Does Corporate Performance Determine Capital Structure and Dividend Policy?

Michael Faulkender
Olin School of Business, Washington University in St. Louis

Todd Milbourn
Olin School of Business, Washington University in St. Louis

Anjan Thakor
Olin School of Business, Washington University in St. Louis

Abstract

We present an integrated theory of capital structure and dividend policy in which both financial policy choices are driven by the same underlying factors and jointly determined as implicit governance mechanisms to allocate control over real (project choice) decisions between managers and investors. At one extreme is a very highly levered firm with very little equity. Such a firm puts the maximum control over project choice in the hands of investors. At the other extreme is an all-equity firm that pays no dividends. Such a firm puts the maximum control in the hands of the manager. Between these two extremes is a continuum of control allocations determined by different debt-equity ratios and different dividend payout ratios. Higher debt-equity ratios and higher dividend payouts lead to greater investor control. Control matters even though there are no agency or asymmetric information problems because of a divergence of beliefs between the manager and investors that could lead to disagreement over the value-maximizing project choice. The extent of the potential disagreement depends upon the firm’s prior performance. The manager sets the firm’s dividend policy and capital structure to optimally trade off the value he attaches to being in control of project choice against the decline in stock price from taking control away from investors. We generate testable predictions from the theory and then test them empirically. These tests provide strong support for the theory.

Correspondence email: faulkender@olin.wustl.edu. The research assistance of Pete Vitale is greatly appreciated.
I. INTRODUCTION

The two major financial policy decisions a firm makes are its dividend policy and its capital structure. We have numerous theories that produce predictions about dividend policy as well as many that produce predictions about capital structure. There are two noteworthy observations, however. First, for the most part, theories of dividend policy differ from theories of capital structure. That is, the literature has treated dividend policy and capital structure as two distinct financial policy variables, even though there is reason to believe that there are common factors affecting both and that corporations treat both as part of an integrated financial policy determination. Second, the empirical success of these theories has been mixed at best, leaving us with many unanswered questions. The purpose of this paper is to propose a new theory of dividend policy and capital structure that treats these financial policy variables as two sides of the same coin, and empirically test its predictions. A key aspect of this theory is that capital structure and dividend policy are jointly determined as part of a continuum of control allocations between managers and investors, and hence cross-sectional variations in both are driven by the same underlying factors. The allocation of control between the manager and investors is important not because of agency or private information problems but because of potentially divergent beliefs that can lead to disagreement about the value of the project available to the firm. The key underlying factor is past corporate performance. Better past performance leads to less disagreement and thus affects the costs and benefits of different control allocations. That is, dividend policy and capital structure constitute an implicit governance mechanism that determines how much control over the firm’s real (investment) decisions is exercised by the manager vis a vis the shareholders, and the firm’s past performance has a critical impact on this governance mechanism.

The two dominant dividend policy theories are signaling (e.g. Bhattacharya (1979), John and Williams (1985), Miller and Rock (1985), and Ofer and Thakor (1987)) and free cash flow (e.g.

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1 There are exceptions. For example, Chang (1993) develops a model in which managers privately observe cash flows and thus have an incentive to underreport cash flows in order to reduce payouts to investors. Managerial compensation contracts can be used to motivate manager to make payouts. When the payout is purely discretionary, the claim on the payout is interpreted as equity. In a costly-state-verification setting, if a payout below a predetermined threshold triggers information-acquisition by investors and a transfer of control, the claim on this payout is interpreted as debt. That paper, however, is not aimed at linking financial policy to a the firm’s stock price, which has been empirically observed.
Easterbrook (1984), Jensen (1986), and Lang and Litzenberger (1989)). If dividends signal management’s proprietary information to shareholders, then an unexpected dividend increase must cause an abnormal stock price appreciation. If dividends diminish free-cash-flow inefficiencies, then an increase in dividends will increase firm value by reducing excess cash. Thus, both theories predict that unexpected increases in dividends should generate positive price reactions, which has been empirically supported.

The empirical research paints a somewhat hazy picture when it comes to being able to choose which of the two theories can best explain the data. The evidence that supports signaling is that stock price changes following dividend change announcements have the same signs as the dividend changes and the magnitude of the price reaction is proportional to the magnitude of the dividend change (see Allen and Michaely (2002)), and Nissam and Ziv (2001)). Bernheim and Wantz (1995) find that the signaling impact of dividends is positively related to dividend tax rates, consistent with a key implication of dividend signaling models that the signaling value of dividends should change with changes in dividend taxation. However, Bernatzi, Michaely, and Thaler (1997) present conflicting evidence. They find that the dividends are related more strongly to past earnings than future earnings. Further, there is a significant price drift in the years following the dividends, and it is the large and profitable firms (with less informational asymmetries) that pay most of the dividends (Fama and French (2001)), which is consistent with the free-cash-flow hypothesis. The free-cash-flow hypothesis also has mixed empirical support. Supporting evidence is provided by Grullon, Michaely, and Swaminathan (2002), who find that firms anticipating declining investment opportunities are likely to increase dividends, and Lie (2000) who finds that firms with cash in excess of that held by peers in the industry tend to increase their dividends. However, Yoon and Starks (1995) encounter a symmetric price reaction to dividend changes across high-Tobin’s Q and low-Tobin’s Q firms, which seems inconsistent with the free-cash-flow hypothesis.

More troubling is the fact that existing theories also do not explain why some firms never pay dividends whereas others consistently do, why the payment of dividends seems dependent on the firm’s stock price, and why there seem to be correlations between firms’ capital structure and dividend policy choices. For example, companies like Cisco and Microsoft until recently have for years operated with no
dividends. Similarly, firms like General Electric, Anheuser-Busch, and Coca-Cola have had a long
history of paying dividends while still maintaining relatively high growth. Why? It seems implausible to
argue that Cisco and Microsoft have nothing to signal while General Electric, Anheuser-Busch and Coca-
Cola do, or that managers at Anheuser-Busch and Coca-Cola pay dividends to reduce managerial excess
cash consumption while Cisco and Microsoft are not burdened with such worries. Further, Baker and
Wurgler (2004) find that managers pay dividends when investors place a premium on dividend-paying
stocks and don’t pay dividends when investors prefer non-dividend paying stocks. This suggests that
managers are conditioning dividend decisions on their firms’ stock prices. And we know that firms
consider their stock price to be an important determinant of whether to issue debt or equity (see Graham
and Harvey (2001)), which suggests that capital structure and dividend policy choices may depend on
common factors and thus be correlated.

We are thus left without a theory of dividends that squares well with these stylized facts. The
evidence on capital structure is even more troubling. The two dominant capital structure theories are the
(static) tradeoff theory and the pecking order theory.² The tradeoff theory states that a firm’s capital
structure balances the costs and benefits of debt financing, where the costs include bankruptcy and agency
costs, and the benefits include the debt tax shield and reduction of free-cash-flow problems (e.g. Jensen
(1986), Jensen and Meckling (1976) and Stulz (1990)). A prediction of the theory is that an increase in
the stock price, because it lowers the firm’s leverage ratio, should lead to a debt issuance by the firm to
bring its capital structure back to its optimum. The pecking order theory (see Myers and Majluf (1984))
assumes that managers have private information that investors don’t have, and goes on to show that firms
will finance new investments first from retained earnings, then from riskless debt, then from risky debt,
and finally, only in extreme circumstances like financial distress, from equity. This implies that equity
issues should be quite rare, particularly when the firm is doing well and its stock price is high.

The empirical evidence is, however, perplexing in light of these theories. As reinforced by
Graham and Harvey’s (2001) survey evidence, firms issue equity rather than debt when their stock prices
are high (e.g. Asquith and Mullins (1986), Jung, Kim, and Stulz (1996), Marsh (1982), and Mikkelson

² There are also numerous dynamic capital structure papers that are largely “debt-centered” and focus on leverage
dynamics, such as Dangl and Zencher (2004) and Fischer, Heinkel and Zechner (1989).
and Partch (1986)). More ominously for the existing theories, Baker and Wurgler (2002) find that the level of a firm’s stock price is a major determinant of which security to issue, and Welch (2004) finds that firms let their capital structures change with their stock prices rather than issuing securities to counter the mechanical effect of stock returns on capital structure. While Baker and Wurgler (2002) attribute their finding to managers attempting to time the market, Dittmar and Thakor (2005) show theoretically and empirically that firms may issue equity when their stock prices are high even when managers are not attempting to exploit market mispricing (see also Schultz (2003) for empirical evidence).

Recently, Fama and French (2004) have provided direct evidence against the pecking order hypothesis and concluded that this hypothesis cannot explain capital structure choices. They find that equity issues are not as infrequent as the pecking order hypothesis predicts, and that between 1973 and 2002 the annual equity decisions of more than half the firms in their sample violated the pecking order. These empirical studies on dividend policy and capital structure raise the obvious question: why do firms work with lower leverage and dividend payout ratios when their stock prices are high?

In this paper, we address this question by developing a fresh approach with a simple model that departs from the usual agency and signaling stories. We assume that the manager wishes to maximize a weighted average of the stock prices at the initial and terminal points in time. At the initial point in time he raises the funds needed for a future project with either debt or equity, and thereby determines the firm’s capital structure. Moreover, he also decides how large a dividend to promise to pay at the next point in time. At the time that the manager makes his financial policy choices, he is aware that investors may not agree with his future project choice. Because the manager’s objective function is based on the firm’s equity value, there is no divergence between his goals and those of the shareholders, and project-choice disagreement arises solely from potentially different beliefs about project value rather than agency or private information problems. In our model, this difference in beliefs about project value is due to heterogeneous prior beliefs about the precision of a signal about project value. This heterogeneity is linked to the fact that the manager is investing in what we view as an “innovative” project, one that is a departure from the firm’s routine operations, so that prior beliefs about its value could easily diverge and insufficient hard historical data are available for convergence of beliefs.
Potential disagreement with investors will not matter to the manager’s ability to invest in the project of his choice if he has the necessary liquidity within the firm to make the investment. But if he has to approach the shareholders for external financing, their disagreement will matter because the shareholders will refuse additional funding if their assessment of the project is negative. This means that the degree of autonomy or control the manager has in choosing the project he wants is affected by the prior dividends paid, since lower dividends means higher retained earnings and hence more internal funds to invest. Viewed in this light, the firm’s dividend policy determines the allocation of control to shareholders, with a decrease transferring greater control to the manager. A manager motivated to maximize the terminal wealth of the shareholders would wish to appropriate all control for himself by not paying any dividends. But such autonomy from investors comes at a cost. Since the investors know that lower dividends mean less control for them, the stock price at the time of the dividend announcement is increasing in the promised dividend. The manager thus bears the cost of a lower initial stock price if he declares a lower dividend. We show in our analysis that the magnitude of the adverse stock price reaction is smaller when the likelihood of future disagreement between the manager and the investors is lower. Moreover, the likelihood of disagreement is lower the better the past performance of the firm.\(^3\) Hence, the model predicts that firms that perform better have lower dividend payout ratios.

Let us now turn to the choice of debt versus equity. We permit the manager the possibility of investing in two other projects besides the innovative project: a “routine” project that has a lower value than a “good” innovative project, and a lemon that has a negative net present value. The manager will never invest in the lemon when he chooses to raise external funds with equity. But the presence of debt introduces an asset-substitution moral hazard problem and causes the manager to prefer the lemon over all others. Anticipating this, bondholders will refuse to extend financing unless the manager includes in the debt covenants a binding pre-commitment to invest in the routine project. Thus, debt financing is costly to the manager because he surrenders all project choice control to investors. The benefit is the debt tax shield. We show that the manager prefers debt over equity when potential disagreement with investors is

\(^3\) In our model, we only consider the historical performance of the firm in the presence of a single manager. That is, we do not incorporate any management turnover. Thus, statements over the past performance of the firm in reality reflect the performance of the firm while the incumbent manager has been at the helm.
the highest and the cost of managerial control is therefore also the highest. Since the possibility of disagreement is greater when the firm’s performance is poorer, the model predicts a firm’s debt-equity ratio to be inversely related to the extent of agreement between the manager and the investors and hence also inversely related to the firm’s prior performance.\(^4\)

In our model, higher agreement between the manager and the investors implies a higher stock price, so the model predicts leverage and dividend payout ratios to be inversely related to the firm’s stock price. Additionally, our model makes two straightforward predictions: (i) the better the firm performs, the lower will be its leverage ratio, and (ii) the better the firm performs, the lower will be its dividend payout ratio. That is, a firm’s current financial policy is driven by its past operating and current stock price performance.

