DIVIDEND PAYOUT AND EXECUTIVE COMPENSATION: THEORY AND EVIDENCE

Nalinaksha Bhattacharyya*

Amin Mawani

Cameron Morrill

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ABSTRACT

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* Nalinaksha Bhattacharrya is from the University of Manitoba. Mailing address: I. H. Asper School of Business, University of Manitoba, Winnipeg MB R3T 5V4 CANADA. Tel: (204) 474-6774. Fax: (204) 474-7545. E-mail: bhattach@ms.umanitoba.ca. Amin Mawani is from York University and Cameron Morrill is from the University of Manitoba. The authors acknowledge financial assistance provided by the Centre for Accounting Research (CARE) at the University of Manitoba. Ron Giammarino, Heather Wier, Gady Jacoby, Kai Li, Vikas Mehrotra, Usha Mittoo, Ranjini Sivakumar and Steven Zheng provided helpful comments on earlier versions of the paper.

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DIVIDEND PAYOUT AND EXECUTIVE COMPENSATION: THEORY AND EVIDENCE

Why do corporations pay dividends? Despite decades of study, we have yet to understand completely the factors that influence dividend policy and the manner in which these factors interact. A quarter of a century ago, Black (1976) wrote that ". . . the harder we look at the dividend picture, the more it seems like a puzzle, with pieces that just don't fit together" (p. 5). The situation is not much different today, where Brealy and Myers (2003) list dividends as one of the ten important unsolved problems in finance.

To date, finance researchers have advanced three principal paradigms to explain the dividend puzzle. Miller and Modigliani (1961) offered the tax clientele theory, according to which investors select portfolios with reference to their marginal tax rates. A change in dividends changes the tax position of shareholders and induces trading as investors rebalance their portfolios. Signalling theory (e. g., Bhattacharya, 1979; Miller and Rock, 1985; John and Williams, 1985) suggests that managers use dividends to signal their private information to investors. Finally, the free cash flow hypothesis (Easterbrook, 1984; Jensen, 1986) posits that an increase in dividends is favorably received by investors because it means that managers will have less cash to invest in negative net present value projects.

Bhattacharyya (2003) develops a model of dividend payout that is based in the principal-agent paradigm. In his model, uninformed principals (shareholders) set up a menu of contracts to screen agents according to productivity type (which is known to the agent). Higher quality agents are those who have access to more positive net present value (NPV) projects. These agents are induced to invest the firm's cash rather than pay out dividends. Lower quality agents do not have the same access to positive NPV projects, and the compensation contract they choose induces them to pay out higher dividends.[i] In equilibrium, high quality managers receive higher

compensation than do low quality managers and pay out lower dividends. Empirically, Bhattacharyya's model predicts that dividend payout and managerial compensation are negatively correlated. We perform tobit analyses of managerial compensation and dividend payout in US firms over the period 1992-2001. Our results are consistent with the predictions of Bhattacharyya's model.

The rest of the paper is organized as follows. The next section presents Bhattacharyya's dividend payout model. Then, the sample data and results of empirical analyses are presented. Finally, conclusions are drawn.

I. A Theory of Dividend Payout and Managerial Compensation

A. Background

The main contribution of this study is to develop a formal model that explicitly links managerial compensation to the proportion of earnings paid out as dividends, and document empirical support for hypotheses arising from the theoretical model. While other studies have documented evidence in related areas, they differ in the variables selected for empirical constructs as well as in their underlying models.

For example, Fenn and Liang (2001) find that the ratio of cash dividends paid to the market value of the common stock (or the dividend yield from the investor's perspective) is negatively linked to managerial stock incentives as proxied by the level of stocks and stock options held by executives as a percentage of shares outstanding. In contrast, our dependent variable is the ratio of dividends paid to earnings to reflect the choice variables faced by managers – i.e., what proportion of earnings should be paid out as dividends? We argue that the dividend yield (as measured by the ratio of cash dividends paid to the market value of the common stock) is more influenced by the vagaries of the stock market, and is less within the

control of managers. In addition, unlike Fenn and Liang (2001), our explanatory compensation variable is a flow variable consisting of total compensation, bonus and options granted in the same period in which the decision to payout a certain percentage of earnings as dividends is made. In contrast, Fenn and Liang (2001) use the level of cumulative stocks and stock options (as a percentage of total shares outstanding) as their explanatory compensation variable.

Lambert *et al* (1989) find a negative link between changes in the cash level of dividends paid and the adoption of employee stock option plans for executives. In contrast, we examine dividend payouts instead of levels or changes in levels, and test for an association with the annual flow of compensation from options, salary and bonus instead of an association with a one-time (stock option plan) adoption event. White (1996) finds that dividend payments are linked to management's stock ownership. Unlike this study, she does not examine dividend payouts, nor does she examine the link with stock options or with total compensation.

