Relationship investing: Large shareholder monitoring with managerial cooperation*

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Abstract

We characterize conditions under which a large institutional shareholder and the manager of a firm will establish relationship investing, wherein the manager actively cooperates with the institution in the monitoring process, to resolve agency problems. The setting of our model is that of a privately informed manager choosing between a project that has a faster resolution of uncertainty and a project that has a delayed resolution of uncertainty. The agency problem arises because the manager has incentives to focus on the firm's perceived market value, rather than its true long-term value, through his compensation contract and leads to investment distortions. We show that relationship investing solves the agency problem and reduces the free-riding problem associated with large shareholder monitoring. We also show that under some conditions it is optimal for shareholders to make the manager's compensation more distortionary by increasing the manager's incentives to focus on the firm's perceived market value, in order to induce him to cooperate in the monitoring process.

1 Introduction

Institutional investors control over 4 trillion investment dollars and own nearly 50% of the equity in the market. Their large equity holdings increasingly make them one of the larger shareholders of a firm – for example, Fidelity Management and Research Corporation had 5% ownership in 273 firms in 1992, in 359 firms in 1993, and in 454 firms in 1994, as reported by Compact Disclosure. Such large and stable holdings give institutions incentives to monitor firm management as has been documented by Carleton, Nelson, and Weisbach (1998), Chidambaran and Woidtke (1998), Opler and Sokobin (1997), and Smith (1996). Anecdotal evidence also suggests that managers actively cooperate with institutions in the monitoring process. It is routine for CEOs and senior management to meet with analysts and institutional investors and otherwise invest substantial time, effort, and resources in order to reduce the frictions to monitoring (see Appendix A for details). In this paper, we develop a theoretical model to investigate the conditions under which it is optimal for managers to actively cooperate with large institutional shareholders and facilitate the monitoring of the firm.

The active cooperation by management in the monitoring process is the central aspect of what *we define as relationship investing*. Previous researchers have documented such interactions between institutional investors and managers. Carleton, Nelson, and Weisbach (1998) analyze correspondence between TIAA-CREF and 40 firms and show that management and institutional shareholders engage in a continuous dialog and, in over 95% of the cases, management voluntarily responds to the concerns of its institutional shareholder. Opler and Sokobin (1995) note the absence of confrontations between institutions and the management of firms on the focus list of the Council of Institutional Investors and conclude that it is evidence of a relationship between managers and the institutional shareholders. Pound (1993) has also emphasized the voluntary nature of relationship investing in arguing for increased institutional involvement in corporate governance.

Theoretical research, however, has not fully explored the role of the manager and has focused mainly on the optimality of costly monitoring by a large shareholder (see Shleifer and Vishny (1986), Admati, Pfleiderer, and Zechner (1992), Kahn and Winton (1998), and Maug (1998)). We extend the research by investigating the role of the manager and the effects of a generalized cost structure that reflects the cooperation costs incurred by managers. Our cost structure assumes that the manager bears a cost when he cooperates in the monitoring and that managerial cooperation reduces the institution's monitoring costs. We show that in equilibrium, the manager's costs are passed on to all the shareholders of the firm and, unlike the traditional scenario, a part of the total monitoring costs are borne partly by other shareholders. This results in a reduction of the free-rider problem associated with monitoring and increases the incidence of large shareholder monitoring.

We derive results for an agency problem that arises when the manager is given incentives to focus on the firm's perceived market value, rather than its true long-term value, through his compensation contract. We show that relationship investing is optimal when the agency problem is high – shareholders and managers will not incur the costs when the agency problem is low. An interesting result is that, under some conditions, shareholders will choose a compensation contract that increases the potential agency problem. Such a compensation contract increases the cost to the manager if he does not cooperate with the institution and thereby induces him to establish relationship investing.

The setting of our model is that of a privately informed manager choosing between a project with a fast resolution of uncertainty and a project with a delayed resolution of uncertainty. We refer to the project with the faster resolution of uncertainty as the short-term project and the project with the delayed resolution of uncertainty as the long-term project. Shareholders will value the firm at its true value if the manager chooses the short-term project, but will value the firm at its conditional expected value if he chooses the long-term project. The agency problem arises because the manager chooses the investment that maximizes his compensation and deviates from the full information investment policy. The difference in information resolution gives rise to two types of investment distortions - a) myopia, where the manager underinvests in the long-term project when the short-term project is very good, benefiting from the early revelation of private information,[1] and b) hyperopia, where the manager overinvests in the long-term project to avoid revealing a bad short-term project.

In our framework, monitoring resolves the agency problem caused by incomplete contracting and serves as a mechanism for transmitting information to the market. The role of the institutional investor is to acquire the private information of the manager, and credibly convey the information to other shareholders. The institutional shareholder does have to be willing to hold shares for a period long enough for market prices to incorporate the manager's private information. Institutional shareholders' fiduciary obligations are usually long-term, which allows them to consider a longer investment horizon.

Our model of the large institutional investor is different from models where the large shareholder is willing to take over the firm (see Shleifer and Vishny (1986)) or acquires a block of shares to garner control benefits (see Barclay and Holderness (1989)). As documented by Roe (1990), institutional investors face many legal restrictions regarding the amount of equity they can own in any one company. They are, therefore, prevented from gaining control of the firm simply by virtue of the fact that they allocate wealth among a limited supply of stocks. Their role is also different from that discussed by Monks (1993) and Gordon and Pound (1993), who argue that institutions should take large positions in firms and get actively involved in corporate governance. The institutional investor we model takes an intermediate approach between passivity on the one end and control on the other as those envisaged by Black (1992).

In the next section we set up the basic structure of the asymmetric information model and discuss the manager's compensation contract. Section 3 describes the optimal investment policy under full information and the distortions that arise in an asymmetric information setting. We then describe conditions under which relationship investing will be established between the firm's manager and the institutional shareholder. Section 5 discusses the role of the manager's compensation contract and the monitoring cost structure. Section 6 presents a summary and our conclusions.

2 The Model

The model consists of an entrepreneur who sells his firm to investors, a manager who is appointed to make investment decisions and manage the firm, a large institutional shareholder, and atomistic investors. We assume the firm is an all equity firm in order to focus on the agency relationship between shareholders and the manager, and capture the principal issues as simply as possible. The model is described in two parts: the first part describes the time line, the characteristics of the investment opportunities available to the firm, and the nature of the information asymmetry between the manager and shareholders of the firm; the second part describes the management compensation contract and the agency problem.

2.1 The time line and project parameters

Figure 1 shows the time line for our model which has three periods and four dates. At $t = 0$, the entrepreneur sells all shares in the firm to investors through a Walrasian auction and a manager is appointed. At $t = 1$, the manager makes the investment, choosing between two positive net present value projects after privately observing project characteristics. At $t = 2$, the information asymmetry is resolved partially. At $t = 3$, cash flows are realized and the firm is liquidated.

The result of the initial auction is such that the institution gets an α fraction of the shares[2] and atomistic shareholders hold the remaining $(1 - \alpha)$ fraction. The auction raises an amount greater than I, the amount needed for investing in the project, the difference representing a dividend to the entrepreneur. The equilibrium market value will incorporate the institution's optimal monitoring decision.

Immediately after the auction, the shareholders choose a manager to make the investment decision and manage the firm. The manager receives at a minimum the reservation wage, $\bar{W}$, through a compensation contract that depends on the market value of the firm and on its true value. The manager's objective is to maximize expected compensation and he will choose the firm's investment accordingly.

The firm has two mutually exclusive investment opportunities: a short-term project and a long-term project. Let $\tilde{p} \in [0, 1]$ be the random return of the long-term project and $\tilde{q} \in [0, 1]$ be the random return of the short-term project. If the manager invests in the long-term project with a return p, the terminal cash flows of the firm is equal to $(1 + p)I$. If the manager invests in the short-term project with a return q, the terminal cash flows of the firm is equal to $(1 + q)I$. We assume that the probability distribution for $\tilde{p}$ and $\tilde{q}$ are independent and uniform density functions over the interval $[0, 1]$.

If the manager invests in the short-term project, the q that he observes is revealed to shareholders at $t = 2$. Shareholders then know the conditional true value of the firm. If the manager instead invests in the long-term project, no additional information is revealed to shareholders at $t = 2$. Since the probability distribution for $\tilde{p}$ and $\tilde{q}$ are independent, shareholders' valuation of the firm is conditional only on the choice of the long-term project. The differential resolution of information between the two projects is similar to that of Hirshleifer and Chordia (1992) and Stein (1988, 1989).

The rule that the manager follows in choosing between the two projects, is his *investment policy* and is generically denoted as θ.

2.2 Management compensation contract and the agency problem

We assume that the manager is risk neutral and requires a reservation wage, $\bar{W}$, that is determined by competitive forces in the managerial labor market. We also assume that the manager is compensated through a linear compensation contract similar to that used in Ross(1977) and Miller and Rock(1985). The compensation contract is a function of the firm's market value and its true value and is given as,

$$S(\theta, \gamma_0, \gamma_1) = \gamma_0 V(\theta, \gamma_0, \gamma_1) + \gamma_1 \Upsilon(\theta, \gamma_0, \gamma_1) \qquad (1)$$

where $V(\theta, \gamma_0, \gamma_1)$ denotes the expected market value of the firm, $\Upsilon(\theta, \gamma_0, \gamma_1)$ denotes its true value conditional on the manager's private information at $t = 1$, γ_0 is the fractional weight on $V(\theta, \gamma_0, \gamma_1)$, and γ_1 is the fractional weight on $\Upsilon(\theta, \gamma_0, \gamma_1)$. The manager's compensation contract given in Equation (1) above will be denoted as the compensation contract $\{\gamma_0, \gamma_1\}$ in the remainder of the paper.

The agency problem arises because the manager has incentives to focus on the firm's market value through his compensation contract. He will take into consideration the effect of his investment choice on both the market value of the firm and its true value. His optimal investment policy, therefore, will not maximize the firm's true value.

The dependence of the manager's compensation on $V(\theta, \gamma_0, \gamma_1)$ is a reduced form representation of the manager's concern for the firm's market value in practice. Managers care about the firm's market value for a variety of reasons. First, some shareholders of the firm could have a shorter investment horizon for liquidity reasons. They would, therefore, like to incorporate terms in the manager's compensation contract that give him reasons to care about intermediate market value. Second, investors may infer a low market value to be a signal of the manager's incompetence and fire the manager. This will cause the manager to lose private control benefits tied to the job. Third, an active takeover market could penalize the manager for low firm value, even if it is temporary. An informed raider could take over a firm more easily when it is cheap and displace the manager. The manager will thus want to maximize the firm's market value in order retain his job.

The dependence of the manager's compensation on $\Upsilon(\theta, \gamma_0, \gamma_1)$ has an effect that is similar to giving him restricted equity. Restricted equity has been suggested as a mechanism to impose market discipline on the manager and align his incentives with that of the shareholder (see for example Admati and Pfleiderer (1994), Dybvig and Zender (1991), and John and John (1993)). We show, however, that as long as the manager is concerned with a firm's market value, such restricted equity alone cannot resolve the agency problem described above.

The linearity of the compensation contract is not an important restriction in our setting. In particular, the linear family includes the optimal contract which solves the agency problem. As shown later, a contract with $\gamma_0 = 0$ is such an optimal contract. The linearity of the contract however allows us to conveniently parameterize the level of the agency problem caused by incomplete contracting. For the various reasons mentioned above, the best admissible contracts may involve a minimum value of γ_0 which is strictly positive. The level of agency problems due to incomplete contracting can thus be parameterized by the minimum admissible level of γ_0, i.e. $\gamma_0^{Min} (> 0)$.

