

Did CEO's Equity-Based Compensation Benefit Firms at All?

– Evidence From the Regime Before Adoption of Statement of Financial Accounting Standards 123(R)

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Abstract

Previous studies documented empirical evidence that stock- and option-based compensation exacerbates the agency problem, which is opposite to the goal of awarding such kind of compensations to executives. If the stock- and option-based compensation is so bad, why did companies previously adopt such kind of compensation method. I use data from 1992-2005, a period before the adoption of FAS 123 (R), to examine whether the stock-based and option-based compensation benefits firms at all. I find that the firms, whose CEOs received higher values of stock- and option- compensations, have higher accruals quality and more predictable reported earnings, as well as enjoy lower implied costs of equity capital.

These findings are robust to various sensitivity tests. The results indicate that such compensation method at least provided certain benefits to the firms.

Keywords: Management and shareholders, Efficient contract, Executive equity-based incentive compensation, Accrual quality, Earnings predictability, Cost of equity capital

JEL Classification Codes: M4, M40, M41, M49

1. Introduction

I investigate whether the executive equity-based compensation incentive plans, which aim to reduce agency problem, benefit the firms at all. Empirically, I test whether and how the value

of the executive equity-based compensation of a firm are associated with the firm's earnings quality and implied cost of equity capital.

This paper is motivated by the concern whether executive equity-based compensation is an efficient compensation contract, which aligns the interest of the principal (shareholders) and the agent (managers). Early work (e.g., Berle and Means 1932) recognizes the separation of ownership and management as a source of corporate governance problems. To minimize this agency problem, firms grant managers stock-based and option-based compensation to align managers' personal wealth with firm value. (Note 1) However, the empirical evidence on this argument is mixed. On one hand, Hanlon et al. (2003) show that executive equity-based compensation aligns the interests of shareholders and managers. On the other hand, some studies cast doubt on the alignment of the principal and the agent's interest provided by executive equity-based compensation plan (e.g., Aboody and Kasznik 2000; Jenter 2001; Hall and Murphy 2002; Meulboek 2001). Therefore, given the importance of an efficient compensation contract for firms and the long-standing debate on equity-based compensation plans, further research is warranted. This paper provides additional empirical evidence by documenting the association between the equity-based compensation incentives and accruals quality and predictability of reported earnings as well as implied cost of equity capital. (Note 2)

I measure equity-based compensation incentives by a normalized variable, which captures the share of hypothetical CEO's total compensation that would come from a one percentage point increase in the value of the CEO's equity in the company (e.g., Core and Guay 2002; Bergstresser and Philippon 2006). Moreover, I use accruals quality as a proxy for the earnings quality in this paper because it is a popular measurement for earnings quality and the existing empirical evidence on the relationship between equity-based compensation incentives and accruals is inconsistent (e.g., Francis et al. 2005b; Bergstresser and Philippon 2006; Erickson et al. 2006). Furthermore, I use the predictability of reported earnings as the second proxy for the earnings quality because investors very much care about it and the capital market penalizes the firms who miss the earnings targets. Lastly, I measure implied cost of capital as Easton (2004), Gode and Mohanram (2003), Claus and Thomas (2001), and Gebhardt et al. (2001).

Using a sample of 6,509 firm-year observations for years 1992-2005, I examine and find that the accruals quality (both total and discretionary) and predictability increase with increasing levels of CEO incentives. Moreover, multivariate regressions of cost of equity capital estimates on the proxy for CEO incentives show that the implied cost of equity capital decreases with increasing in CEO incentives. The documented results suggest that more incentivized CEOs attempt to improve reported earnings quality and reduce discount rates, which benefit investors.

This paper extends the prior literature in following ways. First, the results in this paper provide additional evidence that CEO's decision-making does affect, at different levels, multiple features of earnings quality evaluated by investors in the capital market, which is part of the goal of the equity-based compensation. Second, I offer empirical evidence that

implied cost of equity capital decreases with increased CEO incentives. Overall, the empirical results in this paper indicate that the executive equity-based compensation is an efficient way to motivate CEO to improve firms' capital market performance. Thus, given the conflicting findings of the previous studies regarding whether the executive equity-based compensation aligns the agents' and owners' interests, the results of this paper have practical implication for researchers, investors, and firm compensation committees.

The rest of paper proceeds as follows. Section 2 discusses the prior related literature and develops hypotheses. Section 3 describes research design. Section 4 reports the empirical results and Section 5 concludes and suggests future research.

2. Relevant Literature and Hypotheses Development

The conflict interests exist between principals (stockholders) and agents (managers) (e.g., Jensen and Meckling 1976). A careful design of compensation packages is one way to align the interests of the two parties. An efficient compensation package should closely link pay to performance, and equity-based compensation has been promoted as a way to improve the pay-for-performance sensitivity. Intuitively, when managers do a good job, stock prices rise, and managers' personal wealth represented by stocks of the firm accordingly goes up. Although this argument is intuitive and appealing, the current empirical evidence is mixed.

Some studies support the argument that equity-based compensation motivates the agent to act to increase firm value. Jensen and Meckling (1976) analytically show that incentive compensation plans can be useful in aligning the incentives of managers with those of shareholders. (Note 3) Some empirical results are consistent with the incentive alignment view (e.g., Mehran 1995).

On the other hand, there is also growing literature that argues that equity-based compensation, and in particular, stock options, may not be an efficient way to compensate managers (e.g., Jenter 2001; Meulboek 2001; Hall and Murphy 2002). (Note 4) The reason that equity-based compensation may not be optimal is that it may induce managers to manipulate earnings to affect the valuation of equity (Jensen 2003). This behavior has been modeled by Bar-Gill and Bebchuk (2003) and Goldman and Slezak (2006), and has gathered much empirical support. (Note 5)

Therefore, there is no conclusive evidence on whether stock-based and option-based compensation is an efficient contract package. Since investors usually use financial reports to make financial decision (e.g., investment, financing) and higher quality earnings are more reliable indicators for future cash flows, investors (shareholders) should prefer high quality earnings. Thus, an efficient compensation contract aligning the interests of agent and principals should motivate managers (agent) to improve earnings quality.

If the equity-based compensation incentive could motivate managers to improve earnings quality, I expect that earnings quality increase with increasing levels of CEO incentive compensation package. (Note 6) My first hypothesis is stated in the alternative form as below.

H1_a: The earnings quality of a firm increases with increasing in executive equity-based based incentive compensation.

If awarding of executive equity-based compensation aligns the interests of principals and agents, the more incentivized CEOs whose wealth is more tied with firms' share prices will try to increase the firms' market value. One way to increase market value of firms is by reducing the cost of equity capital (Francis et al. 2004). Moreover, if the capital market regards rewarding incentive compensation package as a positive signal for the firm's future performance, then, the market may require lower rate of return. Therefore, I expect that more incentivized CEOs are likely to seek reduced cost of equity capital assuming the equity-based compensation is an efficient compensation package. The below second hypothesis is stated in the alternative form.

H2_a: The cost of equity capital of a firm decreases with increasing in executive equity-based incentive compensation.

Next section follows the research design used to test my hypotheses.

3. Research Design

In this section, I begin with sample selection procedure, followed by describing the models used to test my hypotheses.

3.1 Sample Selection

The sample selection involves multiple steps. First, I identify the firms with available executive compensation data from ExecuComp, which contains over 2500 companies, both active and inactive, over the years 1992-2005. (Note 7) The universe of firms includes the Standard & Poor's 1500, companies that were once part of the 1500 companies and are no longer traded, and companies that were removed from the S&P 1500 index that are still trading. This selection results in 17,703 firm-year observations, and 2,302 distinct firms.

In the second step, I obtain the accounting data from Compustat and returns data from CRSP from year 1983 to 2005 for firms chosen in the first step. I only include firms with financial data over rolling firm-specific ten-year windows (i.e., a firm is selected in the year t sample if it has available data in years $t-9$ to t). Therefore, 1992 is the first year for a firm to have available measures of earnings quality, consistent with the first year that ExecuComp has executive compensation data. This procedure leads to 10,206 firm-year observations, and 1,541 distinct firms.