We test these and other predictions of the model and find strong empirical support, after controlling for a host of other factors that could impact capital structure and dividend policy. As a proxy for the agreement level between the manager and investors, we turn to analyst forecast dispersion and managerial compensation data. If analysts disagree with each other about the expected performance of the firm, then it is also likely that investors disagree with the management about the future prospects of the firm. Our examination of managerial compensation is motivated by the basic premise that managers who have performed better should receive higher compensation. Naturally, managers who have entrenched themselves may also receive relatively high wages. However, we find a statistically and economically significant positive relationship between past performance and executive compensation, suggesting that managerial entrenchment is not what is driving the results. Rather, it appears that better past performance leads to greater investor confidence in the manager and hence greater potential agreement between the manager and the shareholders. To further address this issue, we calculate the predicted value of a CEO’s compensation based on his firm’s past performance as our proxy for

\(^4\) In this respect, the leverage part of the theory presented here is similar to that in Dittmar and Thakor (2005) who develop a model of security issuance to explain when a firm will issue equity and when it will issue debt. In particular, they develop a model in which, similar to our framework, the manager’s decision of when to issue equity is driven by perceived agreement with investors, so that equity issues occur when agreement (and hence the firm’s stock price) is high. However, their model is concerned with the timing of equity issues, rather than the broader capital structure implications of agreement. Moreover, their analysis is not linked to corporate performance, and is not concerned with dividend policy choice as an integral component of financial policy, along with capital structure.
agreement, where higher values of performance-induced compensation are associated with greater levels of agreement.⁵ We then examine the extent to which our agreement proxies affect the capital structure and dividend choices of firms.

Our empirical results are arguably quite strong, and consistent with the model’s predictions. We find that firms for which there is greater agreement (i.e., lower analyst forecast dispersion and greater performance-based compensation) have significantly less debt in their capital structure – as measured by either market or book leverage, or interest coverage – and pay out a significantly smaller fraction of the earnings in the form of dividends, measured using both the dividend payout ratio and the dividend yield. Specifically, a one standard deviation increase in our proxy for agreement translates to as much as a 6.3% reduction in the amount of debt in the firm’s capital structure, a 15.8% increase in interest coverage, and as much as a 10.1% reduction in dividends. Thus, we conclude that manager-shareholder agreement is an economically important determinant of both capital structure and dividend polices.

The rest of the paper is organized as follows. Section II develops the model. Section III presents the empirical approach and Section IV describes the data. Section V contains the results of the empirical analysis. Section VI concludes.

II. THE MODEL

In this section, we describe the model, explain how disagreement over project choice may arise and what managerial autonomy means in that setting, and examine the firm’s capital structure and dividend policy choices. Our goal is the produce testable predictions that we will take to the data.

A. Disagreement

A key feature of our model is that even a manager whose sole objective is to maximize stock price may face disagreement from investors over whether a particular project choice is value-maximizing. This happens in our model because the manager and investors may have different prior beliefs about the value of the project. While rationality requires that agents use Bayes rule to update their prior beliefs, economic theory has little to say about the origination of the prior beliefs themselves. These priors are

⁵ In Section IV, we outline our empirical methodology in detail.
typically taken as primitives, along with preferences and endowments. Morris (1995) has pointed out that heterogeneity of priors is perfectly consistent with Bayesian rationality, and Kreps (1990) has noted that heterogeneous prior beliefs represent a more general specification than homogeneous priors. Numerous papers have used heterogeneous prior beliefs, including Abel and Mailath (1992), Allen and Gale (1999), Coval and Thakor (2005), Manove and Padilla (2001), Van den Steen (2004), and the famous Arrow-Debreu-McKenzie model.

Of course, the standard argument for assuming common priors as in the Harsanyi doctrine is that it provides discipline by limiting modeling flexibility (see Samuelson (2004)). While we recognize this, it is also important to note that our goal is to develop a model that is both able to explain previously-unexplained stylized facts and generate additional predictions that can be confronted with the data to potentially refute the model. Thus, ultimately the data will be the best judge of whether our use of heterogeneous beliefs leads to a theoretical framework that appropriately characterizes cross-sectional variations in financial policy.

B. Model Description

Preferences and Relationship of Past Performance to Beliefs: All agents are risk neutral and the riskless interest rate is zero, so there is no discounting of payoffs. There are four points in time: 0, 1, 2, 3. At t=0, the firm is all-equity financed and has existing assets in place, with an expected (after-tax) value of V at t=3 that everybody agrees on. At t=0, the firm has been in existence for N periods {-N, -N+1, . . . , -1}. The operating and stock price performance of the firm and its manager over those N periods is observable at t=0 and it can be represented by a summary statistic \( \Lambda \) that is a sufficient statistic for all the relevant information about the firm until t=0. We assume that \( \Lambda \in \{ \Lambda_L, \Lambda_M, \Lambda_H \} \) where \( \Lambda_L < \Lambda_M < \Lambda_H \).

\( \Lambda \) reveals noisy information about the ability of the firm’s manager. The manager’s ability is \( A \in \{ T, U \} \), where T represent “talented” and U represent “untalented”. The commonly-held prior

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6 Kreps (1990) (p. 370) notes, “First it is conventionally assumed that all players share the same assessments over nature’s actions. This convention follows from deeply held “religious” beliefs of many game theorists. Of course, one hesitates to criticize another individual’s religion, but to my own mind this convention has little basis in philosophy or logic. Accordingly, one might prefer, being more general, to have probability distributions \( \rho \) and \( \rho_0 \), which are indexed by I, reflecting the possibly different subjective beliefs of each player.”
belief is that $\Pr(A = T) = \omega \in (0, 1)$ and $\Pr(A = U) = 1 - \omega$. It is common knowledge that $\Pr(\Lambda = \Lambda_H | A = T) = q \in (0, 1)$ and $\Pr(\Lambda = \Lambda_M | A = T) = 1 - q$. Moreover, the manager believes that $\Pr(\Lambda = \Lambda_L | A = U) = 1$. However, investors’ beliefs, conditional on $\Lambda = \Lambda_M$, are randomly determined at $t=2$ when the project investment decision has to be made. In particular, with probability $\rho \in (0, 1)$, investors share the manager’s beliefs that $\Pr(\Lambda = \Lambda_L | A = U) = 1$ and $\Pr(\Lambda = \Lambda_M | A = U) = 0$. With probability $1-\rho$, they believe:

$$
\Pr(\Lambda = \Lambda_M | A = U) = r(\Psi) \in (0, 1)
$$

$$
\Pr(\Lambda = \Lambda_L | A = U) = 1 - r(\Psi)
$$

where $\Psi \in [0, 1]$ represents the “agreement parameter”, and $r' < 0$, $r(1) = 0$, and $r(0) = 1 - q$. The parameter $\Psi$ measures the degree of alignment between the manager and investors, with $\Psi = 0$ representing no alignment and $\Psi = 1$ representing perfect alignment. This means that the probability of investors disagreeing with the manager disappears as $\Psi \to 1$. We view $\Psi$ as being possibly affected by exogenous factors that go beyond corporate performance, although we can permit $\Psi$ to be increasing in performance within the $\Lambda_M$ group if there is some performance heterogeneity within this group.

**Timeline:** At $t=0$, it is common knowledge that a project opportunity will arrive with probability $\alpha \in (0, 1)$ at $t=2$. This opportunity is a portfolio of projects. Every project in the portfolio requires an investment of $I$ at $t=2$. This portfolio consists of three mutually exclusive projects: a safe “routine” project that pays off $M > I$ for sure at $t=3$, a risky innovative project that pays off a random amount $Z$ at $t=3$, where $Z \in \{0, X_G\}$ with $X_G > M$, and a risky lemon project that pays off a random amount $\xi$ with probability density function $f(\xi)$. We assume that $\int \xi f(\xi) d\xi + V < I$. Everybody agrees on the payoff distributions of the routine and the lemon projects, but there may be disagreement about the value of the innovative project. The firm has no investment capital available at $t=0$ to finance the project and must raise the necessary funds from external financiers. At this point, the manager makes his capital structure and dividend policy choices as well. For simplicity, we limit the manager to binary choices on both and assume that $I$ is an upper bound on the external financing raised. That is, the manager chooses to raise the
necessary external financing either through debt or equity at t=0. And if equity is chosen, the manager
must decide at t=0 whether or not to promise to pay a dividend at t=1.

At t=1, the firm realizes an interim sure cash flow of \( C_1 > 0 \) from its assets in place. If a dividend
was promised or the debt contract stipulated an interest payment, the dividend or interest payment is made
at t=1.

At t=2, the manager privately observes whether the project opportunity arrived. In addition, the
manager receives a private signal about the payoff of the innovative project \( \theta^M \in \{ \theta_l, \theta_h \} \), where \( 0 < \theta_l < \theta_h < 1 \), and \( \theta^M = \Pr(Z = X_G) \). We assume \( X_h \equiv \theta_h X_G \) and \( X_l < 1 < X_h [1-\tau] \). Hence, if \( \theta^M = \theta_h \), the manager
views the innovative project as worth investing in, and if \( \theta^M = \theta_l \), he would like to reject the innovative
project. The prior probability of the manager receiving the signal \( \theta^M = \theta_h \) is \( \delta \in (0,1) \) and the probability
of the manager receiving \( \theta^M = \theta_l \) is \( 1-\delta \).

If the manager chooses to reveal the innovative project to investors, then they also get to observe
his beliefs about the payoff on the project, i.e., there is no misrepresentation about these beliefs. How
accurate the manager’s signal about the payoff on the innovative project is depends on the manager’s
ability. Let \( \theta’ \) be the true probability of \( Z = X_G \). Then

\[
Pr\left( \theta’ = \theta^M \mid A = T \right) = 1, \text{ and } \\
Pr\left( \theta’ = \theta^M \mid A = U \right) = \begin{cases} 
\delta & \text{if } \theta^M = \theta_h \\
1 - \delta & \text{if } \theta^M = \theta_l 
\end{cases}
\]

That is, if the manager is talented, the manager’s signal is perfect. If the manager is untalented, the signal
he receives at t=2 is uninformative and posterior beliefs about the project payoff should remain at the
prior beliefs. After the manager updates his beliefs about the project payoffs, so do investors. They do
this on the basis of the manager’s beliefs and the firm’s performance \( A \).

At t=2, the manager also decides what to do with the funds raised at t=0. If no project has
arrived, the manager simply pays off the bondholders or disburses cash to shareholders. We motivate this
on the basis of the assumption that cash left idle between t=2 and t=3 dissipates in value. Specifically,
$1 kept idle between t=2 and t=3 is worth only \( \lambda \in (0,1) \) at t=3. If a project opportunity arrives at t=2 and

\[7\] This could be due to free-cash-flow problems or other inefficiencies.
the manager wishes to invest, he will go ahead and invest if he has sufficient funds within the firm to do so. If he lacks the funds because of payments made at $t=1$, he approaches the investors (either shareholders or bondholders) for what is needed.\(^8\) If investors provide the additional funds, then the project payoff is realized at $t=3$. If investors choose not to provide the additional funds, then again the funds within the firm (from money raised at $t=0$) are disbursed to investors. We assume that raising external financing at either $t=0$ or $t=2$ involves an after-tax transactions cost, $TC$, that is a function of the amount of financing raised, $F$, and given by:

$$
TC(F) = \begin{cases} 
K_0 > 0 & \forall F \leq F^* \\
K_0 + K[F - F^*] & \forall F > F^*
\end{cases}
$$

where $K_0$ is a positive constant, $K \in (0,1)$, and $F^*$ is a cut-off financing level. The idea is that there is a fixed-cost component of transactions costs and then a variable-cost component that kicks in if the financing being raised exceeds a threshold level. We will assume henceforth that $C_1 = F^* < I$. This is a simplifying assumption that does not affect the analysis much.

At $t=3$, the terminal value of the firm, $V$, as well as the project payoff (if any) are realized and investors are paid off. All payoffs are taxed at a rate $\tau \in (0,1)$. For simplicity, all debt principal and interest payments are tax deductible. Figure 1 describes the time line.