Although we derive the results for relationship investing for the specific agency problem described above, similar results would apply to a broad class of agency problems where monitoring by shareholders is beneficial. For example, we could have chosen an agency problem arising from non-contractible consumption of perquisites as described in Jensen and Meckling (1976). Our parameterization provides a convenient way to capture the effects of incomplete contracting that drives the agency problem as well as the shortcomings of other corporate governance systems in place. This enables us to focus on residual agency problems which are solved by relationship investing in our paper.

3 Optimal Investment Policies

In this section, we derive the optimal investment policies the manager follows under full information and under asymmetric information. With full information, firm value is maximized independent of the manager's compensation contract and serves as the benchmark. On the other hand, the optimal investment policy under asymmetric information is a function of the terms of the compensation contract. We, therefore, solve for the optimal investment policy for a given compensation contract $\{\gamma_0, \gamma_1\}$. This allows us to express firm value under asymmetric information and the deviations from the benchmark full information value as a function of γ_0 and γ_1. In subsequent sections, we use these results to compare the costs and benefits of relationship investing in terms of $\{\gamma_0, \gamma_1\}$ and determine the optimal compensation contract $\{\gamma_0^{opt}, \gamma_1^{opt}\}$.

3.1 Full information investment policy

As a base case, we step away from the agency problem and analyze the situation in a full information setting where shareholders know p and q and complete contracting is feasible.

Proposition 1 : When shareholders have full information about project characteristics, the manager implements the following investment policy,

- *If $q > p$ invest in the short-term project*
- *If $p > q$ invest in the long-term project*

The investment policy above will be denoted as θ^f.

Proof: See Appendix B.

Under full information the manager maximizes his compensation by investing such that the true value of the firm is maximized. Figure 2 illustrates the full information investment policy θ^f in (p, q) space. The diagonal line represents equal values of p and q for which the manager is indifferent between the two projects. The upper left triangle represents the region where $p > q$ and the manager invests in the long-term project. The lower right triangle represents the region where $p < q$ and the manager invests in the short-term project.

Corollary 1A: Under full information, the unconditional expected value of the firm is,

$$E[V(\theta^f, \gamma_0, \gamma_1)] = (1 + \frac{2}{3})I \qquad (2)$$

Proof: See Appendix C.

The expected value of the firm under full information represents the maximum value that can be attained and is the benchmark. The expected returns from the short-term project and the long-term project conditional on the manager's project choice are identical in a full information setting. The conditional firm values are, therefore, equal.

Corollary 1B: Under full information, the expected compensation for a manager who has a compensation contract $\{\gamma_0, \gamma_1\}$ *is,*

$$E[S(\theta^f, \gamma_0, \gamma_1)] = (\gamma_0 + \gamma_1)(1 + \frac{2}{3})I = (\gamma_0 + \gamma_1)E[V(\theta^f, \gamma_0, \gamma_1)] \quad ; \quad \gamma_0 > 0 \tag{3}$$

Proof: See Appendix D.

Under full information, the manager's compensation is a function of the sum $(\gamma_0 + \gamma_1)$ but does not depend on the relative proportions. Note that

Corollary 1C: Under asymmetric information, a management contract with the fractional weight on market value of the firm equal to zero, i.e. $\gamma_0 = 0$*, is the optimal linear compensation contract.*

Proof: If $\gamma_0 = 0$, all of the manager's compensation is determined by the firm's true value. This is equivalent to the full information setting in Proposition 1 and the manager implements the full information investment policy θ^f. With $\gamma_0 = 0$ in the compensation contract, incentives of the manager and shareholders are perfectly aligned.

3.2 Investment under asymmetric information

Under asymmetric information, the critical issue is that the market value of the firm can be different from its true value if the manager chooses the long-term project. The discrepancy between the firm's true value and its conditional market value causes the manager to deviate from the full information investment policy.

We first solve for the manager's investment strategy given the shareholders' valuation of the firm at $t = 2$. Of course, shareholders' valuation of the firm anticipates and incorporates the manager's investment policy. In equilibrium, shareholders' valuation of the firm will be consistent with the manager's optimal investment policy.

Proposition 2 : Under asymmetric information and no monitoring, the manager who has the compensation contract $\{\gamma_0, \gamma_1\}$*, will make the following investment choices after observing* p *and* q*:*

- *If* $q > F(p^*, p)$*, invest in the short-term project*
- *If* $q < F(p^*, p)$*, invest in the long-term project*

where, p^* (given by Equation (35) in Appendix E) is the expected return on the long-term project conditional on the manager choosing the long-term project, and $F(p^*, p)$ is,

$$F(p^*, p) = \frac{\gamma_0}{(\gamma_0 + \gamma_1)} p^* + \frac{\gamma_1}{(\gamma_0 + \gamma_1)} p \tag{4}$$

The investment policy above will be denoted as θ^*.

Proof: See Appendix E.

After observing p and q, the manager picks the project that will maximize his compensation. His decision depends on $F(p^*, p)$, which is a weighted average of the market's perceived value of the long-term project, p^*, and its true value, p. $F(p^*, p)$ reflects the increasing importance of the firm's perceived market value in determining the manager's investment policy when its weight in his compensation, $\frac{\gamma_0}{(\gamma_0 + \gamma_1)}$, is larger.

Figure 3 illustrates investment policy θ^* in (p, q) space. For all p and q values to the left of the solid line representing $F(p^*, p)$, the manager invests in the long-term project. When $q < q_1$, $q < F(p^*, p)$ for all values of p and the manager invests in the long-term project. When $q > q_2$, $q > F(p^*, p)$ for all values of p and the manager invests in the short-term project. Equation (26) and Equation (27) give the values of q_1 and q_2 respectively.

The shaded areas in the lower left and upper right in Figure 3 represent values of (p, q) for which the manager deviates from the full information investment policy. For (p, q) values in the lower left area, the manager's investment strategy is hyperopic, i.e. he overinvests in the long-term project. This region represents cases for which the manager avoids revealing that the firm has relatively bad projects by choosing the long-term project. He uses the fact that shareholders, who do not share his information, will value the long-term project at its conditional expected value. For (p, q) values in the upper right area, the manager's investment strategy is myopic, i.e. he overinvests in the short-term project. In this region, the long-term project is better than the short-term project, but the shareholders will only value the long-term project at its lower conditional value. The manager can get a higher market value by choosing the short-term project even though the long-term project has higher expected return.

From Figure 3, the deviations in the investment policy are larger when q_1 increases or q_2 decreases. From Equation (26) and Equation (27), these happen when $\frac{\gamma_0}{\gamma_0+\gamma_1}$ is higher. Thus, the deviations from the full information investment policy are higher when the fractional weight on the firm's market value is high. In the extreme case when all the weight in the manager's compensation contract is on the firm's market value, i.e. $\gamma_1 = 0$, $F(p^*, p) = 1/2$ from Equation (35) in Appendix E and Equation 4. The manager thus ignores the true value of the long-term project in making his investment decision. Deviations from the full information investment policy are maximized in this case. On the other hand when $\gamma_0 = 0$, $F(p^*, p) = p$ from Equation (4), and the investment policy θ^* collapses to the full information investment policy as was also shown in Corollary 1C.

Corollary 2A : Under asymmetric information and no monitoring, the unconditional expected value of the firm under investment policy θ^*, is,

$$E[V(\theta^*, \gamma_0, \gamma_1)] = \left[75 + 77\left(\frac{\gamma_1}{\gamma_0}\right) + \sqrt{3\left\{3 + 10\left(\frac{\gamma_1}{\gamma_0}\right) + 3\left(\frac{\gamma_1}{\gamma_0}\right)^2\right\}}\right]\left(\frac{I}{48}\,\frac{\gamma_0}{\gamma_0 + \gamma_1}\right) \quad ; \; \gamma_0 > 0 \quad (5)$$

Proof: See Appendix F.

It is immediate from Equation (5) that firm value under information asymmetry increases as $\frac{\gamma_1}{\gamma_0}$ increases. When the weight on the market value of the firm in the manager's compensation contract is relatively high, firm value is low because investment distortions are higher.

Corollary 2B : Under asymmetric information and no monitoring, the expected compensation for a manager who has a compensation contract $\{\gamma_0, \gamma_1\}$ is,

$$E[S(\theta^*, \gamma_0, \gamma_1)] = \left[75 + 77\left(\frac{\gamma_1}{\gamma_0}\right) + \sqrt{3\left\{3 + 10\left(\frac{\gamma_1}{\gamma_0}\right) + 3\left(\frac{\gamma_1}{\gamma_0}\right)^2\right\}}\right]\left(\frac{I}{48}\,\gamma_0\right) \quad ; \; \gamma_0 > 0 \quad (6)$$

Proof: See Appendix G.

Note that $E[S(\theta^*, \gamma_0, \gamma_1)] = (\gamma_0 + \gamma_1)\; E[V(\theta^*, \gamma_0, \gamma_1)]$.

4 Monitoring and Cooperation

In this section, we derive conditions under which relationship investing is established assuming that the manager has a compensation contract $\{\gamma_0, \gamma_1\}$ and under a generalized monitoring cost structure. We first determine the improvement in firm value possible through relationship investing and express it as a function of γ_0 and γ_1. We then compare this benefit of establishing relationship investing with the costs incurred for both the institutional investor and the manager. We use these results to determine whether relationship investing is optimal and show that it depends on the level of the agency problem as parameterized by γ_0 and γ_1

4.1 The benefits of relationship investing

Without monitoring, the manager implements investment policy θ^* and firm value as a function of the compensation contract $\{\gamma_0, \gamma_1\}$ is given by Equation (5). The effect of monitoring is to reveal p and q to all shareholders. The manager will then implement the full information investment policy θ^f and firm value is given by Equation (2).

Let, $V_{Diff}[\gamma_0, \gamma_1] = E[V(\theta^f, \gamma_0, \gamma_1)] - E[V(\theta^*, \gamma_0, \gamma_1)]$ be the improvement in firm value from implementing investment policy θ^f instead of θ^*. From Equation (2), firm value $E[V(\theta^f, \gamma_0, \gamma_1)]$ is independent of γ_1. Equation (5) gives $E[V(\theta^*, \gamma_0, \gamma_1)]$. Then,

$$V_{Diff}[\gamma_0, \gamma_1] = \left[5 + 3\left(\frac{\gamma_1}{\gamma_0}\right) - \sqrt{3\left\{3 + 10\left(\frac{\gamma_1}{\gamma_0}\right) + 3\left(\frac{\gamma_1}{\gamma_0}\right)^2\right\}}\right]\left(\frac{I}{48}\frac{\gamma_0}{\gamma_0 + \gamma_1}\right) \quad ; \ \gamma_0 > 0 \qquad (7)$$

$V_{Diff}[\gamma_0, \gamma_1]$ is a function of the manager's compensation contract $\{\gamma_0,\ \gamma_1\}$. It is decreasing in $\frac{\gamma_1}{\gamma_0}$ and is increasing in the scale of operations of the firm, I. Note that it depends only on the ratio of γ_1 and γ_0. To determine the optimality of relationship investing, $V_{Diff}[\gamma_0, \gamma_1]$ has to be adjusted for the difference in the manager's wage with and without relationship investing and for the costs that shareholders and the manager incur.

