CEO Compensation In Poorly Performing Firms

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Abstract

This paper studies the association between CEO compensation and firm performance in solvent but poorly performing firms. By focusing on solvent firms, this study insulates the bankruptcy effects (and the complex creditor-shareholder-manager effects) on pay-performance relationship. Furthermore, there is a widespread belief that CEO pay in such firms does not reflect firms' poor performance. I find that on average, the level of CEOs cash compensation is positively related to the firms' level of operating cash flows. I interpret this finding as suggesting that stockholders of poorly performing firms reward CEOs in the short-run, for the effect of the managerial decisions on cash flows. However, change in CEOs compensation is unrelated to any measure of the changes in firms' performance. This is consistent with the cautious approach of stockholders to wait and see, if change in performance is more permanent.

Introduction

This paper studies the association between CEO compensation and firm performance in solvent but under performing firms. Although executive compensation and firms' performance has been the subject of debate amongst academics, there is little consensus on the precise nature of the relationship, especially in poorly performing firms. For example, Jensen and Murphy (1990a and 1990b) conclude that senior managers on average suffer little reduction in their personal wealth even when their firms perform poorly. Others suggest a positive relationship between executive pay and firm performance even amongst loss-making firms (Kaplan, 1994). The arguments over pay-performance sensitivity in loss-making firms are also echoed in media coverage and the associated public opinion polls that suggest a widespread view that CEOs of loss-making firms are paid

too much or that pay-performance relationship is tenuous at best.¹

The results of this study indicate that the level of CEOs cash compensation is tied to the level of operating cash flows generated by the firm, but is unrelated to either accounting or market performance. None of the other CEO's compensation components is related to any other firm performance measure. The positive association between CEO compensation and cash flows is consistent with previous research (see Natarajan, 1996). Failure to include cash performance measure in pay-performance studies may thus create the impression that management compensation is unresponsive to corporate performance as suggested by some scholars. (See Jensen and Murphy, 1990b).

I also find that the changes in CEO compensation are unrelated to changes in firm performance, whether they are accounting, cash, or

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market performance. One plausible explanation for this result may be, that, stockholders in poorly performing firms would like to adopt a cautious wait and see attitude, as to whether a change in performance is more lasting before rewarding their senior managers. These results are also consistent with Gilson and Vetsuypens (1993), that the association between pay and performance is smaller in economic terms when performance is measured in terms of *changes* rather than *levels*.

This study makes three major contributions to the executive pay-performance literature. First, it includes only firms that have a history of poor financial performance. Since, even a profitable firm can incur a loss occasionally, the pay-performance sensitivity in such firms during loss years may not be reflective of firms that have a history of making losses. Second, the availability of CEO compensation data facilitates a much more complete analysis, including consideration of long-term compensation and deferred stock-based compensation such as the value of stock options granted to CEOs. Third, the paper considers the simultaneity in relationship of compensation components on the one hand, and performance measures on the other, by employing a new methodology, namely, Canonical Correlation Analysis (CCA).² CCA controls for moderator or suppressor effects and is preferable to the multiple regression approach. Multiple regression analysis is conceptually inconsistent because the stockholders use different performance measures simultaneously to determine the individual compensation component as well as the overall pay package of CEOs.

The remainder of this paper is organized as follows. Section 2 briefly reviews the literature. Section 3 describes the sample and methodology. Section 4 presents the results of the empirical study. Section 5 summarizes my findings.

Literature Review

The rise of the industrial corporations and

limited liability has led to the separation of ownership and management. The divergence of interests between owners and managers, along with asymmetric information amongst the two stakeholders, has led to the classic example of a principal-agent problem. Primarily, the problem involves motivating the CEO of the firm (agent) to act in the best interests of the stockholders (principal). Firms seek to address this problem by structuring managerial incentive contracts so as to provide the appropriate short-term and long-term incentives.

Although the market value of the common stock can be used as a barometer of a firm's performance, it is not an indicator of an executive's contributions to the firm. While firms' stock value is affected by market forces which are arguably relevant in firm valuation, these same forces may be irrelevant in evaluating managerial effort. As a result, some firms supplement market-based awards with accounting-based awards, such as return on assets, earnings per share, or return on equity. As Lambert and Larcker (1985) argue, the important issue is whether accounting or market data or a combination of these is most useful and efficient as a means to create the proper incentives to management (see also Scholes, 1991).