In the next step, the sample is further restricted to firms with data required to compute cost of capital. The cost of equity capital for the sample firms is constructed by methodologies described in Gebhardt et al. (2001), Claus and Thomas (2001), Gode and Mohanram (2003), and Easton (2004). I calculate the cost of equity capital at the end of June for each year t , following Gebhardt et al. (2001) and Gode and Mohanram (2003). (Note 8) For all measures, I require that the firm has one- and two-year-ahead earnings-per-share forecasts (eps_{t+1} and eps_{t+2}) and either a three-year-ahead earnings-per-share forecasts (eps_{t+3}) or long-term growth forecast (Ltg). Data selection criteria in Gode and Mohanram (2003) and Easton (2004) require $eps_{t+2} > eps_{t+1} > 0$. Furthermore, I require at least 60 months of continuous return data

available in CRSP. These requirements lead to 8,114 firm-year observations and 1,377 distinct firms.

Finally, following prior literature, I delete the financial institutions and observations in which CEOs hold over five percent of the common shares outstanding. (Note 9) The final sample contains 6,509 CEO-year observations, with 1,195 distinct firms. Table 1 shows the selection process for the initial sample.

Table 1. Selection of sample

Descriptions	Firm-year observations	Distinct firms
Firm-years listed on ExecuComp database from 1992 to 2005 (including only CEO observations)	17,703	2,302
Less firm-years with		
Missing Compustat data to compute earning quality	<u>7,497</u>	<u>761</u>
subtotal	10,206	1,541
Missing Cost of Capital data	<u>2,092</u>	<u>164</u>
subtotal	8,114	1,377
Less firm-year with		
CEO holding over 5% of outstanding common shares and excluding financial institutions firms	<u>1,605</u>	<u>182</u>
Final Sample	6,509	1,195

3.2 Empirical Models

3.2.1 CEO Incentives and Earnings Quality

Prior studies suggest that earnings quality is jointly determined by intrinsic (innate) factors, such as firms' business models and operating environment, and by management's (discretionary) reporting and implementation decisions (e.g., Francis et al. 2004 and 2005a). Therefore, I use equation (1) below to examine H1, controlling for innate factors of earnings quality, which are identified in prior literature (Dechow and Dichev 2002; Francis et al. 2004 and 2005a).

$$EQ_{j,t}^k = \gamma_{0,t} + \gamma_{1,t} Assets_{j,t} + \gamma_{2,t} STDCFO_{j,t} + \gamma_{3,t} STDSale_{j,t} + \gamma_{4,t} OperCycle_{j,t} + \gamma_{5,t} NegEarn_{j,t} + \gamma_{6,t} Int_int_{j,t} + \gamma_{7,t} Int_Dummy_{j,t} + \gamma_{8,t} Cap_int_{j,t} + \theta_{1,t} Incentive_{j,t} + \xi_{j,t} \quad (1)$$

Where, $EQ_{j,t}^k$ represents firm j 's value of the k th earnings quality in year t , k includes accruals quality and predictability. The construction of the proxies for earnings quality follows the empirical procedures in Francis et al. (2004), a larger value of a proxy means poorer earnings quality. $Incentive_{j,t}$ is the proxy for the power of the equity-based incentives

of the CEO who manages firm j in year t . This *Incentive* measure is normalized in a way that it captures the share of hypothetical CEO's total compensation that would come from a one percentage point increase in the value of the CEO's equity in the company. For the convenience of notations in the regressions, I use a scaling that the larger (smaller) value of *Incentive* variable indicates a less (more) incentivized executive. Please refer to the details of measurements of all variables in the Appendix.

I use accrual quality and predictability to capture reported earnings quality because the following reasons. The accruals quality, a proxy for earnings quality, has been widely used in the literature and could capture how closely the earnings maps into cash. Researchers regard earnings mapping more closely into cash as higher quality (e.g., Penman 2001; Harris et al. 2000; Francis et al. 2005a). Moreover, Lee (1999) suggests that predictability is an essential component of valuation in analysts' forecasts. Predictability also impacts the investors investment decision (Francis et al. 2004). Therefore, I also examine whether and how the executive equity-based based compensation influences the predictability of reported earnings. I define predictability of earnings as the ability of past earnings to predict future earnings, which is reflected in the variance of the shocks in the univariate earnings process (i.e., as the variance increases, the predictability of earnings decreases) (Lipe 1990).

Since investors and analysts view the more persistent and/or predictable earnings of higher quality, CEOs tend to provide information helpful in earnings forecasts. For example, Malmendier and Tate (2005) argue that superstar CEOs manage earnings to report strong financial performance to the stock market. Thus, I expect that more incentivized CEOs would increase the magnitude of predictability of earnings, thereby facilitating outsiders to predict reported earnings. In a sum, if the CEO equity-based incentives improve earnings quality (i.e., the more incentivized CEOs are associated with firms having better earnings quality), then a positive relation between *Incentive* and one or more k th proxies for earnings quality ($EQ_{j,t}^k$)

will be observed in equation (1) ($\theta_{1,t} > 0$).

These control variables are the innate determinants of earnings quality in equation (1). Following Francis et al. (2004), I expect that *Assets* variable is negatively associated with each proxy for the earning quality, and each proxy for earning quality is positively associated with *STDCFO*, *STDSale*, *OperCycle*, and *NegEarn*.

3.2.2 CEO Incentives and Cost of Capital

The implied cost of equity capital of a firm increases with the level of perceived risk of the firm. If the market regards a heavily awarding executive equity-based incentive compensation as a positive (negative) signal about the firm's future performance, the market may demand a lower (higher) rate of rate, which can be reflected at implied cost of equity capital. Therefore, I test H2 using the below equation (2).

$$RP_{j,t} = \lambda_{0,t} + \lambda_{1,t} Beta_{j,t} + \lambda_{2,t} BM_{j,t} + \lambda_{3,t} Size_{j,t} + \theta_{1,t} Incentive_{j,t} + \varepsilon_{j,t} \quad (2)$$

Where, $RP_{j,t}$ represent proxies for risk premia (including RP_PEG, RP_OJ, RP_CT, and RP_GLS) for firm j in year t , calculated as the estimates of implied cost of capital, which are estimated by following Easton (2004), Gode and Mohanram (2003), Claus and Thomas (2001), and Gebhardt et al. (2001), respectively, less the risk free rate. (Note 10). These four estimates of risk premia are used in primary analyses separately, and the average value of these four proxies of estimated implied risk premia is used to analyze overall results. Please refer to the details of computations of all variables in the regression in the Appendix.

If the impact of CEO equity-based incentives in capital markets is perceived as favorable, a positive relationship between $Incentive_{j,t}$ and $RP_{j,t}$ will be expected in equation (2) ($\theta_{1,t} > 0$). Moreover, I expect that risk premium increase (decrease) with beta and BM (size) (e.g., Fama and French 1993).

4. Empirical Results

4.1 Sample Descriptive Statistics and Correlations

Panel A of Table 2 provides descriptive statistics for the sample used to test my hypotheses. The median values of total assets and sales are 956.54 and 968.99 million dollars, respectively, which show that firms in this sample tend to be large firms compared with the population in the Compustat database. (Note 11) The mean value of accruals quality (AQ) in the sample is 0.0369. The mean values of four proxies for the implied cost of equity capital are 0.1098 (r_{EPG}), 0.1234 (r_{OJ}), 0.1002 (r_{CT}), and 0.0968 (r_{GLS}), respectively, which are estimated by following Easton (2004); Gode and Mohanram (2003), Claus and Thomas (2001), and Gerhardt et al. (2001), respectively. These implied cost of capital estimates are close to those documented in previous studies.

Panel B of Table 2 shows the sample has a good coverage of industry membership of population firms, using the Fama and French (1997) 48 industry classification. The business service industry comprises the largest proportion of the sample (11.12 percent).