Let, $S_{Diff}[\gamma_0, \gamma_1] = E[S(\theta^f, \gamma_0, \gamma_1)] - E[S(\theta^*, \gamma_0, \gamma_1)]$ be the difference in the manager's compensation from implementing investment policy θ^f instead of θ^*. From Equation (3)and Equation (6),

$$S_{Diff}[\gamma_0, \gamma_1] = \left[5 + 3\left(\frac{\gamma_1}{\gamma_0}\right) - \sqrt{3\left\{3 + 10\left(\frac{\gamma_1}{\gamma_0}\right) + 3\left(\frac{\gamma_1}{\gamma_0}\right)^2\right\}}\right]\left(\frac{I}{48}\gamma_0\right) \quad ; \ \gamma_0 > 0 \qquad (8)$$

Note that $S_{Diff}[\gamma_0, \gamma_1] = (\gamma_0 + \gamma_1)V_{Diff}[\gamma_0, \gamma_1] \geq 0$. That is, for a given $\{\gamma_0, \gamma_1\}$, the manager's compensation under full information is higher than that under asymmetric information, reflecting the investment distortions caused by the agency problem.

4.2 The Monitoring Cost Structure

We augment the conventional cost structure of monitoring by large shareholders by allowing it to depend on the possibility of managerial cooperation. The institution incurs a monitoring cost C_{nc} when it monitors the firm without the cooperation of the manager. These costs, for example, reflect the expenses of analysts' reports and wages paid to people needed to verify the manager's information. The manager can reduce the institutions monitoring costs to a lower level c_i by cooperating in the monitoring process, but he incurs a cooperation cost c_m. For example, the manager can participate in industry conferences and agree to one-on-one meetings with shareholders, making it easy to gather information about the firm (see Appendix A for further details on the mechanisms managers use in practice to provide information to institutional investors). c_m represents the costs borne by the manager for these activities.

The elements of the monitoring cost structure, C_{nc}, c_i and c_m, are the efficiency parameters of the monitoring environment. We assume that $C_{nc} \geq c_i + c_m$.

4.3 Manager's decision to cooperate

The manager will cooperate if the benefits to him outweigh the costs he will incur.

Proposition 3 : A manager who has the compensation contract $\{\gamma_0, \gamma_1\}$ *and who faces cooperation costs* c_m*, will choose to cooperate in the monitoring process if,*

$$V_{Diff}[\gamma_0, \gamma_1] > \frac{c_m}{\gamma_0 + \gamma_1} \tag{9}$$

The manager's expected compensation if he cooperates is, $E[S(\theta^f, \gamma_0, \gamma_1)] = \bar{W} + c_m$.

Proof: See Appendix H.

Cooperating in the monitoring process benefits the manager as he shares in the value gains brought about by monitoring through his compensation contract. From Equation (7), the decrease in firm value due to the distortions in investment policy is large when γ_0 is relatively large. Therefore, there is more to be gained by cooperating when γ_0 is larger. As expected, cooperation is less likely when the cooperation cost c_m is large. Under relationship investing, asymmetric information is resolved and the manager receives his reservation wage net of cooperation costs.

4.4 The institution's decision to monitor

We first evaluate the institution's decision to monitor assuming that it is optimal for the manager to cooperate. The benefits of monitoring to the institution equals α times the increase in firm value due to monitoring (recall that α is the fraction of the firm held by the institution). Firm value will be reduced by the amount of the manager's wage, which can be different under the monitoring and no-monitoring scenarios, and we take this into account.

Proposition 4 : With cooperation from a manager who has the compensation contract $\{\gamma_0, \gamma_1\}$ *and who incurs cooperation costs* c_m*, an institutional shareholder holding* α *shares and facing monitoring costs* c_i *will monitor if,*

$$V_{Diff}[\gamma_0, \gamma_1] > \frac{c_i}{\alpha} + S_{Diff}[\gamma_0, \gamma_1] \quad ; \ \gamma_0 > 0 \tag{10}$$

Proof: See Appendix I.

If the institution chooses to monitor, it has to bear monitoring costs and a prorated fraction of the difference in the manager's compensation. Equation (10) implies that the improvement in firm value has to be higher than the sum of these costs. When γ_0 is high, the distortions in investment policy are higher, and it is more likely that the institution will choose to monitor. When α is high, a larger fraction of the benefits of monitoring accrues to the institution, and monitoring is optimal at lower γ_0.[3]

We focus our analysis for parameter values wherein $C_{nc} \geq c_i + c_m$, i.e. when the sum of the institutions monitoring costs and the manager's cooperation costs is less than or equal to the costs borne by a large shareholder when monitoring without the manager's cooperation. If this condition does not hold, the parameters of the cost structure could be such that Equation (10) is true and $C_{nc} < c_i + \alpha S_{Diff}[\gamma_0, \gamma_1]$. These conditions imply that it is optimal for the institution to monitor, but cooperation by the manager does not decrease the institution's costs significantly and the increase in his compensation required to cover his cooperation costs is very high. In this case, relationship investing is not established and shareholders will set γ_1 in the compensation contract such that the manager will not be compensated for his cooperation costs.

5 Conditions for Relationship Investing

In this section we determine the optimal managerial compensation contract $\{\gamma_0^{opt}, \gamma_1^{opt}\}$ that solves the agency problem taking into account the results of previous section on the viability of relationship investing. As a first step, we determine the set of contracts for which relationship investing is optimal and the complement set for which the level of agency problems are not high enough to warrant monitoring. A management compensation contract with zero weight on the market value of the firm, i.e. $\gamma_0 = 0$, involves no the agency problem as shown in Corollary 1C. However, for reasons described in Section 2.2, we assume that the admissible compensation contracts are such that γ_0 is greater than a minimum positive level γ_0^{Min}. The level of $\gamma_0^{Min}(> 0)$ represents the level of real world imperfections and incomplete contracting and parameterizes the residual agency problem in our framework.

We determine the optimal compensation contract $\{\gamma_0^{opt}, \gamma_1^{opt}\}$ subject to the constraint that $\gamma_0^{opt} \geq \gamma_0^{Min}$, which is strictly positive. We also explore the effects of the monitoring cost structure and discuss the implications of relationship investing for the returns to the institutional investor and other atomistic shareholders.

5.1 The optimal γ_1^{opt} for a specific γ_0

The optimal level of $\gamma_1 = \gamma_1^{opt}$ corresponding to a specific value of γ_0 is such that firm value is maximized and we take into consideration whether relationship investing is optimal.

Proposition 5: For a specific value of γ_0 the corresponding γ_1^{opt} in the manager's compensation contract $\{\gamma_0, \gamma_1\}$ is determined as follows. Shareholders will set $\gamma_1^{opt} = \gamma_1^r$ if relationship investing is optimal or $\gamma_1^{opt} = \gamma_1^*$ if relationship investing is not optimal. γ_1^r and γ_1^* satisfy the following equations respectively.

$$E[S(\theta^f, \gamma_0, \gamma_1^r)] = \bar{W} + c_m \qquad \textit{relationship investing} \tag{11}$$

$$\begin{aligned} \max_{\gamma_1} \quad & E[V(\theta^*, \gamma_0, \gamma_1^*)] - E[S(\theta^*, \gamma_0, \gamma_1^*)] \qquad \textit{no relationship investing} \\ s.t. \quad & E[S(\theta^*, \gamma_0, \gamma_1^*)] \geq \bar{W} \end{aligned} \tag{12}$$

Proof: Under relationship investing, shareholders will know the manager's private information and his optimal investment policy through the large shareholder's monitoring. The manager's compensation contract does not play a role in establishing the value of the firm in this case. Shareholders will pay the manager the minimum possible and set the compensation contract such that he receives his reservation wage net of cooperation costs. For a specific value of γ_0 Equation (2) and Equation (3) determine the value $\gamma_1 = \gamma_1^r$ that maximizes firm value and give the manager his reservation utility under the full information investment policy achieved under relationship investing.

Under no monitoring, shareholders rely on the incentives in the management compensation contract to induce the manager to maximize the value of the firm. In Equation (5), $E[V(\theta^*, \gamma_0, \gamma_1)]$ is larger when $\frac{\gamma_1}{\gamma_0}$ is larger. However, in Equation (6), $E[S(\theta^*, \gamma_0, \gamma_1)]$ is also higher. For a specific value of γ_0, therefore, the optimal γ_1^* is one that maximizes the difference and also ensures that the manager at least receives his reservation wage.

Shareholders will set γ_1 either equal to γ_1^r or γ_1^*, after comparing firm value under the two scenarios. Relationship investing is optimal for a specific value of γ_0, if firm value is the highest possible with $\gamma_1 = \gamma_1^r$ and institutional monitoring with managerial cooperation is established. *Q.E.D.*

We next use the results of Proposition 5 to determine the range of γ_0 values for which relationship investing is optimal assuming that γ_1 is set optimally.

Proposition 6: Given monitoring costs c_i, cooperation cost c_m, and institutional holdings α, relationship investing is established when the $\gamma_0 > max\left({\gamma_0}^i, {\gamma_0}^m\right)$. ${\gamma_0}^i$ and ${\gamma_0}^m$ are cut-off values which satisfy the following conditions:

$$V_{Diff}[\gamma_0^i, \gamma_1^*] \;= \frac{c_i}{\alpha} + S_{Diff}[\gamma_0^i, \gamma_1^*] - \frac{5}{3}\gamma_0 I(\gamma_1^* - \gamma_1^r) \quad (institution's\ cut-off) \tag{13}$$

$$V_{Diff}[{\gamma_0}^m, {\gamma_1}^r] = \frac{c_m}{{\gamma_0}^m + {\gamma_1}^r} \quad (manager's\ cut-off) \tag{14}$$

Proof: γ_o^i in Equation (13) is the cut-off level of γ_0 above which the institutional shareholder is willing to monitoring. This threshold level of γ_0 is such that the agency costs when the institution does not monitor are equal to the costs incurred in monitoring minus the savings gained by forcing the manager's net compensation to his reservation wage. $V_{Diff}[\gamma_0^i, \gamma_1^*]$ represents the improvement in the value of the firm when agency costs are eliminated and is given by Equation (7) evaluated at $\gamma_1 = \gamma_1^*$. $S_{Diff}[\gamma_0^i, \gamma_1^*]$ is equivalent to the increase in the manager's compensation if full information is established and is given by Equation (8) at $\gamma_1 = \gamma_1^*$. The last term is the difference in the manager's wage in going from $\gamma_1 = \gamma_1^*$ to $\gamma_1 = \gamma_1^r$, and is generally positive. The increase in firm value and the savings in the manager's compensation increase when γ_0 is higher, hence it is optimal for the institution to monitor for all $\gamma_0 > \gamma_0^i$.

γ_0^m in Equation (14) is the cut-off value above which the manager finds it optimal to cooperate in the monitoring process and is derived from Equation 44 in Appendix H. The cost structure determines which of the two cut-off values, ${\gamma_0}^i$ or ${\gamma_0}^m$, is greater. *Q.E.D.*

Figure 4 illustrates the constraints for the institution and the manager as a function of γ_0. Parameter values used are: $I = 500$, $\alpha = 0.04$, $\bar{W} = 5.0$, $c_i = 0.1$, and $c_m = 0.04$. The point at which these constraints intersect the line depicting $V_{Diff}[\gamma_0, \gamma_1]$ determines ${\gamma_0}^i$ and ${\gamma_0}^m$ respectively.

If γ_0 is greater than $max({\gamma_0}^i, {\gamma_0}^m)$, the agency costs are high and it is optimal for both the institutional shareholder to monitor and for the manager to cooperate. This is the region to the right of the two intersection points in Figure 4. Relationship investing is, therefore, established and γ_1 is set such that $E[S(\theta^f, \gamma_0, \gamma_1^r)] = \bar{W} + c_m$.

