Political Economy*, *106*(6), pp.1113-1155.

LaPorta, R., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R.W., 1997. Legal determinants of external finance. *Journal of Finance*, *52*(3), pp.1131-1150.

Li, H. and Wang, Y., 2016 How do Corporate Governance Decisions Affect Bondholders? *Quarterly Journal of Finance* 6(3), p.1650011.

Li, K., Griffin, D., Yue, H. and Zhao, L., 2013. How does culture influence corporate risk-taking? *Journal of Corporate Finance*, *23*, pp.1-22.

Li, S. and Filer, L., 2007. The effects of the governance environment on the choice of investment mode and the strategic implications. *Journal of World Business*, *42*(1), pp.80-98.

Li, Y. and Zahra, S.A., 2012. Formal institutions, culture, and venture capital activity: A cross-country analysis. *Journal of Business Venturing*, 27(1), pp.95-111.

Ljungqvist, A., Marston, F. and Wilhelm, W.J., 2009. Scaling the hierarchy: How and why investment banks compete for syndicate co-management appointments. *Review of Financial Studies*, 22(10), pp.3977-4007.

Mansi, S.A. and Reeb, D.M., 2002. Corporate diversification: what gets discounted? *The Journal of Finance*, *57*(5), pp.2167-2183.

McConnell, J. and Nantell, T.J., 1985. Corporate combinations and common stock returns: The case of joint ventures. *The Journal of Finance*, *40*(2), pp.519-536.

Merchant, H. and Schendel, D., 2000. How do international joint ventures create shareholder value? *Strategic Management Journal* 21(7), pp.723-737.

Meredith, J.R. and Mantel Jr, S.J., 2011. *Project Management: A Managerial Approach*. John Wiley & Sons.

Morosini, P., Shane, S. and Singh, H., 1998. National cultural distance and cross-border acquisition performance. *Journal of International Business Studies* 29(1), pp.137-158.

North, D.C., 1990. Institutions, institutional change and economic performance. Cambridge university press.

Ongena, S. and Penas, M.F., 2009. Bondholders' wealth effects in domestic and cross-border bank mergers. *Journal of Financial Stability*, *5*(3), pp.256-271.

Owen, S. and Yawson, A., 2013. Information asymmetry and international strategic alliances. *Journal of Banking & Finance*, *37*(10), pp.3890-3903.

Page, S.E., 2008. *The Difference: How the Power of Diversity Creates Better Groups, Firms, Schools, and Societies*. Princeton University Press.

Parsley, D.C. and Faccio, M., 2009. Sudden Deaths: Taking Stock of Political Connections. *Journal of Financial and Quantitative Analysis*, *44*(3), 683–718.

Pevzner, M., Xie, F. and Xin, X., 2015. When firms talk, do investors listen? The role of trust in stock market reactions to corporate earnings announcements. *Journal of Financial Economics*, *117*(1), pp.190-223.

Pich, M.T., Loch, C.H. and Meyer, A.D., 2002. On uncertainty, ambiguity, and complexity in project management. *Management Science*, *48*(8), pp.1008-1023.

Portes, R. and Rey, H., 2005. The determinants of cross-border equity flows. Journal of international Economics, 65(2), pp.269-296.

Qian, J. and Strahan, P.E., 2007. How laws and institutions shape financial contracts: The case of bank loans. *The Journal of Finance*, *62*(6), pp.2803-2834.

Shore, B. and Cross, B.J., 2005. Exploring the role of national culture in the management of large-scale international science projects. *International Journal of Project Management*, *23*(1), pp.55-64.

Spamann, H., 2010. The "antidirector rights index" revisited. *Review of Financial Studies*, *23*(2), pp.467-486.

Stigler, G.J., 1971. The theory of economic regulation. *The Bell Journal of Economics and Management Science* 2(1), pp.3-21.

Stulz, R.M. and Williamson, R., 2003. Culture, openness, and finance. *Journal of Financial Economics*, *70*(3), pp.313-349.

Weitzel, U. and Berns, S., 2006. Cross-border takeovers, corruption, and related aspects of governance. Journal of International Business Studies, 37(6), pp.786-806.

Williamson, O.E., 2000. The new institutional economics: taking stock, looking ahead. *Journal of Economic literature*, *38*(3), pp.595-613.

Xin, K.K. and Pearce, J.L., 1996. Guanxi: Connections as substitutes for formal institutional support. *Academy of Management Journal*, *39*(6), pp.1641-1658.

Yasuda, A., 2005. Do bank relationships affect the firm's underwriter choice in the corporate-bond underwriting market? *The Journal of Finance*, 60(3), pp.1259-1292.

Yeh, Y.H., Shu, P.G. and Chiu, S.B., 2013. Political connections, corporate governance and preferential bank loans. *Pacific-Basin Finance Journal*, 21(1), pp.1079-1101.

Zheng, X., El Ghoul, S., Guedhami, O. and Kwok, C.C., 2012. National culture and corporate debt maturity. *Journal of Banking & Finance*, *36*(2), pp.468-488.

Appendix A

Panel 1: Distribution of JVs and SAs by year.

Year	Full Sample		Joint Ventures		Strategic Alliances	
	N	%	*N*	%	*N*	%
2009	2,492	11.8	1,472	10.41	1,020	14.62
2010	1,542	7.3	1,153	8.16	389	5.58
2011	3,353	15.88	2,431	17.19	922	13.22
2012	4,233	20.05	2,591	18.33	1,642	23.54
2013	3,723	17.63	2,264	16.01	1,459	20.92
2014	3,686	17.46	2,462	17.41	1,224	17.55
2015	2,084	9.87	1,765	12.48	319	4.57
Total	21,113	100	14,138	100	6,975	100

Note: This table shows the distribution for JVs and SAs deals around the world from 2009 to 2015 by announcement year.

Panel 2: Distribution of all JVs participants by nation.

Joint Ventures											
Nation	*N*	%	Nation	*N*	%	Nation	*N*	%	Nation	*N*	%
Afghanistan	1	0	Dominican Rep	3	0.01	Laos	15	0.05	Romania	18	0.06
Albania	2	0.01	Ecuador	12	0.04	Latvia	10	0.03	Russian Fed	811	2.62
Algeria	24	0.08	Egypt	181	0.59	Lebanon	9	0.03	Rwanda	2	0.01
Andorra	2	0.01	El Salvador	2	0.01	Lesotho	1	0	Saudi Arabia	444	1.44
Angola	16	0.05	Equator Guinea	1	0	Libya	6	0.02	Senegal	2	0.01
Argentina	55	0.18	Eritrea	6	0.02	Liechtenstein	1	0	Serbia	15	0.05

(*Continued*)

Panel 2: Distribution of all JVs participants by nation.

Joint Ventures											
Nation	*N*	%	Nation	*N*	%	Nation	*N*	%	Nation	*N*	%
Armenia	5	0.02	Estonia	11	0.04	Lithuania	18	0.06	Seychelles	1	0
Australia	1,487	4.81	Ethiopia	5	0.02	Luxembourg	49	0.16	Sierra Leone	2	0.01
Austria	67	0.22	Fiji	4	0.01	Macau	2	0.01	Singapore	650	2.1
Azerbaijan	21	0.07	Finland	117	0.38	Macedonia	8	0.03	Slovak Rep	3	0.01
Bahamas	1	0	France	681	2.2	Malaysia	518	1.68	Slovenia	14	0.05
Bahrain	73	0.24	Gabon	2	0.01	Mali	3	0.01	Somalia	1	0
Bangladesh	30	0.1	Georgia	5	0.02	Malta	9	0.03	South Africa	181	0.59
Barbados	3	0.01	Germany	716	2.32	Marshall Is	2	0.01	South Korea	489	1.58
Belarus	29	0.09	Ghana	14	0.05	Mauritania	2	0.01	Soviet Union	1	0
Belgium	111	0.36	Gibraltar	7	0.02	Mauritius	14	0.05	Spain	281	0.91
Belize	1	0	Greece	46	0.15	Mexico	118	0.38	Sri Lanka	55	0.18
Benin	1	0	Greenland	2	0.01	Monaco	1	0	Sudan	7	0.02
Bermuda	19	0.06	Guatemala	2	0.01	Mongolia	19	0.06	Surinam	3	0.01
Bhutan	5	0.02	Guernsey	20	0.06	Morocco	15	0.05	Swaziland	2	0.01
Bolivia	6	0.02	Guinea	2	0.01	Mozambique	11	0.04	Sweden	183	0.59
Bosnia	1	0	Guinea-Bissau	1	0	Myanmar(Burma)	56	0.18	Switzerland	222	0.72
Botswana	10	0.03	Guyana	4	0.01	N. Mariana	1	0	Syria	1	0
Brazil	330	1.07	Haiti	1	0	Namibia	8	0.03	Taiwan	221	0.72
British Virgin	47	0.15	Honduras	1	0	Nepal	5	0.02	Tajikistan	2	0.01
Brunei	14	0.05	Hong Kong	707	2.29	Netherlands	307	0.99	Tanzania	22	0.07
Bulgaria	11	0.04	Hungary	30	0.1	New Caledonia	2	0.01	Thailand	362	1.17
Burkina Faso	1	0	Iceland	6	0.02	New Zealand	121	0.39	Timor-Leste	1	0
C.African Rep	1	0	India	1,761	5.7	Nicaragua	4	0.01	Trinidad&Tob	1	0
Cambodia	20	0.06	Indonesia	276	0.89	Nigeria	43	0.14	Tunisia	3	0.01

(*Continued*)

Panel 2: Distribution of all JVs participants by nation.

Joint Ventures											
Nation	*N*	%	Nation	*N*	%	Nation	*N*	%	Nation	*N*	%
Cameroon	2	0.01	Iran	16	0.05	North Korea	3	0.01	Turkey	176	0.57
Canada	1,709	5.53	Iraq	15	0.05	Norway	164	0.53	Turkmenistan	1	0
Cayman Islands	8	0.03	Ireland-Rep	111	0.36	Oman	124	0.4	Ukraine	30	0.1
Chad	1	0	Isle of Man	9	0.03	Pakistan	34	0.11	United Kingdom	1,378	4.46
Chile	82	0.27	Israel	114	0.37	Palestine	4	0.01	United States	5,750	18.61
China	3,962	12.82	Italy	368	1.19	Panama	7	0.02	Unknown	843	2.73
Colombia	36	0.12	Ivory Coast	1	0	Papua N Guinea	17	0.06	Uruguay	4	0.01
Costa Rica	1	0	Japan	1,886	6.1	Peru	27	0.09	Utd Arab Em	393	1.27
Croatia	9	0.03	Jersey	20	0.06	Philippines	287	0.93	Uzbekistan	49	0.16
Cuba	7	0.02	Jordan	30	0.1	Poland	74	0.24	Venezuela	48	0.16
Cyprus	17	0.06	Kazakhstan	67	0.22	Portugal	25	0.08	Vietnam	164	0.53
Czech Republic	25	0.08	Kenya	10	0.03	Puerto Rico	3	0.01	Yemen	2	0.01
Dem Rep Congo	4	0.01	Kuwait	79	0.26	Qatar	177	0.57	Zambia	14	0.05
Denmark	87	0.28	Kyrgyzstan	8	0.03	Rep of Congo	5	0.02	Zimbabwe	12	0.04
Total										30,897	100

Note: This table shows the distribution of joint venture events around the world from 2009 to 2015 across 176 countries where the participating firms operate.

(*Continued*)

Panel 3: Distribution of all SAs participants by nation.

Strategic Alliances								
Nation	*N*	%	Nation	*N*	%	Nation	*N*	%
Afghanistan	3	0.02	Gibraltar	5	0.03	Panama	3	0.02
Algeria	5	0.03	Greece	94	0.64	Papua N Guinea	4	0.03
Angola	2	0.01	Guatemala	4	0.03	Paraguay	1	0.01
Argentina	13	0.09	Guyana	2	0.01	Peru	9	0.06
Armenia	1	0.01	Haiti	1	0.01	Philippines	35	0.24
Australia	328	2.25	Hong Kong	133	0.91	Poland	21	0.14
Austria	30	0.21	Hungary	12	0.08	Portugal	14	0.1
Azerbaijan	10	0.07	India	450	3.09	Puerto Rico	4	0.03
Bahamas	3	0.02	Indonesia	25	0.17	Qatar	113	0.77
Bahrain	73	0.5	Iran	6	0.04	Romania	8	0.05
Bangladesh	2	0.01	Iraq	9	0.06	Russian Fed	133	0.91
Barbados	2	0.01	Ireland-Rep	72	0.49	Saudi Arabia	217	1.49
Belarus	6	0.04	Isle of Man	4	0.03	Senegal	1	0.01
Belgium	45	0.31	Israel	133	0.91	Serbia	6	0.04
Bermuda	5	0.03	Italy	109	0.75	Seychelles	1	0.01
Bolivia	4	0.03	Japan	647	4.44	Singapore	73	0.5
Brazil	78	0.53	Jersey	1	0.01	Slovenia	4	0.03
British Virgin	1	0.01	Jordan	34	0.23	South Africa	36	0.25
Brunei	1	0.01	Kazakhstan	9	0.06	South Korea	181	1.24
Bulgaria	3	0.02	Kenya	2	0.01	Spain	96	0.66
Cambodia	2	0.01	Kuwait	58	0.4	Sri Lanka	10	0.07
Cameroon	2	0.01	Laos	2	0.01	St Kitts&Nevis	1	0.01
Canada	637	4.37	Latvia	1	0.01	Sudan	1	0.01
Cayman Islands	1	0.01	Lebanon	11	0.08	Supranational	1	0.01
Chile	36	0.25	Lithuania	1	0.01	Swaziland	1	0.01
China	771	5.29	Luxembourg	16	0.11	Sweden	147	1.01
Colombia	19	0.13	Malaysia	66	0.45	Switzerland	167	1.15
Costa Rica	3	0.02	Malta	3	0.02	Syria	1	0.01
Croatia	8	0.05	Mauritius	2	0.01	Taiwan	112	0.77
Cuba	4	0.03	Mexico	53	0.36	Thailand	38	0.26
Cyprus	9	0.06	Monaco	1	0.01	Tunisia	2	0.01
Czech Republic	2	0.01	Mongolia	4	0.03	Turkey	45	0.31
Dem Rep Congo	1	0.01	Montenegro	1	0.01	Ukraine	4	0.03
Denmark	113	0.77	Morocco	5	0.03	United Kingdom	760	5.21
Dominican Rep	2	0.01	Myanmar(Burma)	6	0.04	United States	6,620	45.4
Ecuador	5	0.03	Nepal	2	0.01	Unknown	90	0.62
Egypt	64	0.44	Netherlands	115	0.79	Uruguay	2	0.01
Falkland Is	1	0.01	New Zealand	46	0.32	Utd Arab Em	278	1.91
Fiji	1	0.01	Nigeria	9	0.06	Uzbekistan	2	0.01
Finland	83	0.57	North Korea	1	0.01	Venezuela	5	0.03
France	317	2.17	Norway	67	0.46	Vietnam	28	0.19
Georgia	1	0.01	Oman	42	0.29	Zambia	2	0.01
Germany	307	2.11	Pakistan	11	0.08	Zimbabwe	2	0.01
Ghana	5	0.03	Palestine	20	0.14			
Total							14,583	100

Note: This table shows the distribution of SA events around the world from 2009 to 2015 across 131 countries where the participating firms operate.