Past research has documented a strong link between the compensation of many CEOs and firm outputs, measured as firm earnings (e. g., Healy, 1985) and/or firm stock price and returns (e. g., Jensen and Murphy, 1990; see Pavlik *et al*, 1993, for a review of this literature). Some researchers have also noted a positive link between dividend payment and executive compensation, implying that dividend payments are, under certain circumstances at least, rewarded by shareholders. Lewellen *et al* (1987) find a significant positive association between executive cash compensation (salary and bonus) and dividend payout, a result that is consistent with Healy's (1985) observation that the upper limit on amounts transferred to the executive bonus pool is often a function of cash dividends paid on common stock. Other mechanisms that directly link executive compensation to dividend payments include dividend units (Larcker, 1983) and restricted stock (Crystal, 1989).

Bhattacharyya (2003) models the dividend-compensation link identified in the empirical studies cited above and tries to understand the impact of such linkages on the dividend policies followed by firms. He starts by positing a linear compensation contract[ii] where managerial compensation is a linear function of dividends and output. If the compensation contract is a linear function of dividends alone, then the rational action for the manager is to have a 100% dividend payout ratio. Having both dividends and outputs as components of linear compensation contracts ensures that managers try to achieve a proper balance between dividend payments and investments.

When managers are of different productive qualities (which are privately known to managers but are essentially unobservable attributes), then compensation contracts will be set up in a way such that managers with the lowest level of acceptable quality will be paid the reservation wage *ex ante* and managers of higher quality will be paid information rent *ex ante.* The amount of rent will depend, *inter alia,* on the probability distribution of managerial quality. In equilibrium the optimal compensation contract will be such that, *ceteris paribus* (and in particular for a given amount of available cash), managers of highest quality get the most rent and invest the most in productive projects, while managers with least acceptable productive quality will get just the reservation wage and will invest the least.

It therefore follows that compensation contracts will ensure that, for a given amount of available cash, managers with higher quality will get more information rents (i.e., more compensation), will invest more in productive enterprises and, as a result, will have less money to distribute as dividends. Similarly, managers with lowest acceptable quality will get the participation wage and invest less, thereby leaving more cash for distribution as dividends. The payout ratio, i.e., the fraction of available cash paid out as dividends, will thus be negatively related to agent quality which, in turn, is positively related to managerial compensation.

Therefore, a testable hypothesis of the model is that the dividend payout ratio will be negatively related to managerial compensation.

B. The Model

Bhattacharyya's (2003) one-period model is used as a starting point to motivate our empirical hypothesis. The manager of firm j is presented with a menu of linear wage contracts that determine total compensation ϖ_j. Each member of the menu of wage contracts is a linear function of the dividend declared and stochastic output to be realized. The general form of the contract is presented in equation (1) below:

$$\varpi_j = b_0 + b_D D_j + b_Y \tilde{Y}_j \tag{1}$$

where b_0 is the fixed component of managerial compensation, D_j is the dividend declared for the period, $\tilde{Y}_j$ is the stochastic output for the period, and b_D and b_Y are nonnegative coefficients (this is discussed below).

Different contracts will have different coefficients b_0,b_D and b_Y. The manager is presented with a menu of contracts and the manager selects a contract. The menu of contracts is designed so as to be separating in agent types. Having picked the contract which is most beneficial to him/her, the manager will then declare a dividend D_j and invest the balance of the available amount.

Cash available for the period is partially distributed as D_j at the manager's discretion, and the rest is invested in the production process. The stochastic output from the production process is given by

$$\tilde{Y}_j = \theta_j e_j 1n\left(C_j - D_j\right) + \tilde{\varepsilon}_j \tag{2}$$

where θ_j is the productivity or quality of the manager (i.e., the manager's ability to identify net present value projects; managerial quality is assumed to be unknown to the owner), C_j is the cash

available for the period, e_j is the effort expended by the manager (also unobservable to the owner), and the final term is random noise. Output is dependent on the logarithm of the net investment, implying diminishing marginal returns to investment. Substituting (2) into (1), we get

$$\varpi_j = b_0 + b_D D_j + b_Y\left(\theta_j e_j 1n\left(C_j - D_j\right) + \tilde{\varepsilon}_j\right) \tag{3}$$

We should note here that the signs of both b_D and b_Y must be positive because if either is negative, then the manager will ensure that the expected value of that component is zero. To illustrate, suppose b_D is negative, i. e., the manager is penalized for paying dividends. Then the manager will always set the dividend equal to zero. Similarly, if b_Y is negative, then the manager will set effort to zero, which will make the expected value of production zero. The sign of b_0 will be indeterminate and b_0 will be adjusted to ensure that the *ex ante* expected compensation for the manager with the lowest acceptable quality is set at the participation constraint.[iii] For managers of higher quality, the intercept term b_0 will be adjusted to minimise the information rent payable.

