Essays on Corporate Governance

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Chapter 6
Monitoring, Shareholder Activism and the Correction of Managerial Failure

1 Introduction

Several authors (e.g. Jensen 1989 and 1993, Porter 1992) have argued that the financial systems of Japan and many Continental European countries provide relatively efficient solutions to resolving conflicts of interests between investors and managers of large firms. The (supervisory) board members that monitor firms in these countries tend to be independent in the sense that they are not also executives of the same company. Share ownership is concentrated and these large shareholders are able to exercise control, for example through supervisory board representation.

According to this view, the Continental European and Japanese governance structures create financial systems where de facto agents are extensively monitored and controlled by principals. In this chapter, we present a different view on the nature of control in these systems. We presume that control over large companies is generally of a more hierarchical nature and that it is better characterized by a framework where agents monitor/control other agents on behalf of the principal(s). To illustrate why this approach might be more appropriate, consider the monitoring role of the board of directors/supervisory board. Most theoretical models that focus on agency problems do not allow for any specific role for the board of directors. Therefore, these studies implicitly assume that either (A) the interests of the board are fully aligned with those of management or that (B) if the board disciplines management, there exists some sort of residual agency problem that remains to be analyzed and for which we can abstract from the existence of the board of directors.

These implicit assumptions may not be innocuous. For example, the board's effectiveness in monitoring and controlling the firm may depend crucially on the presence of other governance mechanisms such as takeovers and concentrated ownership. To analyze the precise role of the board of directors in reducing agency problems between management and shareholders, one therefore needs to consider the board as a separate entity, which has its own incentives and that is 'positioned' somewhere in between the agent (management) and principal (shareholders). Or, as Hirshleifer and Thakor (1998) argue, "... we must be cognizant of the hierarchical nature of agency relationships in publicly-owned corporations."
Managers are agents of the boards of directors, who are themselves agents of shareholders, who in turn rely on potential acquirers to monitor the performances of both managers and boards."

The need to look beyond a non-hierarchical principal-agent framework when analyzing governance issues does not solely arise from the presence of a board of directors or a supervisory board. Even if we assume away these delegated monitors, the hierarchical nature of the agency problem is likely to persist. Consider how control takes place by large shareholders. The standard way of approaching concentrated ownership in theoretical work is to assume that the large shareholder is also the principal in the sense that the wealth of this shareholder changes dollar for dollar with the value of the stake. This interpretation of the large shareholder as a principal can be troublesome, however. Large shareholders in most counties are not individuals, but tend to be financial institutions and corporations. These shareholders are therefore agents themselves of their own shareholders.

Abstracting from this may be without much loss of generality for some agency problems but not for others. For example, ‘the large shareholder’ may be quite effective in reducing excessive expenditures by the company or in limiting over-investment. On the other hand, he/she may be more reluctant than the ultimate shareholders/principals to press for drastic intervention, for example because this disturbs the relation with corporate insiders. The consequence of this observation is that with concentrated ownership, control by large shareholders may be of quite a different nature than control by the principal.

Both visions outlined above necessitate a broader perspective on the monitoring solutions of agency problems than is employed by most papers. In this chapter, we develop a model that recognizes that governance tends to take place through monitoring by parties who are not in fact the principals. The incentives of these monitors are to maintain their reputation as a capable monitor. We analyze the effectiveness of such a monitor in correcting management when it fails to implement the optimal corporate strategy.

Our analysis suggests that intrusive monitoring by such parties can actually be inefficient from the perspective of firm value. The reason is that intrusive monitoring by a delegated monitor not only has benefits in terms of a timely correction of managerial failure, it also creates a potential for a lack of objectivity of the monitor in evaluating corporate policy in later stages. The source of this distortion is that intervention in the firm may have adverse consequences for reputation of the monitor. With intrusive monitoring, the need to intervene in the firm is more likely if the monitor has failed to correct managerial policy at an early stage. Intervention may therefore suggest that the monitor is not very capable in performing her task. To avoid this, the monitor may decide to continue to support managerial policy even if this policy is sub-optimal.
Such a distortion does not arise if the monitor is put in a position where close or intrusive monitoring is impossible, i.e. where timely recognition of managerial failure is difficult. In that case, the need to intervene in the firm in order to correct earlier failures is relatively uninformative about the quality of the monitor. Even the best monitors will be unlikely to be timely informed about managerial failures if the distance between the firm and the monitor is large. The cost of preserving the objectivity of the monitor this way is that by virtue of the distance between the firm and the monitor, the latter will be unable to recognize and correct managerial failure at an early stage.