*Figure 1 goes here*

**What do the Different Projects Represent?:** We view the routine project as an extension of the firm’s existing operations. Therefore, it is familiar to the manager and to investors and everybody agrees it will pay off $M$ at $t=3$. The lemon is a project that everybody agrees is bad, so its role is to create an asset-substitution moral hazard possibility in the presence of debt. To admit this possibility, we assume that while investors can tell whether the manager is investing in the routine project or the risky project, they cannot distinguish ex ante between the two risky projects in that they cannot tell whether the manager is investing in the innovative project or the lemon.

\(^8\) Note that since external financing is raised at $t=0$, any shortfall at $t=2$ can only come about because some funds were used up to pay dividends / interest at $t=1$. 

We view the innovative project as differing substantially from the firm’s existing operations. It thus has more “unfamiliar” payoff characteristics and is also subject to greater potential disagreement about its value. Examples are a new business design such as Amazon’s on-line sales, a new strategy like Starbucks’ coffee franchise in the U.S., a biotech or pharmaceutical company researching a new drug like monoclonal antibodies for curing cancer and so on. The basic idea is that the innovative project is a departure from the past, so that there is a lack of historical data to predict its future prospects the way one would predict the future (t=3) value of the existing assets. Our notion of heterogeneous prior beliefs about the innovative project thus is consistent with Kurz’s (1994) notion of “rational beliefs” as being those that are not precluded by historical data. When there is a paucity of historical data, there will be many prior beliefs that are not precluded by the data.

**Manager’s Objective Function:** The manager’s objective is to maximize a weighted average of the stock price at t=0 and the manager’s assessment of the terminal value of the firm at t=3. That is, the manager seeks to maximize the expected terminal wealth of those who are shareholders of the firm at t=0, but he also cares about how this terminal wealth is perceived by investors at t=0, when he chooses the firm’s capital structure and dividend policy. Specifically, the manager seeks to maximize:

$$ W = P_0^i + \beta P_3^M $$(1)

where $P_3^M$ is the expected value of the firm at t=3 to the shareholders at t=0, as assessed by the manager at t=0, and $P_0^i$ is the firm’s value to its t=0 shareholders based on the stock price at t=0. Here $\beta > 0$ is a weighting constant.

Another way to think about (1) is that management is maximizing a weighted average of two stock prices, one at t=0 and the other at t=3. Since the stock price at t=3 is random, the manager computes its expected value, conditional on his beliefs at t=0. Objective functions of this type, in which management cares about both its own opinion as well as the opinions of investors are common, e.g. Miller and Rock (1985). This sort of objective function could also be justified based on the assumption that management cares about the current stock price as well as future price appreciation, e.g. Holmstrom and Tirole (1993).
C. Analysis

Although the model has four points in time, the crucial dates are $t = 0$ and $t = 2$. At $t = 0$, the manager is choosing the firm’s capital structure and dividend policy, and at $t = 2$ the manager is making a project choice. No decision are taken at $t = 1$ since at this date the firm’s interim operating cash flow is realized and the manager simply uses it to pay a dividend if one was promised or debt coupon if the debt contract involves coupon-paying debt. But this is simply a mechanical payout, with no decision relevance at $t = 1$ \textit{per se}. At $t = 3$, all terminal payoffs are realized, with nothing of decision relevance happening.

So we will focus on analyzing the events at $t = 0$ and $t = 2$. As usual, we will use backward induction, starting with $t = 2$ and working back to $t = 0$.

\textbf{Analysis at $t = 2$:} For the purpose of this analysis, we will assume that the firm raised the amount $I - C_1$ from shareholders at $t = 0$, rather than the $I$ needed for investment in the project, in anticipation of the operating cash flow of $C_1$ at $t = 1$. In the case of debt, which we will deal with later, the firm raises $I$ in debt. Moreover, we will also assume that if the firm chooses to issue equity with a dividend payment, the promised dividend will be $C_1$. Finally, we will assume that if the firm chooses to issue debt at $t = 0$, it will be debt that promises an interest payment of $C_1$ at $t = 1$ and the payment of the remainder, $I - C_1$, at $t = 3$, with no prepayment penalty. When we do our $t = 0$ analysis, we will endogenize this and establish that this is indeed how the manager will wish to behave.

Since the key decision at $t = 2$ is the choice of project, we begin our analysis with an examination of the beliefs the manager and investors will have about the project payoffs at $t = 2$. Suppose first that the firm’s performance until $t = 0$ was such that $\Lambda = \Lambda_H$. In this case, both the manager and investors believe that $\Pr(A = T \mid \Lambda = \Lambda_H) = 1$. Hence, $\Pr(\theta^i = \theta^M \mid \theta^M, \Lambda = \Lambda_H) = 1$, i.e. investors rationally assign the same probability to the innovative project having a cash flow of $X_G$ as the manager does. Consequently, the manager and the shareholders will agree on project choice, given the manager’s objective function.

Next consider $\Lambda = \Lambda_L$. In this case, both the manager and investors believe that $\Pr(A = U \mid \Lambda = \Lambda_L) = 1$. Hence, the manager and investors agree that the manager’s signal at $t = 2$ is uninformative about the payoff of the innovative project.
Finally, consider $\Lambda = \Lambda_M$. In this disagreement state, investors believe that an untalented manager can generate $\Lambda_M$ with probability $r(\Psi)$ and $\Lambda_L$ with probability $1 - r(\Psi)$. Thus, they compute the following posterior belief:

$$Pr(\Lambda = T | \Lambda_M) = \omega_M = \frac{[1-q]\omega}{[1-q]\omega + r[1-\omega]}$$  \hspace{1cm} (2)

Now,

$$Pr(\theta' = \theta_h | \theta^M = \theta_h, \Lambda = \Lambda_M) = Pr(\theta' = \theta_h | \theta^M = \theta_h, T) Pr(T | \Lambda = \Lambda_M)$$

$$+ Pr(\theta' = \theta_h | \theta^M = \theta_h, U) Pr(U | \Lambda = \Lambda_M)$$

$$= 1^* Pr(T | \Lambda = \Lambda_M) + \delta[1 - Pr(T | \Lambda = \Lambda_M)]$$

$$= \delta + [1 - \delta]\omega_M$$  \hspace{1cm} (3)

Similarly,

$$Pr(\theta' = \theta_l | \theta^M = \theta_l, \Lambda = \Lambda_M) = 1 - \delta[1 - \omega_M]$$  \hspace{1cm} (4)

Defining $\theta_{hM}$ as the posterior probability assigned by investors that the payoff on the innovative project will be $X_G$, when $\Lambda = \Lambda_M$ and the manager’s belief is $\theta^M = \theta_h$, we can write:

$$\theta_{hM} = Pr(\theta' = \theta_h | \theta^M = \theta_h, \Lambda = \Lambda_M)\theta_h$$

$$+ [1 - Pr(\theta' = \theta_h | \theta^M = \theta_h, \Lambda = \Lambda_M)]\theta_l$$

$$= \{\delta + [1 - \delta]\omega_M\}\theta_h + [1 - \delta][1 - \omega_M]\theta_l$$  \hspace{1cm} (5)

Similarly, defining $\theta_{lM}$ as the posterior probability assigned by investors that the payoff on the innovative project will be $X_G$, when $\Lambda = \Lambda_M$ and the manager’s belief is $\theta^M = \theta_l$, we can write:

$$\theta_{lM} = \delta[1 - \omega_M]\theta_h + [1 - \delta][1 - \omega_M]\theta_l$$  \hspace{1cm} (6)

We will now impose two parametric restrictions on the model to limit the number of possibilities we need to consider.

**Restriction 1:**

$$[1 - \tau]M - I < 0 < [1 - \tau](M - I) - K[I - C_t] - K_o$$  \hspace{1cm} (7)

This restriction says that if the firm has to pay taxes on the entire $M$ payoff on the routine project, then it is a negative NPV project, but if the initial investment is tax deductible (as it would be
with debt financing, given our assumptions), then it has a positive NPV, even taking into account transactions costs. The consequence of this assumption is that the routine project will never be chosen with equity, but may be chosen with debt. This restriction is rather innocuous in that our main predictions do not depend on it.

**Restriction 2:**

\[
\rho \theta_h X_G [1 - \tau] + [1 - \rho] I - I > [1 - \tau] [M - I] > 0
\]  

(8)

This restriction simply says that the weighted average of the NPVs of the innovative project and the initial investment exceeds that available with the routine project and debt. This restriction leads to the possibility of equity with shareholder control dominating debt.

**Restriction 3:**

\[
\int_{\tilde{\xi}}^{\infty} (\tilde{\xi} - I) f(\tilde{\xi}) d\tilde{\xi} > \theta_h [X_G - I]
\]  

(9)

This restriction ensures that there is an asset-substitution moral hazard problem with debt. Even if the interest rate on debt is zero, the value of equity when there is debt is higher with the lemon project than with the innovative project conditional on the probability of the high payoff being \(\theta_h\).

**Restriction 4:**

\[
I - \theta_h^{I} (\omega) X_G [1 - \tau] > \beta(\theta_h X_G [1 - \tau] - I)
\]  

(10)

This restriction says that if investors assess their posterior belief about the probability of the high payoff on the innovative project by setting the posterior belief that the manager is talented at \(\omega_{M}=\omega\) (the prior belief that the manager is talented), then the innovative project has a negative NPV and the absolute value of this negative number is large enough to exceed the value that the manager attaches to the terminal NPV of the innovative project conditional on \(\theta_M = \theta_h\). This restriction means not only that there is scope for disagreement between the manager and the investors but that the manager will be concerned enough about this disagreement to cede project-choice control to the investors in some states.

**Restriction 5:**

\[
\delta \theta_h X_G [1 - \tau] < I
\]  

(11)
This restriction says that if the manager or investors evaluate the innovative project at the prior belief that $\theta^M = \theta_h$, it is a negative NPV project.

We will now examine the project choice possibilities in the three cases of interest: (i) all equity financing with no dividend; (ii) all equity financing with a promised dividend of $C_1$ at $t=1$; and (iii) (zero-coupon) debt financing. We now have the following result.

**Proposition 1:** Suppose the firm’s performance prior to $t = 0$ was $\Lambda = \Lambda_H$ and the firm had issued equity at $t = 0$ with no promised dividend. Then the manager will act as follows at $t = 2$:

(i) use $I$ (sum of $I - C_1$ raised at $t = 0$ and operating cash flow of $C_1$ at $t = 1$) to repurchase stock at $t = 2$ if no project opportunity arrives at $t = 2$ or if a project opportunity arrives at $t = 2$ and the manager’s beliefs about the probability of a high payoff on the innovative project is $\theta^M = \theta_l$; and

(ii) invest in the innovative project if a project opportunity arrives at $t = 2$ and the manager’s belief about the probability of a high payoff in the innovative project is $\theta^M = \theta_h$.

The intuition is as follows. If no project opportunity arrives at $t = 2$, the manager is faced with the prospect of keeping idle cash for a period, which would dissipate in value at the rate of $\lambda$ per dollar of idle cash. The manager therefore finds it optimal to disburse the cash to shareholders via a repurchase. If a project opportunity does arrive and the manager’s belief about the probability of a high payoff on the innovative project is $\theta_h$, then we know that he views the innovative project as having negative NPV, and the routine project always has negative NPV. Moreover, with all-equity financing, we know that the manager never wishes to invest in the lemon. Thus, he chooses to repurchase stock. Finally, if an investment opportunity arrives and the manager’s belief about the probability of a high payoff on the innovative project is $\theta^M = \theta_h$, he obviously prefers to invest in the innovative project. As for the predicate of this proposition that no-dividend equity is issued at $t = 0$ when $\Lambda = \Lambda_H$, we will establish the optimality of this when we do our analysis of events at $t = 0$.

We now consider what happens if the firm had issued equity at $t = 0$ with the promise of a dividend $C_1$ at $t = 1$.

**Proposition 2:** Suppose the firm’s performance prior to $t = 0$ was $\Lambda = \Lambda_M$ and the firm had issued equity at $t = 0$ with a promise to pay a dividend of $C_1$ at $t = 1$. Then the manager will act as follows at $t = 2$:
(i) use I-C_1 raised at t = 0 to repurchase stock at t = 2 if no project opportunity arrives at t= 2 or if a project opportunity arrives and the manager’s belief is that the probability of the high payoff on the innovative project is θ^M = θ_l; and

(ii) with a probability ρ he will raise C_1 at t = 2 from shareholders to invest I in the innovative project and with probability 1-ρ he will use I - C_1 to repurchase stock, if his belief is that the probability of the high payoff on the innovative project is θ^M = θ_h.