When $\gamma_0 \leq max({\gamma_0}^i, {\gamma_0}^m)$, relationship investing is not established. In this range, Equation (6) is used to calculate γ_1 such that the manager receives his reservation wage. For γ_0 values in this region the losses associated with investment distortions by the manager are not large enough to overcome monitoring costs. This can be seen in Figure 4 where relationship investing is not optimal for all $\gamma_0 \leq {\gamma_0}^m$.

5.2 Determining the optimal γ_0^{opt}

A management compensation contract with zero weight on the market value of the firm, i.e. $\gamma_0 = 0$, is the optimal linear contract that involves no agency problems as shown in Corollary 1C. In this section, we assume that the admissible compensation contracts are such that γ_0 is greater than a minimum positive level γ_0^{Min} and derive the optimal contract under this constraint. In choosing the contract, shareholders will incorporate the results of the previous sections and anticipate that relationship investing will be established for certain parameters of the compensation contract.

Proposition 7: Shareholders will choose a compensation contract $\{\gamma_0^{opt}, \gamma_1^{opt}\}$ such that,

- $\gamma_0^{opt} = {\gamma_0}^m \qquad$ *iff* ${\gamma_0}^i < \gamma_0^{Min} < {\gamma_0}^m$
- $\gamma_0^{opt} = \gamma_0^{Min} \qquad$ *otherwise*

where γ_0^{Min} is the minimum possible level of γ_0 and ${\gamma_0}^i$ and ${\gamma_0}^m$ are the institution's and manager's cut-off values as specified in Proposition 6.

Proof: Figure 5 shows the decision rule that shareholders will use to set the optimal compensation contract. Shareholders choose the compensation contract that maximizes the value of the firm. In making the choice, shareholders anticipate that relationship investing is optimal for certain parameters of the compensation contract.

Shareholders first evaluate whether it is optimal for the institutional shareholder to monitor the firm, that is, they check whether the minimum positive level of γ_0 is less than the institution's cut-off value given by Equation (13). If $\gamma_0^i > \gamma_0^{Min}$, monitoring by the institutional shareholder is not optimal, and shareholders set $\gamma_0 = \gamma_0^{Min}$. Relationship investing is not established in this case.

On the other hand, if $\gamma_0^i < \gamma_0^{Min}$, monitoring by the institution is optimal. The next step is to evaluate whether cooperation by the manager is optimal, that is, whether the minimum positive value of γ_0 is less than the manager's cut-off value given by Equation (14). If $\gamma_0^m < \gamma_0^{Min}$, it is optimal for the manager to cooperate even at the minimal level of γ_0. Shareholders set $\gamma_0 = \gamma_0^{Min}$ and relationship investing is established. If $\gamma_0^m > \gamma_0^{Min}$, it is not optimal for the manager to cooperate. Recall that this node in the tree is reached when it is optimal for the institution to cooperate, but it is not optimal for the manager to cooperate. In this case, shareholders will choose a higher level of γ_0 than the minimum allowed and set $\gamma_0 = \gamma_0^m$. At this level of γ_0, it will be optimal for the manager to cooperate and relationship will be established. *Q.E.D.*

Figure 6 plots the value of the institution's α shareholding using parameter values: $I = 500$, $\alpha = 0.04$, $\bar{W} = 5.0$, $c_i = 0.1$,and $c_m = 0.04$. For values of γ_0^{Min} such that $\gamma_0^{Min} < {\gamma_0}^i$ relationship investing is not established and the value of the institution's α shareholding is equal to the no-monitoring value as shown by the solid line in the left panel of the figure. For values of γ_0^{Min} such that $\gamma_0^{Min} > max({\gamma_0}^i, {\gamma_0}^m)$ relationship investing is established and the value of the institution's α

shareholding is equal to the full information value less the monitoring costs as shown by the solid line in the right panel of the figure.

In equilibrium, management compensation contracts $\{ \gamma_0, \gamma_1 \}$ are not optimal when ${\gamma_0}^i < \gamma_0 < {\gamma_0}^m$. Although, the benefits of relationship investing at $\gamma_0 = \gamma_0^{Min}$ are higher than the monitoring costs for the institutional shareholder, they are lower than the cooperation costs for the manager. Shareholders can increase firm value by setting γ_0 at least equal to γ_0^m. The manager is induced to cooperate and relationship investing is established. Therefore, when ${\gamma_0}^i < \gamma_0^{Min} < {\gamma_0}^m$, γ_0^{opt} is set equal to γ_0^m rather than equal to γ_0^{Min}.

5.3 Effect of c_i and c_m

If monitoring and cooperation costs are very high, relationship investing is not feasible. Cooperation costs can be high, for example, if the nature of the firm's cashflows make it difficult to convince shareholders of the true worth of the firm's projects. The institution's monitoring costs can be high if specialized talent has to be hired to analyze the firm's investment prospects.

Proposition 8 : Relationship investing is not feasible if,

$$c_m > \frac{\bar{W}}{39} \tag{15}$$

and,

$$c_i > \frac{1}{6}\left[\frac{\alpha I}{4} - \frac{\alpha \bar{W}}{39}\right] \tag{16}$$

Proof: See Appendix J.

The largest distortions in investment policy occur when the manager is compensated only in terms of the firm's market value, i.e. when $\gamma_1 = 0$. $\gamma_1 = 0$ thus represents the extreme case of the agency problem. Evaluating the institution's decision to monitor and the manager's decision to cooperate in this scenario, give the upper bounds on c_i and c_m for which relationship investing is feasible.

The reservation wage of the manager is relevant because it determines the level of γ_1 for each level of γ_0, as given in Equation (3) and Equation (6). As expected, when the fraction of shares owned by the institution, α, increases, the institution can tolerate higher monitoring costs.

If c_m is lower than the upper bound in Equation (15), it is optimal for the manager to cooperate when $\gamma_0 \geq {\gamma_0}^m$. In Equation (14), ${\gamma_0}^m$ is lower when c_m is lower, and relationship investing is optimal at lower levels of the agency problem.

If c_i is lower than the upper bound in Equation (16), it is optimal for the institutional investor to monitor when $\gamma_0 \geq {\gamma_0}^i$. In Equation (13), ${\gamma_0}^i$ is lower when c_i is lower, and institutional monitoring relationship investing is optimal at lower levels of the agency problem.

The levels of c_i, c_m, and γ_0^{Min} are the critical parameters that determine whether relationship investing is optimal. Relationship investing is established when the level of the agency problem is high and is more likely when the manager's cooperation leads to a larger reduction in the institution's monitoring costs.

5.4 The free-rider problem

Free-riding by non-monitoring atomistic shareholders reduces firm value and the incentives for the large shareholder to monitor. The critical issue is that the price paid for shares by a large shareholder who is known to monitor will reflect the benefits of monitoring. Many of the models of large shareholder monitoring (see Admati, Pfleiderer, and Zechner (1993), Jensen and Meckling (1976), and Shleifer and Vishny (1997)), assume that the large shareholder is endowed with an initial holding of shares and the price paid for these shares is not explicitly modeled. More recently, Holmstrom and Tirole (1993), Kahn and Winton (1998), Maug (1998) use a microstructure setting which allows the large shareholder to be an anonymous trader and accumulate shares at a price that does not fully reflect the benefit of monitoring. Stoughton and Zechner (1998) discuss the case where rationing the amount of shares that atomistic shareholders are allowed to purchase in an IPO setting, allows the large shareholder to accumulate shares at a price lower than their cum-monitoring value. We highlight the issue in the discussion below and show that relationship investing is pareto-optimal and reduces the loss in firm value due to the free-rider problem.

If the initial shares of the firm are purchased in a Walrasian auction, a single equilibrating price will be established for all buyers. Obviously, the institution will not pay more than the cum-monitoring value of the shares net of the monitoring costs. The price of the shares, therefore, will be such that the institution will just break-even ex-ante and monitoring is optimal ex-post. This however creates a free-rider problem. Atomistic shareholders get an excess return as they are able to buy the shares at the cum-monitoring value minus monitoring costs but do not incur any costs.

Let V_{nc} be the value of the firm established in the initial Walrasian auction in the absence of relationship investing. Assuming that the institution breaks even ex-ante,

$$\begin{aligned} V_{nc} &= E[V(\theta^f, \gamma_0, \gamma_1)] - \frac{C_{nc}}{\alpha} \qquad && if \quad \alpha V_{Diff}[\gamma_0, \gamma_1] > C_{nc} \\ &= E[V(\theta^*, \gamma_0, \gamma_1)] && otherwise \end{aligned} \tag{17}$$

Let V_r be the value of the firm established in the initial Walrasian auction under relationship investing. Assuming that the institution breaks even ex-ante,

$$\begin{aligned} V_r &= E[V(\theta^f, \gamma_0, \gamma_1)] - c_m - \frac{c_i}{\alpha} \qquad && if \quad \alpha(V_{Diff}[\gamma_0, \gamma_1] - c_m) > c_i \\ &= E[V(\theta^*, \gamma_0, \gamma_1)] && otherwise \end{aligned} \tag{18}$$

From Equation (11) and Equation (12), $V_r \geq V_{nc}$ since $C_{nc} > c_i + \alpha c_m$. We can also calculate the value gains on the $(1-\alpha)$ shares that are purchased by atomistic shareholders. Under relationship investing the value gain is equal to c_i/α. Under no-cooperation monitoring, the excess return is C_{nc}/α. Since $C_{nc} > c_i + \alpha c_m$, the value gains to the atomistic shareholders are lower under relationship investing than under the no-cooperation regime.[4]

The gains from free-riding are, therefore, lower under relationship investing. Effectively, a part of the monitoring costs are borne by the manager and passed through to all shareholders.

5.5 Investment horizon

In our model, all shareholders know when it is optimal for the institutional investor to monitor. This has important implications for how long the institution has to hold its shares to realize their higher value.

An announcement at $t = 0$ to the effect that the institutional investor is going to monitor is not credible.[5] Further, there is no guarantee that the institution will actually spend the money for monitoring. The institution, therefore, faces an adverse selection problem when it trades. If it were to divest its shares before the information asymmetry is resolved, it will receive the lower no monitoring value. Once the investment is made, however, the manager announces the expected return on the project. The market verifies the information by observing the trading behavior of the institution.[6] After the fair market price is determined, institutional investors are able to trade purely for their own liquidity considerations. Institutions thus have to be willing to hold shares till the investment is made and market prices reflect the private information of the manager.

There is some support for our assumption that the institution's decision to monitor is publicly known. The disclosure requirements for institutional investors in practice suggests that the institution's holdings are known to the rest of the market. SEC rules require institutions to file form 13F and reveal their holdings quarterly. The nature of the information gathering process also is conducive to our argument. Institutions acquire much of their information by buying analysts' reports, which are also available to other shareholders. It is also publicly known when a CEO meets with institutional investors, thereby revealing the institution to be an active monitor. Finally, both institutions and firms hold press conferences to disclose meetings with one another.

5.6 Empirical implications

Our model provides theoretical justification for the substantial resources and time that managers devote to communication with shareholders as detailed in Appendix A. We also show that the structure of the incentives in the manager's compensation contract plays an important role in determining the mechanisms by which agency problems are resolved.

5.6.1 Pay-for-performance, ownership concentration, and firm performance

The model has specific refutable predictions on the effect of the presence of a large shareholder on firm performance. Our results imply that a differential performance based on the presence of a large shareholder should be limited to firms which have compensation structures weighted more towards its current market value.

