How Does CEO Equity-based Compensation Affect Firm's Propensity of Issuing New Securities?

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Abstract

CEO equity-based compensation is designed to reduce the agency problem between top management and shareholders, which should have direct consequences on firm's capital structure decisions as evidenced by the behaviors of new security issuances. This research paper focuses on the impact on the propensity of issuing new securities by two common CEO equity-based compensations – option compensation and restricted stock compensation. Empirical results show that CEO option compensation yields statistically significant evidences that it will lower firm's propensity of SEO issuance and debt issuance. However, it has no direct effect on firm's preferred stock issuance. On the other side, CEO restricted stock compensation has only statistically significant and negative impact on firm's propensity of SEO issuance. Moreover, CEO option compensation has much higher estimated marginal effects in absolute value on SEO issuance than CEO restricted stock compensation does.

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Keywords: CEO Equity-based Compensation, Option Compensation, Restricted Stock Compensation, SEO Issuance, Preferred Stock Issuance, Debt Issuance

1 Introduction

The purpose of the management of firm's capital structure is to use capital more efficiently and effectively, consistent with the goal of maximizing shareholders' wealth. However, due to agency problem, top management, represented by CEO, may not always be acting as the same interest as of shareholders. The structure of CEO compensation package is designed to reduce the agency problem between top management and shareholders. As a consequence, different CEO compensation structures will have various direct impacts on the choice of firm's capital structure as well as firm's investment decisions.

John and John (1993) analyzed the optimal management compensation under different capital structures. With the attempt to mitigate agency problem, if firm's capital structure consists of equity and risky debt, then the optimal compensation should have low pay-for-performance sensitivity. While, if firm's capital structure consists of equity and convertible debt, then the optimal compensation should have high pay-for-performance sensitivity. Yermack et al. (1997) found that long tenure entrenched CEOs seek to avoid debt. Leverage levels are lower when CEOs have weak ownership and compensation incentives or active monitoring. Datta, Iskandar-Datta and Raman (2005) documented a negative relationship between stock market reaction to SEO announcements and equity-based compensation of the issuing firm. The results provide evidences that market perceives that seasoned equities issued by managers with high equity-based compensation are highly likely to be overvalued. Eisdorfer, Giaccotto and

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White (2012) argued that managers with more pension-based compensation tend to underinvest. While, managers with greater equity-based compensation are more likely to overinvest. This suggests that managers can deviate from the optimal investment choice with the attempt to increase the value of their own compensation package. Lin, Chou and Wang (2012) claimed that, for a given firm's capital structure, shareholders are always able to design an optimal executive compensation contract to maximize the shareholders' wealth. Their research findings suggest that, for firms with higher leverage ratio, shareholders should design compensation contracts with higher incentives for future good company performance.

These past literatures contributed a lot of evidences about how top-management's compensation package is related to firm's capital structure, and how firm's capital structure would influence the board on choosing the optimal compensation package. However, they ignored to investigate one major aspect which is the effect of CEO equity-based compensation on firm's propensity of issuing new securities. This research paper builds a link between them by focusing on two most common CEO equity-based compensations: option compensation and restricted stock compensation. The paper incorporates these two compensation categories into both pooled and panel data regressions to analyze the behaviors of firm's new security issuances, while firm's fundamental and market characteristics are being controlled.

2 Literature Review

The literatures about capital structure can be dated back to Modigliani and Miller (1958) and Modigliani and Miller (1963). In their 1958 paper, they theoretically proved that firm's capital structure is irrelevant to its market value. Moreover, firm's overall weighted average cost of capital is thought to stay the same regardless of debt-to-equity ratio, because the increased cost of borrowed funds as leverage increases will tend to be offset by the corresponding reduction in the yield of common stock. However, in their 1963 paper, they made major revisions by recognizing the tax benefit associated with debt financing, which will lead to an unbelievable conclusion that firms should have 99% of debt in their capital structure to fully maximize the market value, while minimizing the capital cost.

However, their papers are built on the assumption that financial market is frictionless, which is not the case in reality. Because of information asymmetry (Ackerlof (1970)) and agency problem between managers and shareholders (Jensen and Meckling (1976), Myers (1977)), the choice of new capital issuance would send out a signal to the market, which is valued by outside investors. In a frictional market, there are two recognized competing theories regarding firm's capital structure. Trade-off theory (Kraus and Litzenberger (1973)) suggests that the optimal capital structure should consider both tax benefit and bankruptcy cost from debt financing. Therefore, it implies an optimal leverage point for each firm. On the other side, pecking order theory (Myers and Majluf (1984)) suggests that seasoned equity offering (SEO) is less preferred when firm wants to raise additional capital. Because managers are thought to hold inside information and act in the interest of passive stockholders. If new equity shares are issued, outside investors believe that managers think the firm is overvalued and they are taking advantage of this over-valuation. Comparably, "not issuing additional equity shares" signals good information. In short, the pecking order theory proposes that, when new capital is needed for future projects, firms would first prefer to use internal financing, then debt. Raising capital by issuing seasoned equity should be the "last resort".

The follow-up literatures made the efforts to document the relationship between firm's top management compensation and the corresponding capital structure. Mehran (1992) documented a positive relationship between firm's leverage ratio and executive incentive plans, managers equity ownership, number of bankers on the board, and the equity ownership of blockholders. The author suggests that capital structure models need to take agency costs into consideration. Yermack et al. (1997) provided evidences that entrenched CEOs prefer to minimize the use of debt. Firms' leverage levels are lower when CEOs have weak ownership, low compensation incentives, and active monitoring. Moreover, leverage level increases after firm experiencing entrenchment-reducing shocks, such as unsuccessful tender offers, involuntary CEO replacement, and new members joining the board. The paper also articulates that entrenched managers use leverage as a defensive tool to buy time for their own restructuring program, supporting the idea that, on average, firms are below their optimal leverage point. Ortiz-Molina (2006) found that the pay-for-performance sensitivity is lower in firms with straight-debt, but higher in firms with convertible debt. The result confirmed that equity-based compensation will tend to decrease the agency problem between the shareholders and managers.

Meanwhile, recent literatures also developed in discovering the association between top management compensation and managers' risk-taking behaviors. Coles, Daniel and Naveen (2006) studied the relationship between the managerial incentives and the CEO risk-taking behavior. After controlling for pay-performance sensitivity (delta) and the feedback effects of firm policy, they found that CEOs with high sensitivity of wealth to stock volatility (vega) would implement riskier corporate policies, which include more R&D expenditures, less investments in PPE, and more use of leverage. Xie, Qi, and Liu (2010) built theoretical models to show that compensation consisting of both cash and equity-based components motivate CEOs to chase for aggressive capital structure. Moreover, they also discovered that firms with high debt ratio are inclined to give CEO low incentive compensations. Assaf, Carmelo, and White (2012) showed that, if the gap between executive compensation leverage ratio and the firm leverage ratio is large, there will be more investment distortions. Managers with more debt-like compensation (such as pension) will tend to underinvest. While, high equity-based compensation will lead to overinvestment. Their research suggests that management compensation structure will make firms deviate from the optimal investments. Bolton, Mehran and Shapiro (2015) argued that executive's risk-taking behaviors can be addressed by making compensation based on both stock price and credit default swaps (CDS). Because CDS provides a market price for risk, it can be put into the compensation contract along with an equity component. This compensation mechanism can reduce agency cost and reduce manager's the risk-taking behaviors. Zhang and Jiang (2015) confirmed that market responded negatively to SEO announcements causing losses in CEO's firm-related wealth. However, firms provided subsequent grants to CEOs in order to offset their losses. But those grants are in the form of options that are either out-the-money or at-the-money, meaning that the option grants will have minimal values if the future stock price wouldn't pick up.