Table 2. Sample statistics

Panel A. Sample descriptive statistics

Variable	Mean	Std Dev	10%	25%	Median	75%	90%
AT \$mil	3034.12	5954.93	217.21	421.41	956.54	2511.96	7483.00
Sales \$mil	2450.56	4120.87	212.81	428.59	968.99	2404.37	6030.70
Size	7.1568	1.3048	5.5382	6.2274	7.0189	8.0466	8.9802
BM	0.5394	0.5035	0.1456	0.2570	0.4329	0.6977	0.9947
Beta	1.1183	1.2050	-0.1514	0.3498	0.9513	1.7056	2.6408
Assets	6.9490	1.3551	5.3065	5.9702	6.8051	7.7800	8.8588
STDCFO	0.0720	0.0542	0.0223	0.0382	0.0600	0.0908	0.1295
STDSale	0.2013	0.1638	0.0541	0.0988	0.1617	0.2558	0.3823
OperCycle	3.7572	0.8337	2.6818	3.6091	3.9589	4.2349	4.4792
NegEarn	0.9588	1.4594	0.0000	0.0000	0.0000	1.0000	3.0000

Cap_int	0.4660	0.6118	0.0712	0.1308	0.2385	0.5025	1.1749
Int_int	0.0491	0.0868	0.0000	0.0000	0.0137	0.0599	0.1561
Int_dummy	0.3772	0.4847	0.0000	0.0000	0.0000	1.0000	1.0000
AQ	0.0369	0.0328	0.0088	0.0164	0.0293	0.0481	0.0708
DisAQ	-0.0001	0.0268	-0.0250	-0.0140	-0.0040	0.0089	0.0270
Predictability	0.0836	0.2433	0.0009	0.0057	0.0223	0.0717	0.1859
Incentive	0.1263	0.1548	0.3126	0.1505	0.0724	0.0333	0.0144
r_{PEG}	0.1098	0.0413	0.0692	0.0845	0.1007	0.1260	0.1614
r_{OI}	0.1234	0.0415	0.0839	0.0972	0.1134	0.1395	0.1756
r_{CT}	0.1002	0.0625	0.0173	0.0310	0.1127	0.1393	0.1683
r_{GLS}	0.0968	0.0363	0.0481	0.0753	0.0980	0.1190	0.1422
r_{ave}	0.1072	0.0298	0.0709	0.0871	0.1053	0.1233	0.1435

The above descriptive statistics of the accounting sample is obtained from 6,509 firm-year observations for a period of 1992 to 2005.

AT = the mean value of total assets for the full sample, unit is million dollars.

Sales = the mean value of gross sales, scaled in millions.

Please refer to the measures of variables in Appendix.

Panel B. Fama French 48 industry membership for firms in the sample

Industry	Frequency	Percent
BusSv	724	11.12
Util	637	9.79
Rtail	620	9.53
Chips	491	7.54
Mach	330	5.07
Comps	302	4.64
Drugs	216	3.32
Enrgy	214	3.29
MedEq	211	3.24
Chems	206	3.16
Trans	185	2.84
LabEq	173	2.66
Whsl	173	2.66
Meals	151	2.32
Hlth	145	2.23
Books	144	2.21
Paper	133	2.04
Hshld	131	2.01
Steel	127	1.95
Autos	111	1.71
Food	101	1.55

Telcm	98	1.51
Clths	92	1.41
BldMt	87	1.34
PerSv	80	1.23
Txtls	75	1.15
Fun	70	1.08
ElcEq	66	1.01
Cnstr	62	0.95
Boxes	58	0.89
Mines	48	0.74
Misc	37	0.57
Rubber	34	0.52
Toys	34	0.52
FabPr	32	0.49
Agric	30	0.46
Beer	17	0.26
Ships	15	0.23
Soda	13	0.2
Guns	11	0.17
Coal	10	0.15
Aero	8	0.12
Gold	7	0.11
Total	6,509	100

In Table 3, the Pearson (above the diagonal) and Spearman (below the diagonal) correlations between Incentive and AQ, Predictability, RP_PEG, RP_GLS, RP_CT, and RP_OJ are consistent with my expectation that highly motivated CEOs are associated with better accruals quality, more predictable earnings, and lower implied risk premia. The results are not only statistically significant, except the pair between Incentive and AQ, but also economically significant. For example, the Spearman correlation between Incentive and RP_OJ (0.185, P-value <0.001) suggests that the implied risk premium decreases 0.185 units with one unit increase in the CEO incentive compensation package. The correlations among independent variables suggest that there is no multicollinearity concern.

Table 3. Pearson (above the diagonal) and Spearman (below the diagonal) correlations for variables in regressions (I suppress the subscripts j, t of each variable in the table.)

	Incentive	AQ	Predictability	RP_PEG	RP_GLS	RP_CT	RP_OJ	Asset	NegEarn	OperCycle	STDCFO	STDSale	Cap_int	Int_int	Int_dummy	Beta	BM	Size
Incentive		0.008	0.098	0.121	0.052	0.086	0.162	-0.078	0.058	-0.016	-0.050	-0.081	0.098	-0.139	0.091	-0.092	0.279	-0.311
AQ	-0.013		<0.001	0.185	-0.035	0.056	0.137	-0.264	0.284	0.047	0.511	0.277	-0.303	0.226	-0.186	0.175	-0.109	<0.001
Predictability	0.313	<0.001		0.154	0.005	0.080	0.157	0.071	0.253	0.075	0.065	0.004	<0.001	0.050	-0.020	0.028	0.113	<0.001
RP_PEG	0.105	0.077	<0.001		0.024	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.771	<0.001	0.124	0.028	0.001	<0.001	0.033
RP_GLS	0.120	0.236	0.117	0.019		0.172	0.966	-0.168	0.347	0.049	0.196	0.130	-0.069	0.068	-0.083	0.173	0.227	0.345
RP_CT	<0.001	<0.001	<0.001	0.122	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP_OJ	0.031	-0.023	<0.001	0.028	0.012	0.001	0.001	-0.026	-0.094	-0.118	-0.010	0.030	-0.063	-0.145	-0.025	-0.084	-0.024	0.033
Asset	0.013	0.059	0.045	0.024	0.322	0.952	0.040	0.040	<0.001	0.432	0.027	0.027	<0.001	0.047	0.047	0.001	0.058	0.007
NegEarn	0.060	0.064	0.089	0.216	0.017	0.168	<0.001	-0.063	0.059	-0.018	0.045	0.038	-0.094	-0.025	-0.029	0.027	0.024	0.102
OperCycle	<0.001	<0.001	<0.001	<0.001	0.162	<0.001	<0.001	<0.001	<0.001	0.163	0.001	0.004	0.001	0.041	0.018	0.029	0.049	<0.001
STDCFO	0.185	0.162	0.130	0.941	0.007	0.215	-0.125	0.311	0.060	0.114	0.073	0.031	0.031	0.013	-0.007	0.124	0.283	0.348
STDSale	<0.001	<0.001	<0.001	0.574	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.012	0.290	0.595	<0.001	<0.001	<0.001
Cap_int	-0.090	-0.280	0.113	-0.197	-0.020	-0.054	-0.157	-0.106	-0.055	-0.301	-0.189	0.294	0.294	-0.186	0.192	-0.143	0.149	0.785
Int_int	<0.001	<0.001	<0.001	<0.001	0.113	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Int_dummy	0.089	0.306	0.280	0.346	-0.098	0.050	0.303	-0.088	0.087	0.319	0.086	0.086	-0.033	0.278	-0.126	0.192	0.039	-0.151
Beta	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.008	<0.001	<0.001	<0.001	0.001	<0.001
BM	-0.049	0.104	0.080	0.063	-0.139	0.005	0.049	-0.118	0.115	0.057	-0.199	0.013	0.013	0.180	-0.044	0.072	-0.016	0.032
Size	0.000	<0.001	<0.001	<0.001	<0.001	0.713	0.000	<0.001	<0.001	<0.001	<0.001	<0.001	0.288	<0.001	0.000	<0.001	0.191	0.011
	-0.093	0.562	0.049	0.291	-0.002	0.063	0.163	-0.355	0.292	0.111	0.388	0.388	-0.302	0.327	-0.247	0.185	-0.212	-0.126
	<0.001	<0.001	0.000	<0.001	0.898	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	-0.094	0.349	-0.015	0.224	0.023	0.063	0.128	-0.273	0.123	-0.135	0.504	0.504	-0.344	0.009	-0.067	0.115	-0.133	-0.111
	<0.001	<0.001	0.282	<0.001	0.089	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.484	<0.001	<0.001	<0.001	<0.001
	0.085	-0.411	0.056	-0.119	-0.027	-0.084	-0.018	0.347	-0.042	-0.093	-0.477	-0.468	<0.001	-0.239	0.397	-0.157	0.290	0.090
	<0.001	<0.001	<0.001	<0.001	0.032	<0.001	0.154	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	-0.141	0.286	0.039	0.104	-0.050	0.001	0.018	-0.212	0.216	0.205	0.364	0.135	-0.279	<0.001	-0.509	0.297	-0.234	0.070
	<0.001	<0.001	0.003	<0.001	<0.001	0.941	0.150	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	0.087	-0.242	-0.018	-0.118	-0.038	-0.035	-0.034	0.174	-0.133	-0.118	-0.297	-0.183	0.268	-0.863	<0.001	-0.171	0.239	0.007
	<0.001	<0.001	0.161	<0.001	0.002	0.005	0.007	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.593
	-0.085	0.202	0.019	0.203	-0.066	0.044	0.142	-0.127	0.180	0.087	0.241	0.174	-0.182	0.257	-0.178	<0.001	-0.071	-0.052
	<0.001	<0.001	0.141	<0.001	<0.001	0.000	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	0.372	-0.171	0.123	0.223	-0.017	0.020	0.303	0.131	0.059	-0.036	-0.285	-0.185	0.302	-0.328	0.266	-0.089	<0.001	-0.336
	<0.001	<0.001	<0.001	<0.001	0.159	0.101	<0.001	<0.001	<0.001	0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	-0.331	-0.182	0.001	-0.363	-0.021	-0.094	-0.372	0.779	-0.158	-0.071	-0.162	-0.187	0.157	0.031	0.013	-0.040	-0.362	<0.001
	<0.001	<0.001	0.968	<0.001	0.088	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.013	0.300	0.001	<0.001	<0.001