In our framework, pay-for-performance incentives through equity participation in the manager's compensation contract solve the agency problem in either of two ways depending on whether the participation is primarily through γ_0 or γ_1. From Proposition 6, shareholders will set $\gamma_0 = \gamma_0^{Min}$ when γ_0^{Min} is low and relationship investing is not necessary. Indeed, when $\gamma_0^{Min} = 0$, agency problems are completely resolved through contracting. On the other hand, relationship investing is established and shareholders choose a compensation contract with a high γ_0 when γ_0^{Min} is higher than the cut-off values given by Equation (13) and Equation (14). Putting a larger weight on γ_0 is distortionary, but it induces the manager to cooperate in the monitoring process. Therefore, there is a positive correlation between the importance of shareholder monitoring and the market value weight in the manager's compensation.

The relative importance of market value in determining the manager's compensation can be proxied by measures of the bonus component that depends on the stock price or current earnings. The importance of the firm's long-term value in determining the manager's compensation can be proxied by the restricted equity and stock options awarded to the manager, (i.e. the component of the manager's compensation that depends on the firm's value over a longer horizon). Our model predicts that the firm's performance would not be affected by the presence of a large investor when the compensation is weighted more towards the long term value of the firm. Further, firms that has compensation contracts weighted more towards their current market value should have a higher performance only when they have large shareholders who can act as relationship investors.

5.6.2 Cost of managerial cooperation and the viability of relationship investing

Proposition 3 and Proposition 8 characterize the environment wherein relationship investing would evolve as a function of manager's cooperation costs, c_m. Using proxies for c_m and proxies for the presence and intensity of relationship investing as described in Appendix A, these propositions are directly testable.

In our model, the manager's cooperation makes it easier for the institutional shareholder to access verifiable information. Firms in high-tech industries such as computer firms and biotechnology firms are inherently less likely to be able to produce verifiable information about future projects. Further, managers may be reluctant to share information with shareholders for strategic reasons and to prevent it from being appropriated by their competitors. For such firms the mechanism of relationship investing breaks down and there should be less incidence of relationship investing.

On the other hand, managers face a lower cost of cooperation in industries where it is easy to produce verifiable information, for example in the transportation and retail industries. Firms in such industries could find it optimal to establish relationship investing. For these firms, we should find more evidence of contacts between managers and shareholders, the presence of investor relations departments, and a higher analyst following, all of which proxy for the existence and intensity of relationship investing as discussed in Appendix A.

The magnitude of the agency problems which are present in start-up companies and the obvious pressure the manager faces to establish a high perceived market value for a new venture, give rise to conditions in the venture capital industry where our model would predict the optimality of relationship investing. The relationship between managers and venture capitalists, wherein the manager provides a high degree of information and actively cooperates in the intense monitoring of the firm, is thus consistent with the results of our model.

5.7 Summary and Conclusions

In this paper, we have developed a theoretical model of relationship investing. We have characterized conditions under which it is optimal for management to cooperate with large institutional shareholders in the monitoring process. The bilateral nature of the monitoring process is the central feature of what *we define as relationship investing.*

Our model extends the theoretical research on large shareholder monitoring by incorporating the role managers play in resolving agency problems. The manager's cooperation makes it easy for the institution to access verifiable information and reduces its monitoring costs. Some of the reduction in monitoring costs come about because they are now shared with other atomistic investors. Relationship investing, therefore, serves to reduce the free-riding problem associated with monitoring since it transfers some of the costs to non-monitoring shareholders.

The setting of our model is that of a privately informed manager choosing between a short-term project that has a faster resolution of uncertainty and a long-term project that has a delayed resolution of uncertainty. The differential resolution of information leads to valuation differences and explains two kinds of investment distortions. The first distortion is an overinvestment in the short-term project, or myopia, which is caused by the manager seeking to take early advantage of a good short-term project even if the long-term project is better. The second distortion is overinvestment in the long-term project, or hyperopia, which is caused by the manager hiding behind the shareholders' lack of knowledge of the true quality of the long-term project and using it to avoid revealing that he has only bad projects.

We show that when the proportion of the manager's compensation that depends on market value compared to the proportion that depends on the firm's true long-term value is larger, the deviations from full information investment policy are greater and firm value is lower. The institution's decision to monitor and the manager's decision to cooperate, therefore, depend on the terms of the management compensation contract. Shareholders evaluate firm value for various contract specifications and choose one that maximizes the value of the firm. An important result is that shareholders may choose to increase the fraction of the manager's compensation that depends on market value, even though it implies larger investment distortions in a no-monitoring regime. Such a contract increases the cost to the manager if he does not cooperate, thereby inducing him to establish relationship investing. An interesting implication is that managerial contracts in which the dependence on the firm's market value is at intermediate levels are not feasible in equilibrium.

Even though we derive results specifically for an agency problem that arises because the manager has incentives to focus on the firm's perceived market value, rather than its true long-term value, through his compensation contract, relationship investing is relevant in all situations where shareholder monitoring is optimal. The terms of the manager's compensation however conveniently parameterizes the level of the agency problem and the optimal linear compensation contract is easily specified. We show that it is optimal for the institutional shareholders and the manager to establish relationship investing when the minimum weight on the firm's market value is relatively high, i.e. when the level of the agency problem is high.

Another important implication of our model is that institutional shareholders are good candidates to establish relationship investing. We show that only shareholders who have a long-term investment horizon can play the role of a relationship investor. The monitoring shareholder also has to have sufficiently large holdings in the firm. Institutions satisfy both the necessary conditions.

Relationship investing has many benefits. First, it is pareto-optimal and increases the value of the firm. Second, managers will not ignore long-term value maximizing projects. It is, therefore, a plausible solution to the bias towards short-term investments discussed by Stein (1988, 1989) and Narayanan (1985). Finally, the level of the free-rider problem associated with large shareholding monitoring is reduced.

Appendix A:[7]

CEOs and senior firm management routinely interact with institutional shareholders and analysts. Analysts gather information about the firm's investment policy, capital budget, capital allocation, and financial performance. They summarize their findings as reports for institutional investors who are their major clients. As one corporate investor relations director commented, "Analysts are very aggressive in seeking information and we find out the impact of our meetings in the report they issue for their institutional clients." Large institutional shareholders also initiate direct contacts with top management to seek explanations for the firm's performance and discuss their goals for the future.

Managers view this process as a way to get their message across to investors. The expectations of analysts and the reports they issue have a direct impact on the stock price and managers try to ensure that analysts do not base their reports on the wrong information. While managers value the feedback they receive from these conferences and meetings, they do not see this process as interfering with their ability to run the firm. Analysts believe that managers see them as valuable allies in transmitting information to the market and that their actions serve to reduce price volatility.

An advantage of communicating to shareholders through analysts is that firms can ensure they are in compliance with SEC rules governing the disclosure of information. By arranging public meetings, they avoid the perception of disclosing insider information to a subset of shareholders.

Meetings between large shareholders, analysts, and firm management take the following forms:

- One-on-one meetings: When there are unexpected events and during periods of poor performance, large shareholders of the firm meet directly with top management. Essentially, investors seek to distinguish between poor performance caused by events over which the manager has little control from those that are due to poor management. However, such actions make the manager focus on the firm's stock price and the market's perception of firm value.
- Industry Conferences: Securities firms regularly arrange conferences focusing on specific industries, bringing together CEOs and senior management of firms in the industry with analysts who follow the industry. For example, the Merrill Lynch Annual Chemical Conference held in March 1998 was titled, "Chemicals: Major, Specialty, Fertilizer, Packaging." Presen-

tations were scheduled from 53 CEOs and senior management of companies in these areas. Burkenroad Reports of Tulane University's A. B. Freeman School of Business held their annual "Bargains on the Bayou" conference in March 1998 and had presentations from 27 CEOs and senior management of small companies with headquarters in Louisiana, Mississippi, and Texas. In the Wall Street Journal dated September 16, 1996, Donaldson, Lufkin and Jenrette advertised a gathering of 216 CEOs of emerging growth industries who made presentations to institutional investment professionals. Such conferences usually focus on the companies' operations and future plans and is followed by an active question and answer session.

- Conferences arranged by firms: Firms hold special conferences to focus analysts' attention on a special business segment of the firm. For example, Dupont's Life Sciences Conference in August 1997, focused on the role of their Life Sciences businesses. The conference presentations, by the CEO and senior management, included a description of the firm's pipeline of products and R&D efforts.

- Financial reports and conference calls: It is a routine practice for firms to arrange a conference to discuss their latest quarterly financial statements. We also found that companies in the same industry tend to have these meetings within a short period of one another. For example, Burlington Northern Santa Fe, Canadian National, CSX, Norfolk Southern, and Union Pacific, all held their meetings in January, 1998, in New York, to discuss their financial results for 1997. Investors can also listen in at these meetings via a conference call if they are unable to attend the meetings. The emphasis during these meetings is on the financial results; however the firms capital expenditure projections and plans also receive scrutiny.

- Investor relations: Many firms run active investor relations departments. Directors of investor relations report that it is routine for investors to contact them for information and that they mostly react to queries and requests rather than initiate contacts with shareholders on their own. For example, an investor would be placed on a mailing list only if they ask to be included. Investor relations department also track their firm's ownership structure and know their major shareholders.

Appendix B: Proof of Proposition 1

With no information asymmetry, the market value of the firm is equal to its true value, i.e. $V(\theta^f, \gamma_0, \gamma_1) = \Upsilon(\theta^f, \gamma_0, \gamma_1)$. The manager's compensation given in Equation (1) is maximized when $\Upsilon(\theta, \gamma_0, \gamma_1)$ is maximized.

The return on the long-term project is p and that on the short-term project is q. The value of the firm conditional on the manager investing in the short-term project, $\Upsilon(\theta|s,q) = (1+q)I$. The value of the firm conditional on the manager investing in the long-term project, $\Upsilon(\theta|l,p) = (1+p)I$. The value maximizing investment policy is, therefore, to invest in the long-term project if $p > q$ and invest in the short-term project if $p < q$. *Q.E.D.*

Appendix C: Proof of Corollary 1A

The unconditional expected value of the firm at $t = 0$ when the manager invests I according to investment policy θ^f is,

$$\begin{aligned} E[V(\theta^f, \gamma_0, \gamma_1)] &= (1 \ + \ E[Return(\theta^f, \gamma_0, \gamma_1)]) \ I \\ &= (1 \ + \ \{E[Return \mid p < q] \ + \ E[Return \mid p > q]\})I \\ &= (1 \ + \ \{\int_0^1 \int_p^1 q \ dq \ dp \ + \ \int_0^1 \int_0^p p \ dq \ dp \ \}) \ I \\ &= (1 \ + \ \frac{2}{3}) \ I \quad Q.E.D. \end{aligned} \tag{19}$$

Appendix D: Proof of Corollary 1B

Under full information, the market value of the firm and its true value are identical. Equation (1), gives the manager's compensation for a particular p or q. Integrating over all possible values of p and q for investment policy θ^f, the manager's expected compensation is,

$$E[S(\theta^f, \gamma_0, \gamma_1)] = (\gamma_0 + \gamma_1) \left(1 \ + \ \left\{\int_0^1 \int_p^1 q \ dq \ dp \ + \ \int_0^1 \int_0^p p \ dq \ dp \ \right\}\right) \ I \tag{20}$$

Therefore,

$$E[S(\theta^f, \gamma_0, \gamma_1)] = (\gamma_0 + \gamma_1)(1 + \frac{2}{3})I \qquad Q.E.D. \tag{21}$$

Appendix E: Proof of Proposition 2

The strategy that the manager follows in choosing between the projects hinges on the perceived market value of the firm when the long-term project, $E[V(\theta|l)]$, is chosen. In equilibrium, the investment policy and shareholders' valuation has to be mutually consistent.