Bushman and Indejejian (1993), Lambert (1993) and Sloan (1993) reckon that despite the inherent noisiness of accounting income, it improves the CEO's incentive contract, as accounting earnings may be a less noisy signal of the CEO's effort than stock returns. Sloan (1993) argues that even if the noise in accounting earnings is more than that of the stock returns, accounting earnings may still be useful in an executive compensation contract, as long as the covariance of noise between accounting earnings and stock returns is less than the variance of the noise in stock returns. Furthermore, accounting earnings are extensively used in CEO contracts. For instance, Ittner et al (1997) find in a recent survey of 312 firms, that a significant proportion of firms used the following financial measures:

Earnings per Share (28.5%), Net Income (27.2%), Operating Income (25.3%), Sales (13.8%), Cash Flow (12.8%), and Return on Assets (9.6%).

Lambert and Larcker (1987), and Sloan (1993) show that CEOs *cash* compensation may be more closely related to accounting performance rather than stock performance. While Natarajan (1996) finds that cash flow measures are used to supplement accounting earnings in CEO contracts, Kaplan (1994) finds that CEOs *cash* compensation is positively related to negative earnings.

Gilson and Vetsuypens (1993) study the CEO compensation structures for firms in financial distress. They find that when firms become financially distressed, the pay-to-shareholder wealth ratio declines dramatically. They conclude that the pay-performance sensitivity is close to zero during financial distress.

John and John (1993) convincingly argue that when the agency costs of debt are high (i.e., firms in distress), pay-to-shareholder-wealth sensitivity may be lower in order to avoid the risk-shifting incentives in the executives. Consequently, executive compensation structure may be aligned less with the shareholder interests and the rewards are tied to say, stability and size of total cash flows.

Three features distinguish this study. First, most of the empirical work on pay-performance relationship has typically employed multiple regression methodology, whereas I use the CCA to examine the relationship between a set of compensation measures and performance metrics simultaneously. Fornell and Larcker (1980) show that a single criterion procedure such as multiple regression ignores the interrelationships within the criterion set and will inaccurately portray the underlying multivariate variable association. They clearly demonstrate the superiority of CCA over multiple regression methodology in moderately correlated criterion sets. Second, multiple

regression methodology in cross-sectional analysis suffers from coefficient bias due to scale deflators (see Barth and Kallapur, 1996), while CCA looks at correlation between two sets of undeinflated variables. Third, I provide support for the argument of Lambert and Larcker (1985) that a combination of accounting and stock performance measures might be useful in creating the proper incentives for managers. Consequently, I have included several accounting and market performance measures and examine their relationship simultaneously.

Sample and Methodology

Sample

The sample consists of all firms that meet the following criteria: (1) the firms' beginning retained earnings are negative for all five years prior to the year in question and (2) financial data are available in *Compustat* database for the years 1992-1995 (both inclusive). Compensation data are available for 1992-1995 from *Standard and Poor's Compustat ExecuComp*.

The first condition is imposed to include only firms that have a record of poor performance. This condition ensures that the firm's accumulated losses in the past (i.e., from the date of the inception of business to the beginning of the year in question) exceeds its accumulated profits for the same period - in other words, these firms are perennially loss-making. I stop at five years to prevent the sample size from becoming too small, while at the same time ensuring those firms with a record of losses are included. This condition may also make it difficult for a firm to be included in the sample merely because the firm suffers a rare loss in a particular year. The last two conditions are required due to data constraints.

The data consist of 249 (187) firm-years when levels of (changes in) compensation and levels of (changes in) performance is considered. For each firm, four compensation components

(including short-term and long-term compensation) and five performance measures (including accounting, market, and cash flow measures) are obtained. The compensation variables and performance measures are defined below:

Compensation Variables

CHSAL: $\text{Salary}_t - \text{Salary}_{t-1}$

Where Salary is the dollar value of the base salary (cash and non-cash) earned by the CEO during the year. Salary includes amounts deferred or paid in common or restricted common stock.

CHBON: $\text{Bonus}_t - \text{Bonus}_{t-1}$

Where Bonus is the dollar value of the bonus (cash and non-cash) earned by the CEO during the year. Bonus includes amounts deferred or paid in common or restricted common stock.

CHLT: $\text{LTCOMP}_t - \text{LTCOMP}_{t-1}$

Where LTCOMP is the total long term compensation and is defined as the *sum* of the value of restricted stock granted, long-term incentive plan payout, and all other long term compensation *excluding* the value of stock options.

CHSTOPT: $\text{STOPT}_t - \text{STOPT}_{t-1}$

Where STOPT is the aggregate value of stock options granted using Black-Scholes option pricing model.