Table 3 reports correlation statistics among dependent and independent variables for the sample firms of 6,509 firm-year observations. The P-values for the test statistics are reported under the estimated correlation coefficients, based on two-sided t-tests. Please refer to the measures of variables in Appendix.

4.2 Regression Results

Table 4 reports Fama and MacBeth (1973) regression results. Equations (1) test the effect of the executive equity-based compensation on the earnings quality (i.e., total accruals quality, AQ; discretionary accrual quality, DisAQ; predictability of earning, Predictability). The estimated coefficients on *Incentive*, the variable capturing the level of executive equity-based incentive, are 0.007 (P-value <0.01), 0.007 (P-value <0.01), and 0.112 (P-value <0.01) for total accrual quality (AQ) [in column (1)], discretionary accrual quality (DisAQ) [in column (2)], and predictability (Predictability) [in column (3)] regressions, respectively. These results are not only statistically significant but also economically significant: the total and discretionary accrual quality increased by 0.007 units and predictability increased by 0.112 units with one unit increase in the CEO equity-based incentive compensation package. The results indicate that CEOs motivated by equity-based compensation affect accruals quality through their decisions, that less (more) incentivized CEOs use larger (smaller) discretionary accruals. Moreover, the results suggest that earnings are more predictable for firms managed by more incentivized CEOs. The signs of significant control variables in the three regressions are generally consistent with my expectations.

Table 4. Coefficient estimates and t-statistics (*in italics*) from regressions of earnings attributes on CEO equity-based incentives^a (I suppress the subscripts j, t of each variable in the table)

$$EQ_{j,t}^k = \gamma_{0,t} + \gamma_{1,t} Assets_{j,t} + \gamma_{2,t} STDCFO_{j,t} + \gamma_{3,t} STDSale_{j,t} + \gamma_{4,t} OperCycle_{j,t} + \gamma_{5,t} NegEarn_{j,t} + \gamma_{6,t}$$

$$Int_int_{j,t} + \gamma_{7,t} Int_Dummy_{j,t} + \gamma_{8,t} Cap_int_{j,t} + \theta_{1,t} Incentive_{j,t} + \xi_{j,t} \quad (1)$$

Column		AQ (1)	DisAQ (2)	Predictability (2)
Independent				
<u>Variable</u>	<u>Expected Sign</u>			
Intercept	?	0.024*	-0.005†	-0.114*
		<i>8.33</i>	<i>-2.02</i>	<i>-4.34</i>
Assets	-	-0.002*	0.002*	0.018*
		<i>-5.4</i>	<i>6.68</i>	<i>6.93</i>
NegEarn	+	0.002*	-0.002*	0.032*
		<i>6.36</i>	<i>-7.83</i>	<i>14.93</i>

OperCycle	+	0.001*	-0.001†	0.013*
		<i>3.11</i>	<i>-2.74</i>	<i>3.57</i>
STDCFO	+	0.229*	0.055*	0.081
		<i>29.79</i>	<i>7.73</i>	<i>1.33</i>
STDSale	+	0.021*	-0.007*	0.039†
		<i>7.26</i>	<i>-4.02</i>	<i>2.1</i>
Cap_int	?	-0.006*	-0.006*	0.015†
		<i>-8.71</i>	<i>-8.71</i>	<i>2.41</i>
Int_int	?	0.014†	0.014†	0.023
		<i>2.63</i>	<i>2.63</i>	<i>-0.71</i>
Int_dummy	?	0	0	-0.019†
		<i>-0.18</i>	<i>-0.18</i>	<i>-2.61</i>
<i>Incentive</i>	+	0.007*	0.007*	0.112*
		<i>2.75</i>	<i>2.73</i>	<i>5.44</i>
Adj. R^2		0.341	0.06	0.07

^a This table reports the coefficient estimates from annual regressions of each earnings attribute on the set of innate determinants and executive equity-based compensation incentive; t-statistics (*in italics*) are based on the standard errors of the annual coefficient estimates. The last row shows the average adjusted R^2 from the 14 annual regressions (1992 -2005).

* indicates statistically significant at 0.01 level. † indicates statistically significant at 0.05 level. ‡ indicates statistically significant at 0.1 level.

Measurements of variables:

Assets = log of total assets;

EQ = AQ and Predictability.

Please refer to the measures of other variables in Appendix.

Table 5 reports the results of estimating regression equation (2) that tests the cost of equity capital effects of CEO incentives. The estimated coefficients on *Incentive* are 0.006 (P-value >0.1), 0.005 (P-value <0.05), 0.023 (P-value <0.01), 0.002 (P-value <0.05), and 0.005 (P-value <0.01) for RP_PEG [in column (1)], RP_OJ [in column (2)], RP_CT [in column (3)], RP_GLS [in column (4)], and RP [in column (5)] regressions, respectively. The results suggest that the equity market regards rewarding equity-based incentive compensation package as a positive signal of the firm's future performance, thereby, demanding a lower cost of equity capital. Control variables in equation (2) are risk proxies known to impact the cost of capital: beta, firm size, and book-to-market ratio (Fama and French 1993). The control variables are generally statistically significant with predicted signs, except for risk premium proxy RP_GLS model. (Note 12)

Table 5. Results of annual cross-sectional regressions of cost of capital on the CEO

equity-based incentives^a (I suppress the subscripts j, t of each variable in the table.)

$$RP_{j,t} = \lambda_{0,t} + \lambda_{1,t} Beta_{j,t} + \lambda_{2,t} BM_{j,t} + \lambda_{3,t} Size_{j,t} + \theta_{1,t} Incentive_{j,t} + \varepsilon_{j,t} \quad (2)$$