Rearranging the terms in (3), we get

$$\varpi_j = b_0 + b_D D_j + b_Y \theta_j e_j\left[1nC_j + 1n\left(1 - \frac{D_j}{C_j}\right)\right] + b_Y\tilde{\varepsilon}_j \tag{4}$$

Note that D_j/C_j is a dividend payout ratio. Transposing and simplifying, we get

$$1n\left(1 - Payout\ \text{Ratio}_j\right) = -\frac{b_0}{b_Y\theta_j e_j} - \frac{b_D}{b_Y\theta_j e_j}D_j - 1nC_j + \frac{v_j}{b_Y\theta_j e_j} - \frac{1}{\theta_j e_j}\tilde{e}_j \tag{5}$$

The left-hand side of equation (5) can be interpreted as a measure of earnings retention. The model predicts that dividend payout (earnings retention) is positively (negatively) associated with both D_j, dividends declared, and C_j, cash available.

The positive relationship between D_j and the payout ratio, D_j / C_j, is not surprising. The relationship between C_j and the payout ratio is more subtle. At first glance, it would appear that, by construction, an increase in C_j will result in a reduction in the payout ratio. This is not the case, however, because of the assumption regarding diminishing marginal returns to investment implicit in equation (2). The manager will allocate available C_j between investment and dividends such that, *ex ante*, the marginal compensation from dividend payment is equal to the marginal compensation from production. Marginal compensation from dividend payment (b_D) is constant. Marginal compensation from production (b_Y) is also constant. However, from (2), expected marginal production increases with investment but at a diminishing rate. Therefore, as C_j increases, the manager will find it increasingly to his/her advantage to pay out proportionately more dividends. Hence, there is a positive relationship between C_j and the payout ratio.

Dividend payout (retention) is negatively (positively) associated with managerial compensation, reflecting that higher quality managers will be induced to invest more in the production process and earn greater compensation. The next section of the paper presents the results of empirical tests of this model.

II. Empirical Tests

A. Data

We obtained executive compensation data from the 2002 Execucomp database and collected firm-specific accounting variables from Compustat. Our sample began with a total of 14,013 firm-year observations. Firms in the financial service, professional service and government sectors were deleted (2,263 firm-years), as well as firm-years with negative or missing shareholders' equity (636 firm-years) and negative share repurchases (2 firm-years). In addition, we restrict our analysis to firms with payout ratios that are (1) non-negative because of

difficulty in interpreting a negative payout ratio; and (2) less than one, since ln(1 – Payout) is undefined for values of dividend payout greater than or equal to one.

A preliminary analysis of the data revealed the presence of some extreme values in many of the variables in our analysis. To mitigate the effect of these extreme values on our results, we eliminated observations falling within the top and bottom one-half of one percent of values of the following variables: Total CEO compensation, market-to-book ratio, capital expenditures and beta. In addition, we eliminated the top one-half of one percent of the following variables: Salary, options, bonus and debt-equity ratio. We did not perform this elimination process on variables that were "naturally" truncated. For example, bonus and options each had a significant number of zero values as the minimum. For these variables, we only eliminated the top one-half of one percent of values. As well, the logarithmic transformation of income available to shareholders eliminated loss firm-years from our sample and reduced extreme positive values. Performing our analyses without these eliminations had no effect on the statistical results presented here.

Descriptive statistics on the remaining sample are presented in Table I. The mean (median) firm-year in our sample has total assets of $4.370 billion ($1.063 billion). The mean (median) total annual CEO compensation is $3.253 million ($1.664 million), while the mean (median) Black-Scholes value of annual stock options granted to CEOs in our sample is $1.633 million ($415,090). On average, the value of options granted accounts for more than 50% of total compensation. The mean (median) annual CEO salary and bonus are $551,140 ($500,000) and $468,750 ($282,450), respectively. The mean (median) dividend payout ratio is 0.23 (0.14). The minimum and maximum values of the payout ratio (0 and 0.99, respectively), and the smaller number of valid cases, result from the restrictions imposed on the payout ratio as described above.

A correlation matrix of the variables in the sample is presented in Table II. By virtue of the large sample size, almost all of the correlations are statistically significant at conventional levels. It is noteworthy that firm size, as measured by the log of total assets, is positively correlated with total compensation and all of its components, and is particularly highly correlated with salary (Pearson r = 0.68). This finding is consistent with results reported by Baker *et al* (1988) and suggests that CEO salary is the component of compensation that is most highly correlated with firm size.

Dividend payout is positively associated with firm size (LNASSETS) and negatively associated with BETA. Consistent with the descriptive statistics in Table I, the value of options granted is very highly correlated with total compensation (Pearson r = 0.90), much higher than the correlations between total compensation and salary (r = 0.43); and total compensation and bonus (r = 0.49).

B. Tobit regression results

Bhattacharyya models dividend payout as a function of dividends (D_j), cash (C_j) and managerial compensation (ϖ_j). In our empirical tests of this model, we use dividends declared as D_j and compensation figures from Execucomp as ϖ_j. We use earnings available to common shareholders as the empirical proxy for C_j for three reasons. First, the dividend payout ratio is traditionally defined as dividends divided by earnings available to common shareholders. Second, dividend payouts are often constrained by earnings-based covenants (e.g., times-dividends-earned). Finally, earnings are frequently used as a measure of the long run cash-generating potential of a firm.