Performance Measures

CHMKRT: $\text{MKRT}_t - \text{MKRT}_{t-1}$

Where MKRT is the market return and is defined as the close of fiscal year stock price *plus* dividends per share by ex-date *plus* cash equivalent per share by ex-date *divided* by close of fiscal year stock price. One (1) is *subtracted*

from the quantity and the result is *multiplied* by 100.

CHROAA: $\text{ROAA}_t - \text{ROAA}_{t-1}$

Where ROAA is the return on average assets and is defined as the income before extraordinary items *divided* by the average of the current year's total assets and the prior year's total assets. This is then *multiplied* by 100.

CHEP: $\text{EP}_t - \text{EP}_{t-1}$

Where EP is the earnings per share and is defined as the earnings per share from operations *divided* by the closing stock price.

CHCFP: $\text{CFP}_t - \text{CFP}_{t-1}$

Where CFP is the cash flow per share and is defined as the net change in cash from all items classified in the operating activities section on a statement of cash flows *divided* by the average number of common shares outstanding.

CHGRSLS: $\text{GRWSLS}_t - \text{RWSLS}_{t-1}$

Where GRWSLS is the continuously compounded growth in sales and is defined as the natural logarithm of sales in current year *minus* natural logarithm of sales in current year.

Table 1 summarizes the descriptive statistics for these firms.

In all tables, panel A relates to the *levels* and panel B to *changes*. It is evident from table 1, panel A, that stock option (STOPT) is the single largest component of CEO compensation and is also the most variable component. The mean salary plus bonus is about equal to stock options. On average, the market return (MKRT) of these firms appears to be considerably higher than the book return (ROAA). The mean change in stock options (CHSTOPT) is negative (panel B) and, the change in market return (CHMKRT) is higher than changes in book return (CHROAA).

Table 1
Descriptive Statistics of Selected Variables Pertaining to Loss-Making Firms for 1992-95

Panel A : Levels of compensation and performance (n=249)

Variable	Mean	Median	Minimum	Maximum	Std. Dev.
CEO Compensation:					
Salary (\$TH)	399	347	11	2,475	249
Bonus (\$TH)	298	121	0	3,000	508
LTCOMP (\$TH)	308	10	0	14,530	1,340
STOPT (\$TH)	791	222	0	19,158	2,121
Firm Performance:					
MKRT	26.77	9.71	-79.01	471.43	82.65
ROAA	- 8.16	0.96	-146.95	36.72	23.63
EP	- 0.01	0.03	- 0.72	0.24	0.13
CFP	0.87	0.45	- 11.09	7.34	2.01
GRWSLS	0.21	0.13	- 2.19	4.11	0.55
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CHSAL : $\text{Salary}_t - \text{Salary}_{t-1}$, where Salary is the dollar value of the base salary (cash and non-cash) earned by the CEO during the year.

CHBON : $\text{Bonus}_t - \text{Bonus}_{t-1}$, where Bonus is the dollar value of the bonus (cash and non-cash) earned by the CEO during the year.

CHLT : $\text{LTCOMP}_t - \text{LTCOMP}_{t-1}$, where LTCOMP is the total long term compensation and is defined as the *sum* of the value of restricted stock granted, long-term incentive plan payout, and all other long term compensation *excluding* the value of stock options.

CHSTOPT : $\text{STOPT}_t - \text{STOPT}_{t-1}$, where STOPT is the aggregate value of stock options granted using Black-Scholes option pricing model.

CHMKRT : $\text{MKRT}_t - \text{MKRT}_{t-1}$, where MKRT is the market return and is defined as the close of fiscal year stock price *plus* dividends per share by ex-date *plus* cash equivalent per share by ex-date *divided* by close of fiscal year stock price. One (1) is *subtracted* from the quantity and the result is *multiplied* by 100.

CHROAA : $\text{ROAA}_t - \text{ROAA}_{t-1}$, where ROAA is the return on average assets and is defined as the income before extraordinary items *divided* by the average of the current year's total assets and the prior year's total assets. This is then *multiplied* by 100.

CHPEP : $\text{EP}_t - \text{EP}_{t-1}$, where EP is the earnings per share and is defined as the earnings per share from operations *divided* by the closing stock price.

CHCFP : $\text{CFP}_t - \text{CFP}_{t-1}$, where CFP is the cash flow per share and is defined as the net change in cash from all items classified in the operating activities section on a statement of cash flows *divided* by the average number of common shares outstanding.

CHGRSLS : $\text{GRWSLS}_t - \text{GRWSLS}_{t-1}$, where GRWSLS is the continuously compounded growth in sales and is defined as the natural logarithm of sales in current year *minus* natural logarithm of sales in current year

The spearman correlations between the two sets of variables appear in table 2.