Column		RP_PEG (1)	RP_OJ (2)	RP_CT (3)	RP_GLS (4)	RP (5)
Independent	Expected					
<u>Variable</u>	<u>Sign</u>	<u>Coef.</u>	<u>Coef.</u>	<u>Coef.</u>	<u>Coef.</u>	<u>Coef.</u>
Intercept	?	0.118*	0.123*	0.075*	0.053*	0.091*
		<i>37.18</i>	<i>38.54</i>	<i>14.43</i>	<i>19.32</i>	<i>39.92</i>
Beta	+	0.006*	0.004*	0.002*	-0.003*	0.002*
		<i>12.11</i>	<i>8.83</i>	<i>2.85</i>	<i>-7.97</i>	<i>6.38</i>
BM	+	0.007*	0.012*	-0.007†	-0.001‡	0.002*
		<i>7.79</i>	<i>11.6</i>	<i>-2.05</i>	<i>-1.57</i>	<i>4.57</i>
Size	-	-0.011*	-0.009*	-0.003*	-0.001*	-0.006*
		<i>-25.97</i>	<i>-22.48</i>	<i>-4.9</i>	<i>-4.57</i>	<i>-20.48</i>
<i>Incentive</i>	+	0.006	0.005†	0.023*	0.002†	0.005*
		<i>0.81</i>	<i>1.93</i>	<i>5.15</i>	<i>1.76</i>	<i>3.34</i>
Adj. R ²		0.181	0.165	0.027	0.043	0.112

^a The coefficients and t-statistics (*in italics*) are based on 14 annual Fama-MacBeth regressions from 1992 to 2005.

The dependent variables (RP_PEG, RP_OJ, RP_CT, RP_GLS, and RP) are proxies for risk premia (implied cost of capital [r_{EPG} , r_{OJ} , r_{CT} , r_{GLS} , and r_{ave}] less risk-free rate).

* indicates statistically significant at 0.01 level. † indicates statistically significant at 0.05 level. ‡ indicates statistically significant at 0.1 level.

Please refer to the measures of other variables in Appendix.

4.3 Sensitivity Tests

4.3.1 Incentive Portfolio Tests

I estimate mean values of risk premia portfolios formed by the ranked value of equity-based incentive for the sample firms. The higher the rank, the more incentivized the CEO. Untabulated results show that, generally, risk premia (RP_GLS, RP_CT, RP_OJ, and RP_PEG) monotonically decrease with the increase in ranks of *Incentive*. These results are consistent with results reported in Table 5 that firms having more incentivized CEOs enjoy a lower cost of capital.

4.3.2 Extreme Values of Variables in Regressions

Francis et al. (2004) use rank regression to mitigate the extreme value observation effects of

earnings attributes on estimates of regressions. To check whether my results are affected by extreme observations in regressions, I use ranked values of proxies for earnings quality and *Incentive* (Note 13) to re-run all regression equations, the results of which are similar to reported ones.

4.3.3 Alternative Econometric Methods

To ensure that the reported results are not sensitive to different econometric estimate methods, I repeat the analysis for Tables 4 and 5, clustering the standard errors by firm to account for possible correlation of regression residuals (Petersen 2009). The coefficient estimates are the qualitatively same as reported ones, and t-statistics of estimated coefficients are smaller to those obtained by using Fama and MacBeth (1973) regression procedure.

4.3.4 Firm Specific, Year and Industry Effects

To address the firm-specific effect, I also run the regressions using fixed effect (by firms). The results of regressions of proxies for earnings quality on CEO incentives are weaker than those in Table 4. That might be due to that adding year and industry dummy variables reduce the sample size to less than half of the observations of the original sample. The results of regressions of cost of capital on CEO incentives are qualitatively similar to those reported in Tables 5.

4.3.5 Controlling for Governance Effect

To test whether the corporate governance has any effect on implied cost of capital, I add G index (Gompers et al. 2003) into regression equations (1) and (2) and analyze tables 4 and 5 again. Untabulated results are qualitatively similar to reported results.

4.3.6 Regulated Industry Effect

Utility industry is regulated strictly by the Federal Government. I delete the observation classified in the utility industry. The results are stronger than those reported in tables 4 and 5. (Note 14)

4.4 Discussion

Overall the sensitivity tests show that more incentivized CEOs tend to lead firms with better performances compared with those of firms managed by less incentivized CEOs (i.e., higher earnings quality and lower cost of capital). However, the results documented in this section must be interpreted with caution. Because this is an experiment without random assignment, the analysis of causality cannot be finally concluded. The reasons include the possibility that some unobserved corporate characteristics are correlated with equity-based compensation incentive and is related to cost of capital. Although I control for governance index (Gompers et al. 2003), but it is still possible to omit unobservable factors (e.g., corporate culture) affecting earnings quality and/or cost of capital. Moreover, I use implied cost of equity capital to proxy for the ex-ante cost of capital, which might not be as same as the “true” expected cost of capital in investors’ minds.

5. Conclusions and Summary

I investigate whether executive equity-based compensation is an effective compensation contract that aligns interests of the principal and the agent. Using the sample of the Standard & Poor's 1500 companies for years 1992-2005, I find that more incentivized CEOs (proxied by the sensitivity of CEOs' wealth to the change of firms' market value) tend to be associated with firms with higher earnings quality defined as in Francis et al. (2004) and lower implied cost of equity capital. The cost of capital effect of CEO incentives is also confirmed in the tests for the five portfolios formed on the ranked CEO incentive levels. I interpret these results as that the stock-based and option-based executive compensation is an efficient contract for aligning the interests of principal and agent (i.e., the more "incentivized" CEOs tend to increase the firm's earnings quality and to reduce cost of capital of firms).

This study contributes to the existing literature in two ways. First, I test and find that the impact of CEO incentive on multiple aspects of earnings quality vary with each earnings quality proxy, suggesting that efficient compensation contracts motivate managers to improve earnings quality. Second, I show that perceived risk decreases with the increased level of CEO equity-based incentives by investigating the CEO incentive effects on implied cost of equity capital. These results indicate that the market perceives that firms managed by more incentivized CEOs are less risky than firms managed by less incentivized CEOs. The documented results indicate that executive incentive compensation at least benefits the investors at certain degree within a certain period.

Since how to align the interests between the principal (owners) and agent (managers) is a crucial and unsettled question in academia and industry, future research could contribute this line of research by providing new evidence. For example, it is interesting and important to know whether and how the adoption of SFAS 123(R) influences the effects of equity-based incentive compensations on the firm's performance and financial positions. Moreover, in the post-SFAS 123(R), there is a decline in the usage of equity-based incentive compensation. Future research may look at whether firms innovate new compensation schemes to motivate managers to work hard and the extent to which, if they adopt any, the new incentive compensations reduce the agency cost.

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References

- Aboody, D., & R. Kasznik. (2000). CEO stock option awards and the timing of corporate voluntary disclosures *Journal of Accounting and Economics*, 29, 73-100.
- Bar-Gill, O., & L. Bebchuk. (2003). Misreporting corporate performance. *Working Paper*. Harvard Law School.
- Bebchuk, L., J. Fried, & D. Walker. (2002). Managerial power and rent extraction in the design

of executive compensation. *The University of Chicago Law Review*, 69, 751-846.

Berle, A., & G. Means. (1932). *The Modern corporation and private property*. Macmillan, New York.

Bergstresser, D., & T. Philippon. (2006). CEO incentives and earnings management. *Journal of Financial Economics*, 80, 511-529.

Bickley, J., S. Bhagat, & R. Lease. (1985). The impact of long-range managerial compensation plans on shareholder wealth. *Journal of Accounting and Economics*, 7, 115-129.

Claus, J., & J. Thomas. (2001). Equity premia as low as three percent? Evidence from analysts' earnings forecasts for domestic and international stock markets. *Journal of Finance*, LVI(6), 1629-1666.