Let firm value at $t = 2$ if the manager chooses the long-term project be $E[V(\theta^* \mid l)] = (1 + p^*)I$, where p^* denotes the expected return on the long-term project conditional on the manager selecting the long-term project. The manager's compensation if he chooses the long-term project, is,

$$S(\theta^* \mid l) = \gamma_0(1 + p^*)I \ + \ \gamma_1(1 + p)I \tag{22}$$

If the manager invests in the short-term project, conditional firm value at $t = 2$ is $V(\theta^* \mid s) = (1 + q)I$. The manager's compensation is then,

$$S(\theta^* \mid s) = \gamma_0(1 + q)I \ + \ \gamma_1(1 + q)I \tag{23}$$

If $S(\theta^* \mid s) > S(\theta^* \mid l)$, the manager will choose the short-term project, otherwise he will choose the long-term project. Comparing Equation (22) and Equation (23) the manager will choose the short-term project when,

$$q \ > \ \frac{\gamma_0}{(\gamma_0 \ + \ \gamma_1)}p^* \ + \ \frac{\gamma_1}{(\gamma_0 + \gamma_1)} \ p \tag{24}$$

Define $F(p^*, p)$ as,

$$F(p^*, p) = \frac{\gamma_0}{(\gamma_0 \ + \ \gamma_1)}p^* \ + \ \frac{\gamma_1}{(\gamma_0 + \gamma_1)} \ p \tag{25}$$

The manager will invest in the short-term project when $q \ > \ F(p^*, p)$ and in the long term project when $q \ < \ F(p^*, p)$.

Consider the case when $p = 0$. Then, $0 < F(p^*, 0) = \frac{\gamma_0}{(\gamma_0 \ + \ \gamma_1)}p^* < p^*$. For some $q_1, 0 < q_1 < p^*$,

$$q_1 = \frac{\gamma_0}{(\gamma_0 \ + \ \gamma_1)}p^* \tag{26}$$

When $q < q_1$, Equation (24) is not satisfied for all $p \in [0, 1]$, and the manager invests in the long-term project. Similarly, consider the case when $p = 1$. Then, $p^* < F(p^*, p) = p^* + \frac{\gamma_1}{(\gamma_0 \ + \ \gamma_1)}(1 - p^*) < 1$. For some $q_2, p^* < q_2 < 1$,

$$q_2 = \frac{\gamma_0}{(\gamma_0 \ + \ \gamma_1)}p^* \ + \ \frac{\gamma_1}{(\gamma_0 \ + \ \gamma_1)} \tag{27}$$

When $q > q_2$, Equation (24) is always satisfied for all $p \in [0, 1]$, and the manager invests in the short-term project.

$E[V(\theta^*|l)]$ is calculated as,

$$E[V(\theta^* \mid l)] = \left\{1 + \left(\frac{E[Return \mid l]}{Prob[Long - term\ project\ is\ chosen]}\right)\right\}\ I \tag{28}$$

From Equation (25) and Equation (26), the long-term project is chosen for (p, q) pairs such that $0 < q < (\frac{\gamma_0}{\gamma_0+\gamma_1}\ p^*)$ when $0 < p < 1$ and for (p, q) pairs such that $(\frac{\gamma_0}{\gamma_0+\gamma_1}\ p^*) < q < (\frac{\gamma_0}{\gamma_0+\gamma_1}\ p^* + \frac{\gamma_1}{\gamma_0+\gamma_1})$ when $(\frac{(\gamma_0+\gamma_1)}{\gamma_1}\ q - \frac{\gamma_0}{\gamma_1}p^*) < p < 1$.

$$E[Return \mid l] = \int_0^{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}} \int_0^1 p\ dp\ dq\ +\ \int_{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}}^{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}+\frac{\gamma_1}{\gamma_0+\gamma_1}} \int_{\frac{(\gamma_0+\gamma_1)q}{\gamma_1}-\frac{\gamma_0 p^*}{\gamma_1}}^{1}\ p\ dp\ dq \tag{29}$$

Therefore,

$$E[Return \mid l]\ =\ \frac{1}{6}\ \frac{[3\gamma_0 p^* + 2\gamma_1]}{\gamma_0+\gamma_1} \tag{30}$$

Similarly,

$$\begin{aligned} Prob[Long - term\ project\ is\ chosen]\ &=\ \int_0^{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}} \int_0^1 dp\ dq\ + \\ &\int_{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}}^{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}+\frac{\gamma_1}{\gamma_0+\gamma_1}} \int_{\frac{(\gamma_0+\gamma_1)q}{\gamma_1}+\frac{(\gamma_0+\gamma_1)p^*}{\gamma_1}}^{1}\ dp\ dq \end{aligned} \tag{31}$$

Simplifying,

$$Prob[Long - term\ project\ is\ chosen] = \frac{1}{2}\frac{[2\gamma_0 p^* + \gamma_1]}{\gamma_0+\gamma_1} \tag{32}$$

Substituting these values in Equation (28),

$$E[V(\theta^* \mid l)] = \left\{1 + \frac{1}{3}\ \left(\ \frac{3p^* + 2\frac{\gamma_1}{\gamma_0}}{2p^* + \frac{\gamma_1}{\gamma_0}}\ \right)\right\} I \quad ; \quad \gamma_0 > 0 \tag{33}$$

For equilibrium, $E[V(\theta^* \mid l)] = (1 + p^*)I$, that is,

$$\frac{1}{3}\ \left[\ \frac{3\gamma_0 p^* + 2\gamma_1}{2\gamma_0 p^* + \gamma_1}\ \right] = p^* \tag{34}$$

Solving for p^*,

$$p^* = \frac{1}{4}\left[1 - \left(\frac{\gamma_1}{\gamma_0}\right)\ +\ \sqrt{1 + \left(\frac{\gamma_1}{\gamma_0}\right)^2 + \frac{10}{3}\ \left(\frac{\gamma_1}{\gamma_0}\right)}\right] \quad ; \quad \gamma_0 > 0 \tag{35}$$

QED.

Appendix F: Proof of Corollary 2A

From Equation (25) and Equation (26), the short-term project is chosen for (p, q) pairs such that $(\frac{\gamma_0}{\gamma_0+\gamma_1}\ p^* + \frac{\gamma_1}{\gamma_0+\gamma_1}) < q < 1$ when $0 < p < 1$ and for (p, q) pairs such that $(\frac{\gamma_0}{\gamma_0+\gamma_1}\ p^*) < q < (\frac{\gamma_0}{\gamma_0+\gamma_1}\ p^* + \frac{\gamma_1}{\gamma_0+\gamma_1})$ when $0 < p < (\frac{\gamma_0+\gamma_1}{\gamma_1}\ q - \frac{\gamma_0}{\gamma_1} p^*)$. Therefore,

$$E[Return \mid s] = \int_{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}+\frac{\gamma_1}{\gamma_0+\gamma_1}}^{1} \int_0^1 q\ dp\ dq\ + \int_{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}}^{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}+\frac{\gamma_1}{\gamma_0+\gamma_1}} \int_0^{\frac{(\gamma_0+\gamma_1)q}{\gamma_1}-\frac{\gamma_0 p^*}{\gamma_1}} q\ dp\ dq \tag{36}$$

Simplifying,

$$E[Return \mid s]\ =\ \frac{1}{6}\ \frac{\left(3\ (\gamma_0+\gamma_1)^2 - {\gamma_1}^2 - 3\ {\gamma_0}^2\ {p^*}^2 - 3\gamma_0\gamma_1 p^*\right)}{(\gamma_0+\gamma_1)^2} \tag{37}$$

Similarly,

$$Prob[Short-term\ project\ is\ chosen]\ =\ \int_{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}+\frac{\gamma_1}{\gamma_0+\gamma_1}}^{1} \int_0^1 dp\ dq\ + \int_{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}}^{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}+\frac{\gamma_1}{\gamma_0+\gamma_1}} \int_0^{\frac{(\gamma_0+\gamma_1)q}{\gamma_1}-\frac{\gamma_0 p^*}{\gamma_1}} dp\ dq \tag{38}$$

Simplifying

$$Prob[Short-term\ project\ is\ chosen] = \frac{1}{2}\frac{[2\gamma_0+\gamma_1-2\gamma_0 p^*]}{2(\gamma_0+\gamma_1)} \tag{39}$$

therefore,

$$E[V(\theta^* \mid s)] = \left\{1+\frac{1}{3}\left(\frac{3-3p^*+(6-3p^*)\frac{\gamma_1}{\gamma_0}+2(\frac{\gamma_1}{\gamma_0})^2}{6-6p^*+(9-6p^*)\frac{\gamma_1}{\gamma_0}+3(\frac{\gamma_1}{\gamma_0})^2}\right)\right\} I \quad ; \quad \gamma_0 > 0 \tag{40}$$

From Equation (33), Equation (35), and Equation (40) the unconditional expected value of the firm is,

$$E[V(\theta^*, \gamma_0, \gamma_1)] = \left[\frac{75+77\left(\frac{\gamma_1}{\gamma_0}\right)+\sqrt{3\left\{3+10\left(\frac{\gamma_1}{\gamma_0}\right)+3\left(\frac{\gamma_1}{\gamma_0}\right)^2\right\}}}{1+\left(\frac{\gamma_1}{\gamma_0}\right)}\right]\frac{I}{48} \quad ; \gamma_0 > 0 \tag{41}$$

Equation (25) and Equation (35), give $F(p^*, p)$ and p^* that completely characterizes the manager's optimal investment policy. Equation (33), Equation (40), and Equation (41) give the conditional and unconditional firm values. *Q.E.D.*

Appendix G: Proof of Corollary 2B

Equation (1) gives the manager's compensation for a particular p and q. Integrating over all possible values of p and q, we calculate the manager's expected compensation for investment policy θ^* as,

$$\begin{aligned}
E[S(\theta^*,\gamma_0,\gamma_1)] \;=\;& \int_0^{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}}\int_0^1 \gamma_0(1+p^*)Idpdq + \int_{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}}^{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}+\frac{\gamma_1}{\gamma_0+\gamma_1}}\int_{\frac{(\gamma_0+\gamma_1)q}{\gamma_1}-\frac{\gamma_0 p^*}{\gamma_1}}^1 \gamma_0(1+p^*)Idpdq + \\
& \int_0^{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}}\int_0^1 \gamma_1(1+p)Idpdq + \int_{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}}^{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}+\frac{\gamma_1}{\gamma_0+\gamma_1}}\int_{\frac{(\gamma_0+\gamma_1)q}{\gamma_1}-\frac{\gamma_0 p^*}{\gamma_1}}^1 \gamma_1(1+p)Idpdq + \qquad (42)\\
& \int_{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}+\frac{\gamma_1}{\gamma_0+\gamma_1}}^1\int_0^1 \gamma_0(1+q)Idpdq + \int_{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}}^{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}+\frac{\gamma_1}{\gamma_0+\gamma_1}}\int_0^{\frac{(\gamma_0+\gamma_1)q}{\gamma_1}-\frac{\gamma_0 p^*}{\gamma_1}} \gamma_0(1+q)Idpdq + \\
& \int_{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}+\frac{\gamma_1}{\gamma_0+\gamma_1}}^1\int_0^1 \gamma_1(1+q)Idpdq + \int_{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}}^{\frac{\gamma_0 p^*}{\gamma_0+\gamma_1}+\frac{\gamma_1}{\gamma_0+\gamma_1}}\int_0^{\frac{(\gamma_0+\gamma_1)q}{\gamma_1}-\frac{\gamma_0 p^*}{\gamma_1}} \gamma_1(1+q)Idpdq
\end{aligned}$$

Simplifying,

$$E[S(\theta^*,\gamma_0,\gamma_1)] = \left[75 + 77\left(\frac{\gamma_1}{\gamma_0}\right) + \sqrt{3\left\{3 + 10\left(\frac{\gamma_1}{\gamma_0}\right) + 3\left(\frac{\gamma_1}{\gamma_0}\right)^2\right\}}\,\right]\frac{\gamma_0 I}{48} \quad ;\ \gamma_0 > 0 \qquad (43)$$

QED.