All compensation components are positively and significantly correlated with each other with Salary and Bonus, as well as Salary and

Table 2
Spearman Correlations Among Variables Pertaining to Loss-Making Firms for 1992-95

Panel A : Levels of compensation and performance (n=249)

A.1 Correlations among the compensation components

	Salary	Bonus	LTCOMP	STOPT
Salary	1.0000			
Bonus	0.3509**	1.0000		
LTCOMP	0.4688**	0.1546*	1.0000	
STOPT	0.2659**	0.3022**	0.1722**	1.0000

A.2 Correlations among the performance measures

	MKRT	ROAA	EP	CFP	GRWSLS
MKRT	1.0000				
ROAA	0.0423	1.0000			
EP	0.0012	0.4502**	1.0000		
CFP	-0.0568	0.4042**	0.3103**	1.0000	
GRWSLS	0.0431	0.0086	-0.0416	-0.0931	1.0000

A.3 Correlations between compensation components and performance measures

	MKRT	ROAA	EP	CFP	GRWSLS
Salary	-0.0214	0.2925**	0.2705**	0.3933**	-0.0709
Bonus	0.0194	0.2689**	0.2253**	0.3736**	0.0165
LTCOMP	-0.0217	0.0892	0.0670	0.0888	-0.0083
STOPT	-0.0591	0.0818	0.0521	0.1369*	-0.0106

* Significant at the 0.05 level, two-tail; ** Significant at the 0.01 level, two-tail.

Notes:

Salary is the dollar value of the base salary (cash and non-cash) earned by the CEO during the year. Bonus is the dollar value of the bonus (cash and non-cash) earned by the CEO during the year. LTCOMP is the total long term compensation and is defined as the sum of the value of restricted stock granted, long-term incentive plan payout, and all other long term compensation *excluding* the value of stock options. STOPT is the aggregate value of stock options granted using Black-Scholes option pricing model. MKRT is the market return and is defined as the close of fiscal year stock price *plus* dividends per share by ex-date *plus* cash equivalent per share by ex-date *divided* by close of fiscal year stock price. One (1) is *subtracted* from the quantity and the result is *multiplied* by 100. ROAA is the return on average assets and is defined as the income before extraordinary items *divided* by the average of the current year's total assets and the prior year's total assets. This is then *multiplied* by 100. EP is the earnings per share and is defined as the earnings per share from operations *divided* by the closing stock price. CFP is the cash flow per share and is defined as the net change in cash from all items classified in the operating activities section on a statement of cash flows *divided* by the average number of common shares outstanding. GRWSLS is the continuously compounded growth in sales and is defined as the natural logarithm of sales in current year *minus* natural logarithm of sales in current year.

LTCOMP exhibiting statistically strong correlation (see, panel A). Amongst performance measures, ROAA is positively, significantly correlated with earnings per share (EP) and cash flow per share (CFP). Between compensation and performance variables, Salary and Bonus are both positively and significantly related to ROAA, EP, and CFP. Further, change in salary (CHSAL) is significantly correlated with both

changes in bonus (CHBON) changes in long term compensation (CHLT) (see, panel B). Given the significance of the correlation amongst the criterion (i.e., compensation) variables in both panels A and B, canonical correlation presents an improvement over multiple regression approach as documented by Fornell and Larcker (1980).

Table 2 (Continued)
Spearman Correlations Among Variables Pertaining to Loss-Making Firms for 1992-95

Panel B: Changes in compensation and performance (n=187)

B.1 Correlations among the compensation components

	CHSAL	CHBON	CHLT	CHSTOPT
CHSAL	1.0000			
CHBON	0.1946**	1.0000		
CHLT	0.2280**	0.2266**	1.0000	
CHSTOPT	0.1431	-0.0788	-0.0643	1.0000

B.2 Correlations among the performance measures

	CHMKRT	CHROAA	CHEP	CHCFP	CHGRSLS
CHMKRT	1.0000				
CHROAA	0.0041	1.0000			
CHEP	-0.1079	0.0220	1.0000		
CHCFP	-0.0210	0.0654	-0.0950	1.0000	
CHGRSLS	0.0340	0.1454*	0.0070	0.0150	1.0000

B.3 Correlations between compensation components and performance measures

	CHMKRT	CHROAA	CHEP	CHCFP	CHGRSLS
CHSAL	0.0499	0.0421	-0.1677*	0.0338	0.0078
CHBON	0.1108	0.0479	-0.0496	0.0405	0.0068
CHLT	0.0798	0.0462	-0.0096	-0.0975	0.0273
CHSTOPT	-0.0126	0.0095	0.0120	0.0067	-0.0360

* Significant at the 0.05 level, two-tail; ** Significant at the 0.01 level, two-tail.