The intuition is as follows. Since the operating cash flow at t = 1 was paid out as a dividend, the manager has only I – C_1 in internal liquidity. If no investment opportunity arrives, then the manager acts as before, repurchasing stock to prevent the value dissipation associated with idle cash. If an investment opportunity arrives and his belief about the probability of a high payoff on the innovative project is θ^M = θ_l, then he would not like to invest in this project. So he never wishes to invest in the routine project with equity, has no project he likes, and ends up using the I – C_1 he has to repurchase stock. If the manager’s belief is θ^M = θ_h, he would like to invest in the innovative project. However, he will be able to do so only if the shareholders agree with him that it is worth doing so. When the firm’s performance is Λ=Λ_M, this only happens with probability ρ. With probability 1 – ρ, the manager is unable to raise the necessary funds (C_1) and thus cannot invest in the innovative project; he ends up using I – C_1 to repurchase stock.

We now turn to what happens at t = 2 if the firm had issued debt at t=0.

**Proposition 3:** Suppose the firm’s performance prior to t = 0 was Λ=Λ_L and the firm had issued debt at t = 0 with proceeds of I at t = 0, a promised coupon of C_1 at t = 1 and maturity at t = 3 with no early-payment penalty. Then the manager will:

(i) repay the debt in full early if no project arrives at t = 2; and

(ii) invest I in the routine project if a project opportunity arrives at t = 2.

The intuition is that the manager always prefers the (risky) lemon project over all others in the presence of debt (see (9)). Since the lemon project has an expected value less that I, the manager will never be able to raise any debt financing, unless he can pre-commit not to invest in the lemon. Such a pre-commitment can be made via a binding covenant that permits bondholders full control over project choice at t = 2, which is possible because the bondholders can distinguish between investment in the
routine project and investment in the risky projects (lemon or innovative). So, if a project opportunity arrives, the firm always invests in the routine project. If a project opportunity does not materialize, then the manager simply pays off the debt early to avoid the value dissipation associated with idle cash.

**Analysis at \( t = 0 \):** We now examine the capital structure and dividend choices of the manager at \( t = 0 \). A sequence of lemmas will be useful before getting to the main part of the analysis.

**Lemma 1:** Suppose the firm raises \( I - C_1 \) at \( t = 0 \). Then, if the manager issues equity at \( t = 0 \) with a promise of a dividend at \( t = 1 \), then: (i) the optimal amount of dividend to issue does not exceed \( C_1 \), and (ii) all dividends \( d \in (0, C_1] \) are equally efficient.

What this lemma says is that any positive dividend not exceeding \( C_1 \) can be promised by the firm without changing the outcome, but the dividend should not exceed \( C_1 \). To understand why, let us note the purpose of a dividend. In the absence of any potential future disagreement over project choice, promising a dividend is obviously inefficient, conditional on raising only \( I - C_1 \) in external capital at \( t = 0 \). The reason is that by paying any positive dividend at \( t = 1 \) makes it necessary to raise external capital again, which incurs a transactions cost. Given the possibility of disagreement with the shareholders, however, the necessity of approaching the shareholders at \( t = 2 \) for additional capital also means that investment in the innovative project cannot occur without the shareholders’ approval. So a dividend serves the purpose of transferring project-choice authority from the manager to the shareholders in a particular state. Since any dividend \( d \in (0, C_1] \) achieves this, all dividends in \((0,C_1]\) are equally efficient from this standpoint.

Of course, the larger the dividend paid at \( t = 1 \), the higher the amount of external financing needed at \( t = 2 \) in case the firm wishes to invest in a project at \( t = 2 \). But all levels of external financing within \( (0, C_1] \) entail the same transactions cost since \( C_1 < F^* \), the threshold financing level below which only the fixed-cost component of transactions costs applies. Thus, all dividend levels in \((0,C_1]\) are equally efficient both from a control-transfer standpoint and a transactions-cost standpoint. Paying a dividend in excess of \( C_1 \) means that additional external financing must be raised just to meet the additional dividend payment. This incurs a transactions cost with no control-transfer benefit and is thus inefficient. We will assume henceforth that the dividend chosen will be \( C_1 \).
Lemma 2: If the firm decides to resort to debt financing at $t = 0$, then it is efficient to use a debt contract that gives bondholders complete control over the firm’s project choice at $t = 2$.

The intuition is that, given (9), the manager always prefers the lemon project to the routine and innovative projects when there is debt financing. Bondholders will therefore never extend funds unless they can ensure that the routine project will be chosen at $t = 2$.

Lemma 3: Supposing issuing debt is optimal at $t = 0$. Given the restriction that no more than $I$ can be raised at $t = 0$, it is efficient for the firm to issue $I$ of debt at $t = 0$ that pays a coupon of $C_1$ at $t = 1$. This debt will require a repayment at $t = 3$ of $I - C_1$.

The idea is straightforward. Issuing $I$ in debt maximizes the debt tax shield at $t=0$. Promising a coupon of $C_1$ at $t = 1$ ensures that the operating cash flow at $t = 1$ does not idle for a period.

Lemma 4: If the firm decides to issue equity at $t = 0$, it will choose to either: (i) issue $I - C_1$ of equity with no dividend to be paid at $t = 1$, or (ii) issue $I - C_1$ of equity with a promise to pay a dividend of $C_1$ at $t = 1$.

The intuition is as follows. At $t = 0$, the manager has two choices with equity. He can either structure the firm’s dividend policy so that he retains all project choice control or he can structure it so that the shareholders have control in one or more states. If he wants to keep all control, then it is clearly efficient to raise $I - C_1$ in equity in anticipation of an operating cash flow infusion of $C_1$ at $t = 1$. This minimizes the transactions costs of external finance. If, on the other hand, he wants to let investors have some control, then he can raise $I - C_1$ and promise a dividend of $C_1$ at $t = 1$ that will use up the operating cash flow at $t = 1$ and necessitate external financing at $t = 2$.

We can now establish the main result of this section.

Proposition 4: Conditional on observing the firm’s performance up to $t = 0$, $\Lambda$, the manager chooses to:

(i) raise $I - C_1$ by issuing equity that promises no dividend if the firm’s prior performance is high, i.e., $\Lambda = \Lambda_H$;

(ii) raise $I - C_1$ by issuing equity with a promise to pay a dividend of $C_1$ at $t = 1$ if the firm’s prior performance is medium ($\Lambda = \Lambda_M$) as long as $\Psi \in (0, \Psi_1^*)$, where $[0, \Psi_1^*)$ is a connected subset of $(0,1)$; and
(iii) raise I by issuing debt that promises a coupon of C_1 at t = 1 and a repayment of I - C_1 at t = 3 if the firm’s prior performance is low (\Lambda = \Lambda_L).

The intuition rests on the tension between the manager’s desire for project choice control and the adverse impact of managerial control on the firm’s stock price. If all that the manager cared about was his assessment of the terminal value of the firm, he would want to keep complete project choice control for himself. This can be achieved by issuing non-dividend paying equity. However, the manager also cares about the impact of his actions on the stock price at t = 0. The more control he keeps for himself, the more adverse the stock price reaction at t = 0 as investors value the equity lower when they have less control. Consequently, the lower the likelihood of disagreement between the shareholders and the manager, the less adverse is the stock price reaction at t = 0 to the manager’s appropriation of control for himself and the less costly is the acquisition of control for the manager.

When the firm’s prior performance is very good (\Lambda = \Lambda_H), the manager faces the smaller likelihood of disagreement with investors\(^9\) and have the smallest cost of keeping control for himself. So he issues non-dividend paying equity, which gives him the most control. When the firm’s prior performance is average (\Lambda = \Lambda_M), acquiring control becomes more costly for the manager since the probability of disagreement with the investors is now higher than it was with \Lambda = \Lambda_H. So the manager issues dividend-paying equity that lets the manager invest in the innovative project when both he and the investors agree it is a good project, but prevents him from investing in that project when the investors do not like it. Finally, when the prior performance of the firm is poor, the probability of disagreement between the manager and the investors is the highest and acquiring control is the most expensive for the manager. Rather than acquiring this expensive control, the manager prefers to surrender all project-choice control to investors by issuing non-coupon debt with a covenant that dictates choice of the routine project. In exchange, the debt provides a tax-shield advantage.

What this analysis shows is that, from a control allocation standpoint, there is an interesting relationship between dividends and debt. Non-dividend-paying equity and debt represent two end-points of a continuum, with non-dividend-paying equity providing maximum managerial control and debt

\(^9\) The disagreement probability is zero in our model when \Lambda = \Lambda_H, but this result can be shown to hold for any agreement probability sufficiently high.
providing maximum investor control. Holding dividend policy fixed, an increase in the firm’s debt-equity ratio transfers control from the manager to investors. Similarly, holding capital structure fixed, as one increases dividends on equity, its control allocation moves closer to that of debt. Hence, the firm’s dividend policy, along with changes in the debt-equity ratio, helps to span the continuum from all equity to almost-all debt.

Another point worth noting is that in our model, higher values of investor agreement (Ψ) lead to higher stock prices since investors value firms more highly if they believe it is more likely that they will agree with the manager’s project choice. Hence, higher stock prices are accompanied by lower leverage and dividend payout ratios.

D. Empirical Predictions

Based on the previous analysis, the main empirical predictions are as follows.

Prediction 1: The better the firm’s performance and the higher the level of agreement between the manager and investors, the lower will be the firm’s leverage ratio.

This prediction follows from Proposition 4. The firms with the best performance and the highest level of agreement with investors, as well as those with moderate levels of performance, issue equity; they thus have relatively low leverage ratios. The firm with the poorest performance and the lowest level of agreement with investors issues debt and has the highest leverage ratio.

Prediction 2: A firm’s dividend payout ratio will be negatively correlated with its prior performance and the level of agreement between the manager and investors.

This prediction too follows directly from Proposition 4. An implication of combining Predictions 1 and 2 is that we should expect leverage and dividend payout ratios to be negatively correlated in the cross-section.

III. EMPIRICAL APPROACH

As discussed in the previous section, our model yields several new and empirically-testable predictions. At the core of each of our model’s predictions is the variation in the degree of agreement between a firm’s CEO and the shareholders. That is, we’ve shown the project-choice control a given CEO has is strictly increasing in the level of agreement between the CEO and the shareholders. The
challenge then is to come up with good empirical proxies for agreement, and these are not obvious. One intuitively-appealing proxy for agreement is the firm’s performance under an incumbent CEO. Consistent performance can be expected to lead to enhanced investor confidence in the CEO. However, it is well known in the existing capital structure literature that many measures of firm performance, such as a firm’s profitability, are negatively correlated with financial leverage. Confirming such a finding in our sample would not allow us to distinguish our theoretical implications related to agreement from the standard story that more profitable firms simply rely more on internally-generated funds than on external debt financing.

We thus seek to identify alternative measures of agreement, and then focus on the portions of those measures that are related to a firm’s performance. For these measures of agreement, we turn to equity analyst forecast dispersion and executive compensation. We argue that analysts have information similar to that of shareholders regarding the firm’s future performance and that the greater the differences of opinion between analysts, the greater the amount of disagreement there is between shareholders in general about the future performance of the firm. Therefore, greater dispersion in analyst forecasts, signifying greater disagreement about corporate decisions, should imply a more highly levered capital structure and a higher dividend level, according to our theory. The theory also suggests that an improvement in firm performance should lead to less disagreement among shareholders and analysts about the decisions made by the manager and hence lower dispersion in analyst forecasts. Since there may be factors other than past performance that impact analyst forecast dispersion, we also estimate the portion of that dispersion arising from the performance of the firm, with the details laid out in the next section.

Similarly, when looking at executive compensation, we posit that when there is greater agreement between a firm’s board and its CEO should lead the board to offer the CEO higher compensation. Such a measure of agreement has the sensible interpretation that the better a firm has performed in the past, the more likely are investors to agree with the CEO’s current decisions and value the CEO more highly. An obvious concern with this approach is that compensation may also be higher for entrenched CEOs who
have captured the firm’s board of directors (see Bebchuk and Fried (2003)). While such an interpretation is plausible, the question of what happens in reality is an empirical one. A firm in which the CEO is getting paid highly because of entrenchment should be one that underperforms its peers with stronger governance. Core, Holthausen, and Larcker (1999) find that firms with weaker governance pay their CEOs more and that higher predicted compensation corresponds to significantly lower operating and stock return performance. Gompers, Ishii, and Metrick (2003) confirm this finding and report that stock returns of firms with weaker governance are significantly lower than those of firms with stronger governance. In a manner similar to the Core, et al (1999) empirical methodology, we first estimate the portion of a CEO’s compensation package that is predicted by industry and size effects, and conduct analyses using the residual of this estimate. Then, similar to our use of analyst forecasts, we estimate the portion of this residual that arises from the performance of the firm. The basic idea is to separate the portion of a CEO’s total wage that is performance-induced from the portion that may be caused by managerial entrenchment or weak governance.