3 Data and Methodology

3.1 Data and Variable Definition

There are three major data sources that contribute to make up the sample for this research paper. CEO annual compensation data is obtained from Execucomp database. Firms' annual fundamental data is obtained from COMPUSTAT database. Firms' stock

performance and market data is obtained from CRSP database. Data retrieved from individual data sources are matched by company identifier and year. Financial ratios and market metrics are calculated beforehand accordingly. Table 1 offers a comprehensive set of variable definitions. The dependent variables are under "*Firm's Security Issuance*", while all independent variables are under "*CEO Compensation*" and "*Firm Characteristics*". The entire sample contains a total of 37,814 observations covering from year 1998 to year 2017.

3.2 Testing Objectives

This research paper focuses on two common CEO equity-based compensations: option compensation and restricted stock compensation. For each category, the econometric models are designed to test how the underlying equity-based compensation affects firm's propensity of issuing new seasoned equity, new preferred stock and new debt, respectively, while firm characteristics are being controlled. Meanwhile, marginal effects across different factors are also evaluated.

3.3 Logit Regression Setups

Because of the objectives of this research paper, as discussed in section 3.2, the proper model is the logit regression. Two logit regression setups are estimated for each sub-section analysis (detailed in section 4): the pooled logit (as expressed in equation (1)) and the random effect logit (as expressed in equation (2))[2]. Both models include one period time lagged (t-1) independent variables as regressors, as it is assumed that the current new security issuance is determined by CEO's previous year's compensation structure and previous year's firm fundamentals and market metrics.

The pooled logit model doesn't distinguish between cross-section and time-series, which means that the model considers the underlying data set as one entire group. It explains the variation and association both between firms and over time. On the other side, the random effect logit model[3] is built on the panel setting. The advantage of this setup is that it can control for unobserved heterogeneities (firm-specific effect). For example, firms could have different culture preferences and/or different organizational structures.

$$Prob\ (new\ security\ issuance_{i,t} = 1 \mid X_{i,t-1}) = \Lambda\ [\ \beta_1 * (CEO\ compensations_{i,t-1}) + \beta_2 (Firm\ characteristics_{i,t-1})\ ]$$

$$Where\ \Lambda(Z) = \{1 + exp(-Z)\}^{-1} \qquad (1)$$

$$Prob\ (new\ security\ issuance_{i,t} = 1 \mid X_{i,t-1}\ ,\ v_i) = \Lambda\ [\ \beta_1 * (CEO\ compensations_{i,t-1}) + \beta_2 (Firm\ characteristics_{i,t-1}) + v_i\ ]$$

$$Where\ \Lambda(Z) = \{1 + exp(-Z)\}^{-1}\ and\ v_i\ is\ the\ firm\text{-}specific\ effect \qquad (2)$$

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[2] $\Lambda(Z) = \{1 + \exp(-Z)\}^{-1}$ is the CDF of the logistic distribution.

[3] The reason that random effect is chosen for analysis rather than fixed effect is that the unobserved heterogeneity across firms is assumed to be distributed as a random variable. It can provide more freedom to the unobserved heterogeneity, which doesn't have to be correlated with other observed firm characteristics.

Table 1: Variable Definitions and Descriptions

Variable Name	Variable Descriptions
	Firm's Security Issuance
SEO Issuance $_{t}$	Firm's seasoned equity offering in year t
Preferred Stock Issuance $_{t}$	Firm's preferred stock offering in year t
Debt Issuance $_{t}$	Firm's straight debt offering in year t
	CEO Compensation
Option $_{t-1}$	CEO option compensation in year t-1
Restricted Stock $_{t-1}$	CEO restricted stock compensation in year t-1
Salary $_{t-1}$	CEO salary compensation in year t-1
Salary Growth $_{t-1}$	CEO salary compensation growth calculated from year t-2 to year t-1
	Firm Characteristics
Tobin's Q $_{t-1}$	Firm Tobin's Q in year t-1. It is the ratio of the market value of common stock plus the book value of total debt divided by the book value of total assets.
Assets $_{t-1}$	Firm's total assets in year t-1
Liabilities $_{t-1}$	Firm's total liabilities in year t-1
Sales $_{t-1}$	Firm's sales in year t-1
Employees $_{t-1}$	The number of employees in year t-1
CAPX $_{t-1}$ /Asset $_{t-1}$	The ratio of capital expenditures to total assets in year t-1
ROA $_{t-1}$	The earnings before interest, taxes, depreciation, and amortization (EBITDA), divided by the firm's total assets in year t-1
One-year stock return $_{t-1}$	The annual company stock return in year t-1, calculated by monthly compounding returns
Beta $_{t-1}$	Firm's contemporary one-year beta in year t-1, calculated based on monthly stock return and an equal weighted market portfolio
Size $_{t-1}$	Firm's total market equity in year t-1
Book-to-Market $_{t-1}$	Firm's total market equity dividend by book equity in year t-1
EPdummy $_{t-1}$	This dummy takes a value of 1 if firm's net income is negative in year t-1. Otherwise, it takes a value of 0

4 Empirical Results

Table 2 presents the summary statistics of firm's security issuances, CEO compensation and firm characteristics. As we can see, the median of SEO issuance is only 23.70, which is much lower than the median of preferred stock issuance (200.00) and the median of debt issuance (266.39). This evidence, in general, is consistent with the pecking order theory (Myers and Majluf (1984)), since firms anticipate that the market would view that the issuance of seasoned equity indicates the over-valuation of firm's share price. However, straight debt financing and preferred stock[4] financing contain much less information about stock valuation. On the other hand, the debt issuance is supported by the signaling theory (Ross (1977)), as it can serve as a signal of "promise to pay" to differentiate the issuing firm from others.

The "*CEO Compensation*" section presents the compensation characteristics for different pay methods. The median CEO salary pay is 650.00 with a standard deviation of 390.52. However, the median CEO option pay is 152.70 with a standard deviation of 2,993.96 and the median CEO restricted stock pay is 0.00 with a standard deviation of 7,698.31. It provides evidences that most firms are still paying their CEOs by fixed annual salary compensation. Option compensation is a common equity-based compensation. However, it has a much lower median and a much higher standard deviation, comparing to salary compensation. More interestingly, the median of 0 of the CEO restricted stock compensation implies that more than half of the companies within the sample didn't utilize this compensation schemes to award their CEOs. The much higher skewness of option compensation (14.42) and the restricted stock compensation (8.57), compared to the skewness of salary compensation (3.10), confirms that equity-based compensations are clustered in subgroups of companies, implying that the method is not universally adopted

The "*Firm Characteristics*" section includes both firm's fundamentals and market metrics. The reason that all those variables are included in the analysis is that the decision of new security issuance could potentially be dependent on them as well. By including them in the following regression analysis, we can control those effects and focus on the impact caused by CEO equity-based compensations. As shown in Table 2, the median of Tobin's Q is 1.28, indicating that the majority of firms have market values that are above their replacement costs. The median of assets is 1975.30, which is well above the median of liabilities (1093.10). Meanwhile, most firms are generating decent revenues and investment returns, with median sales of 1,364.00 and median annual ROA of 13%. Market metrics also offer evidences that the overall market performance of the sample companies is healthy and desirable, as the one-year stock return has a median of 9%. The median beta (0.96) is much close to the market[5], and the majority of the sample companies have market valuation well above their book values since the median of the book-to-market ratio is 0.43. Moreover, the summary statistics of EPdummy tell that most firms are generating positive accounting net profit, since this variable is still 0 for the 75th percentile.