Notes:

CHSAL : $\text{Salary}_t - \text{Salary}_{t-1}$, where Salary is the dollar value of the base salary (cash and non-cash) earned by the CEO during the year.

CHBON : $\text{Bonus}_t - \text{Bonus}_{t-1}$, where Bonus is the dollar value of the bonus (cash and non-cash) earned by the CEO during the year.

CHLT : $\text{LTCOMP}_t - \text{LTCOMP}_{t-1}$, where LTCOMP is the total long term compensation and is defined as the sum of the value of restricted stock granted, long-term incentive plan payout, and all other long term compensation *excluding* the value of stock options.

CHSTOPT : $\text{STOPT}_t - \text{STOPT}_{t-1}$, where STOPT is the aggregate value of stock options granted using Black-Scholes option pricing model.

CHMKRT : $\text{MKRT}_t - \text{MKRT}_{t-1}$, where MKRT is the market return and is defined as the close of fiscal year stock price *plus* dividends per share by ex-date *plus* cash equivalent per share by ex-date *divided* by close of fiscal year stock price. One (1) is subtracted from the quantity and the result is *multiplied* by 100.

CHROAA : $\text{ROAA}_t - \text{ROAA}_{t-1}$, where ROAA is the return on average assets and is defined as the income before extraordinary items *divided* by the average of the current year's total assets and the prior year's total assets. This is then *multiplied* by 100.

CHEP : $\text{EP}_t - \text{EP}_{t-1}$, where EP is the earnings per share and is defined as the earnings per share from operations *divided* by the closing stock price

CHCFP : $\text{CFP}_t - \text{CFP}_{t-1}$, where CFP is the cash flow per share and is defined as the net change in cash from all items classified in the operating activities section on a statement of cash flows *divided* by the average number of common shares outstanding.

CHGRSLS : $\text{GRWSLS}_t - \text{GRWSLS}_{t-1}$, where GRWSLS is the continuously compounded growth in sales and is defined as the natural logarithm of sales in current year *minus* natural logarithm of sales in current year.

The Methodology

To investigate the interaction between a set of compensation components and a set of firm performance variables, I use Canonical Correlation Analysis (CCA). Since CCA simultaneously predicts multiple dependent variables (criterion variables) from multiple independent variables (predictor variables), it is the most appropriate and powerful multivariate technique for

our study. If U and V are linear combinations of the set of compensation components (Y) and firm performance metrics (X) respectively, CCA seeks coefficient vectors, a and b such that:

$$\text{Corr}(U, V) = \frac{[(a' \Sigma_{yx} b) / (a' \Sigma_{yy} a) (b' \Sigma_{xx} b)]}{(1)} \quad (1)$$

Table 3
Canonical Correlation Analysis relating CEO Compensation Components to Firm Performance Measures in Loss-Making Firms

A : Levels of compensation and performance (n=249)*Panel A.1 Tests of each canonical function separately*

Canonical Function	Canonical Correlation	Canonical R ²	F-Statistic	Probability
1	0.5214	0.2719	4.1893	0.0001
2	0.0915	0.0084	0.2869	0.9913
3	0.0693	0.0048	0.2358	0.9647
4	0.0319	0.0010	0.1236	0.8838

Panel A.2 Multivariate test statistics

Statistic	Value	Approximate F Statistic	Probability
Wilks' Lambda	0.7178	4.1893	0.0001
Pillai's Trace	0.2861	3.7437	0.0001
Hotelling's Trace	0.3877	4.6235	0.0001
Roy's Greatest Root	0.3734	18.1487	0.0001

B : Changes in compensation and performance (n=187)*Panel B.1 Tests of each canonical function separately*

Canonical Function	Canonical Correlation	Canonical R ²	F-Statistic	Probability
1	0.1909	0.0364	0.6062	0.9096
2	0.1396	0.0195	0.4534	0.9406
3	0.0949	0.0090	0.3167	0.9282
4	0.0384	0.0015	0.1334	0.8752

Panel B.2 Multivariate test statistics

Statistic	Value	Approximate F Statistic	Probability
Wilks' Lambda	0.9349	0.6062	0.9096
Pillai's Trace	0.0664	0.6111	0.9065
Hotelling's Trace	0.0683	0.6023	0.9127
Roy's Greatest Root	0.0378	1.3688	0.2381

is maximized for each pair of canonical variable where:

$$E(Y) = \mu_y; \quad COV(Y) = \Sigma_{yy}$$

$$E(X) = \mu_x; \quad COV(X) = \Sigma_{xx}$$

$$COV(Y, X) = \Sigma_{yx} = \Sigma'_{xy}$$

I assume that the relationship between any two variables is linear, and that each set of variables is multivariate normal. The latter assumption is required for the statistical inference tests to follow.