Appendix B: Variable Definitions

Variable Names	Variable Definitions
Abnormal Return	
Abnormal Bond Return	For foreign bond, we obtain from Datastream daily prices and calculate raw return base on daily returns, then calculate country-adjusted abnormal returns, and cumulative abnormal returns (CARs). We use Barclay's global aggregate bond index for each country acquired from Datastream and match with each bond by country as benchmark. We include the accrued interest that considers coupon payments, and accordingly the return of bond index is calculated during the same time period. We report the results based on Three-month (-45, +45) window. At the deal-firm level, we use average abnormal bond returns, weighted by the amount outstanding of each bond divided by the total amount outstanding for all bonds for a given firm.
Abnormal Stock Return	We first estimate the parameters based in the window of (-210, -11) month prior to the event by following Adams and Mansi (2009), and then the cumulative abnormal monthly returns are calculated over a given event window. For foreign firms, We obtain daily stock prices from Datastream, and MSCI country indices as benchmark index. We report the results based on Three-month (-45, +45) window.
Country Level Governance	
World Governance Index (WGI)	The World Governance Index consists of six estimates: Control of Corruption, Government Effectiveness, Political Stability and Absence of Violence/Terrorism, Regulatory Quality, Rule of Law, and Voice and Accountability. Each gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. raging from approximately -2.5 to 2.5. Detailed documentation of the WGI, interactive tools for exploring the data, and full access to the underlying source data available at www.govindicators.org.
Low WGI dummy	Dummy variable equals to 1 if WGI is lower than 10% quantile of the sample, zero otherwise.
Strength of Legal Rights Index (SLRI)	Strength of legal rights index measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending. The index ranges from 0 to 12, with higher scores indicating that these laws are better designed to expand access to credit. Data year available: 2013-2015. Since the data does not change much during 2013-2015, we adopt 2013 value as proxy for year 2009-2012. Data source: World Bank, Doing Business project (http://www.doingbusiness.org). We use the residuals from regressing SLRI on the two Hofstede Culture dimensions (Individualism and Power Distance) in the regression models, respectively.

Antidirector Rights Index (ADRI)	The "antidirector rights index" was introduced by La Porta et al. (1998) as a measure of shareholder protection. The index is formed by adding 1 when: (1) the country allows shareholders to mail their proxy vote to the firm; (2) shareholders are not required to deposit their shares prior to the General Shareholders' Meeting; (3) cumulative voting or proportional representation of minorities in the board of directors is allowed; (4) an oppressed minorities mechanism is in place; (5) the minimum percentage of share capital that entitles a shareholder to call for an Extraordinary Shareholders' Meeting is less than or equal to 10 percent (the sample median); or (6) shareholders have preemptive rights that can only be waived by a shareholders' vote. The index ranges from 0 to 6. We adopt the corrected ADRI (2005 values) published by Spamann (2010). We use the residuals from regressing ADRI on the two Hofstede Culture dimensions (Individualism and Power Distance) in the regression models, respectively.
Culture	
Hofstede Culture Dimensions	We adopt Hofstede's culture dimensions - Individualism and Power Distance - each index ranges a score from 0-100. Individualism (IDV) is the opposite of Collectivism. Individualism stands for a society in which the ties between individuals are loose: a person is expected to look after himself or herself and his or her immediate family only. Collectivism stands for a society in which people from birth onwards are integrated into strong, cohesive in-groups, which continue to protect them throughout their lifetime in exchange for unquestioning loyalty. Power Distance (PDI) is defined as the extent to which the less powerful members of institutions and organizations within a society expect and accept that power is distributed unequally.
IDV Culture Distance	Following Ahern et al. (2015), we define culture distance to be log value of 1 plus absolute difference between participating nation and JVSA host nation. If there are more than two JVSA host nations, the average value is used. IDV culture distance is calculated as log value of 1 plus absolute difference between participating nation's Individualism and JVSA host nation's Individualism.
PDI Culture Distance	PDI culture distance is calculated as log value of 1 plus absolute difference between participating nation's Power Distance and JVSA host nation's Power Distance.
Trust	Data are based on the survey question of "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" from World Values Survey (2005-2009), V23 and World Values Survey (2010-2014), V24. Following La Porta et al. (1997), the percentage of people answering "yes" is our measure of trust in a country. We use residuals from regression Trust on WGI.
Synergy Effect	
Geographical Distance	Calculated as the logarithm of geographical distance between headquarters of the participants within a cooperative activity (JV/SA). For foreign deals, we use capital cities of each participant as locations of headquarters. For a cooperative activity with more than two participants,

	we calculate the median value of distances between any of two combinations of participants.
Business Proximity	Defined as an indicator variable that takes the value of one when a given participating firm has the same two-digit of SIC code as that of the cooperative activity.
Financial Constraint Effect	
Low Dividends Payout	Defined as an indicator variable, which takes the value of one if the firm's dividend yield is below the sample average, and zero otherwise. Because US firms and foreign firms have significantly different dividend pattern, we calculated the average dividend yield grouped by US dummy variable and alliance year.
Altman's Z score	Altman's Z score is defined as Z = 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + 1.0X5, where X1 = Working Capital / Total Assets. Measures liquid assets in relation to the size of the company. X2 = Retained Earnings / Total Assets. Measures profitability that reflects the company's age and earning power. X3 = Earnings Before Interest and Taxes / Total Assets. Measures operating efficiency apart from tax and leveraging factors. It recognizes operating earnings as being important to long-term viability. X4 = Market Value of Equity / Book Value of Total Liabilities. Adds market dimension that can show up security price fluctuation as a possible red flag. X5 = Sales / Total Assets. Standard measure for total asset turnover (varies greatly from industry to industry). Firms with a Z score lower than 1.81 is considered distressed firms. And Altman's Z equals to 1 is the firm is in distress and 0 otherwise.
Real Option effect	
Industry Concentration	Defined as an indicator variable which takes a value of one if the industry of cooperative activities has a Herfindahl–Hirschman Index (HHI) more than 0.25 (HHI above 0.25 is identified as a concentrated industry), and zero otherwise. HHI is calculated by event year, industry, and country.
Uncertainty of Industry Investment	This measure is estimated on industry and country basis. The first step of estimation is to sort all COMPUSTAT firms into different industries according to two-digit SIC codes and country according to country code, and then calculate each firm's R&D expenses/Total Assets. The second step is for a given year, industry and country, we calculate the standard deviation of the ratio for all the firms in the same industry and same country. Finally a mean value of standard deviations within three years prior to cooperative activities is used.
Deal Characteristics	
Number of Participants	Calculated as the number of participating firms that join in a given cooperative activity.
Horizontal Dummy	Defined as an indicator variable which takes a value of one if all partners in a given cooperative activity have the same first two-digit SIC code, and zero otherwise.
Equal Ownership	Defined as an indicator variable which takes a value of one if each participant in a given joint venture takes the same shares of stakes in the new entity, and zero otherwise.

High-Tech Dummy	Defined as an indicator variable which takes a value of one if a cooperative activity is involved in high-tech industries, and zero otherwise. We follow Carpenter and Petersen (2002) to identify high-tech industries by using first three-digit SIC code of 283, 357, 361, 362, 366, 367, 382, 384, 386, and 387.
Firm Characteristics	
Total Assets	Book value of participating firm assets.
Leverage	Defined as total debt divided by total market value of assets, where market value of assets is the sum of total debt and market value of equity.
Market to Book	Defined as the sum of the market value of equity and the book value of debt divided by the book value of assets.
Bond Characteristics	
Bond Size	Defined as the aggregate value of all individual bonds outstanding.
Junk Dummy	To define deal-firm level bond credit rating, we utilize the following procedures (i) first use Moody's rating for each individual bond with the highest rating Aaa to the lowest rating D, (ii) then follow Klock et al. (2005) in converting each letter rating to a numerical rating with the corresponding number from 22 to 1, (i.e. Aaa converts to 22, Aa1 converts to 21, …, and D converts to 1), (iii) use the amount outstanding of each individual bond as the weight to find firm-level bond rating. Junk dummy equals 1 if it is less than 13, zero otherwise.
Coupon	Refers to the annual interest rate on bond contract on individual bond level. For deal-firm level, it is defined as weighted average coupon of all bonds outstanding for a given firm, with the weight being the amount outstanding for each bond divided by total amount outstanding for all bonds of the firm.
Time to Maturity	Calculated as the length of time from the present to time when the bond matures on individual bond level. For deal-firm level, it is defined as the weighted average time to maturity of all bonds outstanding for a given firm, with the weight being the amount outstanding for each bond divided by the total amount outstanding for all bonds of the firm.
Other control variables	
Economy	Indicator variable equals to one if it is developed economies, and zero otherwise. Data source: Development Policy and Analysis Division (DPAD) of the Department of Economic and Social Affairs of the United Nations Secretariat (UN/DESA).
Multi Part. Dummy	Indicator variable equal to one if the participating firm participates more than 6 times within our sample period, and zero otherwise.
JV Dummy	Indicator variable equal to one if the cooperative activity is joint venture, and zero if strategic alliance
Difference in WGI (WGI_diff)	The difference in WGI between JVSA host nation and each participating firm nation. If the JVSA host firms reside in more than two countries, the difference will be the average WGI of host nations minus WGI of each participant.

Table 1. Distribution of participants and cooperative activities.

	Full Sample		Joint Ventures		Strategic Alliances	
	N	%	*N*	%	*N*	%
Panel A: Event level distribution by announcement year						
Year						
2009	165	9.76	104	8.59	61	12.73
2010	125	7.40	92	7.60	33	6.89
2011	308	18.22	224	18.50	84	17.54
2012	333	19.70	224	18.50	109	22.76
2013	371	21.95	250	20.64	121	25.26
2014	275	16.27	215	17.75	60	12.53
2015	113	6.69	102	8.42	11	2.30
Total	1,690	100	1,211	100	479	100
Panel B: Event-firm level distribution by country						
Nation						
Australia	79	4.16	73	5.37	6	1.11
Belgium	18	0.95	13	0.96	5	0.93
Brazil	16	0.84	13	0.96	3	0.56
Canada	123	6.48	90	6.62	33	6.12
France	204	10.75	137	10.08	67	12.43
Germany	172	9.06	122	8.98	50	9.28
Hong Kong	14	0.74	13	0.96	1	0.19
Italy	67	3.53	50	3.68	17	3.15
Japan	755	39.78	569	41.87	186	34.51
Malaysia	4	0.21	4	0.29	—	—
The Netherlands	51	2.69	34	2.50	17	3.15
Norway	43	2.27	32	2.35	11	2.04
Qatar	5	0.26	2	0.15	3	0.56
Russian Fed	11	0.58	8	0.59	3	0.56
Singapore	29	1.53	26	1.91	3	0.56
South Korea	8	0.42	7	0.52	1	0.19
Sweden	36	1.90	19	1.40	17	3.15
Switzerland	20	1.05	13	0.96	7	1.30
Thailand	21	1.11	17	1.25	4	0.74
Turkey	2	0.11	1	0.07	1	0.19
United Kingdom	210	11.06	106	7.80	104	19.29
United Arab Emirates	10	0.53	10	0.74	—	—
Total	1,898	100	1,359	100	539	100

Notes: This table shows an overview of 1,690 announcements of cooperative activities initiated by 1,898 event-firm level participants in the period of 2009 through 2015. Data of cooperative activities are collected from SDC. Panel A reports the number of deals by year. Panel B reports the number of firms at event-firm level by country.

Table 2. Abnormal returns and univariate tests.

Panel A: Firm-level									
Event Window	Full Sample			Joint Ventures			Strategic Alliances		
	N	Mean	Median	*N*	Mean	Median	*N*	Mean	Median
				Abnormal return for bondholders (%)					
(0, 0)	1,898	0.000	0.006***	1,359	0.004	0.008**	539	−0.009	−0.001
(−1, 0)	1,898	−0.008	0.007	1,359	−0.007	0.010**	539	−0.012	−0.007
(−1, +1)	1,898	−0.006	0.013**	1,359	−0.003	0.017**	539	−0.013	0.003
(−2, +2)	1,898	−0.003	0.016**	1,359	0.011	0.023***	539	−0.038	−0.003
(−5, +5)	1,898	0.037*	0.04***	1,359	0.071***	0.056***	539	−0.050	0.002
(−15, +15)	1,898	0.097***	0.06***	1,359	0.135***	0.083***	539	−0.001	0.023
(−30, +30)	1,898	0.105**	0.053***	1,359	0.141**	0.080***	539	0.014	−0.073
(−45, +45)	1,898	0.144**	0.052***	1,359	0.224***	0.121***	539	−0.059	−0.153*
				Abnormal return for stockholders (%)					
(0, 0)	1,853	0.094***	0.044**	1,323	0.106**	0.037*	530	0.064*	0.063
(−1, 0)	1,853	0.137***	0.07**	1,323	0.132**	0.009	530	0.149	0.258
(−1, +1)	1,853	0.198***	0.049**	1,323	0.204*	0.039*	530	0.183*	0.081
(−2, +2)	1,853	0.309***	0.078**	1,323	0.3*	0.049**	530	0.333	0.169**
(−5, +5)	1,853	0.209*	0.167	1,323	0.181	0.167	530	0.277	0.165
(−15, +15)	1,853	0.421**	0.494***	1,323	0.54**	0.495***	530	0.124	0.445
(−30, +30)	1,852	0.481**	0.262**	1,323	0.456	0.427**	529	0.542	−0.395
(−45, +45)	1,842	0.382	0.676**	1,317	0.062	0.568	525	1.184	0.878**

Table 2. (*Continued*)

Panel B: Bond-level									
Event Window	Full Sample			Joint Ventures			Strategic Alliances		
	N	Mean	Median	*N*	Mean	Median	*N*	Mean	Median
				Abnormal return for bondholders (%)					
(0, 0)	14,121	0.007***	0.004***	10,819	0.011***	0.004***	3,302	−0.007	−0.001
(−1, 0)	14,121	0.017***	0.019***	10,819	0.023***	0.023***	3,302	−0.004	0.001
(−1, +1)	14,121	0.027***	0.035***	10,819	0.036***	0.040***	3,302	−0.004	0.010*
(−2, +2)	14,121	0.038***	0.054***	10,819	0.054***	0.060***	3,302	−0.015	0.026***
(−5, +5)	14,121	0.075***	0.097***	10,819	0.106***	0.104***	3,302	−0.027	0.070***
(−15, +15)	14,121	0.212***	0.196***	10,819	0.275***	0.215***	3,302	0.005	0.139***
(−30, +30)	14,121	0.311***	0.252***	10,819	0.394***	0.311***	3,302	0.040	0.057*
(−45, +45)	14,121	0.410***	0.301***	10,819	0.525***	0.367***	3,302	0.031	−0.032

Notes: This table shows summary statistics of abnormal returns of JVs and SAs for foreign participants. Panel A shows the mean and median of CARs of different windows for firm-level observations. Panel B shows the mean and median of CARs of different windows for bond-level observations. We report CARs of bond and stock returns in the 1-day, 2-day, 3-day, 5-day, 11-day, 31-day (1-month), 61-day (2-month), and 91-day (3-month) event windows, where day 0 is the announcement day. The symbols (*), (**) and (***) denote significance at the 10%, 5%, and 1% levels, respectively.

Table 3. Descriptive statistics of hypotheses and control variables.