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[4] The preferred stock is commonly treated as debt-like security, since it takes no ownership of the company and the company is obligated to make interest payments to preferred stock holders at predetermined rates.

[5] The market portfolio that contains all equity securities by definition should have a beta of 1.

Table 2: Summary Statistics of Security Issuance, CEO Compensation and Firm Characteristics

	Mean	Std. Dev	25%	Median	75%	Skewness
		Security Issuance				
SEO Issuance	139.61	341.40	7.00	23.70	101.23	5.48
Preferred Stock Issuance	305.95	351.95	96.74	200.00	350.00	2.32
Debt Issuance	1,086.90	3,831.58	60.71	266.39	846.75	13.28
		CEO Compensation				
Option	1,069.99	2,993.96	0.00	152.70	1,200.00	14.42
Ln(Option)	6.88	1.27	6.17	6.98	7.72	-0.69
Restricted Stock	2,964.74	7,698.31	0.00	0.00	2,719.44	8.58
Ln(Restricted Stock)	8.00	1.41	7.19	8.12	8.99	-0.67
Salary	711.55	390.52	450.00	650.00	906.73	3.10
Ln(Salary)	6.39	0.99	6.11	6.48	6.81	-9.42
Salary Growth	21.44	223.79	0.00	4.41	11.11	48.02
		Firm Characteristics				
Tobin's Q	1.78	2.20	0.87	1.28	2.03	16.71
Assets	16,692.40	104,770.40	618.68	1,975.30	7,005.54	17.82
Ln(Assets)	7.69	1.81	6.43	7.59	8.85	0.27
Liabilities	13,456.30	97,453.03	262.58	1,093.10	4,616.00	19.01
Ln(Liabilities)	7.01	2.12	5.57	7.00	8.44	0.08
Sales	5,740.64	18,621.97	485.26	1,364.00	4,151.23	11.62
Ln(Sales)	7.26	1.67	6.19	7.22	8.34	-0.19
Employees	18.61	61.54	1.35	4.58	14.03	18.61
CAPX/Asset	0.05	0.06	0.02	0.04	0.07	3.38
ROA	0.13	0.13	0.09	0.13	0.18	-4.34
One-year stock return	0.16	0.66	-0.14	0.09	0.34	8.89
Beta	1.07	1.13	0.41	0.96	1.59	0.81
Size	8,338.83	28,462.07	586.77	1,584.05	5,093.36	10.26
Ln(Size)	7.49	1.68	6.37	7.37	8.54	0.20
Book-to-Market	0.53	0.56	0.26	0.43	0.65	13.08
Ln(Book-to-Market)	-0.92	0.80	-1.34	-0.85	-0.44	-0.86
EPdummy	0.20	0.40	0.00	0.00	0.00	1.54

This table provides summary statistics for all variables listed in Table 1. "Ln" symbol is the natural logarithm on the indicated variables. CEO compensation variables are in thousands of dollars. Firm's issuance variables and fundamental level variables are in millions of dollars, except for "employees" which is in thousands. CEO annual compensation data is obtained from Execucomp database. Firm's annual fundamental data is obtained from COMPUSTAT database. Firm's stock performance and market data is obtained from CRSP database. Data retrieved from individual data sources are matched by company identifier and year. Financial ratios and market metrics are calculated beforehand accordingly. The entire sample contains a total of 37,814 observations covering from year 1998 to year 2017.

Table 3: Correlations Between Security Issuance, CEO Compensation and Firm Characteristics

	SEO Issuance	Preferred Stock Issuance	Debt Issuance
Ln(Option)	-0.10	-0.13	-0.21
Ln(Restricted Stock)	-0.18	-0.22	-0.36
Ln(Salary)	-0.69	-0.70	-0.77
Salary Growth	-0.20	-0.17	-0.10
Tobin's Q	0.22	0.13	0.31
Ln(Assets)	-0.95	-0.92	-0.93
Ln(Liabilities)	-0.94	-0.90	-0.91
Ln(Sales)	-0.82	-0.78	-0.93
Employees	-0.74	-0.70	-0.88
CAPX/Asset	0.86	0.83	0.95
ROA	0.81	0.77	0.81
One-year stock return	-0.65	-0.72	-0.54
Beta	0.49	0.42	0.64
Ln(Size)	-0.88	-0.92	-0.86
Ln(Book-to-Market)	0.27	0.36	0.21
EPdummy	0.61	0.67	0.63

This table provides correlations between security issuance, CEO compensation and firm characteristics. "Ln" symbol is the natural logarithm on the indicated variables. CEO compensation variables are in thousands of dollars. Firm's issuance variables and fundamental level variables are in millions of dollars, except for "employees" which is in thousands. CEO annual compensation data is obtained from Execucomp database. Firm's annual fundamental data is obtained from COMPUSTAT database. Firm's stock performance and market data is obtained from CRSP database. Data retrieved from individual data sources are matched by company identifier and year. Financial ratios and market metrics are calculated beforehand accordingly. The entire sample contains a total of 37,814 observations covering from year 1998 to year 2017.

Table 3 shows the correlations between firm's security issuances and firm's characteristics. All security issuances (SEO issuance, preferred stock issuance and debt issuance) are negatively correlated with CEO equity-based compensation. This may provide the hint that CEOs are more inclined to use internal funding when their equity-based compensations ramp up. Again, this evidence is consistent with the pecking order theory (Myers and Majluf (1984)) that, when firms propose new investment projects, internal funding should first be utilized, because it is relatively cheap comparing to outside financing and it will be beneficial to firm's long-term stock growth which will in return increase CEO's personal wealth. On the other hand, the negative correlation between firm's security issuances and regular salary compensation generates argument that CEOs are becoming more conservative as their ordinary cash salary increases. The evidence that CEOs are reluctant to issue new securities could be due to the reason that they are unwilling to jeopardize the overall stability of company's stock performance which may incur more volatilities should new securities be issued.

4.1 The Impact on the Firm's Propensity of New Security Issuances by CEO Option Compensation

As one major part of the formal analysis of the impact of CEO equity-based compensation on firm's propensity of issuing new securities, Table 4, Table 5 and table 6 present logit regression results of the influences caused by CEO option compensation on SEO issuance, preferred stock issuance and debt issuance, respectively.