Results

Table 3 summarizes the results of the CCA.

The first statistical significance test is for the canonical correlations of each of the four canonical functions (panel A.1) for the *levels* sample. Only the first canonical function is statistically significant at the 0.1% level, and hence only this will be interpreted. Table 3, panel A.2, reports the results of multivariate tests of all four canonical functions simultaneously. Each of the four multivariate statistics indicates that the canonical functions, taken collectively, are highly significant at the 0.1% level. It is also obvious from table 3, panel B, that none of the canonical

correlations is significant either individually or collectively for the *change* sample.

Table 4 presents two measures of the contribution of each variable to the canonical relationships. The first measure is the canonical loadings (i.e., the correlation between individual variables and the respective canonical variates). The canonical loading reflects the variance that an observed variable in one set of variables (say, performance set) shares with the canonical score for that set. The second measure is the canonical cross-loadings (i.e., the correlation between individual variables and the opposite canonical variates).

For a sample size of 249, a canonical loading of 0.40 is significant based on a 5% significance level (two-tailed), and a power level of 80% [See Hair et al.(1995, p. 385)].

On this basis, Salary, Bonus, and CFP have significant cross-loadings of 0.4329, 0.4019 and 0.4785 respectively. This implies that 19%, and 16% of the variance in Salary, and Bonus respectively, is explained by performance Canonical Variable I, and 23% of the variance in CFP are explained by compensation Canonical Variable I. (The 19%, 16%, and 23% are obtained

Table 4
Canonical Loadings and Cross-Loadings for a Sample of Loss-Making Firms for 1992-95

Panel A : Levels of compensation and performance (n=249)

Variables	Canonical Loadings I	Canonical Cross- Loadings I
<i>Compensation variables:</i>		
Salary	0.8301	0.4329
Bonus	0.7708	0.4019
LTCOMP	0.2001	0.1043
STOPT	0.2544	0.1327
<i>Performance measures:</i>		
MKRT	0.0082	0.0043
ROAA	0.6659	0.3472
EP	0.6008	0.3133
CFP	0.9177	0.4785
GRWSLS	-0.0804	-0.0419

Panel B: Changes in compensation and performance (n=187)

Loadings are not reported since no canonical correlation is significant

by squaring the correlation coefficient of 0.4329, 0.4019 and 0.4785 respectively). Therefore, a relatively large Salary and Bonus are associated with a relatively large CFP. Except, GRWSLS that reveals a non-significant negative relationship, all other performance variables have a positive, direct relationship with compensation components.

Table 5, panel A, presents the redundancy index for the canonical function. The redundancy index indicates that 9.44% of the variance in the compensation variables is accounted for by the variability in the first performance canonical variable. Conversely, 8.99% of the variance in the performance measures is accounted for by the variability in the first compensation canonical variable. The redundancy indices for *changes* in compensation and *changes* in performance (Table 5, panel B), suggests that less than 1% of the variance in the changes in compensation is accounted for by the variability in the first per-

formance canonical variable and vice-versa. Thus, compensation *levels* and performance *levels* are significantly related, although the same cannot be said about *changes* in compensation and *changes* in performance.

Finally table 6 presents the squared multiple correlations (SMC's). The SMC's indicate that the first canonical variable of the firm performance measures is a fairly good predictor of Salary and Bonus, but a poor predictor of LTCOMP and STOPT. The first canonical variable of the compensation components has good predictive power for CFP, but almost none for other performance measures.³

These results can be contrasted with prior studies. For instance, Jensen and Murphy (1990a) found little reduction in the personal wealth of senior managers when their solvent firms were unprofitable. They argue that while CEO pay appears to be equally sensitive to

Table 5
Canonical Redundancy Analysis

Panel A : Levels of compensation and performance (n=249)