Core, J., & W. Guay. (1999). The use of equity grants to manage optimal equity incentive levels. *Journal of Accounting and Economics*, 28, 151-184.

Dechow, P., & I. Dichev. (2002). The quality of accruals and earnings: The role of accrual estimation errors. *The Accounting Review*, 77(Supplement), 35-59.

Demsetz, H., & K. Lehn. (1985). The structure of corporate ownership: Causes and consequences. *Journal of Political Economy*, 93(6), 1155-77.

Easton, P. (2004). PE ratios, PEG ratios, and estimating the implied expected rate of return on equity capital. *The Accounting Review*, 79, 73-95.

Eason, P., T. Harris, & J. Ohlson. (1992). Aggregate accounting earnings can explain most of security returns. *Journal of Accounting and Economics*, 15, 119-142.

Efendi, J., A. Srivastav, & E. Swanson. (2004). Why do corporate managers misstate financial statements? The role of option compensation, corporate governance, and other factors. *Working Paper*. Texas A&M University.

Erickson, M., M. Hanlon, & E. L. Maydew. (2006). Is there a link between executive equity incentives and accounting fraud?. *Journal of Accounting Research*, 44(1), 113-143.

Fama, E.F., & K. French. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, 33, 3-56.

Fama, E.F., & K. French. (1996). Multifactor Explanations of Asset Pricing Anomalies. *The Journal of Finance*, 51(1), 55-84.

Fama, E.F., & K. French. (1997). Industry costs of equity. *Journal of Financial Economics*, 43, 153-193.

Fama, E. F., & J. MacBeth. (1973). Risk Return and Equilibrium: Empirical Tests. *Journal of Political Economy*, 81, 607-636.

Francis, J., R. LaFond, P.M. Olsson, & K. Schipper. (2004). Cost of equity and earnings

attributes. *The Accounting Review*, 79(4), 967-1010.

Francis, J., R. Lafond, P.M., Olsson, & K. Schipper. (2005a). The market pricing of accruals quality. *Journal of Accounting and Economics*, 39, 295-327.

Francis, J., P. Olsson, & K. Schipper. (2005b). Call options and accruals quality. *Working paper*. Duke University.

Gaver, J., K.Gaver, & J. Austin, (1995). Additional evidence on bonus plans and income management. *Journal of Accounting and Economics*, 19, 3-28.

Gebhardt, W., C. Lee, & B. Swaminathan. (2001). Toward and Implied Cost of Capital *Journal of Accounting Research*, 39(1), 135-176.

Gode, D., & P. Mohanram. (2003). Inferring the cost of capital Using the Ohlson-Juettner Model. *Review of Accounting Studies*, 8, 399-431.

Goldman, E., & S.L. Slezak. (2006). An equilibrium model of incentive contracts in the presence of information manipulation. *Journal of Financial Economics*, 80(3), 603-626.

Gompers, P.A., J.L. Ishii, & A. Metrick. (2003). Corporate governance and equity prices. *Quarterly Journal of Economics*, 118(1), 107-155.

Hall, B.J., & K. Murphy. (2002). Stock options for undiversified executives. *Journal of Accounting and Economics*, 33, 3-42.

Hanlon, M., S. Rajgopal, & T. Shevlin. (2003). Are executive stock options associated with future earnings? *Journal of Accounting and Economics*, 36, 3-43.

Harris, T., E. Huh, & P. Fairfield. (2000). Gauging profitability on the road to valuation. In *Strategy Report, Global Valuation and Accounting*. New York, NY: Morgan Stanley Dean Witter.

Healy, P. (1985). The effect of bonus schemes on accounting decisions. *Journal of Accounting and Economics*, 7, 85-107.

Himmelberg, C., G. Hubbard, & D. Palia. (1999). Understanding the determinants of managerial ownership and the link between ownership and performance. *Journal of Financial Economics*, 53, 353-384.

Jensen, M. (2003). Paying People to lie: The trust about the budgeting process. *European Financial Management*, 9, 379-406.

Jensen, M., & W. Meckling. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3, 305-360.

Jenter, D. (2001). Understanding high-powered incentives. *Working paper*. Harvard Business School.

Johnson, S., H. Ryan, & Y. Tian. (2005). Executive compensation and corporate fraud. *Working Paper*. Louisiana State University.

- Jones, J. (1991). Earnings management during import relief investigations. *Journal of Accounting Research*, 29, 193-228.
- Ke, B. (2002). Why do CEOs of publicly traded firms prefer reporting small increases in earnings and long duration of consecutive earnings increases? *Working Paper*. Pennsylvania State University.
- Lee, C. (1999). Accounting-based valuation: Impact on business practices and research. *Accounting Horizons*, 13, 413-425.
- Lewellen, W., C. Loderer, & A. Rosefeld. (1985). Merger decisions and executive stock ownership in acquiring firms. *Journal of Accounting and Economics*, 7, 209-231.
- Lipe, R. (1990). The relation between stock returns and accounting earnings given alternative information. *The Accounting Review*, 65(1), 49-71.
- Malmendier, U., & G. Tate. (2005). Superstar CEOs. *Working paper*. Stanford University.
- Meulbroek, L. (2001). The efficiency of equity-linked compensation: understanding the full cost of awarding executive stock options. *Financial Management*, 30, 5-30.
- Rajgopal, S., & T. Shevlin. (2002). Empirical evidence on the relation between stock option compensation and risk taking. *Journal of Accounting and Economics*, 33(2), 145-171.
- Ohlson, J. (1995). Earnings, Book Values and Dividends in Equity Valuation. *Contemporary Accounting Research*, 11(2), 661-687.
- Ohlson, J., & B. Juettner-Nauroth. (2005). Expected EPS and EPS growth as determinants of Value. *Review of Accounting Studies*, 10(2-3), 349-365.
- Penman, S. (2001). *Financial Statement Analysis and Security Valuation*. New York, NY: McGraw-Hill / Irwin.
- Petersen, M. (2009). Estimating standard errors in finance panel data sets: Comparing approaches. *The Review of Financial Studies*, 22, 435-480.
- Yermack, D. (1997). Good Timing: CEO stock option awards and company news announcements. *Journal of Finance*, 52, 449-477.
- Warfield, T., J. Wild, & K. Wild. (1995). Managerial ownership, accounting choices, and informativeness of earnings. *Journal of Accounting and Economics*, 20(1), 61-91.

Appendix: Variable Measurement

A.1 Proxies for earning quality

The construction of these earnings quality proxies follows the empirical procedures in Francis et al. (2004), adopting the form that a larger value of the proxy indicates the lower quality of the earnings. The below two proxies for earnings quality are measured on a firm- and year-specific basis, using the accounting or market data for rolling ten-year windows, $t-9 \dots t$. This procedure requires firms with time-series data. This requirement biases my sample toward surviving firms (larger and more successful firms). However, the advantage of using the firm as its own benchmark outweighs the sample selection bias. (Note 15)

Accruals quality

I measure accrual quality using Francis et al. (2005a) model.

$$TCA_{j,t} = \phi_{0,j} + \phi_{1,j} CFO_{j,t-1} + \phi_{2,j} CFO_{j,t} + \phi_{3,j} CFO_{j,t+1} + \phi_{4,j} \Delta Rev_{j,t} + \phi_{5,j} PPE_{j,t} + \nu_{j,t} \quad (A1)$$