Variables	Full Sample				Joint Ventures				Strategic Alliances			
	N	Mean	Median	Std Dev	*N*	Mean	Median	Std Dev	*N*	Mean	Median	Std Dev
WGI	1,898	1.28	1.31	0.36	1,359	1.28	1.26	0.37	539	1.30	1.31	0.33
ADRI	1,872	4.61	5.00	0.57	1,339	4.60	5.00	0.57	533	4.65	5.00	0.56
Strength of legal rights index (SLRI)	1,898	5.16	4.00	2.10	1,359	5.16	4.00	2.19	539	5.16	4.00	1.84
Individualism (IDV)	1,898	61.68	67.00	18.66	1,359	60.29	67.00	18.76	539	65.18	69.00	17.94
Power distance (PDI)	1,898	49.62	54.00	12.81	1,359	50.29	54.00	12.71	539	47.92	54.00	12.92
IDV culture distance	1,514	1.73	1.76	1.61	1,056	1.65	1.61	1.63	458	1.90	2.20	1.56
PDI culture distance	1,514	1.50	1.61	1.45	1,056	1.44	1.10	1.49	458	1.65	1.79	1.34
Trust	1,870	36.56	35.90	11.61	1,336	36.83	35.90	11.48	534	35.88	35.90	11.91
Log (Distance)	1,881	5.92	7.95	3.54	1,348	5.82	7.73	3.59	533	6.19	8.20	3.42
Business proximity	1,898	0.47	0.00	0.50	1,359	0.49	0.00	0.50	539	0.44	0.00	0.50
Low dividend payout	1,875	0.49	0.00	0.50	1,341	0.50	1.00	0.50	534	0.45	0.00	0.50
Altman's *Z*	1,825	0.32	0.00	0.46	1,302	0.34	0.00	0.47	523	0.26	0.00	0.44
Industry concentration	1,827	0.47	0.00	0.50	1,309	0.47	0.00	0.50	518	0.49	0.00	0.50
Uncert. of industry investment	1,554	0.11	0.03	0.34	1,099	0.10	0.02	0.37	455	0.14	0.04	0.26
Number of participants	1,898	2.33	2.00	0.79	1,359	2.39	2.00	0.85	539	2.16	2.00	0.60
Horizontal dummy	1,898	0.36	0.00	0.48	1,359	0.34	0.00	0.47	539	0.41	0.00	0.49
Equal ownership	1,311	0.53	1.00	0.50	1,311	0.53	1.00	0.50	—	—	—	—
High-tech dummy	1,898	0.12	0.00	0.33	1,359	0.09	0.00	0.29	539	0.20	0.00	0.40

Table 3. (*Continued*)

Variables	Full Sample				Joint Ventures				Strategic Alliances			
	N	Mean	Median	Std Dev	*N*	Mean	Median	Std Dev	*N*	Mean	Median	Std Dev
Log (total assets)	1,898	10.64	10.83	1.25	1,359	10.60	10.74	1.27	539	10.73	11.04	1.19
Leverage	1,898	0.29	0.26	0.13	1,359	0.30	0.27	0.13	539	0.27	0.25	0.12
Market to book	1,898	1.84	1.32	1.50	1,359	1.72	1.28	1.36	539	2.16	1.45	1.79
Log (bond size)	1,898	15.01	15.06	1.23	1,359	14.97	15.00	1.23	539	15.11	15.28	1.24
Credit rating	1,898	15.07	15.00	3.01	1,359	14.96	15.00	3.02	539	15.36	16.00	2.95
Coupon	1,898	3.37	3.26	2.06	1,359	3.33	3.15	2.06	539	3.47	3.46	2.05
Time to maturity (year)	1,886	6.63	5.43	4.26	1,355	6.51	5.49	4.00	531	6.94	5.03	4.86
Economy	1,898	0.94	1.00	0.24	1,359	0.93	1.00	0.26	539	0.96	1.00	0.18
Difference in WGI	1,898	−0.04	0.00	0.67	1,359	−0.04	0.00	0.74	539	−0.02	0.00	0.45
Alliances in same nation	1,898	0.21	0.00	0.41	1,359	0.22	0.00	0.42	539	0.18	0.00	0.39
Multiple participation dummy	1,898	0.59	1.00	0.49	1,359	0.58	1.00	0.49	539	0.61	1.00	0.49

Notes: This table presents the mean and median of the event-firm variables related to (i) hypotheses and (ii) country, deal, firm, and bond characteristics for the 1,898 firms participanted in JVSA for the period 2009–2015. We require valid information of 3-month bond CAR, total assets, leverage, market to book, and credit rating. The table reports full sample (JV and SA) firms, JV firms, and SA firms separately. Variable definitions are summarized in Appendix B. At the event-firm level, we calculate the weighted average of bond rating, coupon rate, and time to maturity using amounts outstanding as the weights.

Table 4. Correlation matrix.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	3-month Bond CAR	1															
2	WGI	0.02	1.00														
3	Number of participants	0.00	−0.06	1.00													
4	ADRI	−0.07	−0.24	0.09	1.00												
5	Strength of legal rights index	0.04	0.54	−0.09	−0.36	1.00											
6	Individualism	−0.01	0.40	−0.15	−0.32	0.53	1.00										
7	Power distance	−0.05	−0.59	0.07	0.37	−0.53	−0.61	1.00									
8	IDV culture distance	0.00	−0.03	−0.15	−0.03	−0.12	−0.02	0.05	1.00								
9	PDI culture distance	−0.01	−0.07	−0.13	−0.01	−0.14	0.01	0.07	0.87	1.00							
10	Trust	0.09	0.56	−0.01	−0.59	0.30	0.09	−0.62	−0.04	−0.10	1.00						
11	Log (GEO distance)	−0.03	0.01	−0.14	−0.01	−0.08	0.05	0.00	0.74	0.71	−0.03	1.00					
12	Business proximity	0.03	0.05	−0.07	−0.19	0.14	0.21	−0.11	−0.01	0.00	0.06	0.00	1.00				
13	Low dividend payout	0.01	−0.03	0.03	0.19	−0.12	−0.34	0.17	−0.02	−0.06	−0.01	−0.03	−0.10	1.00			
14	Altman's Z	0.03	−0.09	0.00	0.05	−0.05	0.03	0.11	−0.02	−0.03	−0.18	−0.07	0.05	0.05	1.00		
15	Industry concentration	−0.02	0.01	0.06	0.42	−0.12	−0.31	0.06	−0.10	−0.10	−0.11	−0.09	−0.09	0.27	−0.02	1.00	
16	Uncert. of industry investment	−0.02	0.13	−0.07	−0.17	0.21	0.27	−0.23	0.01	0.01	0.09	0.05	0.05	−0.12	−0.07	−0.10	1

Notes: This table shows the correlation matrix for main variables including bond abnormal returns, measures of country-level governance, measures of culture, synergy measures, measures of alleviation of financial constraints, and measures of real option benefits in multivariate regressions. Variable definitions are provided in Appendix B.

Table 5. Baseline cross-sectional regressions of bondholder wealth effects for JVSA.

	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6
Country-level governance						
WGI*Junk dummy	−2.796***	−2.801***			−2.746***	−2.803***
	(0.001)	(0.001)			(0.001)	(0.002)
WGI	0.040	0.038			0.495	0.452
	(0.943)	(0.947)			(0.377)	(0.450)
Number of participants*Low WGI dummy			1.122***	1.105***		
			(0.000)	(0.000)		
Low WGI dummy			−1.237	−1.153		
			(0.190)	(0.234)		
SLRI	0.211**	0.223**	0.192**	0.206**		
	(0.019)	(0.030)	(0.026)	(0.036)		
ADRI					−0.589**	−0.643***
					(0.014)	(0.010)
Culture						
Individualism	0.014		0.014		0.020**	
	(0.164)		(0.117)		(0.014)	
IDV culture distance	0.063		0.058		0.042	
	(0.202)		(0.278)		(0.434)	
Power distance		−0.017		−0.017		−0.020***
		(0.111)		(0.120)		(0.002)
PDI culture distance		0.069*		0.070*		0.042
		(0.083)		(0.086)		(0.389)
Trust	0.023**	0.025*	0.021*	0.022	0.010	0.001
	(0.014)	(0.099)	(0.068)	(0.174)	(0.450)	(0.932)
Synergy						
Business proximity	0.259	0.262	0.262	0.264	0.216	0.226
	(0.109)	(0.103)	(0.103)	(0.103)	(0.150)	(0.140)
Geographic distance	−0.032	−0.030	−0.030	−0.030	−0.029	−0.025
	(0.413)	(0.394)	(0.443)	(0.394)	(0.450)	(0.460)

Table 5. (*Continued*)

	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6
Alleviation of financial constraints						
Low dividends payout	0.032	0.030	−0.002	−0.006	0.111	0.090
	(0.907)	(0.911)	(0.993)	(0.981)	(0.673)	(0.730)
Altman's Z	0.195	0.196	0.147	0.150	0.160	0.175
	(0.418)	(0.420)	(0.529)	(0.525)	(0.496)	(0.445)
Real option						
Uncertainty of industry investment	−0.502	−0.498	−0.443	−0.437	−0.428	−0.394
	(0.184)	(0.200)	(0.264)	(0.289)	(0.279)	(0.339)
Industry concentration	−0.113	−0.115	−0.130	−0.140	0.086	0.017
	(0.203)	(0.155)	(0.161)	(0.138)	(0.281)	(0.879)
Deal characteristics						
Number of participants	−0.065	−0.066	−0.074	−0.074	−0.066	−0.070
	(0.448)	(0.420)	(0.373)	(0.349)	(0.461)	(0.416)
Horizontal dummy	0.257	0.258	0.216	0.218	0.246	0.256
	(0.214)	(0.215)	(0.326)	(0.325)	(0.255)	(0.232)
High-tech dummy	0.015	0.015	−0.006	−0.006	0.007	0.005
	(0.963)	(0.963)	(0.987)	(0.986)	(0.983)	(0.987)
Firm characteristics						
Total asset	−0.157***	−0.156***	−0.164***	−0.166**	−0.160***	−0.169***
	(0.000)	(0.002)	(0.001)	(0.016)	(0.000)	(0.000)
Leverage	−1.169	−1.155	−1.472	−1.482	−0.766	−0.873
	(0.223)	(0.207)	(0.161)	(0.156)	(0.367)	(0.332)
Market to book	−0.120*	−0.118*	−0.086	−0.084	−0.114*	−0.102
	(0.059)	(0.050)	(0.192)	(0.183)	(0.075)	(0.128)
Bond characteristics						
Bond size	0.316***	0.309***	0.312***	0.308***	0.326***	0.334***
	(0.001)	(0.003)	(0.001)	(0.008)	(0.001)	(0.001)
Junk dummy	3.051***	3.061***	−0.528	−0.529	3.009***	3.048**
	(0.003)	(0.006)	(0.161)	(0.144)	(0.008)	(0.012)

Table 5. (*Continued*)

	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6
Coupon	−0.144**	−0.139***	−0.205**	−0.198***	−0.191***	−0.149***
	(0.027)	(0.010)	(0.014)	(0.006)	(0.004)	(0.003)
Time to maturity	−0.008	−0.008	0.001	0.001	−0.008	−0.009
	(0.768)	(0.791)	(0.976)	(0.966)	(0.785)	(0.778)
Other control variables						
Economy	−0.161	−0.046	−0.770	−0.608	−1.006	−0.519
	(0.850)	(0.956)	(0.523)	(0.589)	(0.283)	(0.499)
Multiple participation dummy	−0.047	−0.048	0.021	0.020	−0.103	−0.120
	(0.738)	(0.724)	(0.884)	(0.888)	(0.440)	(0.357)
JV dummy	0.181	0.171	0.201	0.190	0.242	0.228
	(0.241)	(0.284)	(0.195)	(0.234)	(0.159)	(0.189)
WGI_diff	−0.087	−0.085	−0.103	−0.100	−0.078	−0.078
	(0.412)	(0.428)	(0.302)	(0.326)	(0.474)	(0.479)
Intercept	−2.617	−0.987	−1.666	−0.071	−2.834*	−1.175
	(0.120)	(0.665)	(0.378)	(0.976)	(0.094)	(0.544)
Industry and year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1,204	1,204	1,204	1,204	1,202	1,202
Adjusted R^2	0.056	0.056	0.050	0.050	0.055	0.054

Notes: This table provides the results of baseline cross-sectional OLS regressions for bondholder wealth effects around the announcements of JVs and SAs. Six regressions for foreign firms using different proxies are reported. Variable definitions are summarized in Appendix B. The dependent variable is the firm-level 3-month cumulative abnormal bond return. Clustered standard errors at the country level are used to estimate statistical significance and *p*-values are reported in brackets. The symbols (*), (**), and (***) denote significance at the 10%, 5%, and 1% levels, respectively.

Table 6. Determinants of abnormal bond returns for frequent participants and less-frequent participants.

	Frequent Participants				Less-Frequent Participants			
	Reg 1	Reg 2	Reg 3	Reg 4	Reg 1	Reg 2	Reg 3	Reg 4
Country-level governance								
WGI*Junk dummy	−0.576	−0.527	−0.576	−0.536	−2.293**	−2.061**	−2.047*	−2.075*
	(0.613)	(0.685)	(0.433)	(0.485)	(0.015)	(0.018)	(0.052)	(0.053)
WGI	0.984	0.900	1.011**	0.938**	−1.100	−1.069	−0.591	−0.702
	(0.151)	(0.107)	(0.014)	(0.022)	(0.227)	(0.249)	(0.463)	(0.406)
SLRI	0.029	0.038			0.365***	0.337***		
	(0.820)	(0.817)			(0.009)	(0.002)		
ADRI			−0.238	−0.324			−0.969***	−1.034***
			(0.568)	(0.420)			(0.004)	(0.001)
Culture								
Individualism	0.009		0.009		0.012		0.030***	
	(0.705)		(0.697)		(0.435)		(0.007)	
IDV culture distance	0.176**		0.170**		−0.098		−0.167	
	(0.012)		(0.016)		(0.342)		(0.141)	
Power distance		−0.005		−0.006		−0.028		−0.038***
		(0.773)		(0.674)		(0.139)		(0.003)
PDI culture distance		0.101**		0.095*		0.073		0.007
		(0.028)		(0.075)		(0.508)		(0.957)

Table 6. (*Continued*)

	Frequent Participants				Less-Frequent Participants			
	Reg 1	Reg 2	Reg 3	Reg 4	Reg 1	Reg 2	Reg 3	Reg 4
Trust	0.034***	0.033	0.028	0.025	−0.011	−0.008	−0.022	−0.041**
	(0.002)	(0.151)	(0.147)	(0.267)	(0.510)	(0.770)	(0.135)	(0.034)
Intercept	−2.724*	−2.041	−3.053**	−2.382	−0.104	2.648	0.444	3.620
	(0.087)	(0.318)	(0.040)	(0.156)	(0.976)	(0.523)	(0.899)	(0.330)
Number of obs.	746	746	746	746	458	458	456	456
Adjusted R^2	0.078	0.074	0.078	0.075	0.048	0.047	0.045	0.040

Notes: This table provides the results of cross-sectional OLS regressions for bondholder wealth effects for frequent participants and less-frequent participants around the announcements of JVs and SAs. Four regressions using different proxies are reported for foreign firms. Variable definitions are summarized in Appendix B. The dependent variable is the firm-level 3-month cumulative abnormal bond return. Cluster standard errors at the country level are used to estimate statistical significance, and *p*-values are reported in parenthesis. The symbols (*), (**), and (***) denote significance at the 10%, 5%, and 1% levels, respectively. For each regression, synergy, alleviation of financial constraints, real option effect, deal, firm, and bond characteristics are included but for abbreviation coefficients are not reported.

Table 7. Determinants of abnormal bond returns for speculative-grade and investment-grade.