Standardized Variance of the Compensation Components Explained by: Their Own Canonical Variables						The Opposite Canonical Variables Cann R ²	
Factor	Proportion	Cumulative Proportion	Proportion	Cumulative Proportion			
1	0.3470	0.3470	0.0944	0.0944			0.2719
2	0.1690	0.5160	0.0014	0.0958			0.0084
3	0.2397	0.7557	0.0012	0.0969			0.0048
4	0.2443	1.0000	0.0002	0.0972			0.0010
Standardized Variance of the Performance Measures Explained by: Their Own Canonical Variables						The Opposite Canonical Variables Cann R ²	
Factor	Proportion	Cumulative Proportion	Proportion	Cumulative Proportion			
1	0.3306	0.3306	0.0899	0.0899			0.2719
2	0.2058	0.5364	0.0017	0.0916			0.0084
3	0.1777	0.7141	0.0009	0.0925			0.0048
4	0.1476	0.8617	0.0001	0.0926			0.0010

Table 5 (continued)
Canonical Redundancy Analysis

Panel B: Changes in compensation and performance (n=187)

		Standardized Variance of the Compensation Components Explained by: Their Own Canonical Variables				The Opposite Canonical Variables Cann R ²	
Factor	Proportion	Cumulative Proportion	Proportion	Cumulative Proportion			
1	0.2717	0.2717	0.0099	0.0099			0.0364
2	0.2740	0.5457	0.0053	0.0152			0.0195
3	0.1926	0.7383	0.0017	0.0170			0.0090
4	0.2617	1.0000	0.0004	0.0174			0.0015
		Standardized Variance of the Performance Measures Explained by: Their Own Canonical Variables				The Opposite Canonical Variables Cann R ²	
Factor	Proportion	Cumulative Proportion	Proportion	Cumulative Proportion			
1	0.2216	0.2216	0.0081	0.0081			0.0364
2	0.2017	0.4233	0.0039	0.0120			0.0195
3	0.1739	0.5972	0.0016	0.0136			0.0090
4	0.1779	0.7751	0.0003	0.0138			0.0015

accounting earnings and shareholder wealth, the estimated magnitude of both effects is very small. Kaplan (1994), on the other hand, concludes that CEO compensation is significantly related to negative income and changes in income. Murphy (1985) concludes that firm performance as measured by the shareholder's realized return is strongly and positively related to managerial remuneration. While these studies look at firm performance for a particular period, they do not address the issue of pay-performance relationship in historically loss-making firms. Also, these prior studies have ignored the correlation amongst the criterion variables (i.e., compensation components) by using the multiple regression methodology. The results of this paper show that in firms that have accumulated losses

in excess of accumulated gains from the date of their inception, CEO compensation is tied to cash flow performance, as opposed to accounting or stock performance. The results thus lend support to the argument of Gilson and Vetsuypens (1993) that accounting earnings may be an unreliable indicator of firms' true financial condition because CEOs have strong economic incentives to manage accounting earnings, when the firms are in distress. This paper also provides indirect support to John and John's (1993) thesis that firms with high agency cost of debt (typically firms with a poor financial performance record or significant amounts of debt in the capital structure) will have smaller pay-performance ratio of top management compensation.

Table 6
Squared Multiple Correlation

Panel A : Levels of compensation and performance (n=249)

A.1 : Between the compensation components and the first canonical variable of the performance measures

	I
Salary	0.1874
Bonus	0.1616
LTCOMP	0.0109
STOPT	0.0176

A.2 : Between the performance measures and the first canonical variable of the compensation components

	I
MKRT	0.0000
ROAA	0.1205
EP	0.0982
CFP	0.2290
GRWSLS	0.0018

Panel B: Changes in compensation and performance (n=187)

Squared multiple correlations not reported since no canonical correlation is significant.

Notes:

Salary is the dollar value of the base salary (cash and non-cash) earned by the CEO during the year.

Bonus is the dollar value of the bonus (cash and non-cash) earned by the CEO during the year.

LTCOMP is the total long term compensation and is defined as the *sum* of the value of restricted stock granted, long-term incentive plan payout, and all other long term compensation *excluding* the value of stock options.

STOPT is the aggregate value of stock options granted using Black-Scholes option pricing model.

MKRT is the market return and is defined as the close of fiscal year stock price *plus* dividends per share by ex-date *plus* cash equivalent per share by ex-date *divided* by close of fiscal year stock price. One (1) is *subtracted* from the quantity and the result is *multiplied* by 100.

ROAA is the return on average assets and is defined as the income before extraordinary items *divided* by the average of the current year's total assets and the prior year's total assets. This is then *multiplied* by 100.

EP is the earnings per share and is defined as the earnings per share from operations *divided* by the closing stock price.

CFP is the cash flow per share and is defined as the net change in cash from all items classified in the operating activities section on a statement of cash flows *divided* by the average number of common shares outstanding.