This result sharply contrasts with the general notion that more effective monitoring and control over the agent will be beneficial for the principal. Our model therefore points at a cost of arranging close and intrusive monitoring by parties such as the independent (supervisory) boards and ‘large shareholders’. Although the interests of these monitors are initially not aligned with those of management, the close involvement in monitoring managerial policy creates an incentive for them to support inefficient managerial policies.

We also consider whether control by non-monitoring parties, i.e. shareholder activism, can easily substitute for the objectivity of the monitor. Our analysis suggests that outsiders may prefer to remain passive, however, even when the objectivity of the monitor is minimal. The reason is that intrusive monitoring creates uncertainty about whether or not managerial failure has been corrected by the monitor. If erroneous interference is costly, public information on which non-monitoring parties can act might be too noisy to make outsider interference viable. The limited power of outsider interference to substitute for the objectivity of the monitor cannot be easily dismissed. The impaired objectivity of the monitor and the reluctance of outsiders to interfere both originate from the same source, namely the uncertainty about whether or not managerial failure has been timely corrected by the monitor. Our analysis also reveals that the probability of observing outsider interference can be highest in a system where the objectivity in monitoring is large. This result might explain why shareholders are more passive in exercising corporate control in Continental European countries than in Anglo Saxon ones (Franks and Mayer 1990, 1997b)

The argument that intrusive monitoring introduces reputational distortions is closely related to the one presented in Boot and Thakor (1993a) and Boot (1992).\textsuperscript{102} Boot and Thakor (1993a) analyze how the reputational concerns of a bank regulator affect her bank closure policy. With uncertainty about the ability of the regulator to monitor the bank’s asset choice, the need to close a bank potentially suggests a poor monitoring ability of the regulator. To protect her reputation, the regulator will be more lax in his bank closing policy than what is socially optimal. Boot (1992) rationalizes why management may be reluctant to divest assets

\textsuperscript{102} A part of our analysis can also be find in Boot and Macey (1999).
that are worth more outside the firm. Incapable managers are more likely to end up with assets that are worth divesting. If managers would always divest their assets whenever this optimal for the value of the firm, low ability managers would end up divesting relatively more frequently than good managers. Booth shows that it is optimal for low ability managers to divest less often than good managers.

Our work incorporates some main aspects of two approaches in the theoretical literature that have recently emerged. The first one is the explicit recognition that the board of directors serves as an independent monitoring entity whose incentives and actions need to be modeled separately. In the next section, we will discuss most of this work in greater detail. The second strand in the literature that has a lot of similarities to our work has focussed on the costs of control over agents. The theoretical papers that we will discuss in Section 3 reveal that more control or more effective monitoring by the principal can be counterproductive because it distorts the incentives of the agent.

2 Corporate Control through the Board of Directors: Theoretical Insights

2.1 Introduction

In this section we discuss some important theoretical contributions that recognize that the board of directors represents a separate entity in corporate governance. As we already argued in the introduction of this chapter, most theoretical studies in the literature do not recognize a separate role for the board of directors in corporate governance. Such an approach would be fully justified if one can safely assume that the interests of the board are fully aligned with those of management. There is ample empirical evidence, however, that suggest that this is generally not the case. Boards are not completely inactive as monitors of management and characteristics such as the composition of the board seem to be important for corporate decisions in many different countries (John and Senbet 1998).