Appendix H: Proof of Proposition 3

The manager will choose to cooperate in monitoring if $E[S(\theta^f,\gamma_0,\gamma_1)] - E[S(\theta^*,\gamma_0,\gamma_1)] > c_m$. Equation (21) and Equation (43) give the manager's expected compensation under full information and under asymmetric information respectively. Substituting and simplifying,

$$\frac{\gamma_0}{\gamma_0+\gamma_1} > \frac{48c_m \;/\; (\gamma_0+\gamma_1)\,I}{5 + 3\left(\frac{\gamma_1}{\gamma_0}\right) - \sqrt{3\left\{3 + 10\left(\frac{\gamma_1}{\gamma_0}\right) + 3\left(\frac{\gamma_1}{\gamma_0}\right)^2\right\}}} \quad ;\ \gamma_0 > 0 \qquad (44)$$

Expressing the condition in terms of $V_{Diff}[\gamma_0,\gamma_1]$ given by Equation (7),

$$V_{Diff}[\gamma_0,\gamma_1] > \frac{c_m}{\gamma_0+\gamma_1} \quad ;\gamma_0 > 0 \qquad (45)$$

In equilibrium, the manager receives his reservation wage as shown in Corollary 2B. Therefore, he has to receive additional compensation to reimburse him for the cooperation costs he incurs. Since the manager's cooperation restores the full information investment policy, shareholders will set his compensation contract $\{\gamma_0,\gamma_1\}$ such that $E[S(\theta^f,\gamma_0,\gamma_1)] - c_m = \bar{W}$. *QED.*

Appendix I: Proof of Proposition 4

The institution will monitor if,

$$\alpha\left[\left\{E[V(\theta^f,\gamma_0,\gamma_1)]-E[S(\theta^f,\gamma_0,\gamma_1)]\right\}-\{E[V(\theta^*,\gamma_0,\gamma_1)]-E[S(\theta^*,\gamma_0,\gamma_1)]\}\right]>c_i \tag{46}$$

From Equation (2) and Equation (5), the institution will, therefore, monitor when,

$$\alpha\left(\frac{2}{3}\,I\frac{3(1+p^*-p^{*2})+8(\frac{\gamma_1}{\gamma_0})+4(\frac{\gamma_1}{\gamma_0})^2}{6\ (1+\frac{\gamma_1}{\gamma_0})^2}\ I-\left\{E[S(\theta^f,\gamma_0,\gamma_1)]-E[S(\theta^*,\gamma_0,\gamma_1)]\right\}\right)>c_i \tag{47}$$

Substituting for p^* and simplifying,

$$\frac{\gamma_0}{\gamma_0+\gamma_1}>\frac{48(c_i+\alpha S_{Diff}[\gamma_0,\gamma_1])\ /\ \alpha I}{5+3\left(\frac{\gamma_1}{\gamma_0}\right)-\sqrt{3\left\{3+10\left(\frac{\gamma_1}{\gamma_0}\right)+3\left(\frac{\gamma_1}{\gamma_0}\right)^2\right\}}}\qquad;\ \gamma_0>0 \tag{48}$$

Expressing the condition in terms of $V_{Diff}[\gamma_0,\gamma_1]$ given by Equation (7),

$$V_{Diff}[\gamma_0,\gamma_1]>\frac{c_i}{\alpha}+S_{Diff}[\gamma_0,\gamma_1]\quad;\ \gamma_0>0 \tag{49}$$

QED.

Appendix J: Proof of Proposition 8

The largest distortions occur when $\gamma_1=0$. From Equation (25), $F(p^*,p)=p^*$ when $\gamma_1=0$. Solving for p^* in equilibrium, $p^*=\frac{1}{2}$. Substituting for γ_1 and p^* and setting $E[S(\theta^*,\gamma_0,\gamma_1)]=\bar{W}$ in Equation (43),

$$\gamma_0\geq\frac{8}{13}\frac{\bar{W}}{I} \tag{50}$$

Substituting for γ_1 and p^* in Equation (9), the manager will cooperate in the monitoring process when, $c_m\leq\frac{\bar{W}}{39}$

Substituting for γ_1 and p^*, in Equation (10), the institution will monitor when,

$$c_i\leq\frac{1}{6}\left[\frac{\alpha I}{4}-\alpha c_m\right]p \tag{51}$$

Since institutional monitoring is not possible without the manager's cooperation, we can also set the bounds for c_m as a required constraint. Therefore, for it to be feasible for the institution to monitor,

$$c_i<\frac{1}{6}\left[\frac{\alpha I}{4}-\frac{\alpha\bar{W}}{39}\right]\qquad Q.E.D. \tag{52}$$

Footnotes

1. Froot, Perold, and Stein (1992), Hirshleifer and Chordia (1992), Narayanan (1985), Porter (1992), Shleifer and Vishny (1990), and Stein (1988, 1989), also show that the decisions of a privately informed manager can be myopic in order to take advantage of the early resolution of information.

2. α, the fractional holding by the institution, is determined by its equilibrium portfolio allocation. Risk sharing considerations dictate that the institution will not hold all the shares of the firm. See Admati, Pfleiderer and Zechner (1994) for a discussion of the effect of institutional monitoring on its portfolio allocation.

3. With the recent relaxation in the SEC rules governing exchange of information among institutional shareholders, various institutional shareholders can share in monitoring costs. The threshold α for institutional investors to enter into a relationship with managers is then lower than if one institution has to bear all the costs. It is plausible to consider the largest of the institutional shareholders as one block for monitoring purposes. Institutions do not seek to take over the firm and control issues are, therefore, not relevant.

4. The free-riding benefits to atomistic shareholders is still positive under relationship investing. It is, therefore, appropriate to question why investors invest money through institutions. We believe institutions provide other benefits such as diversification which justifies pooling of resources by individual investors.

5. Admati, Pfleiderer, and Zechner (1994) show that institutions will monitor and be better off if they can credibly commit to a level of monitoring independent of their shareholdings. However, they argue it is unlikely that institutions can credibly commit to spending resources to monitor after they have divested their shares. Our proposition is in keeping with their skepticism.

6. The role of the institution makes it an informed trader but their actions do not constitute insider trading. As discussed in Appendix A, managers hold routine planned public meetings with analysts and shareholders and ensure that they follow SEC guidelines for the disclosure of information. Managers make a public announcement of their private information and shareholder monitoring serves as verification of the information.

7. This appendix is based on conversations we had with senior management of firms, analysts, and institutional investment professionals. We would like to thank Bear Stearns, Donaldson Lufkin and Jenrette, Merrill Lynch, Southwest Capital, Dupont, Burlington Northern Santa Fe, Gulf Island Fabrication, Halter Marine, CalPERS, and TIAA-CREF, for the information they provided and for many useful discussions.

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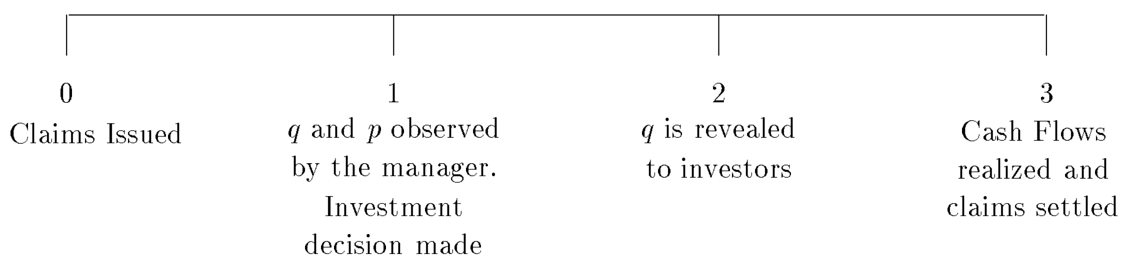
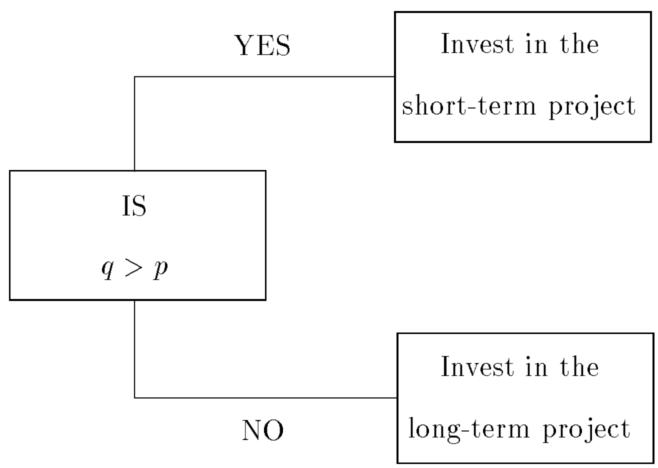
Figure 1 : The Time Line and Project Parameters



- $\tilde{p}$ is the random return on the long-term project
- $\tilde{q}$ is the random return on the short-term project
- $\tilde{p}$ and $\tilde{q}$ are independently and identically distributed uniformly on [0,1]
- q that the manager observes becomes public at $t = 2$

Figure 2 : Investment Decision Under Full Information

This figure illustrates the investment decision under full information when p and q are known to all shareholders. The manager will invest in the long-term project when $q < p$ and in the long-term project when $q > p$. The shaded area in the figure represents values of p and q for which the manager invests in the long-term project.