GRWSLS is the continuously compounded growth in sales and is defined as the natural logarithm of sales in current year *minus* natural logarithm of sales in current year.

Summary and Conclusions

I find modest evidence that CEO compensation and firm performance are associated in poorly performing firms, when the overall rela-

tionship between individual components of compensation and firm performance measures is considered simultaneously. In particular, the levels of *cash* compensation (i.e., Salary and Bonus) are closely tied to *levels* of cash flow measure of

performance. I interpret this finding as suggesting that stockholders of poorly performing firms reward CEOs in the short-run, for the effect of the managerial decisions on cash flows. Shareholder concern with the cash flow implications of managerial decisions is justifiable especially in view of the history of poor performance of the firms. Since cash flows are critical for the very survival of these firms, rewarding CEOs on the basis of cash flows is justified.

However, there is no association between *changes* in compensation and *changes* in performance. This is consistent with the cautious approach of stockholders to wait and see, if change in performance is more lasting. Shareholders are not easily swayed into changing CEO pay merely because of a change in performance in a particular year. It may well be that one year's good performance is offset by future year's poor performance.

There are several caveats with respect to these results. First, the actual relationship between firm performance and CEO pay could be other than monotonic. Second, an industry index could be used to measure the relative performance measures and relative compensation metrics.

The above limitations notwithstanding, the overriding conclusions still seem valid for a rather large sample of poorly performing firms. That is, it would appear that CEOs cash compensation such as salary and bonus is associated with firms' cash flow performance.

Suggestions for Future Research

The following suggestions are offered for future research. First, pay-performance relationship amongst loss-making firms in regulated industries may be analyzed. Second, future research needs to relax the assumption of linear relationship between compensation and firm performance. Thirdly, loss-making firms can be identified by focusing on market returns rather

than accounting earnings. Finally, it would also be interesting to see what is the pay-performance relationship in other countries.

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Appendix:

Definition of Variables Used in This Paper

1. CHSAL : $\text{Salary}_t - \text{Salary}_{t-1}$
where Salary is the dollar value of the base salary (cash and non-cash) earned by the CEO during the year.
2. CHBON : $\text{Bonus}_t - \text{Bonus}_{t-1}$
where Bonus is the dollar value of the bonus (cash and non-cash) earned by the CEO during the year.
3. CHLT : $\text{LTCOMP}_t - \text{LTCOMP}_{t-1}$
where LTCOMP is the total long term compensation and is defined as the *sum* of the value of restricted stock granted, long-term incentive plan payout, and all other long term compensation *excluding* the value of stock options.
4. CHSTOPT : $\text{STOPT}_t - \text{STOPT}_{t-1}$
where STOPT is the aggregate value of stock options granted using Black-Scholes option pricing model.
5. CHMKRT : $\text{MKRT}_t - \text{MKRT}_{t-1}$
where MKRT is the market return and is defined as the close of fiscal year stock price *plus* dividends per share by ex-date *plus* cash equivalent per share by ex-date *divided* by close of fiscal year stock price. One (1) is *subtracted* from the quantity and the result is *multiplied* by 100.
6. CHROAA : $\text{ROAA}_t - \text{ROAA}_{t-1}$
where ROAA is the return on average assets and is defined as the income before extraordinary items *divided* by the average of the

current year's total assets and the prior year's total assets. This is then *multiplied* by 100.

7. $CH\bar{E}P : EP_t - EP_{t-1}$

where EP is the earnings per share and is defined as the earnings per share from operations *divided* by the closing stock price.

8. $CHCFP : CFP_t - CFP_{t-1}$

where CFP is the cash flow per share and is defined as the net change in cash from all items classified in the operating activities section on a statement of cash flows *divided* by the average number of common shares outstanding.

9. $CHGRSLS : GRWSLS_t - GRWSLS_{t-1}$

where GRWSLS is the continuously compounded growth in sales and is defined as the natural logarithm of sales in current year *less* natural logarithm of sales in current year.

Endnotes

1. See, for example, J. Mathews, "When Does Pay Match Performance?" *The Washington Post*, May 28, 1995, Section H, p.1: 3, or R. Lowenstein, "Intrinsic Value: Renegade Firms Redefine Executive Pay," *Wall Street Journal*, April 4, 1996, Section C, p.1:3.
2. Theoretical background on canonical correlation is provided in Johnson and Wichern (1992).
3. The empirical results are robust to alternative research designs and samples. Unreported canonical correlations show that the results are not sensitive to outliers, or to surviving firms, or to firms that ranked in the top half of market-performance amongst the loss-making firms, or even amongst surviving firms.

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