We estimate two sets of tobit regression models. The first is a direct test of equation (5) and is operationalized as:

$$\ln(1\text{-PAYOUT}) = \beta_0 + \beta_1 \text{COMPENSATION} + \beta_2 \text{DIVIDEND} + \beta_3 \text{LNINCOME} + \varepsilon \quad (6)$$

where PAYOUT is cash dividends declared to common shareholders divided by net income available to common shareholders (i. e., net income less preferred dividend requirement); COMPENSATION is one of total compensation, bonus and options granted; DIVIDEND is cash dividends declared to common shareholders; and LNINCOME is the log of net income available to common shareholders.[iv] We repeated all of our analyses with several alternate specifications of "dividends" and "cash," and all specifications yielded qualitatively consistent results. These alternate specifications are described later in this paper.

The results of estimating equation (6) are presented in Table III. The pseudo R^2 for the regressions is around 8%, and the Wald test results allow us to reject the null hypothesis that all of the regression coefficients, except for the intercept term, are not significantly different from zero. As predicted by Bhattacharyya (2003), the compensation coefficient β_1 is positive and strongly significant for total compensation, as well as for the individual compensation components bonus and options granted. The coefficients β_2 and β_3, on dividends and income, respectively, are both negative and significant as predicted by Bhattacharyya. The intercept coefficient, β_0, is theoretically indeterminate but is consistently and significantly positive in all four models.

The results in Table III provide strong support for the Bhattacharyya model. However, some or all of these results could be due to excluded variables that other studies have found to be related to dividend policy (e. g., White, 1996). In order to test this possibility, we estimate the following tobit regression model.

$$\ln(1\text{-PAYOUT}) = \beta_0 + \beta_1 \text{COMPENSATION} + \beta_2 \text{DIVIDEND} + \beta_3 \text{LNINCOME} + \beta_4 \text{DEBTEQ} + \beta_5 \text{MKTBOOK} + \beta_6 \text{CAPEXP} + \beta_7 \text{BETA} + \eta_1 \ldots \eta_{53} + \varepsilon \quad (7)$$

where COMPENSATION, DIVIDEND and LNINCOME are as defined in equation (6) above. DEBTEQ is long-term debt divided by common shareholders' equity, and is used here as a measure of firm leverage and a proxy for closeness to debt covenant restrictions. High leverage, with its associated financial risk and debt-servicing requirements, should be associated with lower dividend payout. MKTBOOK is the market value of the firm's common shares divided by the book value of common shareholders' equity, both at fiscal year-end. The market-to-book ratio is frequently used to proxy for investment opportunities available to the firm, regardless of the quality of the manager. We expect a higher market-to-book ratio to be associated with lower dividend payout. CAPEXP is capital expenditures for the year as reported on the cash flow statement, and controls for the possible effects of the firm's normal investment/capital asset replacement cycle. We expect capital expenditures to be negatively associated with dividend payout. BETA is the monthly fundamental beta, calculated for a 60-month period ending in the month of the firm-year's fiscal year end. We expect riskier firms to be more reluctant to pay out dividends and, therefore, expect BETA to be negatively associated with dividend payout. η_1 through η_{53} are dummy variables included to control for the effects of four years and 49 two-digit SIC industry groups in our sample.

Tobit regression results for equation (7) are presented in Table IV (note that the coefficients for the year and industry dummy variables are not reported). The pseudo R^2 for the different versions of the model is approximately 33%. In all three cases, the Wald statistic is significant, permitting rejection of the null hypothesis that all of the coefficients, aside from the

intercept term, are zero. As in Table III, all of the compensation variables are significantly and negatively (positively) associated with dividend payout (earnings retention).

Dividends declared and the natural logarithm of income are both negatively (positively) associated with earnings retention (dividend payout), consistent with the results in Table III. The market-to-book ratio (MKTBOOK), capital expenditures (CAPEXP) and firm beta (BETA) are all negatively associated with dividend payout, as expected, and are statistically significant in all three regressions. The coefficient on the debt-to-equity ratio (DEBTEQ), on the other hand, is negative, contrary to our expectations. Perhaps one of the other control variables (capital expenditures, for example) more effectively proxies for growth opportunities as they affect dividend policy.

While the indicator variables were included only to control for potential industry and year effects, it is noteworthy that no more than five of the 50 two-digit industry indicator variables are statistically significant in any of the three regression models. This is consistent with results obtained by chance, and suggests that either there are no significant inter-industry differences in dividend policy, or that these differences are effectively captured by other independent variables in the regression model. Two of the fiscal year dummy variables, for the years 2000 and 2001, were positive and statistically significant, suggesting that annual dividend payouts in these years were systematically lower than over the period 1997-1999.[v] This supports the argument that firms are increasingly resorting to stock repurchases, rather than cash dividends, to distribute excess cash to shareholders. This possibility is considered in more detail in the next section.