	Speculative-Grade				Investment-Grade			
	Reg 1	Reg 2	Reg 3	Reg 4	Reg 1	Reg 2	Reg 3	Reg 4
Country-level governance								
WGI	−4.104	−5.564***	−3.915**	−3.526*	−0.063	−0.128	0.234	0.084
	(0.162)	(0.002)	(0.027)	(0.073)	(0.915)	(0.812)	(0.671)	(0.876)
SLRI	0.344	0.474			0.167*	0.158		
	(0.496)	(0.210)			(0.053)	(0.122)		
ADRI			−1.199	−0.527			−0.538*	−0.553*
			(0.375)	(0.728)			(0.084)	(0.085)
Culture								
Individualism	0.039		0.057		0.013		0.018*	
	(0.329)		(0.172)		(0.201)		(0.054)	
IDV culture distance	−0.396		−0.514		0.099		0.079	
	(0.212)		(0.137)		(0.123)		(0.251)	
Power distance	−0.097		−0.008		−0.022**		−0.027***	
	(0.177)		(0.937)		(0.035)		(0.002)	
PDI culture distance	0.102		−0.080		0.090		0.069	
	(0.893)		(0.910)		(0.202)		(0.381)	
Trust	−0.036	−0.078	−0.021	0.016	0.023**	0.018	0.010	−0.003
	(0.481)	(0.397)	(0.824)	(0.921)	(0.026)	(0.286)	(0.560)	(0.844)
Intercept	3.451	13.110	2.356	3.911	−2.769*	−0.626	−2.776	−0.387
	(0.567)	(0.136)	(0.685)	(0.691)	(0.090)	(0.769)	(0.107)	(0.841)
Number of observations	171	171	170	170	1,033	1,033	1,032	1,032
Adjusted R^2	0.041	0.036	0.066	0.047	0.088	0.088	0.088	0.088

Notes: This table provides the results of cross-sectional OLS regressions for bondholder wealth effects for speculative-grade and investment-grade bonds around the announcements of JVs and SAs. Four regressions for using different proxies are reported for foreign firms. Variable definitions are summarized in Appendix B. The dependent variable is the firm-level 3-month cumulative abnormal bond return. Cluster standard errors at the country level are used to estimate statistical significance, and p-values are reported in parenthesis. The symbols (*), (**), and (***) denote significance at the 10%, 5%, and 1% levels, respectively. For each regression, synergy, alleviation of financial constraints, real option effect, deal, firm, and bond characteristics are included but for abbreviation coefficients are not reported.

Table 8. Robustness tests.

	Panel A				Panel B				Panel C			
	Reg 1	Reg 2	Reg 3	Reg 4	Reg 1	Reg 2	Reg 3	Reg 4	Reg 1	Reg 2	Reg 3	Reg 4
Country-level governance												
WGI*Junk dummy					−2.241*	−2.573**	−1.884*	−2.153**	−2.796***	−2.801***	−2.746***	−2.803***
					(0.059)	(0.043)	(0.072)	(0.049)	(0.003)	(0.003)	(0.007)	(0.006)
WGI					−0.654	−0.669	−0.324	−0.129	−0.382	−0.418	0.315	0.434
					(0.545)	(0.572)	(0.709)	(0.880)	(0.547)	(0.509)	(0.640)	(0.509)
Prin1*Junk dummy	−1.102***	−1.104***	−1.079***	−1.101***								
	(0.001)	(0.001)	(0.001)	(0.002)								
Prin1	0.019	0.017	0.200	0.182								
	(0.933)	(0.942)	(0.372)	(0.447)								
SLRI	0.208**	0.221**			0.126	0.177			0.211**	0.223**		
	(0.021)	(0.031)			(0.339)	(0.266)			(0.031)	(0.016)		
ADRI			−0.583**	−0.637**			−0.487	−0.612*			−0.589*	−0.643*
			(0.014)	(0.010)			(0.111)	(0.069)			(0.089)	(0.063)
Culture												
Individualism	0.014		0.020**		0.031*		0.034*		0.014		0.020*	
	(0.160)		(0.014)		(0.083)		(0.057)		(0.236)		(0.085)	
Culture distance	0.062		0.042		0.124**		0.108*		0.063		0.042	
(individualism)	(0.205)		(0.433)		(0.027)		(0.067)		(0.403)		(0.579)	
Power distance		−0.017		−0.020***		−0.018		−0.024**		−0.017		−0.020
		(0.109)		(0.002)		(0.125)		(0.018)		(0.236)		(0.164)

Table 8. (*Continued*)

	Panel A				Panel B				Panel C			
	Reg 1	Reg 2	Reg 3	Reg 4	Reg 1	Reg 2	Reg 3	Reg 4	Reg 1	Reg 2	Reg 3	Reg 4
Culture distance		0.069*		0.042		0.028		0.004		0.069		0.042
(power distance)		(0.083)		(0.384)		(0.639)		(0.953)		(0.373)		(0.589)
Trust	0.023**	0.025	0.010	0.001	0.032***	0.028	0.021	0.006	0.023**	0.025*	0.010	0.001
	(0.014)	(0.101)	(0.447)	(0.932)	(0.009)	(0.152)	(0.200)	(0.691)	(0.042)	(0.098)	(0.516)	(0.948)
Intercept	−2.538	−0.917	−2.312	−0.696	−2.592	−0.953	−2.474	−0.481	−2.930**	−1.325	−2.967*	−1.189
	(0.105)	(0.660)	(0.147)	(0.692)	(0.109)	(0.620)	(0.129)	(0.792)	(0.047)	(0.545)	(0.051)	(0.584)
Number of observations	1,204	1,204	1,202	1,202	915	915	915	915	1,204	1,204	1,202	1,202
Adjusted R^2	0.056	0.056	0.054	0.053	0.062	0.058	0.062	0.058	0.056	0.056	0.055	0.054

Notes: This table provides the results of robustness tests on bondholder wealth effects. Panel A uses principal component method on WGI. Panel B adopts a sample with participants' information only. Panel C uses clustered standard errors at firm level. Four regressions using different proxies are reported for foreign firms. Variable definitions are summarized in Appendix B. The dependent variable is the firm-level 3-month cumulative abnormal bond return. Cluster standard errors at the country level are used to estimate statistical significance for Panels A and B. *P*-values are reported in parenthesis. The symbols (*), (**), and (***) denote significance at the 10%, 5%, and 1% levels, respectively. For each regression, synergy, alleviation of financial constraints, real option effects, deal, firm, and bond characteristics are included but for abbreviation coefficients are not reported.

Table 9. Stockholders wealth effects for JVSA.

	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6
Country-level governance						
WGI	0.405	0.670			1.903	1.697
	(0.780)	(0.649)			(0.331)	(0.357)
Number of participants *Low WGI dummy			6.647***	6.775***		
			(0.000)	(0.000)		
Low WGI dummy			−15.966***	−16.326***		
			(0.000)	(0.000)		
SLRI					−0.421	−0.310
					(0.177)	(0.289)
ADRI	1.634	1.276	1.571	1.153		
	(0.122)	(0.245)	(0.168)	(0.335)		
Culture						
Individualism	0.001		0.001		−0.001	
	(0.933)		(0.979)		(0.978)	
Culture distance (individualism)	0.321		0.294		0.307	
	(0.152)		(0.179)		(0.187)	
Power distance		0.042		0.043		0.032
		(0.145)		(0.163)		(0.306)
Culture distance (power distance)		0.145		0.086		0.153
		(0.705)		(0.825)		(0.681)
Trust	0.115*	0.115*	0.117*	0.120**	0.060	0.061
	(0.061)	(0.063)	(0.053)	(0.049)	(0.153)	(0.233)
Synergy						
Business proximity	0.215	0.263	0.264	0.317	0.119	0.172
	(0.761)	(0.714)	(0.708)	(0.659)	(0.865)	(0.810)
Geographic distance	0.098	0.164	0.094	0.167	0.094	0.155
	(0.418)	(0.272)	(0.440)	(0.264)	(0.437)	(0.291)
Alleviation of financial constraints						
Low dividends payout	2.247***	2.112***	2.198***	2.058***	2.454***	2.290***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.000)	(0.000)
Altman's Z	−1.165	−1.136	−1.260	−1.240	−1.310	−1.246
	(0.419)	(0.433)	(0.406)	(0.416)	(0.362)	(0.388)
Real option						
Uncertainty of industry investment	0.734	0.854	0.768	0.897	0.895	0.946
	(0.602)	(0.567)	(0.590)	(0.554)	(0.534)	(0.526)
Industry concentration	−0.175	−0.221	−0.180	−0.210	0.263	0.068
	(0.831)	(0.790)	(0.823)	(0.802)	(0.758)	(0.929)
Deal characteristics						

Table 9. (*Continued*)

	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6
Number of participants	0.075	0.034	−0.061	−0.108	0.099	0.060
	(0.789)	(0.902)	(0.804)	(0.663)	(0.723)	(0.825)
Horizontal dummy	−0.242	−0.234	−0.272	−0.272	−0.313	−0.300
	(0.614)	(0.623)	(0.559)	(0.554)	(0.503)	(0.511)
High-tech dummy	0.653	0.634	0.659	0.635	0.660	0.648
	(0.434)	(0.457)	(0.446)	(0.473)	(0.428)	(0.452)
Firm characteristics						
Total asset	0.056	0.048	0.049	0.044	0.089	0.060
	(0.863)	(0.886)	(0.880)	(0.896)	(0.794)	(0.862)
Leverage	0.272	0.213	−0.162	−0.247	1.221	0.843
	(0.925)	(0.943)	(0.954)	(0.932)	(0.660)	(0.753)
Market to book	−0.280	−0.213	−0.259	−0.185	−0.268	−0.214
	(0.418)	(0.536)	(0.457)	(0.597)	(0.447)	(0.534)
Other control variables						
Economy	−7.528**	−6.478*	−8.050**	−6.862*	−7.896**	−6.702**
	(0.025)	(0.055)	(0.036)	(0.064)	(0.023)	(0.046)
Multiple participation dummy	−1.414	−1.477	−1.336	−1.410	−1.471	−1.490
	(0.236)	(0.203)	(0.262)	(0.222)	(0.241)	(0.226)
JV dummy	0.146	0.079	0.197	0.136	0.234	0.152
	(0.840)	(0.910)	(0.781)	(0.843)	(0.747)	(0.828)
WGI_diff	0.066	0.060	−0.051	−0.071	0.133	0.116
	(0.774)	(0.789)	(0.784)	(0.685)	(0.562)	(0.608)
Intercept	5.294	2.130	7.004	3.924	3.134	1.154
	(0.308)	(0.709)	(0.187)	(0.522)	(0.528)	(0.839)
Industry and year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1,182	1,182	1,182	1,182	1,184	1,184
Adjusted R^2	0.036	0.035	0.039	0.038	0.036	0.035

Notes: This table provides the results of baseline cross-sectional OLS regressions for stockholder wealth effects around the announcements of JVSA. Six regressions using different proxies are reported for foreign firms. Variable definitions are summarized in Appendix B. The dependent variable is the firm-level 3-month cumulative abnormal stock return. Cluster standard errors at the country level are used to estimate statistical significance, and *p*-values are reported in parenthesis. The symbols (*), (**), and (***) denote significance at the 10%, 5%, and 1% levels, respectively.

CHAPTER 3: CAPITAL STRUCTURE PERSISTENCY AND SUBSEQUENT EQUITY FINANCING: EVIDENCE FROM ZERO LEVERAGE AND LEVERED FIRMS

1. Introduction

More than 10% of Compustat firms have zero short-term and long-term debt in their capital structure. Many studies show this is a persistent phenomenon (for example, Devos et al. (2012), Strebulaev and Yang (2013), and Bessler et al. (2013)) and there is an increase in the percentage of zero or low leverage firms in recent years (D'Mello and Gruskin (2014)). To fully understand and explore a firm's capital structure dynamics, in this paper we examine the capital structure evolution starting from the firm's initial public offering (IPO). We focus on IPO firms' first seasoned equity financing (SEO) and study how the initial capital structure and evolution affect the SEO decision and outcomes.

We trace a firm's all-equity or levered status in the IPO year as the initial status. [1] Using a sample of 4,857 IPOs over 1980 to 2014, we find 19% of them going public with a zero leverage capital structure. With a birthmark of all-equity or levered structure at the time of IPO, firms pursue different paths of capital structure evolution thereafter. While a

[1] In this paper we use zero leverage and all-equity interchangeably. We define a firm as zero leverage firm if it has no long-term or short-term debt in the capital structure.

significant proportion of firms maintain the same all-equity or levered structure as in the IPO year during our sample period, large amount of firms switch from zero leverage to levered and vice versa. Of our initial all-equity IPO firms, 27% firms maintain all-equity structure in all subsequent sample years; of our initial levered IPO firms, 69% firms persistently maintain levered structure. If zero leverage is a persistent phenomenon and a firm's initial capital structure status explains a significant proportion of the persistency (Strebulaev and Yang (2013)), a study on the dynamics around and following IPO is expected to cast light on firms' capital structure decisions and the wealth effects of the persistency or switching decisions.

Prior studies argue firms choose to go public via IPO to gain reputation and access to market for subsequent fund raising (Carter and Manester (1990), Brau and Fawcett (2006)). Subsequent equity financing therefore is important to IPO firms, especially IPOs that choose to persistently maintain a zero leverage structure. However, we find levered firms are equally likely to pursue SEO as all-equity firms, though all-equity firms seek their first SEO faster following IPO. We argue that this may be because levered firms use additional equity financing to achieve optimal capital structure or mitigate financial distress. In addition, we find IPOs that switch from levered to zero leverage or vise verse are most active in terms of propensity to undertake SEOs.

It has been well documented that the market reacts negatively to SEOs (Jegadeesh et al. (1993), Loughran and Ritter (1995), and Houston and Ryngaert, (1997)) with an average of -3% cumulative abnormal returns (CARs) around the SEO announcement date. Myers and Majluf (1984) argue that the negative announcement effect is due to the asymmetric information between corporate insiders and outside investors. Firms choose

to issue equity when the insiders (managers) know they are overvalued. However, Myers and Majluf's hypothesis is based on the assumption that a firm has the option to choose financing via equity or debt. All-equity firms, especially those that have persistently maintained all-equity structure, offer an ideal context to test the information contained in SEOs.

All-equity firms, for various reasons, choose not to consider debt financing as an option. Therefore, the market may not view mispricing as a motivation for all-equity firms to issue equity. We then expect the market reacts less negatively to the SEOs by all-equity firms. In a multi-variate set-up, we find that first SEOs have one percentage point higher two-day CARs for firms that have zero leverage before the SEO than that of levered firms, which is both statically and economically significant. The information is stronger for firms that have maintained a persistent zero leverage status from IPO up to SEO (1.2 percentage point higher CARs) and strongest for firms that are persistently all-equity during our sample period (1.5 percentage point higher CARs). This evidence provides a falsification support for Myers and Majluf's hypothesis, and suggests the important information contained in a firm's capital structure.

If zero leverage firms issue equity for reasons other than taking advantage of misevaluation and the market reacts less negatively, it may be because these firms are raising capital for activities viewed favorably by the market. We further explore the channels that may account for the market reaction. We find that SEOs by zero leverage firms may signal to the market that they are likely to maintain all-equity structure, which makes them attractive merger and acquisition target. We also find evidence that zero leverage firms may be less likely to raise capital for wasteful investment. Specifically,

managers in all-equity firms may be more conservative and are less likely to pursue over-confident empire building such as mergers and acquisitions.