We proceed by estimating these measures of agreement and examine the extent to which they are correlated with measures of firm performance. After confirming that high agreement does indeed manifest itself in the form of less analyst forecast dispersion and higher estimates of performance-based compensation, we expect to find that firms with greater agreement will tend to have less debt in their capital structure and pay out lower cash dividends.

IV. DATA

Some of our analysis relies upon analyst earnings forecasts while other portions use measures of compensation in determining the degree of flexibility granted to managers by the board of directors. Therefore, our empirical tests use the set of firms covered either by the I/B/E/S or ExecuComp databases, depending on our proxy choice for disagreement. In both cases, the data are supplemented with financial data from COMPUSTAT and stock return data from CRSP. Data availability limits our analysis to the 1981-2001 time period when we use analyst forecast data, and the 1992-2001 period when we use

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10 Bebchuk and Fried (2003) refer to this phenomenon as ‘managerial power’, and analyze its implications on observed wage packages. In other work, Hermelin and Weisbach (1997) build a model in which a CEO seeks to appoint board members who will vote for her retention, ultimately allowing for greater total wages.
compensation data. Consistent with previous capital structure research, we drop regulated utilities (SIC 4900s) and financial services firms (SIC 6000s). This generates a sample of 24,311 firm-years covering 4,169 firms.

For the tests that use analyst forecast dispersion as the measure of disagreement between shareholders and managers, we use the standard deviation of analyst forecasts of the current period’s earnings per share during the month of the fiscal year end. So, if the firm’s fiscal year ends in December 2000, we use the forecasts made as of December 2000 of earnings per share for the fiscal year that ends on December 31, 2000. To mitigate potential effects of heteroskedasticity, we normalize this standard deviation by the value of the mean forecast, yielding a measure of dispersion that can be interpreted as a percentile, rather than a measure in dollars. As discussed above, we also estimate the portion of earnings forecast dispersion that is associated with performance, to ensure that we are capturing the effect of performance-related disagreement and not other effects possibly correlated with differences in analyst forecasts. This is done by running the following regression of this normalized estimate of analyst forecast dispersion for each two-digit SIC code:

\[
\frac{\text{SD}(\text{Analyst Forecasts})}{\text{Mean Estimate}} = \alpha + \beta_{1s} \cdot (\text{Relative ROA}) + \beta_{2s} \cdot (\text{Equity Return}) + \beta_{3s} \cdot (\text{Number of Analysts}) + \beta_{4s} \cdot \ln(1 + \text{Sales}_{it}) + \epsilon_{it}
\]

where the “s” subscript on the coefficient estimates denote that we are allowing the coefficients to differ across each two-digit industry. We then use the predicted value of this regression for each observation to estimate the portion of forecast dispersion that is resulting from performance, as measured by the relative return on assets and the equity return of the firm’s stock in excess of the S&P 500 during the corresponding fiscal year, controlling for the size and analyst coverage of the firm.\(^{11}\)

Similarly, when we examine the impact of executive compensation, we adjust the pay measure to try to isolate the portion of compensation that captures agreement between, in this case, the manager and the board of directors. Before estimating the portion of compensation driven by performance, we first remove the portion arising from firm size and industry effects. The previous literature suggests that two of the dominant factors influencing executive compensation are the industry in which the firm operates

\(^{11}\) Return on Assets (ROA) is defined as Operating Income before Depreciation (Compustat data #13) divided by the book value of assets (data #6).
and the size of the firm (see Murphy, 1999 for an extensive review). Therefore, our first step is to estimate the residual from a regression of the natural log of one plus total compensation (or just salary & bonus) on the natural log of one plus the sales of the firm during the corresponding fiscal year for all of the firms in the same two-digit SIC. In other words, for each two-digit industry, we estimate the following specification:

$$\ln (1 + \text{Total Compensation}_{it}) = \alpha + \beta \cdot \ln (1 + \text{Sales}_{it}) + \epsilon_{it}$$

(13)

“Residual compensation” is equal to $\epsilon_{it}$. “Residual salary & bonus” is similarly constructed using the natural log of one plus CEO salary & bonus on the left hand side. These variables can be interpreted as a measure of the portion of the CEO’s logged compensation not explained by the relative size of the firm within its industry. The variable is positive when CEOs are paid more than expected based upon their industry and size, and is negative when compensation is less. We argue that the board (representing shareholders) agrees more with CEOs who have positive residual compensation than with CEOs who have negative residual compensation.

To again isolate the portion that is directly related to performance, we use this estimate of compensation that is independent of size and industry effects, and for each industry, regress this residual compensation estimate on two measures of the firm’s relative performance: the return on assets (ROA) for the firm in excess of the average ROA of other firms in the same industry and the equity return of the firm’s stock in excess of the S&P 500 during the corresponding fiscal year. Consistent with most empirical studies of compensation, we restrict our attention to measures of the performance of the firm in the same fiscal year in which the compensation is paid. The regressions are run industry-by-industry to allow the sensitivity of compensation to performance to vary across industries. Specifically, we run the following regression for each two-digit SIC code:

$$\epsilon_{it} = \delta + \gamma_{1s} \cdot (\text{Relative ROA}) + \gamma_{2s} \cdot (\text{Excess Stock Return}) + \mu_{it}$$

(14)

where $\epsilon_{it}$ is the residual compensation from equation (13) and the “s” subscript on the coefficient estimates denotes that we allow the coefficients to differ for across industries. If higher pay is associated

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12 Since compensation has a significant right skew that may lead to outliers having a large effect on our estimate, we use an upper truncation on total compensation of $10 million.

13 To mitigate the effects of heteroskedasticity, these residuals are normalized by the natural log of the corresponding measure of executive compensation in the tests using these agreement proxies.
with greater managerial entrenchment, one would expect that firm performance to be either negatively related or unrelated to compensation. Alternatively, finding that compensation is positively correlated with performance would be consistent with our interpretation that greater CEO compensation is due to greater agreement between the CEO and investors. We return to this issue below, when we discuss the correlations between our measures of agreement and estimates of performance.

We use the predicted value of $\varepsilon_\text{it}$ (from equation (13)) based upon the estimates of $\gamma_{1s}$ and $\gamma_{2s}$ and the values of the relative ROA and the excess return to generate our estimates of the portion of compensation arising from performance. These predicted values, one based upon total compensation and the other based upon just the salary and bonus of the CEO, represent our estimates of the variation in the level of agreement between the board and the CEO across firms over time. It is these predicted values that are our final set of variables of interest in our capital structure and dividend policy examinations.\(^{14}\)

We use three measures of leverage to ensure that our results are not sensitive to a particular measure of the firm’s capital structure. Our definition of debt includes long-term debt, debt due within one year, and notes payable (data #9 plus data #44 plus data #206). Our primary measure of the firm’s capital structure is the market leverage ratio, defined as total debt divided by the market value of assets. Similarly, book leverage is constructed by dividing total debt by the book value of the firm’s assets. Finally, we follow Faulkender and Petersen (2004) and use the natural log of one plus interest coverage, which is calculated as operating income before depreciation (data #13) divided by interest expense (data #15). Firms with negative earnings are coded as having an interest coverage ratio of -0.5, so the natural log of one plus interest coverage takes the value -0.69 ( = LN ( 1 – 0.5 )) for such firms.

Similarly, we use two estimates of dividend policy to ensure that our results are driven by differences across firm-years in the level of dividends, and not by the variable we use to normalize differences across firm-years in the level of dividends, and not by the variable we use to normalize

\(^{14}\) This methodology is very similar to that used by Core, Holthausen, and Larcker (1999) who estimate the portion of compensation arising from differences in governance structures and then use the variation in the predicted level of compensation to estimate its effect on the future performance of the firm. The key difference in methodologies is that their relatively small sample size does not allow for industry effects and they assume that size effects are constant across industries. Because we estimate the effect of performance in two stages where the first stage is run industry by industry, we allow for size effects to differ across industries and we get estimates of performance-related compensation that is independent of size. Also, since we estimate performance-based compensation by regressing performance on the residual that is unexplained by size and industry, the mean of the estimate of performance-based compensation will be zero. For this reason, this estimate should be interpreted as capturing the variation in pay due to performance, and not the level.
dividends. The first measure is the payout ratio, the percentage of income before extraordinary items (data #18) paid out in the form of cash dividends (data #21). Since dividends are “sticky” and there is greater variation in earnings than in dividends, we also include a second measure, the dividend yield, defined as the cash dividends paid divided by the market value of the firm’s equity, in our estimates of how agreement impacts dividend policy. 15

We follow Faulkender and Petersen (2004) in choosing our baseline specification for the capital structure regressions, and Fama and French (2001) in choosing the control variables in our payout ratio regressions. To reduce the potential effect of outliers, all continuous variables are winsorized at the 1st and 99th percentiles. The means, medians, and standard deviations of our financial choice variables, estimated performance-based compensation variables, and the control variables can be found in Table I. Consistent with the construction of the ExecuComp database which covers the S&P 1500, the summary statistics reflect the fact that the firms in our sample are the larger firms found in the COMPUSTAT database.

Table I goes here

Before proceeding with our empirical examination of the effects of agreement on the financial decisions of firms, we first document that our measures of agreement are indeed positively correlated with the firm’s performance. In Table II, we provide the correlation matrix between our various measures of agreement and three measures of performance: the return on assets of the firm relative to the mean return on assets for the industry (measured at the 4-digit SIC level), the relative profit margin, and the equity return in excess of the return on the S&P 500 over the corresponding time period. As predicted, greater analyst dispersion is correlated with weaker performance under all three measures and higher residual compensation is associated with higher levels of performance, again consistent across all three performance measures. Given these correlations, it follows that the estimates of predicted analyst dispersion and predicted compensation are also similarly correlated with performance.

Table II goes here

15 We multiply the dividend yield by 100, so the statistics for this variable are listed in percents rather than raw numbers. Because the magnitudes on this variable are relatively small, this modification reduces the number of decimal places that would need to be presented to arrive at the relevant portion of the estimated effects.
V. EMPIRICAL RESULTS

We begin with examinations of the effects of agreement on capital structure, using three different measures of the debt structure choice of firms: market leverage ratio, book leverage ratio, and interest coverage ratio. We then move to tests of the dividend payout ratio and the dividend yield. Because there are numerous factors previously found to impact capital structure and dividend policy, we run multivariate regressions that include these factors to ensure that our results are due to differences in agreement and not from a spurious correlation between these factors and our measures of agreement. In addition, all regressions include firm fixed effects to capture unmeasured differences across firms that are relatively constant over time but that may be correlated with our proxies for agreement.16

A. Capital Structure: Multivariate Analysis

The baseline market leverage specification, the results of which can be found in column 1 of Table III, yields findings consistent with previous examinations of capital structure (see, for example, Faulkender and Petersen, 2004, Rajan and Zingales, 1995, and Hovakimain, Opler, and Titman, 2001). Higher debt ratios are found among firms that have greater access to public debt markets, are smaller, less profitable, and have a higher proportion of tangible assets.

Table III goes here

The rest of Table III includes our six estimates of agreement and reveal results consistent with our model’s first empirical prediction. Significantly lower debt is encountered in the capital structures of firms with lower analyst earnings forecast dispersion and firms with more highly compensated CEOs. That is, greater agreement is linked with lower financial leverage, as predicted by our theory. Statistically, the estimated coefficients on all six variables are statistically significant at better than one percent. In terms of economic significance, a one standard deviation increase in the standard deviation of analyst forecasts (an increase of 19.8% of the mean earnings estimate) increases the amount of debt in the firm’s capital structure by 48 basis points of the firm’s market value. When one considers that the average firm’s capital structure has debt comprising 16.2% of its market value, this one standard

16 The results of regressions in which the firm fixed effects are absent are qualitatively unchanged, although the statistical significance of the results is weaker when the firm fixed effects are omitted. This is consistent with the results of Flannery and Rankin (2004), for instance, who document that the inclusion of firm fixed effects “provide substantially sharper estimates of target debt ratios.”
deviation reduction in agreement increases the percentage of debt in the capital structure by 3.0% ( = 0.48 / 16.2 ). The impact of an increase in the predicted analyst forecast dispersion is even stronger, again consistent with greater disagreement being associated with a higher leverage.