C. Sensitivity analysis

Cash dividends are not the only vehicle available to managers for distributing income to shareholders. Many firms frequently engage in share repurchases as a way of distributing excess cash to shareholders while avoiding the "stickiness" associated with increased dividends (see, for example, Jolls, 1998; Kahle, 2002; and Weisbenner, 2000). Grullon and Michaely (2002) find evidence that firms have gradually substituted repurchases for dividends. Ignoring share repurchases, therefore, risks misspecifying the cash distribution parameter in Bhattacharyya (2003).

To address this issue, we compute a new payout variable based on the approach used by Grullon and Michaely (2002). DIVPURCH is defined as the sum of cash dividends on common stock declared and total expenditure on repurchase of common and preferred stock, minus any reduction in the value of the net number of preferred shares outstanding. The payout ratio associated with DIVPURCH is DPPAYOUT, defined as DIVPURCH divided by net income available to common shareholders. We redo the analyses presented in tables III and IV, using DIVPURCH and DPPAYOUT in place of DIVIDEND and PAYOUT, respectively.

The results of these supplementary analyses are presented in tables V and VI. In all regressions, the results concerning the effect of compensation on retention are qualitatively similar to those reported in tables III and IV. The results in table VI are similar to those in table IV, except that the market-to-book ratio is no longer statistically significant (although still positive). These results provide strong additional support for the Bhattacharyya model.

As a supplementary check, we identified and deleted from our sample all firm-years reporting share repurchase activity on the cash flow statement. The tobit results obtained from this reduced sample (not reported here) are qualitatively the same as those reported in Table IV, i.

e., total compensation, bonus and options granted are significantly and negatively associated with dividend payout of non-repurchasing firms.

We used earnings available to common shareholders as the empirical measure of the Bhattacharyya cash parameter since earnings can be interpreted as a long-term average measure of cash generated by the firm's operations, and because earnings available to common shareholders is probably the most widely used denominator term in the payout ratio. We also conduct our analyses using (1) cash flow from operations (from the cash flow statement) and (2) free cash flow, as defined by Lehn and Poulsen (1989), in lieu of income available to common shareholders. In a further analysis, we used dividend yield in lieu of dividend payout, and market value of shareholders' equity in lieu of earnings, in our tobit regressions. In all cases, the results are qualitatively similar to those reported in Table IV.

Because it is a one-period model, Bhattacharyya (2003) assumes that the compensation effects of dividend and investment decisions are realized in the same period that those decisions are made. It is possible, however, that current managerial performance is rewarded (or punished) in subsequent periods through lagged adjustments to compensation (Fama, 1980). To test for this possibility, we ran our regressions using next year's (i. e., year t+1) compensation variables in place of this year's (year t) compensation. The results are qualitatively similar to those reported in Tables III and IV.

To ensure that heteroscedasticity or outliers do not affect our results, we performed rank transformations on all of the continuous variables in equation (7) and conducted our analyses using these ranks in place of the raw variable scores (see Iman and Conover, 1979, for a discussion of this technique). Secondly, we divided all variables by total assets and performed

the tobit procedure on the deflated variables. In both cases, the results are qualitatively similar to those reported in Table IV.

III. Conclusion

Understanding dividend policy has for many years been one of the most significant challenges in finance. A number of studies have documented an empirical association between managerial compensation and dividend policy although, until recently, no formal theoretical model has been advanced to explain this link. Bhattacharyya (2003) offers a model of dividend payout that incorporates managerial compensation and demonstrates that compensation affects the level of cash dividends, conditional upon the level of cash available for distribution.

The central premise underlying our model is that shareholders use the compensation contract to induce managers with lower productivity (i. e., managers with less access to positive NPV projects) to distribute more of their available earnings or cash as dividends. In contrast, managers with high productivity have access to many more positive NPV projects. These managers are, therefore, offered incentives to invest more of their available earnings or cash in productive ventures, leaving less for distribution as dividends. Consequently, dividend payout is negatively associated with managerial productivity. In equilibrium, higher productivity managers are paid more and, therefore, it follows that dividend payouts will be negatively associated with managerial compensation. The results of tobit analyses of dividend payouts of US firms over the period 1992-2001 are consistent with the predictions of the Bhattacharyya model, even after controlling for firm size, leverage, market-to-book value, capital expenditures, systematic risk, and year and industry effects.

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Endnotes

[i] The compensation contract is assumed to be structured in such a way that the manager finds it in her self-interest to pay out dividends rather than invest in negative NPV projects, since the latter reduces firm value in an efficient market.

[ii] The linear compensation function is assumed for reasons of tractability.

[iii] b_0 refers to the fixed component of total compensation, but is not equivalent to "salary" as that term is normally used. Salary itself can have a variable component in that it can be adjusted as a function of managerial performance.