The board of directors can therefore best be considered as a separate entity whose interests will not be perfectly aligned with either shareholders or management. What then determines the board’s attitude or stance towards management? In the next sub-section, we will discuss two theoretical papers that endogenize the incentives of members to monitor and control management. After that, we will describe some papers that focus on the interaction of corporate control through the board of directors and through takeovers. In section 2.4, we will discuss the implication of a paper that analyzes the efficiency of the board of directors as a governance mechanism relative to other control mechanisms.
2.2 Attitude of the Board towards Management

In most countries, the law states that shareholders appoint the members of the board. However, management might be able to exert significant influence over board composition. In the US, boards are generally considered to be insider dominated. The chairman of the board of directors is frequently also the CEO of the company and a majority of the directors on the board are often chief officers of the firm or closely affiliated with management (for example ex CEOs or directors who are appointed by the CEO). At first sight, it seems that such high degree of managerial control over the composition of the board will unlikely provide effective monitoring by the board and that it is indicative of a lack of vigilance of the board towards management.

Hermelin and Weisbach (1998) present a model that suggests that the attitude of the board towards management is presumably of a much more delicate nature than the one outlined above. Their analysis implies that board dependence may arise naturally in a setting where the board in fact actively monitors of management. As such, board dependence is not necessarily a clear indication of a failure of corporate governance. The underlying question that Hermelin and Weisbach thus address is how the composition of the board of directors can be (partially) controlled by the CEO of the firm while at the same time this board still functions as an effective monitor management. They thereby focus on the process of how a CEO and other board members choose new members of the board. The task of the board of directors is to bargain with the CEO about the appointment of these new board members as well as about the CEO’s compensation. Newly appointed board members can be independent directors who intensively monitor CEO performance, or they can be more or less dependent directors, who are at the hand of the incumbent CEO. Which type gets appointed depends on the outcome of the bargaining process between the CEO and the board. Because the CEO values control and would like to stay with the firm, she prefers dependent board members.

Hermelin and Weisbach show that whenever the board learns that the current CEO is probably of higher than average ability, the CEO essentially has larger bargaining power when negotiating with the board of directors than before. The reason is that if the CEO leaves the firm, she will be replacement by a CEO who is expected to be of a lower ability. The CEO can use this bargaining power to obtain higher wages and to influence board compensation by proposing his own candidates. At the same time, the favorable track record of the incumbent CEO reduces the need to intensely monitor performance in order to check whether the CEO is capable. The increased bargaining power of the CEO together with the reduced need to monitor the CEO, create a situation where it is optimal for shareholders to allow the CEO greater influence over board composition. Without this concession, the CEO will be able to
negotiate higher wages. Consequently, independent directors who act on behalf of the shareholders will allow the CEO to appoint his own candidates. The model therefore predicts that the independence of the board of directors declines after good performance as well as over the CEO's tenure. Alternatively, poor performance will lead to an increase in the probability that independent directors will be appointed.

The approach in Hermalin and Weisbach (1998) recognizes that the joint control of independent board members and management over the composition of the board introduces some degree of heterogeneity in the composition of the board. This heterogeneity then translates into different intensities of monitoring, depending on the relative number of dependent and independent directors in the board.

Warther (1998) however argues that heterogeneity of the board will be suppressed in its decisions and that the board will generally fail to act against management. In his model, board members act on behalf of the shareholders but also have a preference for remaining on the board. An individual board member will be removed if she votes against management while others support the incumbent managers. To avoid becoming a dissident, board members will only vote against management if they believe that others will vote against incumbent management as well. This implies that only if their own information is strong enough in suggesting that management is incapable, an individual board member will be willing to take position against management. The probability that other board members will have favorable information about management is then rather limited so that the chance of becoming a dissent when speaking out against management is small. Unfavorable information about current management will be neglected if this information is not strong enough. Board members will therefore display a tendency to support management.

Warther also shows that as the power of management over the board increases, this effect of neglecting negative information about incumbent management becomes more prominent. In a board that is dominated by directors that tend to support incumbent management, independent board members are likely to become dissident when they oppose management. As a result, they will have stronger incentives to neglect negative information about managerial ability. Likewise, in a board where most members care less about shareholder value and more about remaining on the board, information will be neglected as long as it does not unambiguously indicate that management is incapable.
2.3 Board of Directors and the Interaction with Takeovers

The papers that we discussed in the previous sub-section endogenized the behavior of the board in absence of any other governance mechanisms. In this sub-section, we turn to two papers by Hirshleifer and Thakor (1994, 1998) that study how internal control by the board of directors and external control through takeovers act simultaneously to replace inadequate management. The focus of their analysis is to look at the interaction of these two mechanisms. To what extent does an active takeover market obviate the need for effective control by the board of directors and do we still need takeovers if board members are quite effective in monitoring and controlling management?