Table 4: Logit Regressions of CEO Option Compensation on SEO Issuance

	Pooled Logit		Random-Effect Logit	
	Coefficient	Z-statistic	Coefficient	Z-statistic
Ln(Option) $_{t-1}$	-1.05***	-10.12	-2.05***	-6.01
Ln(Salary) $_{t-1}$	-0.37***	-2.70	-0.63*	-1.65
Salary Growth $_{t-1}$	-0.003	-0.79	-0.001	-0.12
Tobin's Q $_{t-1}$	-2.71***	-5.07	-2.42*	-1.91
Ln(Assets) $_{t-1}$	-8.98***	-4.85	-10.54**	-2.53
Ln(Liabilities) $_{t-1}$	8.54***	6.56	12.09***	4.02
Ln(Sales) $_{t-1}$	-0.82***	-4.27	-1.16*	-1.92
Employees $_{t-1}$	-0.18***	-9.04	-0.39***	-4.78
CAPX $_{t-1}$/Asset $_{t-1}$	5.37***	3.76	11.82***	2.58
ROA $_{t-1}$	0.47	0.21	-4.78	-0.88
One-year stock return $_{t-1}$	-0.51*	-1.69	-0.43	-0.63
Beta $_{t-1}$	-0.99***	-7.83	-0.95***	-2.95
Ln(Size) $_{t-1}$	3.08***	4.76	3.46**	2.17
Ln(Book-to-Market) $_{t-1}$	1.33**	2.38	1.78	1.42
EPdummy $_{t-1}$	-1.09***	-3.07	-2.35***	-2.75
Log Likelihood	-368.11		-202.20	
LR/Wald Statistic	1,287.42		80.10	
LR test on Rho = 0	N/A		331.83	
P-value on Rho = 0	N/A		0.00	

This table provides estimated coefficients of both pooled and random effect logit regressions. The dependent variable takes a value of 1 if there is at least one SEO issuance in a given year t, otherwise it takes a value of 0. Both models include one period time lagged (t-1) independent variables as regressors, as it is assumed that the current new security issuance is determined by CEO's previous year's compensation structure and previous year's firm fundamentals and market metrics. "Ln(Option)$_{t-1}$" is the natural logged CEO option compensation in year t-1; "Ln(Salary) $_{t-1}$" is the natural logged CEO salary compensation in year t-1; "Salary Growth $_{t-1}$" is the CEO salary compensation growth from year t -2 to year t-1; "Tobin's Q $_{t-1}$" is the firm Tobin's Q in year t-1. It is the ratio of the market value of common stock plus the book value of total debt divided by the book value of total assets. "Ln(Assets) $_{t-1}$" is the natural logged firm's total assets in year t-1; "Ln(Liabilities) $_{t-1}$" is the natural logged firm's total liabilities in year t-1; "Ln(Sales) $_{t-1}$" is the natural logged firm's sales in year t-1; "Employees $_{t-1}$" is the number of employees in year t-1; "CAPX $_{t-1}$/Asset $_{t-1}$" is the ratio of capital expenditures to total assets in year t-1; "ROA $_{t-1}$" is earnings before interest, taxes, depreciation, and amortization (EBITDA), divided by firm's total assets in year t-1; "One-year Stock return $_{t-1}$" is the annual company stock return in year t-1, calculated by monthly compounding returns; "Beta $_{t-1}$" is firm's contemporary one-year beta in year t-1, calculated based on monthly stock return and an equal weighted market portfolio; "Ln(Size) $_{t-1}$" is the natural logged firm's total market equity in year t-1; "Ln(Book-to-Market) $_{t-1}$" is the natural logged firm's total market equity dividend by book equity in year t-1; "EPdummy $_{t-1}$" is a dummy variable that takes a value of 1 if firm's net income is negative in year t-1, otherwise it takes a value of 0. CEO compensation variables are in thousands of dollars. Firm's fundamental level variables are in millions of dollars, except for "employees" which is in thousands. CEO annual compensation data is obtained from Execucomp database. Firm's annual fundamental data is obtained from COMPUSTAT database. Firm's stock performance and market data is obtained from CRSP database. Data retrieved from individual data sources are matched by company identifier and year. Financial ratios and market metrics are calculated beforehand accordingly. The entire sample contains a total of 37,814 observations covering from year 1998 to year 2017. "*" "**" "***" denote significance at the 10%, 5%, and 1% levels, respectively.

Table 5: Logit Regressions of CEO Option Compensation on Preferred Stock Issuance

	Pooled Logit		Random-Effect Logit	
	Coefficient	Z-statistic	Coefficient	Z-statistic
Ln(Option) $_{t-1}$	0.35	0.62	0.05	0.07
Ln(Salary) $_{t-1}$	0.05	0.03	0.40	0.15
Salary Growth $_{t-1}$	-0.04	-1.23	-0.04	-1.03
Tobin's Q $_{t-1}$	-9.17**	-2.47	-9.81**	-2.02
Ln(Assets) $_{t-1}$	-22.19**	-2.18	-19.58*	-1.74
Ln(Liabilities) $_{t-1}$	24.42***	2.83	21.86**	2.34
Ln(Sales) $_{t-1}$	-3.42**	-2.09	-4.15*	-1.89
Employees $_{t-1}$	-0.07	-1.26	-0.08	-1.07
CAPX $_{t-1}$/Asset $_{t-1}$	24.71***	2.92	22.36**	2.10
ROA $_{t-1}$	18.73	1.18	26.31	1.30
One-year stock return $_{t-1}$	0.52	1.37	0.49	1.16
Beta $_{t-1}$	-0.61	-1.11	-0.52	-0.86
Ln(Size) $_{t-1}$	3.75	1.64	4.53	1.61
Ln(Book-to-Market) $_{t-1}$	1.29	0.92	0.83	0.51
EPdummy $_{t-1}$	0.57	0.59	0.86	0.74
Log Likelihood	-4,721.22		-34.82	
LR/Wald Statistic	2,147.29		22.02	
LR test on Rho = 0	N/A		1.95	
P-value on Rho = 0	N/A		0.08	

This table provides estimated coefficients of both pooled and random effect logit regressions. The dependent variable takes a value of 1 if there is at least one preferred stock issuance in a given year t, otherwise it takes a value of 0. Both models include one period time lagged (t-1) independent variables as regressors, as it is assumed that the current new security issuance is determined by CEO's previous year's compensation structure and previous year's firm fundamentals and market metrics. "Ln(Option)$_{t-1}$" is the natural logged CEO option compensation in year t-1; "Ln(Salary) $_{t-1}$" is the natural logged CEO salary compensation in year t-1; "Salary Growth $_{t-1}$" is the CEO salary compensation growth from year t -2 to year t-1; "Tobin's Q $_{t-1}$" is the firm Tobin's Q in year t-1. It is the ratio of the market value of common stock plus the book value of total debt divided by the book value of total assets. "Ln(Assets) $_{t-1}$" is the natural logged firm's total assets in year t-1; "Ln(Liabilities) $_{t-1}$" is the natural logged firm's total liabilities in year t-1; "Ln(Sales) $_{t-1}$" is the natural logged firm's sales in year t-1; "Employees $_{t-1}$" is the number of employees in year t-1; "CAPX $_{t-1}$/Asset $_{t-1}$" is the ratio of capital expenditures to total assets in year t-1; "ROA $_{t-1}$" is earnings before interest, taxes, depreciation, and amortization (EBITDA), divided by firm's total assets in year t-1; "One-year Stock return $_{t-1}$" is the annual company stock return in year t-1, calculated by monthly compounding returns; "Beta $_{t-1}$" is firm's contemporary one-year beta in year t-1, calculated based on monthly stock return and an equal weighted market portfolio; "Ln(Size) $_{t-1}$" is the natural logged firm's total market equity in year t-1; "Ln(Book-to-Market) $_{t-1}$" is the natural logged firm's total market equity dividend by book equity in year t-1; "EPdummy $_{t-1}$" is a dummy variable that takes a value of 1 if firm's net income is negative in year t-1, otherwise it takes a value of 0. CEO compensation variables are in thousands of dollars. Firm's fundamental level variables are in millions of dollars, except for "employees" which is in thousands. CEO annual compensation data is obtained from Execucomp database. Firm's annual fundamental data is obtained from COMPUSTAT database. Firm's stock performance and market data is obtained from CRSP database. Data retrieved from individual data sources are matched by company identifier and year. Financial ratios and market metrics are calculated beforehand accordingly. The entire sample contains a total of 37,814 observations covering from year 1998 to year 2017. "*" "**" "***" denote significance at the 10%, 5%, and 1% levels, respectively.