Our paper makes several contributions to the literature. First, we start from a firm's IPO year, analyze and trace its capital structure evolution throughout our sample period. This enables us to examine the influences of a firm's initial capital structure status and subsequent changes. We find that a firm's initial capital structure status does not contain information that would affect its subsequent financing decisions and outcomes. Whereas, capital structure dynamics has important policy implications. Specifically, firms that persistently maintain zero leverage structure have significantly less negative market reaction to their first SEOs than levered firms. Second, we provide a direct test on Myers and Majluf (1984)'s overvaluation hypothesis of SEOs. We do so from a unique perspective on the assumption of Myers and Majluf's hypothesis. We show when a zero leverage firm *ex ante* excludes debt financing as a choice, market filters out the mispricing signal and reacts less negatively to its first SEO. Lastly, we explore channels that may account for favorable market reaction. We find that some zero leverage firms may have the incentive to go public to be acquired. Moreover, we show evidence that zero leverage firms are less likely to pursue equity financing for wasteful investment. Both channels may partially explain the more favorable market reaction. Our study opens avenues for future research on the implications of capital structure persistency.

The remainder of the paper is organized as follows. Section 2 outlines hypotheses. Section 3 introduces the sample and discusses the variables. Section 4 reports empirical results. Section 5 concludes.

2. Hypotheses development

The literature has argued that all-equity structure is a persistent phenomenon (see, for example, Devos et al. (2012), Lemmon et al. (2008), Strebulaev and Yang (2013), and Bessler et al. (2013)). D'Mello and Gruskin (2014) document that the percentage of firms with little or no debt in their capital structure has been increasing over the last three decades. However, some of the documented evidence is at the aggregate level, jointly considered the entering of new firms and firms switching between zero leverage and levered structure. We focus on analyzing at the individual firm level, tracing back to the initial stage at each firm's IPO time. If persistency is important and expected, a firm's initial capital structure status, and how persistent it sticks to the initial status, will contain important information on firm's subsequent financing decisions and outcomes.

2.1. How subsequent equity financing decisions are related to initial capital structure at IPO and subsequent evolution of capital structure

One objective of a firm's choice to go public is to gain reputation and have better access to external financing sources (see, for example, Carter and Manester (1990), La Porta et al. (1997), Brau and Fawcett (2006), Beck et al. (2008), Brav (2009), and Nofsinger and Wang (2011)). Subsequent financing is important for IPO firms to pursue their growth options and development. Numerous papers use the motivation of seeking SEO to partially explain IPO underpricing (Welch (1989), Jegadeesh et al. (1993), and Spiess and Pettway (1997)). Firms are willing to under-sell to guarantee the success and good reputation of IPO in order to raise more funds in the stock market through a SEO shortly after the IPO.

When considering external financing, a firm may choose either issuing equity or borrowing debt. However, if all-equity firms exclude the debt financing option,[2] equity financing is their only major external source. Therefore, we expect that all-equity firms are more likely to pursue subsequent equity financing. In addition, we expect those firms seek SEO faster with larger scale. On the other hand, levered firms may use additional equity financing to achieve optimal capital structure or release financial distress. With the option to choose equity or debt financing, levered firms are more likely to issue equity when their market value is high, and issue debt when the market value is low (Eckbo (1986), Baker and Wurgler (2002), and Dong et al. (2012)). Lastly, firms may actively use equity financing for capital structure adjustment purpose. For example, for firms that switch from levered to all-equity structure, equity financing is important to pay off debt and replaces debt as the only external financing source. Therefore, it is an empirical question which type of firms will be more active in equity financing after going public.

2.2. Shareholder wealth effect of the first SEO after IPO

It has been well documented that the market reacts negatively to SEO (Jegadeesh et al. (1993), Loughran and Ritter (1995), and Houston and Ryngaert, (1997)). The seminal paper by Myers and Majluf (1984) argues that the negative announcement effect is due to the asymmetric information between corporate insiders and outside investors. SEO reveals overvaluation information to investors leading to stock price adjustment. Alternatively, the market may view SEO as a value destroying decision by empire-

[2] The literature has proposed managerial preference, corporate culture, preserving financing flexibility, and lack of debt capacity to partially explain why all-equity firms do not incorporate debt in the capital structure (Agrawal and Nagarajan (1990), Devos et al. (2012), Strebulaev and Yang (2013), Bessler et al. (2013), and Byoun and Xu (2013)).

building and/or hubris managers (Lee (1997) and Heaton (2002)). In this study we differentiate market reaction to SEOs by all-equity firms and levered firms and examine the information contained in the capital structure history.

Asymmetric information hypothesis and firm's choice of debt and equity financing

All-equity firms provide us with an ideal test field to evaluate the Myers and Majluf (1984)'s asymmetric information hypothesis. An important assumption in Myers and Majluf is that a firm has a choice to issue equity or debt. As a result, asymmetrically informed outside investors will make valuation inferences based on how insiders decide to raise capital. For all-equity firms, they choose not to consider debt financing for various reasons in the first place. Equity issuance may not be viewed as a mispricing signal by the market. Therefore, we expect that the market will react less negatively to SEOs offered by zero leverage firms. Moreover, this effect is expected to be more pronounced for firms that persistently maintain an all-equity structure at least up to the SEO date.

If zero leverage firms issue equity for reasons other than taking advantage of misevaluation and the market reacts less negatively, it may be because these firms are raising capital for activities viewed favorably by the market. We argue that the potential channels include the following. First, the subsequent financing signals real investment opportunities. If this is a viable channel, we expect that zero leverage firms with high growth will have higher SEO shareholder wealth. Second, equity financing by zero leverage firms sends the signal to the market that these firms are likely to maintain all-equity structure. Among other things, this makes them attractive merger and acquisition

target, leading to a more favorable market reaction. Third, managers in all-equity firms may be more conservative and are less likely to pursue over-confident empire building such as mergers and acquisitions. Brau et al. (2012) show that IPO firms that acquire within a year of going public significantly underperform while nonacquiring IPOs do not underperform, indicating acquisition activities by IPO firms are negative NPV investment on average. Lastly, it is possible that zero leverage firms undertake SEO to build equity base in order to subsequently pursue debt markets to finance projects.

Wealth transfer hypothesis

Wealth transfer hypothesis (Eberhart and Siddique (2002)) argues SEOs transfer wealth from shareholders to bondholders because SEOs reduce default risk. Since all-equity firms do not have bondholders, wealth transfer hypothesis predicts that all-equity firms have better stock market reaction than levered firms.

Certification hypothesis

Debt provides certification benefit and reduces asymmetric information (James and Wier (1990), Habib and Ljungqvist (2001), and Schenone (2004)). Debt monitoring also mitigates the agency problem between shareholders and managers by reducing the free cash flow in a firm (Jensen (1986)). According to the certification argument, all-equity firms, with no debt in the capital structure, are expected to have more negative stock market reaction to SEOs.

3. Sample and variables

We start with a sample of IPOs obtained from Securities Data Company (SDC) New Issuance database. Following literature and particularly recent studies on IPO (Butler et al. (2014), Mauer et al (2015)), we apply standard screening criteria to construct the IPO sample and refer to Ritter's website to correct errors of SDC database. We delete REITS, limited partnerships, closed-end funds, ADRs, and unit IPOs; spinoffs and carve-outs are excluded. We exclude IPOs in the financial industry with SIC codes between 6000-6999 and in regulated industries with SIC codes between 4900-4999. We further require IPOs to have offer price no less than $5 to be included.

We then merge the IPO sample with Compustat and CRSP to get accounting and stock market data. We require that firms have positive total assets and book equity in the IPO year to be included. To make sure the capital structure dynamic is observed, we require IPOs to have at least three-year accounting data on Compustat after IPO year. Our final IPO sample includes 4,857 firms over 1980 to 2014, of which 939 (or 19%) firms go public with a zero leverage capital structure. This proportion is about three percentage points higher than the proportion of all-equity firms of all Compustat firms over the same sample period.

Table 1 reports the distribution of IPOs by year. The table reports four groups of IPOs: the overall IPO sample, zero leverage (ZL) IPOs, levered (LEV) IPOs, and the first SEOs undertaken by sample IPOs over 1980 to 2016. An IPO is defined as ZL IPO if it has no long-term nor short-term debt in the IPO year. As seen in column (1), the number of IPOs varies with ups and downs with stock market condition. The proportion of zero leverage IPOs (as shown in column (3) of Table 1) has been increasing over the years, the

average proportion increases from 13.5% in the 1980s and 17.6% in the 1990s to above 25% entering 2000. This is an interesting pattern and adds to the all-equity puzzle that more and more firms present themselves to the market with a zero leverage structure.

For the sample IPO firms, we collect SEOs from SDC New Issuance dataset. We only include public offers of common stocks by US firms listed on AMEX, NASDAQ or NYSE. We identify 2,152 IPOs that have at least one SEO during our sample period. Column (6) of Table 1 reports the year distribution of the first SEOs undertaken by our sample IPO firms.

Table 2 reports the descriptive statistics of relevant IPO and SEO variables. We also report main firm variables in the IPO year and in the year immediately before the first SEO. Definitions of all these variables are provided in the Appendix A. We can see that 19.3% of IPO firms are zero leverage when going public, our sample IPOs have a mean (median) underpricing of 18% (7%), and the mean (median) IPO proceeds are $61 ($31) million. The mean (median) age of firms in the IPO year is 15 (8) years, and 37% of IPOs are backed by venture capitals. These variables are consistent with the literature.

Of our sample IPO firms, 44% (or 2,151 firms) have at least one SEO up to December 31st 2016, with 39.5% of the first SEOs undertaken within 18 months (or 1.5 years) after the IPO date. The mean (median) duration between IPO date and SEO date is 3 (2) years. The mean and median two-day cumulative abnormal returns of SEOs are -2.4% and -2.1%, consistent with the literature.

4. Results

4.1. Univariate comparisons of sample firms based on capital structure dynamics

Table 3 reports the univariate comparison of the subsamples of IPOs/SEOs. Based on the initial capital structure status in the IPO year, we split the IPOs into zero leverage IPOs (ZLIPO) and levered IPOs (LEVIPO) groups. The initial all-equity IPO sample is further divided into two groups: firms that maintain zero leverage structure throughout sample years, and firms that have switched to levered firms (i.e., started to use debt financing). Of the 939 initial all-equity IPOs, 255 (or 27%) firms maintain all-equity structure in all subsequent sample years, which we label as persistent zero leverage firms (PZL). On a similar note, the initial levered IPO firms are further divided into two groups: firms that maintain the levered structure throughout sample years, and firms that have switched to zero leverage. Of the 3,918 initial levered IPOs, 2,694 (or 69%) of them maintain levered structure all subsequent sample years, which we label as persistent levered firms (PLEV). Overall, three groups are identified based on their capital structure evolution: PZL group of 255 persistent zero leverage firms, PLEV group of 2,694 persistent levered firms, and the rest 1,908 firms being switchers that have changed the capital structure from levered to zero leverage or *vice versa*.[3] Further, 2,152 sample IPO firms have undertaken at least one SEO during our sample period. Focusing on the first SEOs, we obtain 224 (or 10.4%) firms that have maintained persistent zero leverage from the IPO year up to the SEO year (labeled as PZL up to SEO); and 405 (or 18.8%) firms

[3] Of the switchers, we identify an *SW10* case as a levered IPO firm switching to zero leverage in year *t,* where year *t* is identified as the switching year. Similarly, we define an *SW01* case as a zero leverage IPO firm switching to levered in the switching year *t*. Note only the first switching after the IPO year is counted. We identify 1,224 *SW10* switchers and 684 *SW*01 switchers.

that have zero leverage in the fiscal year immediately before SEO (labeled as ZL bef SEO).

Table 3 reports the comparison between the two groups based on the initial status – ZLIPO and LEVIPO. Noticeably, the initial zero leverage or levered status does not seem to affect the IPO firm's propensity to undertaking subsequent equity financing. For both groups about 44% firms have at least one SEO during our sample period. Although ZLIPOs have less negative CARs and shorter duration between IPO date and first SEO date, the differences are not statistically significant. The two groups do differ significantly in a variety of IPO aspects and firm characteristics. ZLIPOs have significantly higher underpricing than LEVIPOs, which is consistent with the argument that debt provides signaling benefit and reduces asymmetric information (James and Wier (1990), Habib and Ljungqvist (2001), and Schenone (2004)) at the time of IPO. In addition, ZLIPOs are younger, smaller, with larger a higher proportion of firms having venture capital back-up.

For groups constructed based on capital structure evolution after IPO, we report the comparisons of each group versus the PLEV. The same patterns between ZLIPO and LEVIPO can be seen in the comparisons between PZL and PLEV and between PZL up to SEO and PLEV, with the differences in IPO and firm variables showing much larger magnitude. Switch group is somewhere between PZL and PLEV. SEO CARs are not significantly different across the groups, though PZL up to SEO group appears to have the least negative CARs. Given that the groups of firms are significantly different in many aspects, we will evaluate the wealth effect later in a multivariate set-up. Also note

that the two PZL groups have significantly shorter duration between IPO date and first SEO date than the PLEV group.

4.2. SEO activities of IPO firms

We next study the propensity of financing via SEO by the IPO firms in a multivariate framework. Because our testing period truncates on December 31st 2016, we adopt Cox (1992) proportional hazard model to study the subsequent equity financing undertaken by the IPO firms.[4] Issuing firms are defined as firms that have at least one SEO before December 31, 2016. We measure the time-to-SEO as the number of days between the IPO date and the date of first SEO. Table 4 reports the hazard model results.

To examine how subsequent equity financing decisions are related to capital structure persistency and switching between all-equity and levered, we include as independent variable the initial capital structure status as well as the evolution of capital structure. In column (1), the independent variable is a dummy variable *ZL at IPO* that equals one if a firm has zero leverage in the IPO year. Columns (2) – (3) compare *Persistent ZL* (PZL), *Persistent LEV* (PLEV) and *Switch* groups. In column (2), we include *PZL* and *PLEV* as covariates. So the coefficient estimates indicate the different propensity of undertaking SEO by PZL and PLEV firms as compared with Switchers. In column (3), *PLEV* is the left-over group and the coefficients of *PZL* and *Switch* estimate the different propensity of undertaking SEO by *PZL* and *Switchers* as compared with

[4] Standard Probit model analysis does not consider the probability that a firm may issue equity after the testing period. Therefore we employ the semi-parametric Cox hazard model. This technique non-parametrically estimates the hazard shape and is well suited for our censored data (see Meyer (1990), Jain and Kini (2008), Mauer et al. (2015) for a detailed discussion). Another advantage is that it incorporates time-varying covariates and unobserved heterogeneity. It allows the hazard rates to shift upward and downward in response to each covariate. It also accommodates cross-sectional heterogeneity that arises from left and right data censoring.

PLEV. Other covariates follow Strebulaev and Young (2013) and are measured in IPO year. All specifications control for industry and year fixed effects.

Positive coefficient estimate on a specific covariate indicates that the variable contributes positively to the likelihood of SEO. The results show that as compared with levered IPO, firms that are zero leverage at IPO are equally likely to undertake SEO. This is consistent with the univariate results that a firm's initial zero leverage or levered status does not affect the subsequent equity financing decision. Further, table 4 column (2) shows firms with persistent capital structure (both PZL and PLEV) are less likely to do SEO after IPO than switchers.[5] The hazard ratios show the likelihood of SEO by PZL and PLEV is 74% and 90% of that by switchers. In column (3), although the likelihood of SEO by PZL is 82% of that by PLEV, the difference is not statistically significant. In sum, we find initial zero leverage or levered status does not affect an IPO firm's SEO decision. Firms switching between zero and levered structure tend to be more active in SEO, while firms with persistent zero leverage and persistent levered capital structure do not show significant difference in the propensity to undertake SEO.