Hirshleifer and Thakor model the board as an institution that is in control of the appointment and dismissal of management. On behalf of the shareholders, the board monitors managerial performance and obtains private information about the ability of the incumbent managers. To capture the possibility of conflicts of interests between shareholders and the board of directors, they assume that the board can either be vigilant or lax towards management. A vigilant board acts on behalf of the shareholders and replaces management whenever this is optimal for firm value. The interests of a lax board are more aligned with management. This implies that the board is less inclined to fire incapable management. Whether or not the board is vigilant is unknown to outsiders and hence there is uncertainty about the effectiveness of the board in replacing inefficient management.

The takeover market consists of potential acquirers who themselves collect private information about managerial ability. They can solicit a bid for the shares of the company if their information indicates that replacing management is optimal for firm value. If the takeover market is inactive, the probability that an acquirer indeed solicits a bid is always low. Alternatively, an active takeover market implies that if management is of poor ability, the takeover market is likely to step in and to generate a bid. This will be the case when potential acquirers are able to obtain quite accurate information about the ability of incumbent management.

Hirshleifer and Thakor assume that control always resides with the board. The board decides whether or not management is replaced, as well as whether or not an acquirer who bids for the shares of the firm is allowed to take over the firm. The sequence of events is as follows. First the board privately observes a noisy signal about managerial performance and decides whether or not to fire management. If management is replaced by the board the game ends. If the board does not replace management, a potential acquirer receives his own private signal about managerial ability. This signal allows the acquirer to obtain an estimate of the gains from replacing management. The potential acquirer may then solicit a bid for the shares
of the firm. Whether or not the bid succeeds depends on the willingness of the board to accept the bid.

Because a lax board only acts in the interests of management, it will always neglect unfavorable information about managerial ability. A vigilant board is willing to replace management if the signal that it receives indicates poor managerial ability. However, it may not always be optimal from the perspective of firm value to immediately fire management in that case. The reason is that an active takeover market provides additional information about managerial ability. By deferring replacement, the board can wait and see whether the takeover market generates a bid. If the takeover market is active but no acquirer appears, this is probably because the market possesses favorable information about the ability of incumbent management. It may therefore be optimal in terms of firm value to rely at least to some degree on the takeover market, provided that this market functions well.

The above argument suggests that the decisions of the board are affected by the extent to which the takeover market is indeed active. The more effective the takeover market, the more lenient a vigilant board will be towards management because they will rely on the takeover market. Hirshleifer and Thakor show that the reverse holds as well: the functioning of the takeover market is affected by the effectiveness of board control. If boards are effective, i.e. if the probability that a board is vigilant is high, takeover activity will be low. The reason is that acquirers will neglect their own information about managerial ability if they believe that the board is vigilant and yet did not replace management. In turn, they will be less reluctant to solicit a bid if they expect that the firm is monitored by a lax board. Taken together, these observations imply that the presence of these two control mechanisms lead to an aggregation of information about managerial quality which creates an interaction between them. As a result, internal control by the board of directors and external control through takeovers are substitutes. When internal control works well, the scope for external control is limited. Alternatively, when external control is active, internal control becomes less active in the sense of more leniency towards management.

Although these results are quite intuitive, they might not be very general. Using a similar setting, Hirshleifer and Thakor (1998) allow the bidder to replace the board if he succeeds in taking over the firm. The acquirer has an incentive to do so whenever he has sufficient reason to believe that the incumbent board is lax. The result of this change in the setting is that the board’s decision to fire management will also be driven by reputational concerns. Because a lax board never dismisses management, firing the manager becomes a signal of board vigilance. This implies that the incentives to be lenient towards management in order to use the information supplied by the takeover market are reduced. Hirshleifer and
Thakor (1998) show that the threat of an active takeover market may in fact induce a vigilant board to be too strict towards management from the perspective of the shareholders.