Table 6: Logit Regressions of CEO Option Compensation on Debt Issuance

	Pooled Logit		Random-Effect Logit	
	Coefficient	Z-statistic	Coefficient	Z-statistic
Ln(Option) $_{t-1}$	-0.21***	-7.15	-0.25***	-5.96
Ln(Salary) $_{t-1}$	-0.02	-0.57	-0.04	-0.71
Salary Growth $_{t-1}$	0.0001	0.56	0.00003	0.18
Tobin's Q $_{t-1}$	-0.03	-0.81	-0.03	-0.55
Ln(Assets) $_{t-1}$	-0.77***	-4.67	-0.59**	-2.44
Ln(Liabilities) $_{t-1}$	1.36***	14.46	1.18***	8.51
Ln(Sales) $_{t-1}$	-0.08*	-1.69	0.11	1.24
Employees $_{t-1}$	-0.0004	-0.80	-0.0004	-0.39
CAPX $_{t-1}$/Asset $_{t-1}$	4.57***	8.01	6.61***	7.19
ROA $_{t-1}$	-0.02	-0.05	-0.36	-0.73
One-year stock return $_{t-1}$	0.04	0.96	0.03	0.63
Beta $_{t-1}$	0.0001	0.00	-0.02	-0.58
Ln(Size) $_{t-1}$	-0.06	-0.67	0.03	0.27
Ln(Book-to-Market) $_{t-1}$	0.11*	1.68	0.01	0.15
EPdummy $_{t-1}$	-0.42***	-5.15	-0.27**	-2.50
Log Likelihood	-4,721.22		-4,289.30	
LR/Wald Statistic	2,147.29		694.58	
LR test on Rho = 0	N/A		863.83	
P-value on Rho = 0	N/A		0.00	

This table provides estimated coefficients of both pooled and random effect logit regressions. The dependent variable takes a value of 1 if there is at least one debt issuance in a given year t, otherwise it takes a value of 0. Both models include one period time lagged (t-1) independent variables as regressors, as it is assumed that the current new security issuance is determined by CEO's previous year's compensation structure and previous year's firm fundamentals and market metrics. "Ln(Option)$_{t-1}$" is the natural logged CEO option compensation in year t-1; "Ln(Salary) $_{t-1}$" is the natural logged CEO salary compensation in year t-1; "Salary Growth $_{t-1}$" is the CEO salary compensation growth from year t -2 to year t-1; "Tobin's Q $_{t-1}$" is the firm Tobin's Q in year t-1. It is the ratio of the market value of common stock plus the book value of total debt divided by the book value of total assets. "Ln(Assets) $_{t-1}$" is the natural logged firm's total assets in year t-1; "Ln(Liabilities) $_{t-1}$" is the natural logged firm's total liabilities in year t-1; "Ln(Sales) $_{t-1}$" is the natural logged firm's sales in year t-1; "Employees $_{t-1}$" is the number of employees in year t-1; "CAPX $_{t-1}$/Asset $_{t-1}$" is the ratio of capital expenditures to total assets in year t-1; "ROA $_{t-1}$" is earnings before interest, taxes, depreciation, and amortization (EBITDA), divided by firm's total assets in year t-1; "One-year Stock return $_{t-1}$" is the annual company stock return in year t-1, calculated by monthly compounding returns; "Beta $_{t-1}$" is firm's contemporary one-year beta in year t-1, calculated based on monthly stock return and an equal weighted market portfolio; "Ln(Size) $_{t-1}$" is the natural logged firm's total market equity in year t-1; "Ln(Book-to-Market) $_{t-1}$" is the natural logged firm's total market equity dividend by book equity in year t-1; "EPdummy $_{t-1}$" is a dummy variable that takes a value of 1 if firm's net income is negative in year t-1, otherwise it takes a value of 0. CEO compensation variables are in thousands of dollars. Firm's fundamental level variables are in millions of dollars, except for "employees" which is in thousands. CEO annual compensation data is obtained from Execucomp database. Firm's annual fundamental data is obtained from COMPUSTAT database. Firm's stock performance and market data is obtained from CRSP database. Data retrieved from individual data sources are matched by company identifier and year. Financial ratios and market metrics are calculated beforehand accordingly. The entire sample contains a total of 37,814 observations covering from year 1998 to year 2017. "*" "**" "***" denote significance at the 10%, 5%, and 1% levels, respectively.

Table 4 reports the logit regressions of CEO option compensation on SEO issuance with both pooled and random effect logit models being estimated. The dependent variable takes a value of 1 if there is at least one SEO issuance in a given year t, otherwise it takes a value of 0. Both models include one period time lagged (t-1) independent variables as regressors, as it is assumed that the current SEO issuance is determined by CEO's previous year's compensation structure and previous year's firm fundamentals and market metrics. As we can see, the estimated coefficient of "Ln(Option)$_{t-1}$" is -1.05 with a Z-statistic of -10.12 of the pooled logit regression. Meanwhile, "Ln(Option)$_{t-1}$" has an estimated coefficient of -2.05 with a Z-statistic of -6.01 of the random-effect logit regression. The results present us statistical evidences that the existence or the increase of CEO's past year option compensation will significantly reduce firm's likelihood of issuing new seasoned equities in the following year. This negative association is still significant when unobserved firm heterogeneities are being controlled. Moreover, the negative and significant sign of "Ln(Salary) $_{t-1}$" implies that CEOs are becoming more cautious and conservative about the use of SEO financing when their cash compensation increases, as this normally happens when CEOs get entrenched.

"Tobin's Q $_{t-1}$" and "Ln(Assets) $_{t-1}$" each bear a significant and negative estimated coefficient under both pooled and random effect logit regressions. The implication can be interpreted that firms are expected to enjoy much cheaper debt financing as the overall company value (company scale) increases. "Ln(Sales) $_{t-1}$" also bears a significant and negative sign under both pooled and random effect logit regressions. This is within the expectation, because strong sales are thought to generate strong internal free cashflows, making external financing less necessary. On the other side, "Ln(Liabilities) $_{t-1}$" is attached with a significant and positive sign under both regression estimations. This evidence is consistent with the trade-off theory (Kraus and Litzenberger (1973)), in which firms are continuously adjusting their capital structure by rebalancing their equity and debt proportion. Therefore, here, as firm's liability stepping up, the propensity of issuing new season equity picks up, as companies don't want to deviate too far away from their desired debt-to-equity ratio. Furthermore, "CAPX $_{t-1}$/Asset $_{t-1}$" is the ratio of capital expenditures to total assets in a given year t-1. If the value of this independent variable increases, it means that the underlying company is investing more heavily as comparing to its past. More capital expenditures would require more funding. As a consequence, this variable has a positive and significant estimated coefficient under both pooled and random effect logit regressions.