Using the sample of firms with SEO, we further investigate how initial and evolution of capital structure affect the SEO timing measured by the duration in years between IPO and SEO dates, as well as the scale of SEO measured by the amount of SEO scaled by the book value of equity before the financing. Since the decision to engage in a SEO is made at the individual firm level, those firms with SEO constitute a self-selected sample. If the selection (or decision-making) process is not independent of the outcomes of the SEOs, it may lead to biased inferences regarding the outcomes. To mitigate this

[5] We also split Switchers into SW01 (all-equity IPO firm switching to levered) and SW10 (levered IPO firms switching to zero leverage) and find both SW01 and SW10 are more active in SEOs than firms with persistent capital structure. The results are not tabulated.

potential selection problem, we use a Heckman two-stage estimation procedure and include an Inverse Mills ratio from a first stage Probit model of SEO likelihood in the SEO duration and scale regressions. The results are reported in Table 5.

Conditioning on having a SEO of our sample IPO firms, we find the choices of timing and size of the financing are not significantly different between initially levered and initially zero leverage IPO firms. That is, initial status does not appear to affect the subsequent equity financing decisions. The subsequent capital structure evolution, however, matters. We observe that firms with persistent levered or zero leverage structure pursue SEO after IPO faster than switchers. Although firms with persistent zero leverage structure seek additional equity financing the fastest, the relative financing size is the smallest among the three groups.

4.3. Shareholder wealth effect of fist SEOs

We are most interested in the market reaction to IPO firm's first subsequent equity financing. Following Kalay and Shimrat (1987), Bayless and Chaplinsky (1996), and Elliot et al. (2009), we calculate two-day cumulative abnormal returns (CARs) around the SEO announcement date. Table 6 reports CAR regression results using initial capital structure and capital structure evolution variables as independent variables. The regressions include IPO, SEO and firm characteristics and control for industry and year fixed effects.

Table 6 column (1) shows, again, the effect of initial all-equity or levered status is insignificant. Regression as reported in column (2) shows the market reacts more positively to SEOs announced by firms with zero leverage at the time of SEO.

Controlling for issuing and firm characteristics, the first SEOs announced by zero leverage firms have an average one percentage point higher CARs that levered firms. This phenomenon is consistent with wealth transfer hypothesis, and also consistent with asymmetric information and firm's external financing choice hypothesis.

If more favorable market reaction to SEOs by zero leverage firms is because the market does not view those SEOs as an overvaluation signal, we expect the effect is stronger in firms with persistent zero leverage structure. Persistency tends to reduce information ambiguity and strengthens the market belief that zero leverage firms do not consider debt financing as a viable choice. To further explore the information contained in the capital structure persistency, we decompose *ZL at SEO* firms into *PZL up to SEO* and *Others*, and into *Persistent ZL* and *Others*. The two decomposed group dummies are included regressions and reported in columns (3) and (4). The results show persistent ZL structure sends the strongest information to the market, consistent with the information and external financing choice hypothesis. *PZL up to SEO* and *Persistent ZL* groups have 1.2 and 1.5 percentage point higher SEO CARs than levered firms, respectively. Lastly, columns (5) and (6) use PZL and PLEV, PZL and Switch dummies as independent variables, respectively. We find that the market reacts similarly to SEOs by PLEVs and Switchers, while reacts more positively (less negatively) to SEOs by PZLs.

4.4. Discussions

The market views SEOs undertaken by zero equity firms less value destroying, which are possibly due to a variety of reasons. In this study, we explore three channels to account for the different market reactions to SEOs by ZL and non-ZL firms. First, from

table 3 we see ZL firms have higher growth options, and equity financing may be employed to pursue the growth opportunities. To test this argument, we regress SEO CARs on PZL dummies and PZL dummies interacted with market-to-book ratio immediately before SEO announcement. Table 7 columns (1) and (2) report the results. In these regressions, we observe the interaction variable is positive but not significant. Therefore, we do not find evidence that supports the growth option argument.

Second, the literature has argued that going public or being acquired as a private entity are two exit channels pursued by entrepreneurs and venture capitals (Bayar and Chemmanur (2011), Brau et al. (2003)). We argue there is another exit channel that a firm may consider to maximize the exit value, that is, to go public to be acquired. Consistent with this argument, the literature on mergers and acquisitions has shown that acquiring a public target leads to negative acquirer abnormal returns while acquiring a private target has insignificant or positive acquirer abnormal returns (Chang (1998), Fuller et al. (2002)). This means being a public target may have a larger bargaining power leading to a higher premium than being a private target. All-equity firms are easier to be picked as acquisition target than levered firms, and market may reward all-equity firms' equity financing for maintaining this possibility. To test this channel, we define a dummy variable $ACQ_{\text{within 2 years}}$ that equals one if a firm was acquired within two years of its first SEO.[6] We then interact this dummy variable with PZL and include them into the CARs regressions. Table 7 columns (3) and (4) report the results. We find the interaction variable is positive and significant, indicating some evidence that this channel contributes to the CARs of PZL firms.

[6] We use the Compustat delist date and delist reason to identify the acquisition and the date of being acquired. Note the merger announcement date will be before the delist date.

The third channel we explore is the investment activities around the first SEO. Ultimately, firm's equity financing are used to support the investment activities. We calculate the change of a firm's investment variables from before to after the SEO date, including capital expenditures, R&D expenditures, advertising, and acquisition expenses. We regress the change variables on PZL up to SEO and PZL variables. We reference Coles et al. (2006) for control variables and control for industry and year fixed effects. The results are reported in Table 8. We do not find zero leverage firms have significantly different capital expenditures, R&D, or advertisement as compared with levered firms. However, PZL and PZL up to SEO firms have significantly less acquisition activities around the SEO. Brau et al. (2012) show that IPO firms that acquire within a year of going public significantly underperform while nonacquiring IPOs do not underperform, indicating acquisition activities by IPO firms are negative NPV investment on average. Our finding that all-equity firms have less acquisition than levered firms around SEO may partially explain the less negative SEO announcement effect by those firms.

Lastly, we explore whether the same effect is found in IPO firms' higher-order SEOs (i.e., non-first SEOs). We identify 1,008 sample IPOs with 1,873 higher-order SEOs during our sample period. The CAR regression results of those SEOs are reported in Table 9. Interestingly, we do not find market reacts differently to SEOs by levered and all-equity firms. As suggested by the work of Asquith et al. (1983), Malatesta and Thompson (1985) and Schipper and Thompson (1983), the stock price reaction to the initiation of an acquisition program may reflect investors' anticipation of subsequent acquisition attempts. The same logic can be applied to how market processes information of equity offerings. Therefore, information, if any, will be reflected only in the first

announcement and mute in higher order SEOs. Alternatively, agency problem may be more severe with the expansion of firms and debt monitoring plays a more important role.

5. Conclusion

In this paper, we study firms' capital structure evolution following IPOs and the effect of the initial zero leverage or levered status and the persistency of capital structure on these IPO firms' subsequent equity financing decisions. The results show that initial zero leverage or levered status does not significantly affect an IPO firm's SEO decision. Whereas, a firm's capital structure dynamics exert significant influence. We find firms switching between zero and levered structure have a higher propensity to pursue SEO than firms with persistent zero leverage or levered capital structure. However, we observe that firms with persistent levered or zero leverage structure pursue SEO after IPO faster than switchers, with persistent ZL firms the fastest although the relative financing size is the smallest among the three groups.

The capital structure persistency provides us with an ideal context to examine the information signaled to the market by a firms' equity financing decision. While traditional theory argues that SEOs send overvaluation signal to the market leading to a negative market reaction, this argument is built on the assumption that a firm will choose between equity and debt financing based on market terms. Zero leverage firms, for various reasons, excluding debt as an external financing option, invalidate the assumption that underpins the overvaluation hypothesis. We find that firms that persistently maintain a zero leverage structure have less negative market reactions to their first SEOs, indicating those firms send more favorable information to the market.

We further explore potential channels for the more favorable market reactions to SEOs. We find evidence that market reacts more favorably to SEOs by persistent zero leverage firms that are acquired within two years after the SEO. This suggests that SEOs informs the market those firm's choice to maintain a zero leverage structure which increases the possibility for them to be picked as an acquisition target (i.e., going public to be acquired). We also find the financing by zero leverage firms is less likely to be used for wasteful investment such as acquisitions. Overall, our study casts light on the influence of a firm's capital structure dynamics, especially a persistent zero leverage structure, on policy decisions and outcomes.

REFERENCES

Agrawal, A., Nagarajan, N.J., 1990. Corporate capital structure, agency costs, and ownership control: The case of all-equity firms. *The Journal of Finance* 45, 1325-1331.

Asquith, P., Bruner, R.F., Mullins, D.W., 1983. The gains to bidding firms from merger. *Journal of Financial Economics* 11, 121-139.

Baker, M. and Wurgler, J., 2002. Market timing and capital structure. *The journal of finance* 57, 1-32.

Bayless, M., Chaplinsky, S., 1996. Is there a window of opportunity for seasoned equity issuance?. *The Journal of Finance* 51, 253-278.

Bayar, O., Chemmanur, T.J., 2011. IPOs versus acquisitions and the valuation premium puzzle: A theory of exit choice by entrepreneurs and venture capitalists. *Journal of Financial and Quantitative Analysis* 46, 1755-1793.

Beck, T., Demirgüç-Kunt, A., Maksimovic, V., 2008. Financing patterns around the world: Are small firms different?. *Journal of Financial Economics* 89, 467-487.

Bessler, W., Drobetz, W., Haller, R., Meier, I., 2013. The international zero-leverage phenomenon. *Journal of Corporate Finance* 23, 196-221.

Brau, J.C. and Fawcett, S.E., 2006. Initial public offerings: An analysis of theory and practice. *The Journal of Finance* 61, 399-436.

Brau, J.C., Couch, R.B., Sutton, N.K., 2012. The desire to acquire and IPO long-run underperformance. *Journal of Financial and Quantitative Analysis* 47, 493-510.

Brau, J.C., Francis, B., Kohers, N., 2003. The choice of IPO versus takeover: Empirical evidence. *Journal of Business* 76, 583-612.

Brav, O., 2009. Access to capital, capital structure, and the funding of the firm. *The Journal of Finance* 64, 263-308.

Butler, A.W., Keefe, M.O.C., Kieschnick, R., 2014. Robust determinants of IPO underpricing and their implications for IPO research. *Journal of Corporate Finance* 27, 367-383.

Byoun, S., Xu, Z., 2013. Why do some firms go debt free?. *Asia Pacific Journal of Financial Studies* 42, 1-38.

Carter, R., Manaster, S., 1990. Initial public offerings and underwriter reputation. *The Journal of Finance* 45, 1045-1067.

Chang, S., 1998, Takeovers of privately held targets, method of payment, and bidder returns. *Journal of Finance* 53, 773-784.

Coles, J.L., Daniel, N.D., Naveen, L., 2006. Executive compensation and managerial risk-taking. *Journal of Financial Economics* 79, 431-468.

Cox, D.R., 1992. Regression models and life-tables. In *Breakthroughs in statistics* (pp. 527-541). Springer New York.

Devos, E., Dhillon, U., Jagannathan, M., Krishnamurthy, S., 2012. Why are firms unlevered?. *Journal of corporate finance* 18, 664-682.

D'Mello, R., Gruskin, M., 2014. Are the benefits of debt declining? The decreasing propensity of firms to be adequately levered. *Journal of Corporate Finance* 29, 327-350.

Dong, M., Loncarski, I., Horst, J., Veld, C., 2012. What drives security issuance decisions: Market timing, pecking order, or both?. *Financial Management* 41, 637-663.

Eberhart, A.C., Siddique, A., 2002. The long-term performance of corporate bonds (and stocks) following seasoned equity offerings. *Review of Financial Studies* 15, 1385-1406.

Eckbo, B.E., 1986. Valuation effects of corporate debt offerings. *Journal of Financial Economics* 15, 119-151.

Elliott, W.B., Prevost, A.K., Rao, R.P., 2009. The announcement impact of seasoned equity offerings on bondholder wealth. *Journal of Banking & Finance* 33, 1472-1480.

Fuller, K., Netter, J., Stegemoller, M., 2002. What do returns to acquiring firms tell us? Evidence from firms that make many acquisitions. *Journal of Finance* 57, 1763-1793.

Habib, M., Ljungqvist, A., 2001. Under-pricing and entrepreneurial wealth losses in IPOs: theory and evidence. *Review of Financial Studies* 14, 433-458.

Heaton, J., 2002. Managerial optimism and corporate finance. *Financial Management* 31, 33-45.

Houston, J., Ryngaert, M., 1997. Equity issuance and adverse selection: A direct test using conditional stock offers. *Journal of Finance* 52, 197-219.

Jain, B.A., Kini, O., 2008. The impact of strategic investment choices on post-issue operating performance and survival of US IPO firms. *Journal of Business Finance and Accounting* 35, 459-490.

James, C., Wier, P., 1990. Borrowing relationships, intermediation, and the cost of issuing public securities. *Journal of Financial Economics* 28, 149-172.

Jegadeesh, N., Weinstein, M., Welch, I., 1993. An empirical investigation of IPO returns and subsequent equity offerings. *Journal of Financial Economics* 34, 153-175.

Jensen, M.C., 1986. Agency costs of free cash flow, corporate finance, and takeovers.

American Economic Review 76, 323-339.

Kalay, A., Shimrat, A., 1987. Firm value and seasoned equity issues: Price pressure, wealth redistribution, or negative information. *Journal of Financial Economics* 19, 109-126.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R.W., 1997. Legal determinants of external finance. *Journal of Finance* 52, 1131-1150.

Lee, I., 1997. Do managers knowingly sell overvalued equity?, *Journal of Finance* 52, 1439-1466.

Lemmon, M.L., Roberts, M.R. and Zender, J.F., 2008. Back to the beginning: persistence and the cross‐section of corporate capital structure. The Journal of Finance, 63(4), pp.1575-1608.

Loughran, T., Ritter, J., 1995. The new issues puzzle. *Journal of Finance* 50, 23-51.

Malatesta, P.H., Thompson, R., 1985. Partially anticipated events: A model of stock price reactions with an application to corporate acquisitions. *Journal of Financial Economics* 14, 237-250.

Mauer, D.C., Wang, S., Wang, X., Zhang, Y., 2015. Global diversification and IPO returns. *Journal of Banking & Finance* 58, 436-456.

Meyer, B.D., 1990. Unemployment insurance and unemployment spells. *Econometrica* 58, 757-782.

Myers, S.C., Majluf, N.S., 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of financial economics* 13,187-221.

Nofsinger, J.R., Wang, W., 2011. Determinants of start-up firm external financing worldwide. *Journal of Banking & Finance* 35, 2282-2294.

Schenone, C., 2004. The effect of banking relationships on the firm's IPO under-pricing. *Journal of Finance* 59, 2903-2958.

Schipper, K., Thompson, R., 1983. Evidence on the capitalized value of merger activity for acquiring firms. *Journal of Financial Economics* 11, 85-120.

Spiess, D.K., Pettway, R.H., 1997. The IPO and first seasoned equity sale: Issue proceeds, owner/managers' wealth, and the underpricing signal. *Journal of Banking & Finance* 21, 967-988.

Strebulaev, I.A., Yang, B., 2013. The mystery of zero-leverage firms. *Journal of Financial Economics* 109, 1-23.

Welch, I., 1989. Seasoned offerings, imitation costs, and the underpricing of initial public offerings. *The Journal of Finance* 44, 421-449.