[iv] LNINCOME also serves as a proxy for size, as it is highly correlated (Pearson r = 0.84) with ln of total assets (LNASSETS). The results are qualitatively similar when both LNINCOME and LNASSETS are included as independent variables.

[v] The regressions reported in Table 4 only contain observations from the period 1997-2001 because BETA is not available in Compustat for years prior to 1997.

Table I
Descriptive statistics

Our sample includes firm-years from the period 1992-2001. Dividends is cash dividends declared to common shareholders during the year. Income available is net income available to common shareholders. Payout ratio is dividends divided by income available to common shareholders. Total compensation is total CEO compensation. Salary is CEO salary. Bonus is CEO cash bonus. Options is the Black-Scholes value of stock options granted to the CEO. Assets is total assets as at year-end. Debt-equity ratio is long-term debt divided by common shareholders' equity as at year-end. Market-book ratio is the market value of firms' common shares divided by common shareholders' equity, both as at fiscal year end. Capital expenditures is capital expenditures for the year as reported on the cash flow statement. Assets, debt-equity ratio and market-book ratio are as at fiscal year end; all other items are for the fiscal year. Beta is the monthly fundamental beta, as reported by Compustat, calculated for a 60-month period ending in the month of the firm-year's fiscal year end. Beta is only available on Compustat for the years 1997-2001. As a result, there are only 5,577 valid firm-years in our sample.

Variable	N	Mean	Median	Std dev.	Minimum	Maximum
Dividends[a]	11,297	82.29	5.54	295.1	0	7,442.0
Income[a]	11,326	182.46	44.80	898.4	-56,121.9	21,964
Payout ratio	9,069	0.23	0.14	0.3	0	0.99
Total compensation[b]	11,102	3,253.21	1,664.86	4,833.8	68.0	49,483.3
Salary[b]	11,269	551.14	500.00	276.4	0	1,976.9
Bonus[b]	11,274	468.75	282.45	620.7	0	5,278.3
Options[b]	11,158	1,633.84	415.09	3,694.4	0	40,554.6
Assets[a]	11,330	4,370.72	1,063.78	13,226	5.1	303,100
Debt-equity ratio	11,205	0.35	0.17	0.5	0	5.6
Market-book ratio	11,011	3.44	2.37	3.7	0	43.9
Capital expenditures[a]	11,065	247.02	63.84	547.3	0.4	5,930.0
Beta	5,577	0.93	0.86	0.5	-0.3	3.2

a (b) indicates that amounts are in millions (thousands) of dollars US.

Table II
Correlation matrix

PAYOUT is cash dividends declared to common shareholders divided by net income available to common shareholders. TOTCOMP is total CEO compensation for the (fiscal) year. SALARY is CEO salary for the year. BONUS is CEO cash bonus for the year. OPTIONS is the Black-Scholes value of stock options granted to CEO during the year. DIVIDEND is cash dividends to common shareholders declared during the year. LNINCOME is the log of income available to common shareholders for the year. LNASSETS is log of total assets as at year-end. DEBTEQ is long-term debt divided by common shareholders' equity as at year-end. MKTBOOK is the market value of the firm's common shares divided by common shareholders' equity as at year-end. CAPEXP is capital expenditures for the year. BETA is the monthly fundamental beta from Compustat, calculated for a 60-month period ending in the month of the firm-year's fiscal year end.

	1	2	3	4	5	6	7	8	9	10	11
1. PAYOUT	1										
2. TOTCOMP	-.05*	1									
3. SALARY	.20*	.43*	1								
4. BONUS	.01	.49*	.53*	1							
5. OPTIONS	-.10*	.90*	.25*	.30*	1						
6. DIVIDEND	.31*	.28*	.43*	.30*	.15*	1					
7. LNINCOME	.28*	.40*	.62*	.47*	.27*	.51*	1				
8. LNASSETS	.38*	.40*	.68*	.44*	.25*	.47*	.84*	1			
9. DEBTEQ	.15*	-.06*	.06*	-.07*	-.08*	-.02	-.05*	.20*	1		
10. MKTBOOK	-.10*	.26*	.04*	.16*	.26*	.10*	.18*	-.02	-.25*	1	
11. CAPEXP	.20*	.31*	.43*	.30*	.19*	.60*	.58*	.62*	.04*	.04*	1
12. BETA	-.40*	.11*	-.13*	-.02	.17*	-.11*	-.07*	-.14*	-.16*	.15*	-.06*

* correlation is significantly different from zero at $p < 0.01$.