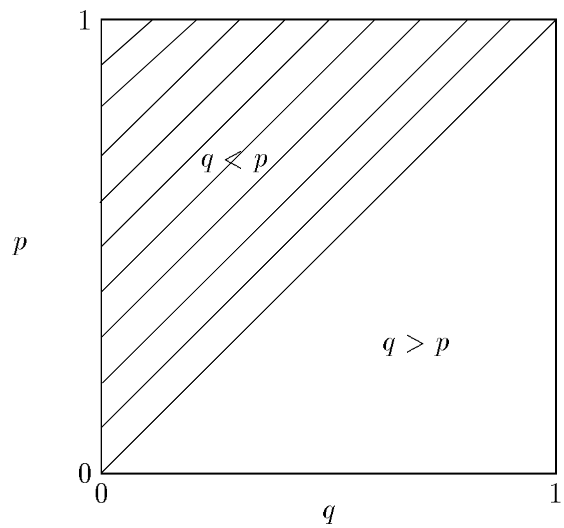
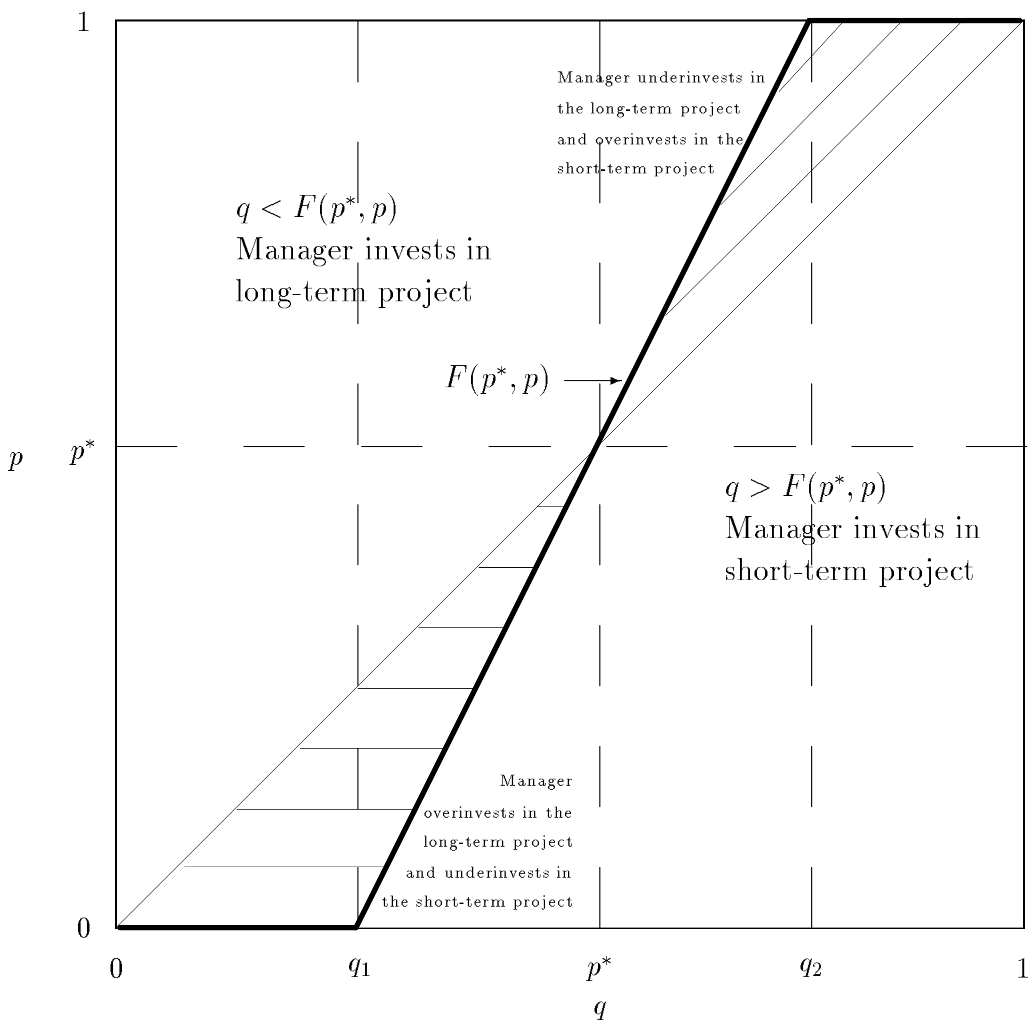


Figure 3 : Investment Decision Under Asymmetric Information

This figure illustrates the investment decision by a manager, who is privately informed about project parameters p and q, as per the equilibrium investment policy θ^*. The equilibrium expected market value of the firm conditional on the manager choosing the long-term project $E[V(\theta^* \mid l)] = (1+p^*)I$, where p^* is given by Equation (35). The manager invests in the long-term project when $q < F(p^*, p)$ and in the short-term project when $q > F(p^*, p)$, where $F(p^*, p)$ is given by Equation (4). For all values of p, the manager invests in the long-term project when $q < q_1$ and in the short-term project when $q > q_2$. The shaded areas represent values of p and q for which the manager invests suboptimally. When $\gamma_0 = 0.0045$, $\gamma_1 = 0.0015$, and $I = 500$, then $q_1 = .405$, $q_2 = .655$, $p^* = 0.54$ and $E[V(\theta^*, \gamma_0, \gamma_1)] = 821.4$.



q = probability of high return on the short-term project
p = probability of a high return on the long-term project

Figure 4 : The Viability of Relationship Investing

This figure illustrates the conditions under which the institution and the manager will establish relationship investing as a function of γ_0^{Min}, the minimum positive fractional weight on the firm's market value in the manager's compensation contract. $\gamma_0^{Min} > 0$ parameterizes the agency problem in our model. V_{Diff} is the improvement in firm value from implementing investment policy θ^f instead of θ^* and is given by Equation (7). ${\gamma_0}^i$ is the cut-off level above which the institution finds it optimal to monitor the manager, with his cooperation, and is given by Equation (13). ${\gamma_0}^m$ is the cut-off level above which the manager will find it optimal to cooperate and is given by Equation (14). Parameter values used are: $I = 500$, $\alpha = 0.04$, $\bar{W} = 5$, $c_i = 0.1$,and $c_m = 0.04$.

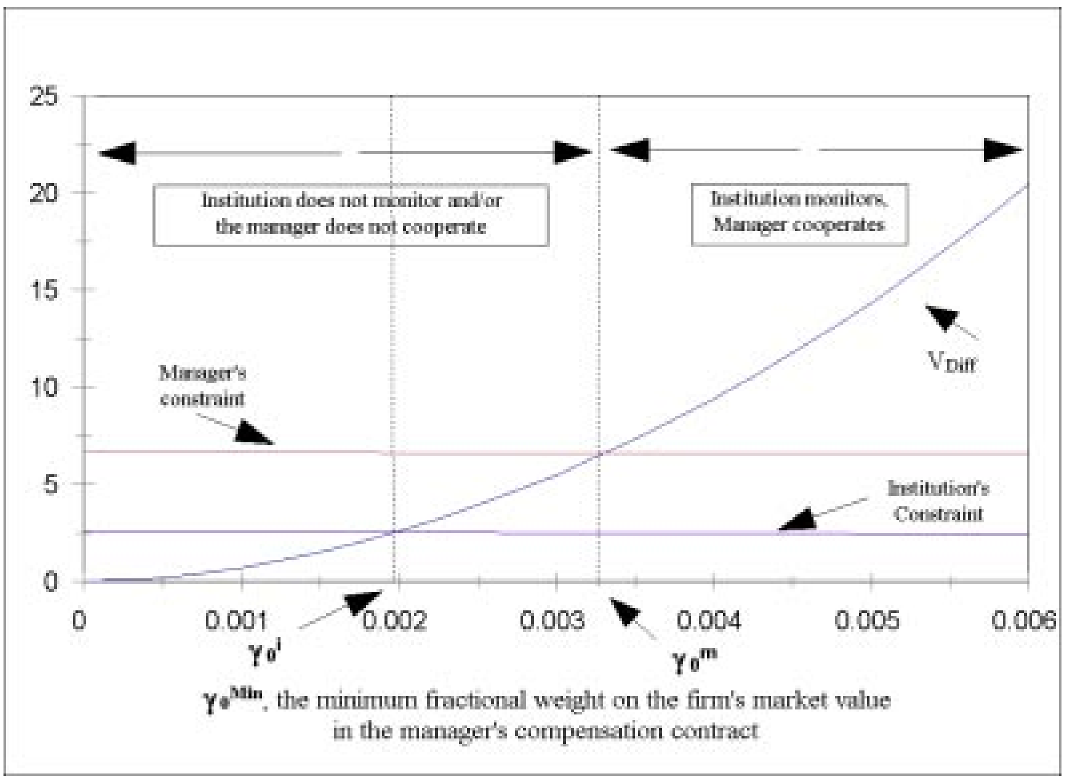


Figure 5 : Setting γ_0^{opt}, the optimal level of γ_0

This figure illustrates the decision rule that shareholders will follow for choosing the optimal level of γ_0 in the managerial compensation contract, i.e. setting γ_0^{opt}, subject to the constraint that $\gamma_0 > \gamma_0^{Min}$. γ_0^i is the cut-off level of γ_0 above which the institution is willing to monitor the manager, with his cooperation, and is given by Equation (13). γ_0^m is the cut-off level of γ_0 above which the manager is willing to cooperate and is given by Equation (14). $\gamma_0^{Min} > 0$ is the minimum admissible value of γ_0 and represents the level of agency problems in our framework. γ_1^{opt} corresponding to the optimal level γ_0^{opt} is set according to Proposition 5.

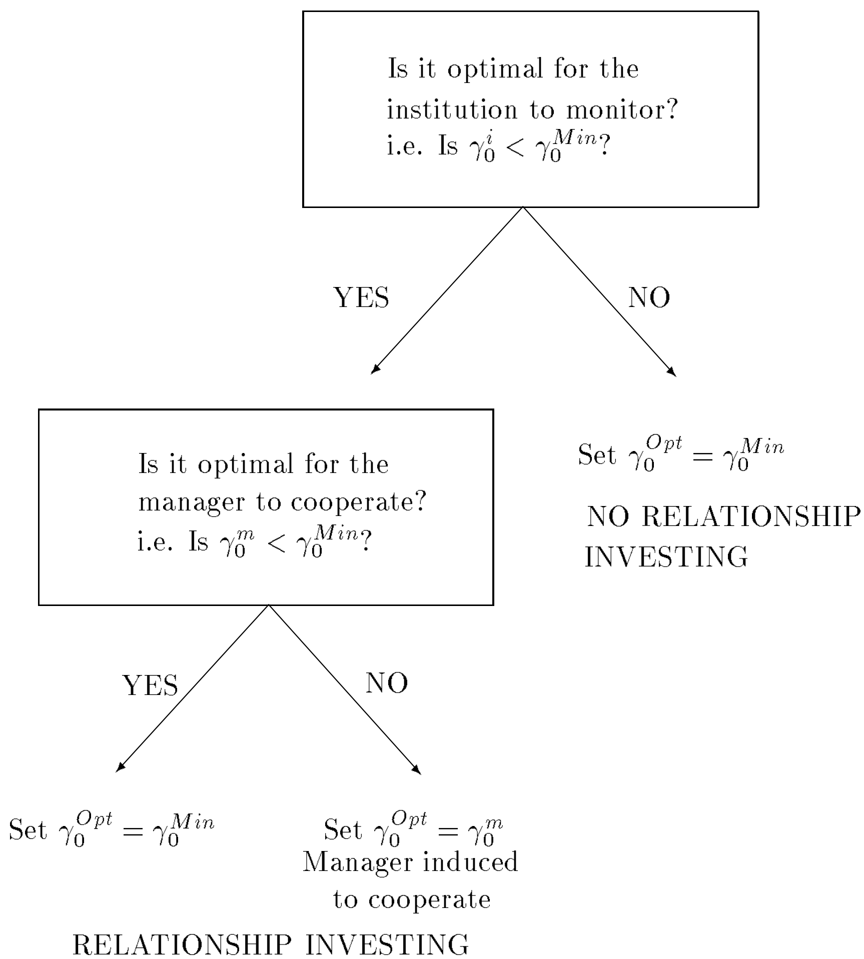


Figure 6 : Value of Institution's Shareholding

This figure illustrates the value of the institution's α shareholding. The solid line shows α fraction of firm value given in Equation (5) as a function of γ_0^{Min}, the minimum positive fractional weight on the firm's market value in the manager's compensation contract. $\gamma_0^{Min} > 0$ parameterizes the agency problem in our model. ${\gamma_0}^i$ is the cut-off level above which the institution is willing to monitor the manager, with his cooperation, and is given by Equation (13). ${\gamma_0}^m$ is the cut-off level of γ_0 above which the manager will find it optimal to cooperate and is given by Equation (14). For compensation contracts $\{\gamma_0, \gamma_1\}$ where ${\gamma_0}^i < \gamma_0 < {\gamma_0}^m$, the manager will not cooperate in the monitoring process and such contracts are suboptimal. Parameter values used are: $I = 500$, $\alpha = 0.04$, $\bar{W} = 5$, $c_i = 0.1$,and $c_m = 0.04$.