The estimated coefficients of market variables tell us the influences caused by firms' market performances. "Beta $_{t-1}$" and "EPdummy $_{t-1}$" both have a negative and significant sign under pooled and random effect logit regressions. As "Beta $_{t-1}$" increases, firms are deemed to carry more market risk which making the firms' valuation more volatile with respect to the overall market. The negative and significant sign attached to "Beta $_{t-1}$" implies that CEOs are aware of potential negative impact caused by SEO issuance if their companies are already within the group of high market risks. This tells us that CEOs would likely avoid using SEO to finance their projects in companies having high beta. Nevertheless, the negative and significant sign of "EPdummy $_{t-1}$" is also expected, since companies with negative net income would further hurt their stock valuation if new season equities are issued. However, the positive and significant sign of "Ln(Size) $_{t-1}$" indicates that firms with higher market valuations are more likely to use SEO financing, because those firms typically have strong market support with big market cap and competitive advantage. Therefore, the issuance of SEO by big firms has

much less negative impact or even viewed as great investment opportunity by outside investors, comparing to firms with much smaller market caps.

Table 5 reports the logit regressions of CEO option compensation on preferred stock issuance. What makes the regression results interesting is that the estimated coefficient on "Ln(Option)$_{t-1}$" is insignificant under both pooled and random effect logit models. The results support the argument that CEO option compensation doesn't have a statistically significant impact on the issuance of preferred stock. On the other side, "Tobin's Q $_{t-1}$", "Ln(Assets) $_{t-1}$" , "Ln(Liabilities) $_{t-1}$", "Ln(Sales) $_{t-1}$" and "CAPX $_{t-1}$/Asset $_{t-1}$" all bear the same negative and significant sign under both models as comparing to those in Table 4. This means that firm's fundamental characteristics are still significant in describing firm's propensity of issuing preferred stocks. However, all market variables are insignificant in Table 5, leaving the impression that preferred stock issuance is not affected by firms' market metrics. Table 6 shows us the results of testing the effect on the propensity of debt issuance by CEO option compensation. In this case, "Ln(Option)$_{t-1}$" is significant under both pooled and random effect logit regressions. This outcome is aligned with the expectation that CEOs are more inclined to use internal funding when their personal compensation scheme is tied to firm's stock performance, which is again consistent with the pecking order theory (Myers and Majluf (1984)). Most firm fundamental variables are still significant under both models, such as "Ln(Assets) $_{t-1}$" , "Ln(Liabilities) $_{t-1}$", "Ln(Sales) $_{t-1}$" and "CAPX $_{t-1}$/Asset $_{t-1}$", while the only significant market variable across the two models is "EPdummy $_{t-1}$".

4.2 The Impact on the Firm's Propensity of New Security Issuances by CEO Restricted Stock Compensation

Table 7, Table 8 and table 9 present logit regression results of the influences caused by CEO restricted stock compensation on SEO issuance, preferred stock issuance and debt issuance, respectively. In table 7, "Ln(Restricted stock) $_{t-1}$", along with "Ln(Salary) $_{t-1}$", is significant under both pooled and random effect logit models. This result provides evidence that, just like option compensation, CEO restricted stock compensation has the similar effect on the firm's propensity of SEO issuance. Moreover, most firm fundamental variables and market variables are significant across the two logit models. Because both the option compensation and the restricted stock compensation require firm's stock price to reach a certain predetermined level to make the corresponding compensation "in the money" or "unvested", the similar effect caused by these two equity-based compensation methods is within the expectation.

Table 8 tests the effect of firm's propensity of issuing new preferred stock by CEO restricted stock compensation. It is very interesting to see that "Ln(Restricted stock) $_{t-1}$" is significant under pool logit regression. However, this variable becomes insignificant under the random effect logit regression. If we look a bit more in detail, the test of unobserved heterogeneity yields a likelihood ratio statistic of 12.31 with a P-value of 0.00. This evidence makes us believe that the existence of firm specific effect is statistically significant. Therefore, random effect logit regression should be given more credibility over the pooled logit regression. To conclude, CEO restricted stock compensation is not considered to generate significant impact on firm's propensity of preferred stock issuance, although several firm fundamental variables and market variables may provide some explanatory power in describing the likelihood of the issuance.

Table 7: Logit Regressions of CEO Restricted Stock Compensation on SEO Issuance

	Pooled Logit		Random-Effect Logit	
	Coefficient	Z-statistic	Coefficient	Z-statistic
Ln(Restricted stock) $_{t-1}$	-0.20***	-2.69	-0.55***	-2.98
Ln(Salary) $_{t-1}$	-0.75***	-6.66	-1.42***	-4.53
Salary Growth $_{t-1}$	-0.0003	-0.26	0.00005	0.03
Tobin's Q $_{t-1}$	-5.51***	-10.12	-6.55***	-4.53
Ln(Assets) $_{t-1}$	-10.06***	-8.22	-14.63***	-4.80
Ln(Liabilities) $_{t-1}$	9.03***	9.93	14.30***	6.09
Ln(Sales) $_{t-1}$	-0.82***	-5.88	-0.53	-1.17
Employees $_{t-1}$	-0.19***	-11.63	-0.35***	-5.74
CAPX $_{t-1}$/Asset $_{t-1}$	2.63***	2.19	7.55**	2.06
ROA $_{t-1}$	-1.40	-1.17	2.28	0.43
One-year stock return $_{t-1}$	0.33*	1.70	0.42	1.01
Beta $_{t-1}$	-0.81***	-8.65	-0.56***	-2.92
Ln(Size) $_{t-1}$	3.07***	7.31	3.61***	3.38
Ln(Book-to-Market) $_{t-1}$	0.77**	2.54	1.43*	1.88
EPdummy $_{t-1}$	-1.40***	-5.11	-2.20***	-3.57
Log Likelihood	-672.63		-378.51	
LR/Wald Statistic	2,287.49		126.73	
LR test on Rho = 0	N/A		588.24	
P-value on Rho = 0	N/A		0.00	

This table provides estimated coefficients of both pooled and random effect logit regressions. The dependent variable takes a value of 1 if there is at least one SEO issuance in a given year t, otherwise it takes a value of 0. Both models include one period time lagged (t-1) independent variables as regressors, as it is assumed that the current new security issuance is determined by CEO's previous year's compensation structure and previous year's firm fundamentals and market metrics. "Ln(Restricted stock)$_{t-1}$" is the natural logged CEO restricted stock compensation in year t-1; "Ln(Salary) $_{t-1}$" is the natural logged CEO salary compensation in year t-1; "Salary Growth $_{t-1}$" is the CEO salary compensation growth from year t -2 to year t-1; "Tobin's Q $_{t-1}$" is the firm Tobin's Q in year t-1. It is the ratio of the market value of common stock plus the book value of total debt divided by the book value of total assets. "Ln(Assets) $_{t-1}$" is the natural logged firm's total assets in year t-1; "Ln(Liabilities) $_{t-1}$" is the natural logged firm's total liabilities in year t-1; "Ln(Sales) $_{t-1}$" is the natural logged firm's sales in year t-1; "Employees $_{t-1}$" is the number of employees in year t-1; "CAPX $_{t-1}$/Asset $_{t-1}$" is the ratio of capital expenditures to total assets in year t-1; "ROA $_{t-1}$" is earnings before interest, taxes, depreciation, and amortization (EBITDA), divided by firm's total assets in year t-1; "One-year Stock return $_{t-1}$" is the annual company stock return in year t-1, calculated by monthly compounding returns; "Beta $_{t-1}$" is firm's contemporary one-year beta in year t-1, calculated based on monthly stock return and an equal weighted market portfolio; "Ln(Size) $_{t-1}$" is the natural logged firm's total market equity in year t-1; "Ln(Book-to-Market) $_{t-1}$" is the natural logged firm's total market equity dividend by book equity in year t-1; "EPdummy $_{t-1}$" is a dummy variable that takes a value of 1 if firm's net income is negative in year t-1, otherwise it takes a value of 0. CEO compensation variables are in thousands of dollars. Firm's fundamental level variables are in millions of dollars, except for "employees" which is in thousands. CEO annual compensation data is obtained from Execucomp database. Firm's annual fundamental data is obtained from COMPUSTAT database. Firm's stock performance and market data is obtained from CRSP database. Data retrieved from individual data sources are matched by company identifier and year. Financial ratios and market metrics are calculated beforehand accordingly. The entire sample contains a total of 37,814 observations covering from year 1998 to year 2017. "*" "**" "***" denote significance at the 10%, 5%, and 1% levels, respectively.