Where, $TCA_{j,t}$ is firm j 's total current accruals in year t , calculated as $TCA_{j,t} = \Delta CA_{j,t} - \Delta CL_{j,t} - \Delta Cash_{j,t} + \Delta STDEBT_{j,t}$. $CFO_{j,t}$ is firm j 's cash flow from operations in year t ($CFO_{j,t} = NIBE_{j,t} - TA_{j,t}$). $NIBE_{j,t}$ is firm j 's net income before extraordinary items (Data #18) in year t . $TA_{j,t}$ is firm j 's total accruals in year t ($TA_{j,t} = \Delta CA_{j,t} - \Delta CL_{j,t} - \Delta Cash_{j,t} + \Delta STDEBT_{j,t} - DEPN_{j,t}$). $\Delta CA_{j,t}$ is firm j 's change in current assets (Data #4) between year $t-1$ and year t . $\Delta CL_{j,t}$ is firm j 's change in current liabilities (Data #5) between year $t-1$ and year t . $\Delta Cash_{j,t}$ is firm j 's change in cash (Data #1) between year $t-1$ and year t . $\Delta STDEBT_{j,t}$ is firm j 's change in debt in current liabilities (Data #34) between year $t-1$ and year t . $DEPN_{j,t}$ is firm j 's depreciation and amortization expense (Data #14) in year t . $\Delta Rev_{j,t}$ is firm j 's change in revenues (Data #12) between year $t-1$ and year t . $PPE_{j,t}$ is firm j 's gross value of PPE (Data #7) in year t . For each firm-year, we estimate equation (A1), rolling ten-year windows. These estimations yield ten firm- and year-specific residuals, $\nu_{j,t}$, $t = t-9, \dots, t$, which form the basis for the accrual quality metric, $AQ_{j,t} = \sigma(\nu_{j,t})$, equal to the standard deviation of firm j 's estimated residuals. The larger (small) the standard deviation of residuals are, the poorer (better) the earnings quality is.

I also estimate the innate factors and discretionary factors of accruals quality. The innate AQ

(denoted as $InnateAQ_{j,t}$) for firm j at time t is the predicted value from ten-year rolling regressions of $AQ_{j,t}$ on the innate factors (equation (A2)). The prediction error from equation (A2) is the measure of discretionary AQ (denoted as $DisAQ_{j,t}$) for firm j in year t .

$$AQ_{j,t} = \lambda_0 + \lambda_1 Size_{j,t} + \lambda_2 STDCFO_{j,t} + \lambda_3 STDSales_{j,t} + \lambda_4 OperCycle_{j,t} + \lambda_5 NegEarn_{j,t} + \mu_{j,t} \quad (A2)$$

$$InnateAQ_{j,t} = \hat{\lambda}_0 + \hat{\lambda}_1 Size_{j,t} + \hat{\lambda}_2 STDCFO_{j,t} + \hat{\lambda}_3 STDSales_{j,t} + \hat{\lambda}_4 OperCycle_{j,t} + \hat{\lambda}_5 NegEarn_{j,t} \quad (A3)$$

The predicted values from (A3) are the estimates of the innate component of firm j 's accruals quality in year t . The residual (DisAQ) from equation (A3) is the estimate of the discretionary component of firm j 's accrual quality (i.e., $DisAQ_{j,t} = \hat{\mu}_{j,t}$).

Predictability

According to Lipe (1990) and Francis et al. (2004), I use the square root of the error variance from Equation (A4) to proxy predictability ($Predictability = \sqrt{\sigma^2(\hat{v}_j)}$). Large (small) values of *Predictability* imply less (more) predictable earnings.

$$X_{j,t} = \phi_{0,j} + \phi_{1,j} X_{j,t-1} + v_{j,t} \quad (A4)$$

$X_{j,t}$, measured as firm j 's net income before extraordinary items in year t divided by the number of outstanding common stock shares during year t (DATA#18/DATA#25). For each firm-year, I estimate Equation (A4) using maximum likelihood estimation and rolling ten-year windows.

A.2 Innate determinants of earnings quality

Following Dechow and Dichev (2002) and Francis et al. (2004), I measure the innate determinants and common factors of earnings quality as below.

Assets: the proxy of firm size, measured by the log of total assets (DATA#6).

STDCFO: cash flow variability, measured by the standard deviation of the firm j 's rolling ten-year cash flows from operation, scaled by total assets.

STDSale: sales variability, is the standard deviation of the firm j 's rolling ten-year sales revenues, scaled by total assets.

OperCycle: operating cycle, is measured by log of the sum of the firm j 's days account receivable and days inventory.

NegEarn: occurrence of negative earnings realization, is measured by the firm j 's proportion of losses over the prior ten years.

Int_int: intangibles intensity, measured as the sum of the firm j 's reported R&D and advertising expense as a proportion of its sales revenues, missing values of R&D and advertising expense are set to zero ($\text{Int_int} = (\text{DATA}\#45 + \text{DATA}\#46) / \text{DATA}\#12$).

Int_Dummy: an intangible intensity dummy variable indicating the absence of reported intangibles, which equals to 1 for firms with $\text{Int_int} = 0$, and 0 otherwise.

Cap_int: capital intensity, is measured by the ratio of the net book value of property, plant, and equipment to total assets ($\text{Cap_int} = \text{DATA}\#8 / \text{DATA}\#6$).

A.3 CEO equity-based incentives (*Incentive*)

Following prior literature (e.g., Core and Guay 2002; Bergstresser and Philippon 2006), I construct the incentive measure: *OnePct* is the dollar change in the value of CEO stock and option holdings coming from a one percent increase in the firm's stock price. The measures below are based on the implicit assumption that the "delta" of the options in the CEO's portfolio is one, i.e., a dollar increase in the price of a firm's shares translates one-for-one to the value of an option.

$$\text{OnePct}_{j,t} = 0.01 * \text{Price}_{j,t} * (\text{Shares}_{j,t} + \text{Options}_{j,t}) \quad (\text{A5})$$

Where, *Price* is a company's share price. *Shares* is the number of shares held by the CEO, and *Options* is the number of options held by the CEO in year t . Then, I use *OnePct* to compute the variable *Incentive*. This measure of incentives is normalized in a way to capture the share of a hypothetical CEO's total compensation that would come from a one percentage point increase in the value of the equity of his /her company, as shown below.

$$\text{Incentive}_{j,t} = \text{OnePct}_{j,t} / (\text{OnePct}_{j,t} + \text{Salary}_{j,t} + \text{Bonus}_{j,t}) \quad (\text{A6})$$

Where, *Salary* and *Bonus* are CEO's cash compensation in year t , obtained from ExecuComp database. Large (small) value of the *Incentive* variable implies high (low) level of equity-based compensation incentives.

A.4 Cost of equity capital (*CostCap*)

CostCap represents the cost of equity capital implied in current stock price and analyst forecast data. In my analyses, I use four different measures, suggested in Claus and Thomas (CT) (2001), Gebhardt et al. (GLS) (2001), Ohlson and Juetter-Nauroth (OJ) (2005) (as implemented by Gode and Mohanram 2003), and Easton (PEG) (2004). The first two are special cases of the residual income valuation model described in Ohlson (1995), while the

latter two are based on the abnormal earnings growth valuation model developed by Ohlson and Juetter-Nauroth (2005). The measurements of cost of equity capital are shown as follow.

Ohlson and Juetter-Nauroth (OJ) (2005) (r_{OJ}):

$$r_{OJ} = A + \sqrt{A^2 + \frac{eps_1}{P_0} \times \left(\frac{eps_2 - eps_1}{2} + \frac{eps_5 - eps_4}{2} - (\gamma - 1) \right)} \quad (A7)$$

where,

$$A = \frac{1}{2} \left[(\gamma - 1) + \frac{dps_1}{P_0} \right],$$

eps_i ($i=1, 2, \dots, 5$) is the earning per share forecast for period i ($i=1, \dots, 5$), dps_1 is the dividend per share forecast one period forward. The assumption $\gamma - 1 = r_f - 3\%$ is the long-term growth rate (Note 16), where r_f is the yield on 10-year U.S. Treasury bills. Forecasted 5-years growth

rate is calculated as $\frac{eps_5 - eps_4}{eps_4}$ and P_0 is current stock price.