### 2.4 Board of Directors vs. Alternative Control Mechanisms

The major task of the board of directors in the two papers of Hirshleifer and Thakor discussed above was to gather private information about managerial ability and to appoint or dismiss inadequate management. Maug (1997) also focuses on the monitoring role of the board but assumes that the board of directors obtains information about the amount of firm-specific skills that management has invested while running the company. The board then negotiates with management about their compensation schemes. In contrast with Hirshleifer and Thakor (1994, 1998), the board cannot directly dictate corporate decisions because management effectively controls the firm.

The focus of the paper is on how corporate governance can simultaneously ensure that management invests sufficiently in firm-specific human capital while at the same time the firm will be liquidated whenever this is optimal from the perspective of firm value. Without governance, these goals are in conflict with each other because management will lose its firm-specific human capital if there is liquidation. The idea behind such firm-specific human capital is that management may need to invest in skills that are worth less outside the company than they are worth inside the company. For example, it may be optimal from the perspective of firm value to concentrate on entering some niche markets or on developing some very special technology. Management, however, may be reluctant to invest their human capital in these activities. If the strategy fails after a few years, they may be specialized to do a type of job for which there is little demand on the managerial labor market. Likewise, stimulating the workers by spending a lot of time at the work floor may be good for firm value, but career wise, the manager may be better of networking with powerful people. In both cases, investment in general skills, as opposed to firm specific skills, may be better from the perspective of the manager because it improves her outside opportunities.

The concern of management about developing firm-specific skills stems from the uncertainty that these skills will be sufficiently rewarded in the future. In Maug (1997), this uncertainty arises from the possibility that the firm is worth more in the future when it is being liquidated than when it remains in business. With liquidation, the manager has to find a new job and the more he has invested in firm specific skills, the lower his career opportunities. Without corporate governance, the manager would therefore never liquidate the firm in order to avoid this loss.
Ideally then, governance would be able to induce both first-best investments by the manager and liquidation of the firm whenever this is optimal. Maug considers how well three different governance mechanisms will work in this setting. These are compensation contracts, takeovers and the board of directors.

Let us first look at compensation contracts, neglecting the possibility of a takeover and presence of a board of directors. A compensation contract can provide a golden parachute to management in the state of the world where liquidation is optimal. Management will then voluntarily liquidate the firm as long as the severance payment is high enough to compensate them for their loss of firm-specific human capital. However, without information about the level of firm-specific investments, the compensation contract cannot condition the golden parachute on the true investments made by management. As a consequence, the level of firm-specific investment will be lower than the first best, which could be achieved if these investments were contractible.

Now consider the consequences of having takeovers as a governance mechanism. A takeover shifts control from management to the raider. The raider can then enforce liquidation without paying a golden parachute, breaching the previous compensation contract. This saves the shareholders an amount equal to the golden parachute. The cost of allowing takeovers to enforce liquidation is that in anticipation of the control shift, the manager will be reluctant to invest in firm specific skills. Maug shows that if bonuses that are paid out in those states of the firm where liquidation is not optimal are powerful enough to elicit a substantial level of firm-specific investment, takeovers will be more efficient than only having a compensation contract.

Finally, let us look at the role of monitoring by the board of directors. Maug assumes that the potential advantage of having a board is that management can be fully compensated for firm specific investments because the board can observe these. This mechanism is potentially more efficient than takeovers or compensation schemes. Confronted with a state of the world in which liquidation is beneficial, the board can use its information about the firm specific investments made by management and renegotiate any existing compensation contract with management. With perfect knowledge about these investments, the board of directors can potentially resolve the conflicts of interests completely. If management knows before hand that they will be compensated for any future loss of skills, their reluctance to invest in firm-specific skills will disappear.

However, the board probably offers only a partial solution to the agency problem. Board member may not be able to perfectly observe the investments of management. In that case, their information about the investments made by managers will be imprecise. Also, the efficiency of the board depends on the bargaining power of the board. If management is still
in control of the decision whether to liquidate or not, they will have some bargaining power during the negotiations the board of directors. With weak directors, management may be able to negotiate an excessive severance payment before liquidation. Maug shows that in that case, having a board of directors may be less efficient than allowing for corporate control through takeovers. A strong board, however, only compensates the manager for firm specific skills and is likely to dominate both takeovers and compensation contracts as a governance mechanism.