Table 8: Logit Regressions of CEO Restricted Stock Compensation on Preferred Stock Issuance

	Pooled Logit		Random-Effect Logit	
	Coefficient	Z-statistic	Coefficient	Z-statistic
Ln(Restricted stock) $_{t-1}$	-0.56**	-2.41	-0.07	-0.17
Ln(Salary) $_{t-1}$	-1.74**	-2.03	-2.62**	-1.97
Salary Growth $_{t-1}$	-0.01	-0.65	-0.001	-0.07
Tobin's Q $_{t-1}$	-14.54***	-3.14	-20.07**	-2.35
Ln(Assets) $_{t-1}$	-20.68	-1.50	-42.89	-1.58
Ln(Liabilities) $_{t-1}$	18.95*	1.86	34.46*	1.75
Ln(Sales) $_{t-1}$	-3.92***	-2.64	-5.85**	-2.25
Employees $_{t-1}$	-0.11	-1.60	-0.13	-1.63
CAPX $_{t-1}$/Asset $_{t-1}$	17.96**	2.24	22.34*	1.72
ROA $_{t-1}$	4.63	0.29	7.82	0.28
One-year stock return $_{t-1}$	1.17**	2.32	2.00**	2.20
Beta $_{t-1}$	-0.94*	-1.90	-1.11	-1.62
Ln(Size) $_{t-1}$	8.15*	1.84	17.48*	1.84
Ln(Book-to-Market) $_{t-1}$	2.26	0.65	8.01	1.08
EPdummy $_{t-1}$	0.89	0.91	0.89	0.66
Log Likelihood	-54.53		-48.37	
LR/Wald Statistic	164.42		14.74	
LR test on Rho = 0	N/A		12.31	
P-value on Rho = 0	N/A		0.00	

This table provides estimated coefficients of both pooled and random effect logit regressions. The dependent variable takes a value of 1 if there is at least one preferred stock issuance in a given year t, otherwise it takes a value of 0. Both models include one period time lagged (t-1) independent variables as regressors, as it is assumed that the current new security issuance is determined by CEO's previous year's compensation structure and previous year's firm fundamentals and market metrics. "Ln(Restricted stock)$_{t-1}$" is the natural logged CEO restricted stock compensation in year t-1; "Ln(Salary) $_{t-1}$" is the natural logged CEO salary compensation in year t-1; "Salary Growth $_{t-1}$" is the CEO salary compensation growth from year t -2 to year t-1; "Tobin's Q $_{t-1}$" is the firm Tobin's Q in year t-1. It is the ratio of the market value of common stock plus the book value of total debt divided by the book value of total assets. "Ln(Assets) $_{t-1}$" is the natural logged firm's total assets in year t-1; "Ln(Liabilities) $_{t-1}$" is the natural logged firm's total liabilities in year t-1; "Ln(Sales) $_{t-1}$" is the natural logged firm's sales in year t-1; "Employees $_{t-1}$" is the number of employees in year t-1; "CAPX $_{t-1}$/Asset $_{t-1}$" is the ratio of capital expenditures to total assets in year t-1; "ROA $_{t-1}$" is earnings before interest, taxes, depreciation, and amortization (EBITDA), divided by firm's total assets in year t-1; "One-year Stock return $_{t-1}$" is the annual company stock return in year t-1, calculated by monthly compounding returns; "Beta $_{t-1}$" is firm's contemporary one-year beta in year t-1, calculated based on monthly stock return and an equal weighted market portfolio; "Ln(Size) $_{t-1}$" is the natural logged firm's total market equity in year t-1; "Ln(Book-to-Market) $_{t-1}$" is the natural logged firm's total market equity dividend by book equity in year t-1; "EPdummy $_{t-1}$" is a dummy variable that takes a value of 1 if firm's net income is negative in year t-1, otherwise it takes a value of 0. CEO compensation variables are in thousands of dollars. Firm's fundamental level variables are in millions of dollars, except for "employees" which is in thousands. CEO annual compensation data is obtained from Execucomp database. Firm's annual fundamental data is obtained from COMPUSTAT database. Firm's stock performance and market data is obtained from CRSP database. Data retrieved from individual data sources are matched by company identifier and year. Financial ratios and market metrics are calculated beforehand accordingly. The entire sample contains a total of 37,814 observations covering from year 1998 to year 2017. "*" "**" "***" denote significance at the 10%, 5%, and 1% levels, respectively.

Table 9: Logit Regressions of CEO Restricted Stock Compensation on Debt Issuance

	Pooled Logit		Random-Effect Logit	
	Coefficient	Z-statistic	Coefficient	Z-statistic
Ln(Restricted stock) $_{t-1}$	0.01	0.21	0.04	0.97
Ln(Salary) $_{t-1}$	0.08	1.61	0.13*	1.72
Salary Growth $_{t-1}$	-0.0002	-1.06	-0.0002	-0.81
Tobin's Q $_{t-1}$	-0.08	-1.64	-0.06	-0.80
Ln(Assets) $_{t-1}$	-0.76***	-3.69	-0.73**	-2.42
Ln(Liabilities) $_{t-1}$	1.31***	10.90	1.32***	7.30
Ln(Sales) $_{t-1}$	-0.16***	-3.11	-0.06	-0.68
Employees $_{t-1}$	0.00	0.06	0.00	-0.70
CAPX $_{t-1}$/Asset $_{t-1}$	4.04***	6.37	5.65***	5.66
ROA $_{t-1}$	-0.11	-0.26	-0.02	-0.04
One-year stock return $_{t-1}$	0.08	1.22	0.05	0.65
Beta $_{t-1}$	0.00	-0.01	-0.01	-0.17
Ln(Size) $_{t-1}$	-0.12	-1.15	-0.07	-0.50
Ln(Book-to-Market) $_{t-1}$	0.08	1.04	0.04	0.38
EPdummy $_{t-1}$	-0.18*	-1.89	-0.03	-0.21
Log Likelihood	-3,719.27		-3,439.32	
LR/Wald Statistic	1,203.69		439.89	
LR test on Rho = 0	N/A		559.89	
P-value on Rho = 0	N/A		0.00	