Table III
Tobit results for earnings retention (no control variables)

$\ln(1\text{-PAYOUT}) = \beta_0 + \beta_1 \text{COMPENSATION} + \beta_2 \text{DIVIDEND} + \beta_3 \text{LNINCOME} + \varepsilon$

PAYOUT is cash dividends declared to common shareholders divided by net income available to common shareholders. COMPENSATION is one of the following annual items, in thousands of $US: TOTCOMP is total CEO compensation; BONUS is CEO cash bonus; OPTIONS is the Black-Scholes value of stock options granted to the CEO. DIVIDEND is cash dividends declared during the year. LNINCOME is the log of income available to common shareholders for the year. Pseudo R^2 is the squared correlation between observed and expected values. The Wald χ^2 tests the null hypothesis that all of the tobit model parameters, other than the intercept term, are zero.

Independent Variable	*Expected sign*	*Coefficients (asymptotic t-statistics)*		
		Model I	Model II	Model III
CONSTANT	?	0.47	0.45	0.45
		(14.72***)	(13.94***)	(14.17***)
TOTCOMP[a]	+	0.47		
		(19.68***)		
BONUS[a]	+		2.35	
			(13.96***)	
OPTIONS[a]	+			0.60
				(19.25***)
DIVIDEND[b]	-	-0.49	-0.50	-0.44
		(-14.34***)	(-13.93***)	(-13.05***)
LNINCOME	-	-0.17	-0.16	-0.15
		(-21.79***)	(-19.67***)	(-20.13***)
Pseudo R^2		0.08	0.07	0.08
Wald χ^2 (3 df)		1,199.9***	1,044.0***	1,181.7***
N		8,904	9,022	8,942

*, **, and *** indicate that the statistic is statistically significant at $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. All p-values are one-tailed tests unless the expected sign of the coefficient is ambiguous (denoted by "?"), in which case the test is two-tailed.
a (b) indicates that the coefficient has been multiplied by 10^4 (10^3).

Table IV

Tobit results for earnings retention (control variables included)

$$\ln(1\text{-PAYOUT}) = \beta_0 + \beta_1 \text{COMPENSATION} + \beta_2 \text{DIVIDEND} + \beta_3 \text{LNINCOME} + \beta_4 \text{DEBTEQ} + \beta_5 \text{MKTBOOK} + \beta_6 \text{CAPEXP} + \beta_7 \text{BETA} + \eta_1 \ldots \eta_{53} + \varepsilon$$

PAYOUT is cash dividends declared to common shareholders divided by net income available to common shareholders. COMPENSATION is one of the following annual items, in thousands of $US: TOTCOMP is total CEO compensation; BONUS is CEO cash bonus; OPTIONS is the Black-Scholes value of stock options granted to CEO. DIVIDEND is cash dividends declared during the year. LNINCOME is the log of income available to common shareholders for the year. DEBTEQ is long-term debt divided by common shareholders' equity as at year-end. MKTBOOK is the market value of firms' common shares divided by common shareholders' equity as at year-end. CAPEXP is capital expenditures for the year. ηi are coefficients for dummy variables indicating one of 49 2-digit SIC industry classifications or one of four fiscal years. BETA is the monthly fundamental beta as reported by Compustat. Pseudo R^2 is the squared correlation between observed and expected values. The Wald χ^2 tests the null hypothesis that all of the tobit model parameters, other than the intercept term, are zero.

Independent Variable	*Expected Sign*	*Coefficients (asymptotic t-statistics)*		
		Model I	Model II	Model III
CONSTANT	?	-0.16	-0.19	-0.14
		(-0.49)	(-0.57)	(-0.44)
TOTCOMP [a]	+	0.11		
		(2.96***)		
BONUS[a]	+		0.49	
			(1.68**)	
OPTIONS[a]	+			0.22
				(4.55***)
DIVIDEND[b]	-	-0.73	-0.74	-0.73
		(-8.09***)	(-8.27***)	(-8.18***)
LNINCOME	-	-0.13	-0.13	-0.13
		(-7.60***)	(-7.14***)	(-7.71***)
DEBTEQ	+	-0.07	-0.06	-0.07
		(-1.50)	(-1.44)	(-1.49)
MKTBOOK	+	0.01	0.02	0.01
		(2.25**)	(3.17***)	(1.86**)
CAPEXP [b]	+	0.07	0.09	0.06
		(1.57*)	(1.92**)	(1.31*)
BETA	+	0.68	0.69	0.67
		(14.98***)	(15.50***)	(14.77***)
Pseudo R^2		0.33	0.33	0.33
Wald χ^2 (60 df)		1,965.8***	1,975.1***	1,977.6***
N		4,198	4,235	4,219

*, **, and *** indicate that the statistic is statistically significant at $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. All p-values are one-tailed tests unless the expected sign of the coefficient is ambiguous (denoted by "?"), in which case the p-value is two-tailed.

a (b) indicates that the coefficient has been multiplied by 10^4 (10^3).