Appendix: Variable Definitions

Variable	Definition (data source)
Capital structure variables (in alphabetical order)	
Leverage	The ratio of book value of debt (debt in current liabilities + long-term debt) to book value of total assets. (Compustat)
Persistent LEV (PLEV)	Dummy variable equal to one for firms with levered capital structure throughout the sample period starting from their IPO date. (Compustat)
Persistent ZL (PZL)	Dummy variable equal to one for firms with zero leverage capital structure throughout the sample period starting from their IPO date. (Compustat)
PZL up to SEO	Dummy variable equal to one for firms with persistent zero leverage until issuing the first SEO. (Compustat)
Switch	Dummy variable equal to one for firms that have changed from zero leverage to levered structure or vice versa during the sample period. (Compusatat)
ZL at IPO	Dummy variable equal to one for firms with zero leverage in IPO year, zero otherwise. (Compustat)
ZL at SEO	Dummy variable equal to one for firms with zero leverage in the fiscal year immediately before SEO year. (Compustat)
IPO variables (in alphabetical order)	
IPO age	The IPO year minus the firm's founding year. (Jay Ritter's website: http://bear.warrington.ufl.edu/ritter/ipodata.htm)
Log (IPO proceeds)	Logarithm of IPO offer proceeds in millions of 2000 constant dollars. (SDC)
Life of firm	Number of years from IPO issue date to either delisted date or IPO sample end date (12/31/2016). (Compustat)
Underpricing	The return from the offer price to the first trading day's closing price. (SDC/CRSP)
Venture Capital	Dummy variable equal to one if an IPO firm has venture capital support, and zero otherwise (SDC)
SEO variables (in alphabetical order)	
CARs	Two-day market-model adjusted cumulative abnormal returns for SEO firms over day [-1, 0] where day 0 is the SEO filing date. The market model parameters are estimated over the period (-210, -11) with the CRSP value-weighted return as the market index. (CRSP)
Near IPO	Dummy variable equal to one if a SEO filing date is within 18 months of the IPO date. (SDC)
SEO dummy	Dummy variable equal to one if a firm has at least one SEO during our sample period, and zero otherwise (SDC)
SEO size	The ratio of SEO issue size to total book value of common equity. (SDC/Compustat)
Years from IPO to 1st SEO	The duration in years between the IPO date and SEO date. (SDC)

Other firm characteristic variables (in alphabetical order)

$ACQ_{\text{within 2 years}}$	Dummy variable equal to one if a firm is acquired within 2 years of issuing SEO. (SDC)
ACQ	The ratio of acquisition expenditures to total sales. (Compustat)
Advertising	The ratio of advertisement expenditures to total sales. Missing advertisement values are set to zero. (Compustat)
Asset Sale	The ratio of asset sales to total book value of assets. (Compustat)
CAPEX	The ratio of capital expenditure to total book value of assets. (Compustat)
Cash ratio	The ratio of cash and marketable securities to total book value of assets. (Compustat)
Dividend	Dummy variable equal to one if a firm makes cash dividend payment, and zero otherwise. (Compustat)
Firm size	Logarithm of the book value of total assets in millions of 2000 constant dollars. (Compustat)
Market-to-book (MTB)	The ratio of book assets plus the difference between the market and book values of equity to book assets. (Compustat)
CAPEX	The ratio of capital expenditure minus sale of property to total book value of assets (Compustat)
Operating Leases	The ratio of the sum of current rental payment and the discounted present value of future rental commitments (up to five years) to total book value of assets. (Compustat)
PP&E	The ratio of net property, plant, and equity to total book value of assets. (Compustat)
Profitability	The ratio of earnings before interests, taxes, and depreciation and amortization (EBITDA) to total book value of assets. (Compustat)
R&D	The ratio of research and development expense to total sales, where R&D is set to zero when research and development expense is missing. (Compustat)
Sales growth	Logarithm of total sales of year t divided by total sales of year t-1. (Compustat)
Stock returns	Buy and hold returns over the fiscal year t. (CRSP)

Table 1. Sample Distribution by Year

The table reports the year distribution of 4,857 US firms that have initial public offering over 1980 to 2014. Financial and utility IPOs are excluded. We require firms to have positive book value of total assets and equity in the IPO year to be included. Columns (1), (2), and (4) report the number of overall IPOs, all-equity IPOs, and levered IPOs each year. Columns (3) and (5) report the percentage of all-equity IPOs to overall IPOs each year (i.e., column (3) / (1)) and the percentage of levered IPOs to overall IPOs each year (i.e., column (4) / (1)). Column (6) reports the number of firms that have SEO(s) after IPO.

	(1)	(2)	(3)	(4)	(5)	(6)
Year	No. IPOs	No. ZL IPOs	%	No. LEV IPOs	%	Firms w/ SEO
1980	52	5	9.62	47	90.38	2
1981	136	18	13.24	118	86.76	4
1982	51	11	21.57	40	78.43	30
1983	282	39	13.83	243	86.17	21
1984	105	13	12.38	92	87.62	48
1985	112	14	12.50	98	87.50	61
1986	228	26	11.40	202	88.60	46
1987	157	25	15.92	132	84.08	19
1988	74	6	8.11	68	91.89	44
1989	72	12	16.67	60	83.33	20
1990	77	9	11.69	68	88.31	82
1991	195	29	14.87	166	85.13	69
1992	264	34	12.88	230	87.12	111
1993	336	51	15.18	285	84.82	90
1994	273	53	19.41	220	80.59	155
1995	309	57	18.45	252	81.55	150
1996	356	77	21.63	279	78.37	115
1997	285	60	21.05	225	78.95	86
1998	170	30	17.65	140	82.35	97
1999	254	60	23.62	194	76.38	115
2000	231	58	25.11	173	74.89	54
2001	37	11	29.73	26	70.27	44
2002	37	7	18.92	30	81.08	67
2003	34	8	23.53	26	76.47	59
2004	111	33	29.73	78	70.27	50
2005	91	19	20.88	72	79.12	64
2006	86	19	22.09	67	77.91	69
2007	100	28	28.00	72	72.00	19
2008	10	3	30.00	7	70.00	44
2009	28	7	25.00	21	75.00	42
2010	50	14	28.00	36	72.00	40
2011	46	15	32.61	31	67.39	41
2012	50	21	42.00	29	58.00	53
2013	72	27	37.50	45	62.50	43
2014	86	40	46.51	46	53.49	73
2015						15
2016						10
Total	4,857	939	19.33	3,918	80.67	2,152

Table 2. Descriptive Statistics

The sample includes all US firms that have initial public offering over 1980 to 2015. Financial and utility firms are excluded. The table reports descriptive statistics of these firms' IPO and first SEO characteristics and main firm variables measured in the IPO year and the year immediately before SEO. All variables are defined in Appendix A.

	N	Mean	Std. Dev.	1st Quartile	Median	3rd Quartile
IPO variables						
ZL at IPO	4,857	0.193				
Underpricing (%)	4,850	18.465	34.324	0.543	7.407	22.857
Log (IPO proceeds)	4,857	3.403	1.125	2.639	3.421	4.143
IPO proceeds ($)	4,857	61.114	246.310	14.000	30.600	63.000
IPO age	4,814	14.935	19.608	4.000	8.000	16.000
Venture Capital	4,857	0.372				
SEO variables						
SEO dummy	4,857	0.443				
Years from IPO to 1st SEO	2,152	3.409	3.937	1.025	1.937	4.019
Near IPO	2,152	0.395				
First SEO size	2,152	1.804	2.650	0.629	1.130	1.930
$CAR(-1, 0)_{1st\ SEO}$ (%)	2,126	-2.446	7.700	-6.369	-2.080	1.716
Firm variables in IPO year:						
Firm Size	4,857	4.295	1.303	3.492	4.215	4.986
Market to Book	4,847	3.474	4.639	1.599	2.409	3.800
Profitability	4,831	0.046	0.251	-0.050	0.110	0.189
PP&E	4,855	0.202	0.206	0.052	0.118	0.284
Dividend	4,844	0.014				
R&D	4,857	0.067	0.114	0.000	0.014	0.099
CAPEX	4,807	0.087	0.110	0.024	0.048	0.102
Operating Leases	4,857	0.111	0.187	0.025	0.057	0.120
Asset Sale	4,857	0.021	0.185	0.000	0.000	0.001
Advertising	4,857	0.016	0.053	0.000	0.000	0.011
Cash ratio	4,857	0.378	0.306	0.076	0.334	0.644
Firm variables prior to SEO year:						
Firm Size	2,097	4.690	1.299	3.829	4.519	5.418
Market to Book	2,105	3.764	5.158	1.609	2.52	4.106
Profitability	2,100	0.021	0.317	-0.036	0.115	0.188
PP&E	2,105	0.228	0.221	0.064	0.146	0.321
Dividend	2,102	0.008				
R&D	2,106	0.107	0.189	0.000	0.014	0.144
CAPEX	2,086	0.080	0.101	0.022	0.046	0.095
Operating Leases	2,106	0.119	0.175	0.029	0.066	0.133
Asset Sale	2,106	0.028	0.137	0.000	0.000	0.001
Advertising	2,106	0.013	0.042	0.000	0.000	0.006
Cash ratio	2,106	0.312	0.303	0.041	0.208	0.542

Table 3. Comparison of Sample Firms Based on CS Dynamics

This table reports the equity financing activities, leverage and growth option of sub-samples of IPO firms grouped based on their initial capital structure and dynamics up to their first SEO. *ZLIPO* subsample includes firms with zero leverage in IPO year. *LEVIPO* includes firms that are levered in IPO year. *PZL* includes firms that maintain zero leverage throughout the sample period. *PLEV* includes firms that maintain levered structure throughout the sample period. *Switch* includes firms that have changed from zero leverage to levered structure or vice versa during the sample period. *PZL up to SEO* includes firms that have persistently maintained zero leverage up to their first SEO. *ZL bef SEO* includes firms with zero leverage in the year immediately before the SEO. The superscripts [a], [b], and [c] in the ZLIPO column indicate the significance of difference between ZLIPO and LEVIPO groups; the superscripts in the PZL, Switch, PZL up to SEO, and ZL bef SEO columns indicate the significance of difference between each group and PLEV. The significance of the difference in means is based on a t-test that assumes unequal variances across groups when a test of equal variances is rejected at the 10% level. The significance of the difference in medians is based on a Wilcoxon rank-sum test. We use [a], [b], and [c] to denote significance at the 1%, 5%, and 10% levels, respectively.

	ZLIPO	LEVIPO	PZL	PLEV	Switch	PZL up to SEO	ZL bef SEO
Number of firms	939	3,918	255	2,694	1,908	224	405
Mean							
SEO dummy	0.442	0.443	0.380	0.426	0.475[a]		
CAR(-1, 0)$_{1st\ SEO}$ (%)	-2.003	-2.550	-2.240	-2.306	-2.645	-1.927	-1.962
Yrs from IPO to 1st SEO	3.189	3.462	1.845[a]	3.114	3.950[a]	1.866[a]	3.053
Near IPO	0.427	0.387	0.546[b]	0.424	0.342[a]	0.580[a]	0.444
SEO size	1.805	1.803	1.426[c]	1.757	1.903[c]	1.765	1.789
Underpricing (%)	23.963[a]	16.964	29.299[a]	13.947	23.017[a]	26.427[a]	23.793[a]
IPO proceeds ($)	52.523[c]	57.407	61.934	63.458	45.856[a]	62.653	54.458[b]
IPO age	9.598[a]	16.206	9.145[a]	18.281	10.992[a]	9.719[a]	9.720[a]
Venture Capital	0.436[a]	0.357	0.518[a]	0.294	0.463[a]	0.420[a]	0.469[a]
Leverage bef 1st SEO	0.047[a]	0.211	0.000[a]	0.265	0.091[a]	0.000[a]	0.000[a]
Leverage after 1st SEO	0.052[a]	0.174	0.000[a]	0.228	0.069[a]	0.001[a]	0.028[a]
Firm Size bef 1st SEO	4.259[a]	4.790	4.157[a]	5.049	4.286[a]	4.183[a]	4.180[a]
MTB before 1st SEO	4.852[a]	3.274	5.622[a]	2.852	4.280[a]	5.520[a]	5.245[a]
Median							
CAR(-1, 0)$_{1st\ SEO}$ (%)	-1.860	-2.131	-1.833	-1.865	-2.328[c]	-1.719	-1.860
Yrs from IPO to 1st SEO	1.863	1.942	1.370[a]	1.771	2.211[a]	1.244[a]	1.688
SEO size	1.186	1.101	1.063	1.035	1.237[a]	1.192[b]	1.219[a]
Underpricing (%)	12.500[a]	6.400	17.500[a]	5.208	10.417[a]	13.606[a]	12.500[a]
IPO proceeds ($)	33.000[a]	30.000	44.800[a]	30.000	30.000	42.000[a]	36.000[a]
IPO age	7.000[a]	8.000	8.000[a]	9.000	7.000[a]	7.000[a]	7.000[a]
Leverage bef 1st SEO	0.000[a]	0.151	0.000[a]	0.236	0.015[a]	0.000[a]	0.000[a]
Leverage after 1st SEO	0.000[a]	0.111	0.000[a]	0.203	0.006[a]	0.000[a]	0.000[a]
Firm Size bef 1st SEO	4.240[a]	4.591	4.232[a]	4.825	4.232[a]	4.216[a]	4.188[a]
MTB before 1st SEO	3.584[a]	2.305	4.309[a]	1.960	3.182[a]	4.061[a]	3.839[a]

Table 4. Likelihood of Equity Financing after IPO

The table reports estimates from a Cox proportional hazard model of the likelihood of doing SEO from the date of the IPO to the SEO date or December 31, 2016. Issuing IPOs are defined as firms that have at least one SEO after IPO. The time-to-issuing is the number of months between the IPO month and the month of SEO (or December 2015 for non-issuing IPOs). The dependent variable is the logged hazard rate. All control variables are measured in the IPO year. All models include year and Fama-French 49-industry fixed effects. Z-statistics reported in parentheses below the coefficient estimates are computed using robust standard errors clustered by industry. Hazard ratios for capital structure dummy variables are reported in the brackets underneath z-statistics. We use ***, **, and * to denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
ZL at IPO	0.029		
	(0.48)		
	[1.03]		
Persistent ZL		-0.298*	-0.198
		(-1.52)	(-1.10)
		[0.74]	[0.82]
Persistent LEV		-0.100**	
		(-2.06)	
		[0.90]	
Switch			0.100**
			(2.06)
			[1.11]
Underpricing	-0.153*	-0.153*	-0.153*
	(-1.77)	(-1.77)	(-1.77)
Firm size	0.239***	0.241***	0.241***
	(8.11)	(7.93)	(7.93)
Market-to-book	0.073***	0.074***	0.074***
	(8.48)	(8.50)	(8.50)
Profitability	0.287	0.292	0.292
	(1.04)	(1.06)	(1.06)
PP&E	-0.210	-0.167	-0.167
	(-0.84)	(-0.68)	(-0.68)
Dividend	-0.119	-0.155	-0.155
	(-0.19)	(-0.25)	(-0.25)
R&D	0.007**	0.007**	0.007**
	(2.29)	(2.29)	(2.29)
IPO age	-0.004***	-0.004***	-0.004***
	(-3.69)	(-3.62)	(-3.62)
CAPEX	0.449	0.412	0.412
	(1.20)	(1.09)	(1.09)
Operating leases	0.079	0.068	0.068
	(0.46)	(0.40)	(0.40)
Asset sale	-0.701***	-0.699***	-0.699***
	(-2.96)	(-2.92)	(-2.92)
Industry dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
N	4,737	4,737	4,737
Adj. R-sq	0.020	0.020	0.020

Table 5. Decision on the Duration between IPO and SEO and SEO Scale

The table reports results using a sub-sample of IPO firms that have at least one SEO during our sample period. The dependent variable in columns (1) – (3) is the distance (in years) between the IPO date and the first SEO date, which is scaled by 100 to match the values of the right-hand-side variables. The dependent variable in columns (4) – (6) is the SEO scale defined as the SEO amount scaled by the book value of equity at the fiscal year end immediately before SEO. All models include year and Fama–French 49-industry fixed effects. T-statistics reported in parentheses below the coefficient estimates are computed using robust standard errors clustered by industry. We use ***, **, and * to denote significance at the 1%, 5%, and 10% levels, respectively.