Moving to the results that rely on CEO compensation to estimate agreement between the CEO and the shareholders, we find similarly strong results. Looking at residual compensation, a one standard deviation increase in executive pay not explained by size and industry (10.7% of the natural log of the CEOs compensation) corresponds to a decrease of 93 basis points in the percentage of debt in the firm’s capital structure. Thus, a one standard deviation increase in agreement, as captured by managerial compensation, is associated with a 5.7% ( = 0.93 / 16.2) decrease in the amount of debt in the firm’s capital structure. Both statistically and economically, our other compensation-based agreement proxies suggest that greater agreement corresponds to lower leverage ratios.

In addition to the effect of current compensation on current leverage, we also examined the impact of past compensation on leverage. Since we take the current fiscal year performance in estimating the portion of compensation attributable to performance, it is possible that there is a time lag before capital structure adjusts to reflect the degree of agreement that we estimate through the CEO’s compensation contract. In other words, a CEO who performed well the last fiscal year and thus enjoyed high agreement with investors and high compensation last year may not alter the firm’s capital structure to correspond to the higher agreement until this fiscal year. In unreported regressions using the one-year lagged estimate of performance-based compensation on leverage, we found results that are very similar, both statistically and economically, to the results using contemporaneous compensation. Even if there is a lag in the CEO’s capital structure adjustments to changes in agreement with investors, it does not appear to affect our finding that greater CEO compensation arising from better performance leads to lower leverage.

We also examined numerous additional specifications to verify that our results are robust to alternative explanations. One such alternative is that the CEO of a firm whose stock price does well during the fiscal year is rewarded with higher compensation, and the higher stock price mechanically leads to a lower market leverage ratio. We examine the empirical merit of that explanation by including a
modification of the implied debt ratio measure of Welch (2004) to account for the mechanical changes in leverage due to movements in the stock price. In our analyses that include the implied debt ratio, we restrict attention to only those firms that have actively changed their capital structures by at least five percent of the previous year’s market value. By construction, a firm that does not issue new or reduce outstanding financial securities will have that year’s capital structure explained entirely by the implied debt ratio and all other variables will have estimated coefficients close to zero. Including non-issuing firms will bias us against finding factors that affect capital structure when firms do make active adjustments. In these unreported specifications, the addition of the mechanical stock price effect again does not significantly change our results. Even after controlling for the effect that a change in stock price has on the market leverage ratio, we find that greater agreement, as measured by higher compensation for the CEO, leads to lower leverage.

To ensure that the results are robust to alternative measures of capital structure, we also examine specifications that use the book value of leverage and the interest coverage ratio as our dependent variables. As shown by the results in Table IV, the book value leverage ratio is also positively related to analyst forecast dispersion and negatively related to compensation, with similarly strong statistical significance as found in the results for market leverage. As before, all coefficients are still significant at better than one percent with the exception of the coefficient for the standard deviation of analyst forecasts, which is now significant at better than five percent. Economically, they suggest that a one standard deviation increase in agreement reduces the book-value leverage ratio by between 0.4% and 1.5% of the book value of the firm’s assets. Measured as a percentage of the firm’s debt, these results suggest that improving agreement between managers and shareholders by one standard deviation decrease the firm’s debt between 1.7% and 6.3%.

Table IV goes here

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17 The implied debt ratio is defined as the previous year’s total debt divided by an estimate of the market value of assets implied by the firm’s equity return over the year. Following Welch (2004), the implied market value of assets is given by the previous year’s total book assets, minus the previous year’s book equity, plus the product of the previous year’s market value of equity and the gross equity return realized over the fiscal year.

18 We examine the change in total debt and the change in book equity not due to changes in retained earnings and code a firm as changing their capital structure if either the one year change in debt or common equity is in excess of five percent of the previous year’s market value of the firm.
Moving to the interest coverage results (see Table V), we once again see that high agreement is associated with less debt in the form of greater interest coverage. Similar to the book leverage results, the results are statistically stronger using compensation-based measures of agreement where all four coefficient estimates are significant at better than one percent. However, the results demonstrate that lower analyst forecast dispersion and higher executive compensation are associated with firms having higher fractions of operating cash flows not designated for interest payments. Looking at the economic magnitudes of these effects, we see that a one standard deviation increase in agreement increases interest coverage by between 2.6% and 15.8%.

Table V goes here

To summarize, using multiple measures of capital structure, multiple proxies for agreement and multiple specifications, we find strong evidence that better firm performance leads to greater agreement between the CEO and investors and lower leverage ratios. The results suggest that there is as much as a six percent difference in the amount of debt firms adopt, and as much as a 15.8% difference in the portion of cash flow claimed by debt holders in the form of interest, for a one standard deviation difference in our proxies for agreement.

B. Dividend Payments: Multivariate Analysis

We now move to tests of our second empirical hypothesis, that dividend payments are negatively correlated with agreement between the manager and shareholders. We test this prediction by using two different measures of dividend policy to ensure that our results arise from cross-sectional and time-series differences in dividends and not the variable used to normalize the measure. The first is the payout ratio, defined as cash dividends divided by income before extraordinary items, and the second is the dividend yield, defined as cash dividend divided by the market value of the firm. We do not include repurchases because the model suggests that repurchases are more flexible than dividends, so they are not perfect substitutes and should not be estimated together.19

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19 Jagannathan, Stephens and Weisbach (2000) also argue that repurchases are a more flexible method of returning cash to shareholders, finding that the distributions of dividends and repurchases are driven by significantly different factors.
The baseline regression examining the dividend payout ratio, found in Table VI, suggest that more profitable firms, smaller firms, and those with more of their assets in the form of plant, property, and equipment pay out a larger percentage of their earnings in the form of cash dividends. The other columns contain the findings of specifications including our various estimates of agreement, with results largely consistent with our hypothesis. Three of our measures of agreement are statistically significant at better than five percent, two of them at better than one percent. As the portion of analyst dispersion estimated to result from past performance increases (consistent with there being less agreement between managers and investors), we estimate that dividend payments increase. Similarly, as the portion of compensation not explained by size and industry increases, which we interpret as extra compensation due to agreement between managers and the board of directors, firms pay out less of their earnings in the form of cash dividends. Economically, these three coefficients suggest that a one standard deviation increase in agreement is associated with a decrease in dividends between 0.6% and 1.96% of earnings. Considering that the average dividend payout ratio of the firm-years in the sample is 19.3%, these results suggest that a one standard deviation improvement in agreement is associated with as much as a ten percent reduction in dividends.

Table VI goes here

To ensure the robustness of our results, we run the same set of specifications on the dividend yield, the results of which are contained in Table VII. The baseline specification yields many of the same results as found using the dividend payout ratio, except that leverage is now highly significant and the profit margin is now insignificant. Once again though, a number of our estimates of agreement are statistically significant in explaining the dividend policy of the firms. All four measures of agreement based upon managerial compensation are statistically significant at better than one percent. Economically, the results suggest that a one standard deviation increase in agreement between managers and the board of directors decreases the percentage of equity market capitalization paid out in the form of dividends by as much as 0.1%. While that may seem like a small impact, it is important to bear in mind that the average dividend yield is only 1.3% of the firm’s equity market capitalization, so this reduction corresponds to as much as a 7.8% reduction in dividends.
VI. CONCLUSION

We have presented a model of potential disagreement between managers and investors that leads to testable predictions about both capital structure and dividend policy. The basic idea is simple. The better a firm performs, the greater is the confidence that investors have in the manager’s ability to make future decisions that will also result in good performance. Hence, the probability that investors will disagree with the manager’s project choice declines and this makes it less expensive for the manager to make financial policy choices that increase the manager’s project-choice control and reduce the investors’ ability to block such project choices.

The analysis implies that the manager’s project-choice control is decreasing in the firm’s leverage and dividend payout ratios. This leads to the following two key predictions: First, better corporate performance, and consequently higher agreement between the manager and investors, results in lower debt-equity ratios. Second, better corporate performance leads to lower dividend payout ratios. We confront both predictions with the data and find support. An important step in the empirical analysis is finding adequate proxies for potential agreement between the manager and investors. We investigate both analyst forecast dispersion and the portion of executive compensation that is not predicted by the size and industry of the firm.\textsuperscript{20} Consistent with the empirical predictions of our model, we find that firms with greater CEO-investor agreement display significantly lower leverage and dividend payout ratios. Interestingly, our theory is consistent with the anecdotal motivation provided in the Introduction. In particular, it provides a possible explanation for why companies like Microsoft and Cisco remained both unlevered and paid no dividends for so many years because of high agreement between the CEOs and the firms’ investors, as reflected in relatively high stock prices during the 1980’s and 1990’s. More recently,

\textsuperscript{20} One might argue that our compensation proxy for agreement may really be a proxy for higher inferred managerial ability in a learning model. Such an interpretation is consistent with the spirit of our theory in that investors are more likely to agree with the manager’s choices when they assess his ability to be higher.
however, lower agreement levels corresponding to lower stock prices have preceded Microsoft’s announcement to pay out nearly $45 billion in dividends.\textsuperscript{21}

Appendix

Proof of Proposition 1: We start with the assumption that the firm’s performance prior to \( t = 0 \) was \( \Lambda = \Lambda_H \) and the firm had issued equity at \( t = 0 \) with no promised dividend. The firm will then have \( $I \) in liquidity at \( t = 2 \) since the operating cash flow of \( C_1 \) at \( t = 1 \) will be added to the initial amount of \( I - C_1 \) that was raised at \( t = 0 \).

(i) If no project arrives at \( t = 2 \), keeping \( I \) idle until \( t = 3 \) dissipates value. So it is obviously optimal for the firm to return the cash to shareholders via a stock repurchase. Similarly, if the project opportunity arrives but the manager’s belief is \( \theta^M = \theta_l \), then he does not wish to invest in the innovative project. Given (8), the routine project has a negative NPV with equity, so the manager passes that up. And the lemon is always rejected with equity because of its negative NPV. Thus, in the case too there is no project investment and the money is returned to the shareholders via a stock repurchase.

(ii) If a project opportunity arrives at \( t = 2 \) and the manager’s signal is \( \theta^M = \theta_h \), then the innovative project is obviously attractive for the manager and shareholders, given (10), and is thus accepted.

Proof of Proposition 2: The proof is similar to that of Proposition 1. One difference is that the operating cash flow of \( C_1 \) at \( t = 1 \) is now used up to pay the promised dividend at \( t = 1 \). Hence, the firm has only \( I - C_1 \) of liquidity at \( t = 2 \).

(i) If no project opportunity arrives or if an opportunity does arrive and \( \theta^M = \theta_l \), then as in the proof of Proposition 1, we have the manager repurchasing stock, albeit with only \( I - C_1 \) to return to the shareholders.

(ii) If a project opportunity arrives and the manager observes \( \theta^M = \theta_h \), it is clear that he wishes to invest in the innovative project. However, he does not have the control to do so if the shareholders do not approve of the project because he needs to raise \( C_1 \) from them in order to have the necessary \( I \) to invest. Shareholders will provide the needed funding only if \( \theta^i = \theta_h \). Since \( \Lambda = \Lambda_M \), we know that with probability \( \rho \) shareholders will believe that \( \Pr(\Lambda = T | \Lambda = \Lambda_M) = 1 \). Moreover, \( \Pr(\theta^i = \theta_h | \theta^M = \theta_h, \Lambda = T) = 1 \). Hence, given (10), the shareholders will extend the necessary funds to the manager in the agreement state, which occurs with probability \( \rho \). In the disagreement state, which occurs with
probability $1 - \rho$, shareholders believe that the probability of a high payoff on the innovative project is $\theta_{iM}$, which is given by (5). Given (7), we know that with this belief, shareholders believe the innovative project has negative NPV and hence reject it, in which case the manager will simply return the cash to the shareholders through a stock repurchase.

**Proof of Proposition 3:** With zero-coupon debt, the firm has $I$ to invest at $t = 2$.

(i) If no project arrives at $t = 2$, then it is obviously efficient to repay the debt early since there is no early-payment penalty.

(ii) If an investment opportunity does arrive, then the bond covenant dictates the routine project. Given (8), we know that it is subgame perfect at $t = 2$ for the manager to do so in the interest of the shareholders.