Table V
Tobit results for earnings retention (no control variables): Payout is cash dividends plus common share repurchases

$\ln(1\text{-DPPAYOUT}) = \beta_0 + \beta_1 \text{COMPENSATION} + \beta_2 \text{DIVPURCH} + \beta_3 \text{LNINCOME} + \varepsilon$

DPPAYOUT is the sum of cash dividends on common stock declared and total expenditure on repurchase of common stock, divided by net income available to common shareholders. COMPENSATION is one of the following annual items, in thousands of $US: TOTCOMP is total CEO compensation; BONUS is CEO cash bonus; OPTIONS is the Black-Scholes value of stock options granted to the CEO. DIVPURCH is sum of cash dividends on common stock declared and total expenditure on repurchase of common stock. LNINCOME is the log of income available to common shareholders for the year. Pseudo R^2 is the squared correlation between observed and expected values. The Wald χ^2 tests the null hypothesis that all of the tobit model parameters, other than the intercept term, are zero.

Independent Variable	*Expected Sign*	*Coefficients (asymptotic t-statistics)*		
		Model I	Model II	Model III
CONSTANT	?	0.27	0.26	0.26
		(5.86***)	(6.39***)	(5.75***)
TOTCOMP[a]	+	0.07		
		(6.17***)		
BONUS[a]	+		1.49	
			(8.55***)	
OPTIONS[a]	+			0.07
				(5.81***)
DIVPURCH[b]	-	-0.42	-0.47	-0.41
		(-11.04***)	(-12.01***)	(-10.76***)
LNINCOME	-	-0.17	-0.19	-0.16
		(-15.70***)	(-16.82***)	(-15.44***)
Pseudo R^2		0.08	0.09	0.08
Wald χ^2 (3 df)		763.8***	807.1***	759.1***
N		6,501	6,573	6,501

*, **, and *** indicate that the statistic is statistically significant at $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. All p-values are one-tailed tests unless the expected sign of the coefficient is ambiguous (denoted by "?"), in which case the test is two-tailed.
a (b) indicates that the coefficient has been multiplied by 10^4 (10^3).

Table VI
Tobit results for earnings retention (control variables included): Payout is cash dividends plus common share repurchases

$$\ln(1\text{-DPPAYOUT}) = \beta_0 + \beta_1 \text{COMPENSATION} + \beta_2 \text{DIVPURCH} + \beta_3 \text{LNINCOME} + \beta_4 \text{DEBTEQ} + \beta_5 \text{MKTBOOK} + \beta_6 \text{CAPEXP} + \beta_7 \text{BETA} + \eta_1 \ldots \eta_{53} + \varepsilon$$

DPPAYOUT is the sum of cash dividends on common stock declared and total expenditure on repurchase of common and stock, divided by net income available to common shareholders. COMPENSATION is one of the following annual items, in thousands of $US: TOTCOMP is total CEO compensation; BONUS is CEO cash bonus; OPTIONS is the Black-Scholes value of stock options granted to CEO. DIVPURCH is the sum of cash dividends on common stock declared and total expenditure on repurchase of common stock. LNINCOME is the log of income available to common shareholders for the year. DEBTEQ is long-term debt divided by common shareholders' equity as at year-end. MKTBOOK is the market value of firms' common shares divided by common shareholders' equity as at year-end. CAPEXP is capital expenditures for the year. ηi are coefficients for dummy variables indicating one of 49 2-digit SIC industry classifications or one of four fiscal years. BETA is the monthly fundamental beta as reported by Compustat. Pseudo R^2 is the squared correlation between observed and expected values. The Wald χ^2 tests the null hypothesis that all of the tobit model parameters, other than the intercept term, are zero.

Independent Variable	*Expected Sign*	*Coefficients (asymptotic t-statistics)*		
		Model I	Model II	Model III
CONSTANT	?	0.41	0.37	0.41
		(1.09)	(0.99)	(1.09)
TOTCOMP [a]	+	0.03		
		(2.01**)		
BONUS[a]	+		0.69	
			(3.07***)	
OPTIONS[a]	+			0.03
				(2.02**)
DIVPURCH[b]	-	-0.55	-0.57	-0.55
		(-9.24***)	(-9.50***)	(-9.16***)
LNINCOME	-	-0.15	-0.16	-0.15
		(-9.57***)	(-9.85***)	(-9.54***)
DEBTEQ	+	-0.01	-0.01	-0.00
		(-0.21)	(-0.25)	(-0.19)
MKTBOOK	+	0.00	0.00	0.00
		(0.75)	(0.73)	(0.75)
CAPEXP[b]	+	0.12	0.11	0.12
		(5.48***)	(5.30***)	(5.47***)
BETA	+	0.46	0.47	0.46
		(11.49***)	(11.78***)	(11.48***)
Pseudo R^2		0.20	0.20	0.20
Wald χ^2 (60 df)		972.1***	983.7***	972.0***
N		3,345	3,360	3,345

*, **, and *** indicate that the statistic is statistically significant at $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. All p-values are one-tailed tests unless the expected sign of the coefficient is ambiguous (denoted by "?"), in which case the p-value is two-tailed.
a (b) indicates that the coefficient has been multiplied by 10^4 (10^3).