Dependent variable:	Duration b/w IPO and SEO			SEO scale		
	(1)	(2)	(3)	(4)	(5)	(6)
ZL at IPO	-0.002			-0.158		
	(-1.32)			(-1.17)		
Persistent ZL		-0.021***	-0.013***		-0.229***	-0.437***
		(-7.90)	(-4.22)		(-3.03)	(-4.21)
Persistent LEV		-0.008***			0.208	
		(-4.00)			(1.68)	
Switch			0.008***			-0.208
			(4.00)			(-1.68)
Inverse Miller ratio	0.069***	0.068***	0.068***	3.264***	3.283***	3.283***
	(6.77)	(6.69)	(6.69)	(9.96)	(9.96)	(9.96)
Underpricing	-0.004	-0.004	-0.004	-0.579***	-0.582***	-0.582***
	(-1.21)	(-1.03)	(-1.03)	(-3.34)	(-3.44)	(-3.44)
Firm size	0.003*	0.003**	0.003**	0.164*	0.150*	0.150*
	(1.80)	(2.22)	(2.22)	(1.94)	(1.69)	(1.69)
Market-to-book	-0.000	-0.000	-0.000	0.233***	0.235***	0.235***
	(-0.12)	(-0.15)	(-0.15)	(9.57)	(9.65)	(9.65)
Profitability	0.012**	0.012**	0.012**	1.796***	1.827***	1.827***
	(2.11)	(2.09)	(2.09)	(11.06)	(10.96)	(10.96)
PP&E	0.041***	0.045***	0.045***	-0.261	-0.317	-0.317
	(5.55)	(6.14)	(6.14)	(-0.95)	(-1.13)	(-1.13)
Dividend	-0.018	-0.022	-0.022	0.462	0.531	0.531
	(-1.16)	(-1.44)	(-1.44)	(0.53)	(0.61)	(0.61)
R&D	-0.000	0.000	0.000	0.006**	0.006**	0.006**
	(-0.22)	(0.58)	(0.58)	(2.19)	(2.15)	(2.15)
IPO age	-0.000***	-0.000**	-0.000**	-0.006**	-0.007**	-0.007**
	(-2.94)	(-2.58)	(-2.58)	(-2.20)	(-2.35)	(-2.35)
CAPEX	-0.064***	-0.064***	-0.064***	0.612	0.589	0.589
	(-3.96)	(-3.99)	(-3.99)	(1.14)	(1.09)	(1.09)
Operating leases	0.012*	0.011*	0.011*	0.300	0.308	0.308
	(1.94)	(1.95)	(1.95)	(1.67)	(1.58)	(1.58)
Asset sale	-0.008**	-0.008**	-0.008**	-0.786*	-0.738*	-0.738*
	(-2.54)	(-2.05)	(-2.05)	(-1.93)	(-1.75)	(-1.75)

Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	2,033	2,033	2,033	2,033	2,033	2,033
Adj. R-sq	0.191	0.207	0.207	0.182	0.183	0.183

Table 6. Effects of Capital Structure Dynamics on Shareholder Wealth of the First SEO

The table reports results using a sub-sample of IPO firms that have at least one SEO during our sample period. Dependent variable is the market model adjusted two-day CARs over days [-1, 0] of IPO firms' first SEOs, where day 0 is the SEO filing date. The market model parameters are estimated over the period (-210, -11) using the CRSP value-weighted return as the market index. All variables are defined in Appendix A. All regressions control for industry (based on Fama-French 49 industries) and year fixed effects. T-statistics (in parentheses) are robust errors corrected for clustering of observations at the industry level. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
ZL at IPO	0.719					
	(1.20)					
ZL at SEO		1.045**				
		(2.59)				
PZL up to SEO			1.208***			
			(2.95)			
Persistent ZL				1.514***	1.270**	1.169*
				(2.90)	(2.27)	(2.01)
Other ZL at SEO			0.865	0.928*		
			(1.26)	(1.92)		
Persistent LEV					0.100	
					(0.34)	
Switch						-0.100
						(-0.34)
Underpricing	0.101	0.182	0.176	0.167	0.120	0.120
	(0.11)	(0.20)	(0.19)	(0.18)	(0.13)	(0.13)
Firm size	0.433***	0.443***	0.442***	0.443***	0.402***	0.402***
	(3.20)	(3.24)	(3.20)	(3.23)	(3.29)	(3.29)
Market-to-book	0.297***	0.285***	0.285***	0.285***	0.299***	0.299***
	(3.85)	(3.65)	(3.64)	(3.69)	(3.88)	(3.88)
Profitability	1.121	0.984	0.977	0.962	1.141	1.141
	(0.79)	(0.72)	(0.71)	(0.70)	(0.82)	(0.82)
PP&E	-1.581	-1.503	-1.529	-1.553	-1.815	-1.815
	(-1.31)	(-1.30)	(-1.36)	(-1.38)	(-1.61)	(-1.61)
Dividend	-1.876	-1.787	-1.834	-1.844	-1.545	-1.545
	(-0.37)	(-0.34)	(-0.36)	(-0.36)	(-0.31)	(-0.31)
R&D	-0.038*	-0.036*	-0.036*	-0.037*	-0.041*	-0.041*
	(-1.82)	(-1.74)	(-1.74)	(-1.75)	(-1.93)	(-1.93)
CAPEX	2.547	2.465	2.505	2.527	2.629	2.629
	(1.11)	(1.08)	(1.13)	(1.14)	(1.17)	(1.17)
Operating leases	-2.369**	-2.581**	-2.614**	-2.633**	-2.362**	-2.362**
	(-2.14)	(-2.36)	(-2.46)	(-2.53)	(-2.34)	(-2.34)
Asset sale	-0.770	-0.954	-0.940	-0.977	-0.829	-0.829
	(-0.70)	(-0.88)	(-0.87)	(-0.88)	(-0.72)	(-0.72)

SEO size	0.232***	0.237***	0.237***	0.237***	0.230***	0.230***
	(3.76)	(3.88)	(3.85)	(3.88)	(3.71)	(3.71)
Near IPO	0.430	0.451	0.431	0.443	0.384	0.384
	(1.10)	(1.12)	(1.00)	(1.09)	(0.96)	(0.96)
Ind. dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	2,052	2,052	2,052	2,052	2,052	2,052
Adj. R-sq	0.044	0.046	0.045	0.045	0.044	0.044

Table 7. Shareholder Wealth Effect, Growth Options, and Exit Channel

The table reports results using a sub-sample of IPO firms that have SEOs during our sample period. Dependent variable is the market model adjusted two-day CARs over days [-1, 0] of IPO firms' first SEOs, where day 0 is the SEO filing date. The market model parameters are estimated over the period (-210, -11) using the CRSP value-weighted return as the market index. Model (1) and (2) show results with growth options, and Model (3) and (4) show results with exit channel. All variables are defined in Appendix A. All regressions control for industry (based on Fama-French 49 industries) and year fixed effects. T-statistics (in parentheses) are robust errors corrected for clustering of observations at the industry level. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)
PZL up to SEO	0.109		1.079**	
	(0.14)		(2.15)	
Persistent ZL		-0.141		1.212*
		(-0.11)		(1.84)
Other ZL at SEO	2.221***	1.327**	0.820	0.894
	(3.17)	(2.29)	(1.02)	(1.65)
PZL up to SEO × MTB	0.209			
	(1.55)			
Persistent ZL × MTB		0.300		
		(1.29)		
Other ZL at SEO × MTB	-0.270**	-0.070		
	(-2.63)	(-1.29)		
PZL up to SEO × $ACQ_{within\ 2\ years}$			4.050*	
			(1.97)	
PZL × $ACQ_{within\ 2\ years}$				3.049
				(1.51)
Other ZL at SEO × $ACQ_{within\ 2\ years}$			1.377	2.186
			(0.46)	(0.74)
Market-to-book	0.344***	0.343***	0.332***	0.328***
	(4.19)	(4.25)	(3.94)	(4.03)
$ACQ_{within\ 2\ years}$			0.882	0.887
			(0.98)	(0.99)
Controls	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
N	2,052	2,052	2,052	2,052
Adj. Rsq	0.044	0.042	0.043	0.042

Table 8. Investment activities around the first SEO

The table reports results using a sub-sample of IPO firms that have SEOs during our sample period. Dependent variables are the change of capital expenditure, R&D, advertisement, and acquisition from before to after the first SEO in models (1), (2), (3), and (4), respectively. All variables are defined in Appendix A. All regressions control for industry (based on Fama-French 49 industries) and year fixed effects. T-statistics (in parentheses) are robust errors corrected for clustering of observations at the industry level. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

	(1)		(2)		(3)		(4)	
	ΔCapex		ΔR&D		ΔADV		ΔACQ	
PZL up to SEO	-0.007		0.018		0.000		-0.012*	
	(-1.15)		(1.50)		(0.04)		(-1.78)	
Persistent ZL		-0.003		0.017		-0.000		-0.023**
		(-0.51)		(0.83)		(-0.09)		(-2.36)
Other ZL at SEO	-0.003	-0.005	-0.008**	0.002	-0.001	-0.000	0.012	0.005
	(-0.64)	(-1.20)	(-2.16)	(0.65)	(-1.10)	(-0.81)	(1.16)	(0.68)
Firm size	0.003**	0.003**	0.010***	0.010***	0.000	0.000	-0.001	-0.001
	(2.25)	(2.22)	(3.33)	(3.36)	(0.74)	(0.75)	(-0.32)	(-0.33)
Market to book	-0.001	-0.001	-0.005***	-0.005***	-0.000	-0.000	0.000	0.000
	(-1.14)	(-1.14)	(-3.82)	(-3.76)	(-0.91)	(-0.91)	(0.10)	(0.10)
Sales growth	0.004	0.004	0.006	0.006	0.001*	0.001*	0.006	0.006
	(1.13)	(1.15)	(0.91)	(0.85)	(2.00)	(1.97)	(1.08)	(1.11)
Stock return	-0.002*	-0.002*	-0.016***	-0.016***	-0.001	-0.001	0.005***	0.005***
	(-1.75)	(-1.74)	(-2.74)	(-2.76)	(-1.49)	(-1.48)	(3.51)	(3.43)
Cash ratio	0.030***	0.030***	0.002	0.004	-0.001	-0.001	0.053***	0.052***
	(4.03)	(4.04)	(0.21)	(0.33)	(-0.60)	(-0.53)	(3.22)	(3.05)
Ind. dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yr dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,951	1,951	1,969	1,969	1,969	1,969	1,839	1,839
Adj. R-sq	0.046	0.046	0.173	0.169	0.015	0.015	0.024	0.024

Table 9. Wealth Effect of Subsequent SEOs

Dependent variable is the market model adjusted two-day CARs over days [-1, 0] of IPO firms' all subsequent SEOs excluding the first one, where day 0 is the SEO filing date. The market model parameters are estimated over the period (-210, -11) using the CRSP value-weighted return as the market index. All variables are defined in Appendix A. All regressions control for industry (based on Fama-French 49 industries) and year fixed effects. T-statistics (in parentheses) are robust errors corrected for clustering of observations at the industry level. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
ZL at IPO	0.749					
	(1.03)					
ZL at SEO		0.038				
		(0.05)				
PZL up to SEO			-0.096			
			(-0.08)			
Persistent ZL				-1.688	-1.789	-1.830
				(-1.09)	(-1.31)	(-1.28)
Other ZL at SEO			0.091	0.313		
			(0.14)	(0.43)		
Persistent LEV					0.041	
					(0.13)	
Switch						-0.041
						(-0.13)
Underpricing	-0.622	-0.545	-0.543	-0.537	-0.561	-0.561
	(-0.92)	(-0.81)	(-0.81)	(-0.81)	(-0.83)	(-0.83)
Firm size	0.236	0.210	0.211	0.201	0.179	0.179
	(1.49)	(1.38)	(1.37)	(1.31)	(1.19)	(1.19)
Market-to-book	0.021	0.019	0.019	0.020	0.024	0.024
	(0.15)	(0.14)	(0.14)	(0.14)	(0.17)	(0.17)
Profitability	-1.428	-1.393	-1.391	-1.390	-1.381	-1.381
	(-0.83)	(-0.80)	(-0.80)	(-0.80)	(-0.79)	(-0.79)
PP&E	-3.904***	-4.037***	-4.026***	-3.917***	-3.979***	-3.979***
	(-4.15)	(-4.38)	(-4.34)	(-4.30)	(-4.17)	(-4.17)
Dividend	4.310	4.229	4.226	4.644	4.752	4.752
	(0.46)	(0.46)	(0.46)	(0.51)	(0.52)	(0.52)
R&D	0.006	0.005	0.005	0.005	0.005	0.005
	(0.36)	(0.33)	(0.34)	(0.34)	(0.31)	(0.31)
CAPEX	7.020**	7.067**	7.052**	6.837**	6.834**	6.834**
	(2.14)	(2.18)	(2.19)	(2.08)	(2.03)	(2.03)
Operating leases	-2.691**	-2.543**	-2.527**	-2.456**	-2.384**	-2.384**
	(-2.70)	(-2.47)	(-2.35)	(-2.34)	(-2.39)	(-2.39)
Asset sale	-1.742***	-1.776***	-1.782***	-1.791***	-1.736***	-1.736***
	(-8.17)	(-5.93)	(-6.00)	(-6.17)	(-7.71)	(-7.71)

SEO size	-0.019	-0.014	-0.013	-0.010	-0.009	-0.009
	(-0.41)	(-0.32)	(-0.30)	(-0.23)	(-0.23)	(-0.23)
Years b/w IPO and SEO	0.044	0.043	0.042	0.032	0.034	0.034
	(0.73)	(0.73)	(0.64)	(0.57)	(0.61)	(0.61)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	1,873	1,873	1,873	1,873	1,873	1,873
adj. R-sq	0.024	0.023	0.022	0.024	0.024	0.024

CONCLUSION

My research interests are generally in the area of corporate finance. In a series of related research, my dissertation research investigates human capital and its influence on investment policy, financing decisions and capital structure evolutions, and bondholder wealth in international corporate restructuring. Overall, my first paper contributes to the nascent but growing literature on the impact of human capital on firm investment. My second paper contributes to the literature by further documenting the impact of institutional environment (i.e., national culture and country-level governance) within the increasingly important context of global JV and SA activities. My third casts light on firms' capital structure decisions and the value effects of the persistence or switching decisions.

REFERENCES

Berk, J.B., Stanton, R. and Zechner, J., 2010. Human capital, bankruptcy, and capital structure. *The Journal of Finance*, *65*(3), pp.891-926.

Chemmanur, T.J., Cheng, Y. and Zhang, T., 2013. Human capital, capital structure, and employee pay: An empirical analysis. *Journal of Financial Economics*, *110*(2), pp.478-502.

Lee, K.H., Mauer, D.C., and Xu, Q.Y., 2017. Human capital relatedness and mergers and acquisitions. *Journal of Financial Economics, 2017.*

Myers, S.C., Majluf, N.S., 1984. Corporate financing and investment decisions when firms have information that investors do not have. Journal of financial economics 13,187-221.