**Proof of Lemma 1:** We start with the assumption that the firm raises $I - C_1$ at $t = 0$. It is clear that it is never efficient to promise a dividend $d > C_1$ because any increase in $d$ beyond $C_1$ will leave unaffected the probability of the shareholders being able to block the manager’s project choice at $t = 2$, but will incur additional transactions costs to replace at $t = 2$ via external financing. Moreover, given the function $TC$ and $C_1 = F^*$, we know that transactions costs are constant for all $d \in (0, C_1]$. Since the probability of the shareholders being able to block the manager’s project choice is also constant for all $d \in (0, C_1]$, we know that all $d \in (0, C_1]$ are equally efficient.

**Proof of Lemma 2:** The proof is obvious given that (9) and the manager’s objective function (1) ensure that the manager will always invest in the lemon with debt, which means shareholders will never extend funds unless they are assured that the funds will be invested in the routine project.

**Proof of Lemma 3:** The proof is obvious. Issuing $I$ of debt with a coupon payment of $C_1$ requires a repayment of $I - C_1$ to satisfy the bondholders’ participation constraint. The resulting debt tax shield is $\tau C_1 + \tau[I - C_1]$, which is the maximum tax shield possible. Moreover, the transactions cost is minimized as well.

**Proof of Lemma 4:** We begin by noting that issuing $I - C_1$ of equity with no dividend at $t= 1$ is equivalent to issuing $I$ of equity with $d = C_1$ at $t = 1$ from the standpoint of allocating project choice control across
the manager and the shareholders. However, issuing \( I - C_1 \) of equity with no dividend leads to a transactions cost of \( K_0 + K[I - 2C_1] \), whereas issuing \( I \) of equity with \( d = C_1 \) leads to a transactions cost of \( K_0 + K[I - C_1] \). Hence, issuing \( I - C_1 \) of equity with no dividend is more efficient. This kind of equity issue leaves all project choice control with the manager since internal liquidity at \( t = 2 \) will be \( I \). By contrast, if the firm issues \( I - C_1 \) of equity with a promise to pay a dividend of \( C_1 \) at \( t = 1 \), all project choice control transfers to the shareholders. The manager will obviously want to choose one of the two control allocation extremes; note that both entail identical transactions costs.

**Proof of Proposition 4:** It is convenient to begin by assuming \( \Lambda = \Lambda_M \) since the other two performance cases are limiting versions of this case. We will consider the case of equity first. If the manager keeps all project-choice control for himself, then he assesses the value of the firm at \( t = 3 \) to those who are shareholders at \( t = 0 \) as:

\[
P^M_3 = \alpha\delta(\theta_h X_G[1-\tau]-I) - K[I-C_1] - K_0 + V \tag{A-1}
\]

The stock price at \( t = 0 \) (prior to the raising of external funds but after announcing the equity issuance) will be:

\[
P^i_0 = \alpha\delta(\rho\theta_h X_G[1-\tau]+[1-\rho]\theta_{hM}^i X_G[1-\tau]-I) - K[I-C_1] - K_0 + V \tag{A-2}
\]

If the manager issues equity and surrenders all control to the shareholders, he assesses the value of the firm at \( t = 3 \) to those who are shareholders at \( t = 0 \) as:

\[
\hat{P}^M_3 = \alpha\delta(\rho\theta_h X_G[1-\tau]+[1-\rho]I-I) - K[I-C_1] - K_0 + V \tag{A-3}
\]

The stock price at \( t = 0 \) (prior to the raising of external funds but after announcing the equity issuance) will be:

\[
\hat{P}^i_0 = \alpha\delta(\rho\theta_h X_G[1-\tau]+[1-\rho]I-I) - K[I-C_1] - K_0 + V \tag{A-4}
\]

Note that all of the above expressions refer to the case in which \( \Lambda = \Lambda_M \) and investors find themselves in the state in which they disagree with the manager, they do not agree that the innovative project is a good choice. It is easy to verify that when \( \Psi=0 \), we have \( r = 1 - q \) and \( \omega_M = \omega \). In this case, (10) guarantees that investors assess the NPV of the innovative project as negative. Define \( \Psi^*_2 \) as follows:
\[ \theta_{KM} (\omega_m r(\Psi_2^*)) X_G [1 - \tau] = I \]  
(A-5)

Clearly, \( \Psi_2^* \in (0,1) \) since when \( \Psi_2^* = 1 \), we have \( r = 0 \) and \( \omega_m = 1 \), so the left-hand side (LHS) of (A-5) becomes \( \theta_h X_G [1 - \tau] \), which we know exceeds I by (9). Hence, whenever \( \Psi \in [0, \Psi_2^* ) \), investors will disagree with the manager’s choice of the innovative project with probability \( 1 - \rho \), conditional on \( \Lambda = \Lambda_M \). For \( \Psi > \Psi_2^* \), there is no disagreement, so it is costless for the manager to keep all project-choice control for himself. Hence, (A-1) – (A-4) apply to the case in which \( \Psi \in [0, \Psi_2^* ) \).

Now consider \( \Psi \in [0, \Psi_2^* ) \). From (1) we know that the manager will prefer to keep all project-choice control for himself if:

\[ P_0^i + \beta P_3^* M > \hat{P}_0^i + \beta \hat{P}_3^M \]  
(A-6)

Rearranging and simplifying we see that (A-6) becomes:

\[ \beta (\theta_h X_G [1 - \tau] - I) > \{ I - \theta_{KM} (\omega_m (r(\Psi))) X_G [1 - \tau] \} \]  
(A-7)

We know by (10) that the above inequality is reversed at \( \Psi = 0 \), i.e., at \( \Psi = 0 \), the manager prefers to give all project-choice control to the shareholders by using dividend-paying equity. Moreover, we know that the above inequality does hold at \( \Psi = \Psi_1^* \) since the right-hand-side (RHS) is zero then. Observing that the left-hand-side (LHS) is independent of \( \Psi \) and \( \partial RHS / \partial \Psi > 0 \), it follows that \( \exists \Psi_1^* \in (0, \Psi_2^* ) \) such that (A-7) holds as an equality for \( \Psi = \Psi_1^* \). Moreover, note that we know from (9) that even if \( \Psi = 0 \), the manager prefers to issue dividend-paying equity (that cedes all project-choice control to shareholders) to equity. Thus, we have proved that \( \forall \Psi \in (0, \Psi_1^* ) \) the manager will issue dividend-paying equity when \( \Lambda = \Lambda_M \) and \( \forall \Psi \in [\Psi_1^*, 1] \) he will issue non-dividend paying equity when \( \Lambda = \Lambda_M \). It is clear from this that the manager will always issue non-dividend paying equity when \( \Lambda = \Lambda_H \) since that state is just the limiting case of \( \Lambda = \Lambda_M \) when \( \Psi = 1 \).

Finally, the result that debt will be preferred when \( \Lambda = \Lambda_L \) follows from (7), (11), and the observation that \( \Pr(\theta^i = \theta^M | A = U) = \delta \) if \( \theta^M = \theta_h \) and \( \Pr(A = U | \Lambda = \Lambda_L) = 1 \).
References


Figure 1: Timeline

- All-equity firm has assets in place with payoff $V$ at $t=3$
- Firm’s prior performance history $\Lambda$ conveys information about manager’s ability
- Probability $\alpha \in (0,1)$ project requiring $I$ will arrive at $t = 2$
  - Lemon: negative NPV
  - Routine: $M > I$ (safe)
  - Innovative: $Z \in \{0, X_G\}$, $X_G > M$
- Choice of debt/equity made and funds raised for project
- Choice of dividend made
- Manager privately observes arrival of project
- Manager receives private signal about payoff on innovative project
- Manager either wishes to invest or reject project
- If investment desired and sufficient funds available, manager invests
- If additional funds needed, investors will provide these if they agree with manager it is a good project, and transactions cost incurred
- Otherwise, excess funds returned to investors
- Interim cash flow $C_1 > 0$ from assets in place
- Dividend / interest paid
- $V$ and project cash flow realized
- Tax rate $\tau \in (0,1)$
Table I: Summary Statistics

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<tr>
<td>Performance-Based Compensation</td>
<td>-0.001</td>
<td>-0.019</td>
<td>0.172</td>
</tr>
<tr>
<td>Performance-Based Salary and Bonus</td>
<td>0.005</td>
<td>-0.004</td>
<td>0.118</td>
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</tbody>
</table>

This table contains the means, medians, and standard deviations of the dependent and control variables for the firm-years in our sample. Market Leverage is defined as total debt (short-term and long-term) divided by the market value of the firm’s assets. Book Leverage is defined as total debt over the book value of the firm’s assets. LN (1 + Interest Coverage) is defined as the natural log of one plus the ratio of Operating Income before Depreciation to Interest Expense. The Payout ratio is defined as cash dividends paid divided by income before extraordinary items whereas dividend yield is cash dividends divided by the market equity of the firm (presented in percentages since the magnitudes are so small). LTD or CP Rating takes the value one if the firm has either a long-term debt or commercial paper rating, zero otherwise. Profit margin is defined as operating income before depreciation divided by sales. Tangible assets is the ratio of Plant, Property, and Equipment to the book value of assets. The standard deviation of analyst forecasts is normalized by the mean forecast estimate. Predicted analyst forecast dispersion is the estimated analyst forecast dispersion for that fiscal year based upon the firm’s size, the number of analyst forecasts, the relative return on assets, and the current equity return of the firm during the corresponding fiscal year. Residual compensation is the portion of total compensation not explained by the size and industry of the firm and similarly, residual salary and bonus is the portion of the firm CEO’s compensation not explained by the industry and size of the firm. Performance-Based
Compensation is the portion of the natural log of CEO total compensation explained by the Relative Return on Assets and the excess stock return of the firm, independent of the industry and size of the firm, as explained in the text. Similarly, Performance-Based Salary and Bonus is the portion of the natural log of the sum of CEO salary and bonus explained by the Relative Return on Assets and the excess stock return of the firm, independent of the industry and size of the firm.
Table II: Correlations Matrix

<table>
<thead>
<tr>
<th></th>
<th>Residual Compensation</th>
<th>Residual Salary and Bonus</th>
<th>Predicted Compensation</th>
<th>Predicted Salary and Bonus</th>
<th>Standard Deviation of Analyst Forecasts</th>
<th>Predicted Analyst Forecast Dispersion</th>
<th>Relative Return on Assets</th>
<th>Relative Profit Margin</th>
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<td>Residual Salary and Bonus</td>
<td>0.5751</td>
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<tr>
<td>Predicted Compensation</td>
<td>0.2252</td>
<td>0.2222</td>
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<tr>
<td>Predicted Salary and Bonus</td>
<td>0.1808</td>
<td>0.2425</td>
<td>0.7628</td>
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<tr>
<td>Predicted Analyst Forecast Dispersion</td>
<td>-0.0069</td>
<td>-0.0075</td>
<td>-0.2158</td>
<td>-0.1695</td>
<td>0.4193</td>
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</tr>
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<td>Relative Return on Assets</td>
<td>0.0687</td>
<td>0.0752</td>
<td>0.3337</td>
<td>0.2684</td>
<td>-0.2193</td>
<td>-0.4846</td>
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<tr>
<td>Relative Profit Margin</td>
<td>0.0883</td>
<td>0.083</td>
<td>0.2335</td>
<td>0.1618</td>
<td>-0.1455</td>
<td>-0.3013</td>
<td>0.8273</td>
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<tr>
<td>Equity Stock Return</td>
<td>0.1239</td>
<td>0.134</td>
<td>0.5241</td>
<td>0.483</td>
<td>-0.0243</td>
<td>-0.0937</td>
<td>0.1221</td>
<td>0.1091</td>
</tr>
</tbody>
</table>

This table displays the correlations between our measures of agreement and measures of the firms’ performance during the corresponding fiscal year. Residual compensation is the portion of total compensation not explained by the size and industry of the firm and similarly, residual salary and bonus is the portion of the firm CEO’s compensation not explained by the industry and size of the firm. Predicted Compensation is the portion of the natural log of CEO total compensation explained by the Relative Return on Assets and the excess stock return of the firm, independent of the industry and size of the firm, as explained in the text. Similarly, Predicted Salary and Bonus is the portion of the natural log of the sum of CEO salary and bonus explained by the Relative Return on Assets and the excess stock return of the firm, independent of the industry and size of the firm. The standard deviation of analyst forecasts is normalized by the mean forecast estimate. Predicted analyst forecast dispersion is the estimated analyst forecast dispersion for that fiscal year based upon the firm’s size, the number of analyst forecasts, the relative return on assets, and the current equity return of the firm during the corresponding fiscal year.
Table III: Market Leverage – Multivariate Regressions