Easton (2004) (r_{PEG}):

The cost of capital estimates using the PEG ratio (r_{PEG}) is estimated by restricting two assumptions for equation (A7): $dps_1 = 0$ and, $\gamma = 1$. And also I use earnings forecast data for

next two years to estimate the 5-years growth rate ($\frac{eps_2 - eps_1}{eps_1}$). The resulting formula of r_{PEG} is given in equation (A8).

$$r_{PEG} = \sqrt{\frac{eps_2 - eps_1}{P_0}} \quad (A8)$$

Claus and Thomas (CT) [2001] (r_{CT}):

$$P_0 = B_0 + \sum_{t=1}^5 \frac{ae_t}{(1+r_{CT})^t} + \left[\frac{ae_5(1+g_{ae})}{(r_{CT}-g_{ae})(1+r_{CT})^5} \right] \quad (A9)$$

Where,

B_0 : expected book (or accounting) value of equity at the end of current year; $ae_t = eps_t - r_{CT} * (B_{t-1})$, expected abnormal earnings for year t , or forecast accounting earnings less a charge for the cost of equity, and eps_0 = earnings forecast for current year; r_{CT} : expected

rate of return on the market portfolio, derived from the abnormal earnings model.

Gebhardt et al. (GLS) (2001) (r_{GLS}):

$$P_t = B_t + \sum_{i=1}^{11} \frac{FROE_{t+i} - r_{GLS}}{(1 + r_{GLS})^i} B_{t+i-1} + \frac{FROE_{t+12} - r_{GLS}}{r_{GLS}(1 + r_{GLS})^{11}} B_{t+11} \quad (A10)$$

Where, P_t and B_t are stock price and book value in year t. $FROE_{t+i}$, forecast ROE for period

t+i. For the first three years, this variable is computed as $\frac{eps_{t+i}}{B_{t+i-1}}$. Beyond the third year,

FROE is forecasted by a linear interpolation to the industry median ROE. $B_{t+i} = B_{t+i-1} + eps_{t+i}$

- dps_{t+i} , where dps_{t+i} is the forecasted dividend per share for year t+i, estimated using the

current dividend payout ratio (k). ($dps_{t+i} = eps_{t+i} * k$). r_{GLS} is the cost of capital estimate.

The assumptions for the above models and empirical procedures to estimate cost of capital are discussed in detail in previous literature, I will not repeat them in this paper. Proxies for cost of capital, r_{CT} and r_{GLS} are estimated by using numerical programming. (Note 17) r_{ave} is the average value of r_{PEG} , r_{OJ} , r_{CT} , and r_{GLS} . Risk premia (RP_PEG, RP_OJ, RP_GLS, and RP_CT) are measured as implied cost of capital minus risk free rate. RP equals to r_{ave} minus risk free rate (or the mean value of RP_PEG, RP_OJ, RP_GLS, and RP_CT).

A5 Other variables in regressions

Beta: Firm j's beta in year t is measured as the coefficients of regressions monthly returns on value weight market index in CRSP over rolling 60-month window.

BM: Book-to-market ratio, measured by the ratio of the book value of equity (hereafter BE) to the market value of equity. Following Fama and French (1996), BE is computed as book value of common equity (Data#216) plus balance-sheet deferred taxes and investment tax credit (if available), less the book value of preferred stock. Market value of equity is measured as product of Data#199 and Data#25.

Size: *Size* is measured as the log of firm j's market value at the end of fiscal year t-1.

Notes

Note 1. Total CEO Compensation has different components: salary, stock grants, stock options, pension and health benefits, perquisites, etc. The use of stock grants and stock options are usually linked to the firm's performance, which is called the alignment of pay with performance (Copeland et al. 2003, chapter 13). Because a good proportion of CEOs' total compensation is tied to firm performance (e.g., pay-for-performance compensation plan),

and because CEOs know that the market prices earnings quality, CEOs are likely to improve earnings quality to achieve a lower cost of capital.

Note 2. I am not aware of any study examining the relationship between the executive equity-based compensation incentives and implied cost of capital (i.e., investors demand varying return rates, based on their perceived risk of the firm), although prior literature has documented the relation between the realized returns and equity-based compensation incentives.

Note 3. More recently, studies suggest that granting options is consistent with firm value maximization include Demsetz and Lehn (1985), Himmelberg, Hubbard, and Palia (1999), Core and Guay (1999), and Rajgopal and Shevlin (2002). Other empirical studies support the incentive alignment view: Bickley et al. (1985) show positive stock price reactions to announcements of long-term managerial compensation plans, Lewellen et al. (1985) indicate that managers are less likely to take merger bids that lower their stock prices when they hold more stocks in the firm, consistent with their interests being aligned with the shareholders, Hanlon et al. (2003) show that, on average, executive stock options are effective in generating positive future payoffs for firms in terms of accounting earnings.

Note 4. Aboody and Kasznik (2000) and Yermack (1997) suggest that managers use option grants for their own benefit, and Yermack (1995) empirically shows that stock options do not exhibit relations consistent with the economic motivations behind granting stock options. The same argument is shared by Bebchuk et al. (2002).

Note 5. Bergstresser and Philippon (2006) contend that CEOs seem to try to inflate earnings to beat the market expectation before they exercise the stock option. They document that periods of high accruals coincide with unusually significant option exercises by CEOs and unloading of shares by CEOs and other top executives. Healy (1985) and Gaver et al. (1995) show that managers tend to manage earnings to exploit non-linearities in the relation between earnings and compensation. Burns and Kedia (2004), Efendi et al. (2005), Johnson et al. (2005), and Ke (2002) all show a positive relation between the use of employee stock option and fraudulent manipulation of accounting statements. Francis et al. (2005b) show that the net effect of using employee stock options as executive compensation is decreasing accruals quality. However, when stock-based and option-based compensation are used for financing debt, the overall incentive is for managers to increase accruals quality.

Note 6. Francis et al. (2005b) present the evidence that the net effect of usage of employee stock option is to worsen accruals quality.

Note 7. I use this period as my sample period because 1992 is the first year in which Compustat has executive equity-based compensation data and 2005 is the last year before the adoption of the FAS 123 (R), which requires firms to immediately expense the equity-based compensations. FAS 123 (R) greatly discourages the firms use equity-based compensation package to reward CEOs. Therefore, the sample period of 1992-2005 is suitable for testing my research question on whether the executive incentive compensation benefits firms at all.

Note 8. Following Gebhardt et al. (2001), I restrict the sample to firms having earnings forecast available in each June. In the sensitivity tests, I replace the firms having earnings forecast in each April (as in Claus and Thomas 2001) or the firms with fiscal year-end at December (as in Easton 2004). Results are qualitatively similar.

Note 9. I delete firms in financial industry (SIC codes 6000-6999) because accruals in this industry are not comparable to other industries. Previous studies find that managerial ownership is related to lower levels of accounting accruals manipulation (Dhaliwal et al. 1982; Warfield et al. 1995). Therefore, I also delete those firm observations where CEOs own more 5 percent of common stock outstanding.

Note 10. In the regressions of cost of capital on incentive, I use risk premia (cost of capital less the risk-free rate) instead of cost of capital, because risk premia can capture the perceived risk better (Gebhardt et al. 2001; Gode and Mohanram 2003). I re-run all regressions using implied cost of capital on the incentive variable, the results of which are qualitatively similar to those obtained by using risk premia.

Note 11. The medians of total assets and sales for the population of Compustat are about 189.5 and 110.67 million dollars, respectively, over 1992-2005.

Note 12. This might due to the error in estimation procedure used in Gerhardt et al. (2001) in which some intermediate variables used to estimate implied cost of equity capital are projected values. -- I use 12 years as the projection interval.

Note 13. I rank each proxy for earnings quality and *Incentive* within each fiscal year and form deciles.

Note 14. After deleting utility industry, there are 5,872 firm-year observations and 1,087 distinct firms in the sample. This sample provides even stronger results (i.e., larger coefficient estimates, and higher levels of statistically significant t-statistics).

Note 15. Easton et al. (1992) document the benefits of using the firm as its own benchmark over a long horizon.

Note 16. Here, $\gamma - 1 = r_f - 3\%$, to account for the effects of inflation. This method has been used in previous literature (e.g., Gode and Mohanram 2003; Guay et al. 2005; Botosan and Plumlee 2005)

Note 17. I very much appreciate the programing help from Hongyu Zhang and Xinlei Zhao.

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