This table provides estimated coefficients of both pooled and random effect logit regressions. The dependent variable takes a value of 1 if there is at least one debt issuance in a given year t, otherwise it takes a value of 0. Both models include one period time lagged (t-1) independent variables as regressors, as it is assumed that the current new security issuance is determined by CEO's previous year's compensation structure and previous year's firm fundamentals and market metrics. "Ln(Restricted stock)$_{t-1}$" is the natural logged CEO restricted stock compensation in year t-1; "Ln(Salary) $_{t-1}$" is the natural logged CEO salary compensation in year t-1; "Salary Growth $_{t-1}$" is the CEO salary compensation growth from year t -2 to year t-1; "Tobin's Q $_{t-1}$" is the firm Tobin's Q in year t-1. It is the ratio of the market value of common stock plus the book value of total debt divided by the book value of total assets. "Ln(Assets) $_{t-1}$" is the natural logged firm's total assets in year t-1; "Ln(Liabilities) $_{t-1}$" is the natural logged firm's total liabilities in year t-1; "Ln(Sales) $_{t-1}$" is the natural logged firm's sales in year t-1; "Employees $_{t-1}$" is the number of employees in year t-1; "CAPX $_{t-1}$/Asset $_{t-1}$" is the ratio of capital expenditures to total assets in year t-1; "ROA $_{t-1}$" is earnings before interest, taxes, depreciation, and amortization (EBITDA), divided by firm's total assets in year t-1; "One-year Stock return $_{t-1}$" is the annual company stock return in year t-1, calculated by monthly compounding returns; "Beta $_{t-1}$" is firm's contemporary one-year beta in year t-1, calculated based on monthly stock return and an equal weighted market portfolio; "Ln(Size) $_{t-1}$" is the natural logged firm's total market equity in year t-1; "Ln(Book-to-Market) $_{t-1}$" is the natural logged firm's total market equity dividend by book equity in year t-1; "EPdummy $_{t-1}$" is a dummy variable that takes a value of 1 if firm's net income is negative in year t-1, otherwise it takes a value of 0. CEO compensation variables are in thousands of dollars. Firm's fundamental level variables are in millions of dollars, except for "employees" which is in thousands. CEO annual compensation data is obtained from Execucomp database. Firm's annual fundamental data is obtained from COMPUSTAT database. Firm's stock performance and market data is obtained from CRSP database. Data retrieved from individual data sources are matched by company identifier and year. Financial ratios and market metrics are calculated beforehand accordingly. The entire sample contains a total of 37,814 observations covering from year 1998 to year 2017. "*" "**" "***" denote significance at the 10%, 5%, and 1% levels, respectively.

Table 9 reports the effect of firm's propensity of debt issuance by CEO restricted stock compensation. In contrast to option compensation, CEO restricted stock compensation (Ln(Restricted stock) $_{t-1}$) doesn't show any statistical significance in describing the propensity of debt issuance under both pooled logit and random effect logit models. While some firm fundamental variables remain their explanatory power, none of the market variables is significant across the two models. In conclusion, firm's propensity of issuing new debt is not affected by CEO restricted stock compensation. This seems puzzling, as no evidence is shown for this compensation method as respect to either the pecking order theory or the trade-off theory.

Table 10: Estimated Marginal Effects of CEO Equity-based Compensation on the Likelihood of New Security Issuances

Estimated Marginal Effects of Option Compensation								
	Pooled Logit				Random-Effect Logit			
	At Mean	Z-stat	Average	Z-stat	At Mean	Z-stat	Average	Z-stat
SEO Issuance	-0.0135***	-10.83	-0.0128***	-11.02	-0.0111***	-7.26	-0.0108***	-7.35
Preferred Stock Issuance	0.0004	0.66	0.0004	0.62	0.00004	0.07	0.00005	0.07
Debt Issuance	-0.0372***	-7.43	-0.0383***	-7.22	-0.0343***	-6.16	-0.0353***	-6.00
Estimated Marginal Effects of Restricted Stock Compensation								
	Pooled Logit				Random-Effect Logit			
	At Mean	Z-stat	Average	Z-stat	At Mean	Z-stat	Average	Z-stat
SEO Issuance	-0.0057***	-2.73	-0.0058***	-2.71	-0.0070***	-3.08	-0.0071***	-3.04
Preferred Stock Issuance	-0.0014**	-2.12	-0.0012**	-2.38	-0.0001	-0.16	-0.0001	-0.17
Debt Issuance	0.0010	0.21	0.0010	0.21	0.0054	0.97	0.0054	0.97

This table provides estimated marginal effects of CEO equity-based compensation on the likelihood of new security issuances. Estimated marginal effects are calculated for both pooled and random effect logit models, which are post-estimated based on models shown through Table 4 to Table 9. "At mean" measures the estimated marginal effect when the underlying variable takes its mean value. "Average" measures the average estimated marginal effect when the underlying variable takes all different values within the sample. Variables follow the same format as indicated in Table 4 to Table 9. "*" "**" "***" denote significance at the 10%, 5%, and 1% levels, respectively.

4.2 The Estimated Marginal Effects of CEO Equity-based Compensation

Table 10 reports the estimated marginal effects on SEO issuance, preferred stock issuance, and debt issuance of both CEO option compensation and CEO restricted stock compensation[6]. As we can see, CEO option compensation has both significant and negative estimated marginal effects on the likelihood of SEO issuance and debt issuance. It means that, as CEO option compensation increases, the underlying firm will become less likely of issuing either new seasoned equity or new debt. More importantly, as shown by "At Mean" and "Average" under both pooled logit and random effect models,

[6] "At Mean" measures the estimated marginal effect when the underlying compensation variable is taking the mean value of the sample. While, "Average" measures the average estimated marginal effect when the underlying compensation variable takes on different values within the sample.

CEO option compensation generates almost 3 times the marginal effect (in absolute value) on debt issuance than on SEO issuance. However, the marginal effect on the preferred stock issuance is insignificant and negligible by this type of equity-based compensation. On the other side, CEO restricted stock compensation has only significant and negative estimated marginal on the likelihood of SEO issuance[7].In comparison, this marginal effect is much smaller (in absolute value) than the marginal effect associated with CEO option compensation, roughly only half under the pooled logit model and 70% under the random effect logit model. Last but not the least, since CEO restricted stock compensation yields insignificant estimated coefficients on preferred stock issuance and debt issuance, the related marginal effects are considered to possess weak explanatory power.

5 Conclusion

CEO equity-based compensation is designed to reduce the agency problem between top management and shareholders, since it is constructed to align the interest between the two parties by tying the compensation value with firm's equity performance. Firm's market value would depend on capital structure decisions as founded by past literatures, such as pecking order theory, signaling theory, and trade-off theory. As direct consequences, CEO equity-based compensation should have impacts on firm's capital structure decisions as evidenced by the behaviors of firm's new security issuances.

This research paper uses econometric models to empirically test the impacts on the firm's behaviors of issuing new securities by two most common CEO equity-based compensations – option compensation and restricted stock compensation. Statistical results show that CEO option compensation yields significant evidences that it will lower firm's propensity of SEO issuance and debt issuance. However, no direct influence is found on firm's preferred stock issuance by this compensation type. On the other side, CEO restricted stock compensation has only significant and negative impact on firm's propensity of SEO issuance, with no direct influence is found on the preferred stock issuance and debt issuance. Moreover, CEO option compensation has much higher estimated marginal effects (in absolute value) on SEO issuance than CEO restricted stock compensation does, meaning changing CEO option compensation would generate relatively larger influence on firm's likelihood of offering new seasoned equities.

6 References

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[7] CEO restricted stock compensation also has a significant and negative estimated marginal on the probability of preferred stock issuance under pooled logit regression. However, as discussed in section 4.2, the existence of firm specific effect is statically significant. Therefore, the estimated marginal effect of random effect logit model should be given more credibility over the pooled logit model.

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