<table>
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<th>I</th>
<th>II</th>
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<th>VII</th>
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<tr>
<td>Standard Deviation of Analyst Forecasts</td>
<td>0.024***</td>
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<td>0.217***</td>
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<td>-0.008</td>
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<td></td>
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<tr>
<td>Residual Salary and Bonus</td>
<td>-0.191***</td>
<td>-0.013</td>
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<td>-0.005</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Predicted Salary and Bonus</td>
<td>-0.120***</td>
<td>-0.007</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Firm has debt rating</td>
<td>0.062***</td>
<td>0.058***</td>
<td>0.057***</td>
<td>0.060***</td>
<td>0.060***</td>
<td>0.055***</td>
<td>0.055***</td>
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<tr>
<td></td>
<td>-0.003</td>
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<td>-0.004</td>
<td>-0.003</td>
<td>-0.003</td>
<td>-0.003</td>
<td>-0.003</td>
</tr>
<tr>
<td>LN(1+Market Assets)</td>
<td>0.007***</td>
<td>0.005***</td>
<td>0.010***</td>
<td>0.007***</td>
<td>0.006***</td>
<td>0.011***</td>
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<tr>
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<td>-0.002</td>
<td>-0.002</td>
<td>-0.002</td>
<td>-0.002</td>
</tr>
<tr>
<td>Profit Margin</td>
<td>-0.091***</td>
<td>-0.074***</td>
<td>-0.096***</td>
<td>-0.098***</td>
<td>-0.096***</td>
<td>-0.106***</td>
<td>-0.111***</td>
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<tr>
<td></td>
<td>-0.006</td>
<td>-0.01</td>
<td>-0.012</td>
<td>-0.008</td>
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<td>-0.009</td>
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<tr>
<td>Asset Tangibility</td>
<td>0.137***</td>
<td>0.178***</td>
<td>0.197***</td>
<td>0.070***</td>
<td>0.060***</td>
<td>0.092***</td>
<td>0.098***</td>
</tr>
<tr>
<td></td>
<td>-0.01</td>
<td>-0.016</td>
<td>-0.018</td>
<td>-0.012</td>
<td>-0.012</td>
<td>-0.012</td>
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</tr>
<tr>
<td>Market to Book</td>
<td>-0.013***</td>
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<td>-0.011***</td>
<td>-0.013***</td>
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<td>-0.001</td>
<td>-0.001</td>
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<tr>
<td>R&amp;D to Sales</td>
<td>-0.016***</td>
<td>-0.031***</td>
<td>-0.043***</td>
<td>-0.014***</td>
<td>-0.012***</td>
<td>-0.018***</td>
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<td></td>
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<td>Advertising to Sales</td>
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<td>-0.018</td>
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<tr>
<td>CapEx to Book Assets</td>
<td>-0.247***</td>
<td>-0.298***</td>
<td>-0.311***</td>
<td>-0.208***</td>
<td>-0.216***</td>
<td>-0.265***</td>
<td>-0.259***</td>
</tr>
<tr>
<td></td>
<td>-0.014</td>
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<td>-0.023</td>
<td>-0.018</td>
<td>-0.018</td>
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<tr>
<td>Observations</td>
<td>18549</td>
<td>7368</td>
<td>6383</td>
<td>12606</td>
<td>12565</td>
<td>10386</td>
<td>10386</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.132</td>
<td>0.146</td>
<td>0.178</td>
<td>0.137</td>
<td>0.145</td>
<td>0.168</td>
<td>0.167</td>
</tr>
</tbody>
</table>

* significant at 10%; ** significant at 5%; *** significant at 1%

This table contains the results of regressions where the dependent variable is the market value of leverage at the end of the firm’s fiscal year. Market Leverage is defined as total debt (short-term and long-term) divided by the market value of the firm’s assets. The standard deviation of analyst forecasts is normalized by the mean forecast estimate. Predicted analyst forecast dispersion is the estimated analyst forecast dispersion for that fiscal year based upon the firm’s size, the number of analyst forecasts, the relative return on assets, and the current equity return of the firm during the corresponding fiscal year. Residual compensation is the portion of total compensation not explained by the size and industry of the firm and similarly, residual salary and bonus is the portion of the firm CEO’s compensation not explained by the industry and size of the firm. Performance-Based Compensation is the portion of the natural log of CEO total compensation explained by the Relative Return on Assets and the excess stock return of the firm, independent of the industry and size of the firm,
as explained in the text. Similarly, Performance-Based Salary and Bonus is the portion of the natural log of the sum of CEO salary and bonus explained by the Relative Return on Assets and the excess stock return of the firm, independent of the industry and size of the firm. “Has debt rating” takes the value one if the firm has either a long-term debt or commercial paper rating, zero otherwise. Profit margin is defined as operating income before depreciation divided by sales. “Tangible assets” is defined as the ratio of plant, property, and equipment to total book assets. All of the specifications include industry fixed effects, where industry corresponds to the two-digit SIC code to which the firm belongs.
<table>
<thead>
<tr>
<th></th>
<th>I</th>
<th>II</th>
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<th>V</th>
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<td>-0.008</td>
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<tr>
<td>Residual Salary and Bonus</td>
<td>-0.161***</td>
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<td>Predicted Salary and Bonus</td>
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<td>-0.090***</td>
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<td>0.058***</td>
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<td>0.082***</td>
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<tr>
<td>LN(1+Market Assets)</td>
<td>0.022***</td>
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<tr>
<td>Asset Tangibility</td>
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<tr>
<td>Market to Book</td>
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<td>-0.010***</td>
<td>-0.011***</td>
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<td>-0.001</td>
<td>-0.001</td>
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<tr>
<td>R&amp;D to Sales</td>
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<td>-0.007</td>
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<td>Advertising to Sales</td>
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<tr>
<td>CapEx to Book Assets</td>
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<td>18549</td>
<td>7368</td>
<td>6383</td>
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<td>R-squared</td>
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</tbody>
</table>

* significant at 10%; ** significant at 5%; *** significant at 1%

This table contains the results of regressions where the dependent variable is the book value of leverage at the end of the firm’s fiscal year. Book Leverage is defined as total debt (short-term and long-term) divided by the book value of the firm’s assets. The standard deviation of analyst forecasts is normalized by the mean forecast estimate. Predicted analyst forecast dispersion is the estimated analyst forecast dispersion for that fiscal year based upon the firm’s size, the number of analyst forecasts, the relative return on assets, and the current equity return of the firm during the corresponding fiscal year. Residual compensation is the portion of total compensation not explained by the size and industry of the firm and similarly, residual salary and bonus is the portion of the firm CEO’s compensation not explained by the industry and size of the firm. Performance-Based Compensation is the portion of the natural log of CEO total compensation explained by the Relative Return on Assets and the excess stock return of the firm, independent of the industry and size of the firm, as explained in the text. Similarly, Performance-
Based Salary and Bonus is the portion of the natural log of the sum of CEO salary and bonus explained by the Relative Return on Assets and the excess stock return of the firm, independent of the industry and size of the firm. “Has debt rating” takes the value one if the firm has either a long-term debt or commercial paper rating, zero otherwise. Profit margin is defined as operating income before depreciation divided by sales. “Tangible assets” is defined as the ratio of plant, property, and equipment to total book assets. All of the specifications include industry fixed effects, where industry corresponds to the two-digit SIC code to which the firm belongs.
This table contains the results of regressions where the dependent variable is the natural log of one plus interest coverage, which is calculated as operating income before depreciation divided by interest expense. Firms with negative earnings are coded as having an interest coverage ratio of -0.5, so the natural log of one plus interest coverage takes the value -0.69 ( = LN (1 – 0.5)) for such firms. The standard deviation of analyst forecasts is normalized by the mean forecast estimate. Predicted analyst forecast dispersion is the estimated analyst forecast dispersion for that fiscal year based upon the firm’s size, the number of analyst forecasts, the relative return on assets, and the current equity return of the firm during the corresponding fiscal year. Residual compensation is the portion of total compensation not explained by the size and industry of the firm and similarly, residual salary and bonus is the portion of the firm CEO’s compensation not explained by the industry and size of the firm. Performance-Based
Compensation is the portion of the natural log of CEO total compensation explained by the Relative Return on Assets and the excess stock return of the firm, independent of the industry and size of the firm, as explained in the text. Similarly, Performance-Based Salary and Bonus is the portion of the natural log of the sum of CEO salary and bonus explained by the Relative Return on Assets and the excess stock return of the firm, independent of the industry and size of the firm. “Has debt rating” takes the value one if the firm has either a long-term debt or commercial paper rating, zero otherwise. Profit margin is defined as operating income before depreciation divided by sales. “Tangible assets” is defined as the ratio of plant, property, and equipment to total book assets. The standard errors in the first three columns are White heteroscedastic consistent, adjusted for clustering by company. All of the specifications include industry fixed effects, where industry corresponds to the two-digit SIC code to which the firm belongs.
Table VI: Dividend Payout Ratio

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<td>Residual Compensation</td>
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<td></td>
</tr>
<tr>
<td>and Bonus</td>
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</table>

* significant at 10%; ** significant at 5%; *** significant at 1%

This table contains the results of regressions where the dependent variable is the value of cash dividends paid by the firm divided by the firm’s income before extraordinary items during the corresponding fiscal year. The standard deviation of analyst forecasts is normalized by the mean forecast estimate. Predicted analyst forecast dispersion is the estimated analyst forecast dispersion for that fiscal year based upon the firm’s size, the number of analyst forecasts, the relative return on assets, and the current equity return of the firm during the corresponding fiscal year. Residual compensation is the portion of total compensation not explained by the size and industry of the firm and similarly, residual salary and bonus is the portion of the firm CEO’s compensation not explained by the industry and size of the firm. Performance-Based Compensation is the portion of the natural log of CEO total compensation explained by the Relative Return on Assets and the excess stock return of the firm, independent of the industry and size of the firm, as explained in the text. Similarly, Performance-Based Salary and Bonus is
the portion of the natural log of the sum of CEO salary and bonus explained by the Relative Return on Assets and the excess stock return of the firm, independent of the industry and size of the firm. Market Leverage Ratio is defined as total debt (short-term and long-term) divided by the market value of the firm’s assets. Profit margin is defined as operating income before depreciation divided by sales. “Tangible assets” is defined as the ratio of plant, property, and equipment to total book assets. All of the specifications include industry fixed effects, where industry corresponds to the two-digit SIC code to which the firm belongs.
Table VII: Dividend Yield

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<td>of Analyst Forecasts</td>
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<td>-0.162</td>
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<td>1.461***</td>
<td>1.873***</td>
<td>2.026***</td>
<td>2.113***</td>
<td>2.018***</td>
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<td>LN(1+Market Assets)</td>
<td>-0.204***</td>
<td>-0.168***</td>
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<td>0.275***</td>
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<td>0.445**</td>
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<td>0.997***</td>
<td>0.930***</td>
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<td>-0.024***</td>
<td>-0.020**</td>
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<td>R&amp;D to Sales</td>
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<td>Advertising to Sales</td>
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<td>1.308*</td>
<td>1.604*</td>
<td>1.556**</td>
<td>1.543**</td>
<td>1.236*</td>
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<td>CapEx to Book Assets</td>
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<td>-0.176</td>
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<td>0.066</td>
<td>0.071</td>
<td>0.094</td>
<td>0.093</td>
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</table>

* significant at 10%; ** significant at 5%; *** significant at 1%

This table contains the results of regressions where the dependent variable is the value of cash dividends paid by the firm divided by the firm’s market equity capitalization during the corresponding fiscal year (multiplied by 100 since the magnitudes are so small). The standard deviation of analyst forecasts is normalized by the mean forecast estimate. Predicted analyst forecast dispersion is the estimated analyst forecast dispersion for that fiscal year based upon the firm’s size, the number of analyst forecasts, the relative return on assets, and the current equity return of the firm during the corresponding fiscal year. Residual compensation is the portion of total compensation not explained by the size and industry of the firm and similarly, residual salary and bonus is the portion of the firm CEO’s compensation not explained by the industry and size of the firm. Performance-Based Compensation is the portion of the natural log of CEO total compensation explained by the Relative Return on Assets and the excess stock return of the firm, independent of the industry and size of the firm, as explained in the text.
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