2.5 Concluding Remarks

The papers that we have discussed in this section explicitly analyzed how the board of directors functions as a governance mechanism. The motivation for the analytical approach that these papers pursued was that regardless of the corporate governance system that we consider, the board is a separate entity whose interests are unlikely to be perfectly aligned with shareholders or with management. So, for a thorough understanding of how control over corporate decision takes place, one cannot neglect this institution as is done by considering a standard principal-agent framework.

The first two papers that we discussed in this section endogenized the behavior of the board in a framework where there where no alternative governance mechanisms. The paper by Hermalin and Weisbach (1998) illustrated that CEO control over the composition of the board is not necessarily an indication of ineffective corporate governance. Warther (1998) argued that the board of directors will show a tendency towards ineffectiveness because individual board members will neglect to act on information that might make them dissidents.

Hirshleifer and Thakor (1994, 1998) concentrated on the interaction between control through the board of directors and control through takeover. Their analysis showed that these mechanisms can enforce as well as weaken each other’s effectiveness. If board members care about their reputations, they may become overly aggressive in replacing management if takeover markets are active. Maug (1997) showed that strong, independent directors are probably more efficient governance mechanisms than takeovers when firm specific human capital and liquidation are both relevant for firm value.

All these papers focus primarily on managerial control over the board and its consequences for the effectiveness of corporate governance. In the US, managerial control over the board is indeed an immediate issue. The one-tier board structure by necessity creates a situation where management and independent directors are brought together to form a governance institution. However, in many countries, supervision and management are formally separated and managerial control over the supervisory board might be limited. In
Germany, the supervisory board often consists only of shareholders and workers. In the Netherlands, management generally does not hold a seat on the supervisory board. According to the analyses above, if managerial control over the board is indeed limited in these countries, governance by the board will work quite well. The model that we present later on in this chapter shows that this need not be the case. It suggests that even if management is unable to control the board so that its members are initially completely independent, there may be powerful forces that drive them to support management in inefficient policies.

3 Excessive Control or Monitoring by the Principal

Parallel to the recognition of the role of the board of directors in the formal literature, several theoretical papers have appeared that suggest that allowing the principal to extensively monitor or control the agent may not always be beneficial for the principal himself. Such conclusions are particularly interesting from the perspective of corporate governance because the general presumption in the governance debates is that inefficiencies arise from a lack of control or oversight of investors over management. The papers that we discuss in this section suggest that this presumption might be misleading. These basic argument of these contributions is that control by the principal distorts can distort the incentives of the agent to take initiative.

3.1 Benefits of Arm’s Length Monitoring

Crémer (1995) considers a situation where the principal can choose to monitor the agent intensively or to stay at arm’s length of the agent. If the principal engages in an arm’s length relation with the agent, he will be less informed about the ability of the agent who is working for him. At first sight, then, it seems that the principal will always be better of by intensively monitoring the agent. Crémer shows that this is not necessarily the case. He uses a multi-period framework where in each period, the agent affects output in two different ways. The first one is the effort that the agent supplies, which is a choice variable for the agent. The second factor relates to the suitability of the agent for the specific job. Initially, all parties are uninformed about the suitability of the agent.

Presume that the principal engages in an arm’s length relation with the agent so that the principal can only observe the output that the agent produces. Whether or not she will rehire the agent after one period then only depends on the output realization. This gives the agent an incentive to work hard because that increases the probability of being hired for another period. Now consider what happens if the principal can observe both output and the
ability of the agent. Agents then know that they will only be re-hired if they are of high ability. Because effort doesn’t affect ability, the agent has fewer incentives to exert effort. Hence, with more information, the principal will find it more costly to induce effort on behalf of the agent.

There is of course also an advantage for the principal of being able to obtain more precise information. On average, he will be hiring more capable agents. If the differences in ability are not very large, this positive effect is likely to be dominated by the negative effect of the increase in costs to induce effort. The principal is then better of by acquiring less precise information about the agent by engaging in an arm’s length relationship.103

Observe that if an arm’s length relationship between the agent and the principal is optimal, the principal needs to be able to credibly commit to staying at arm’s length from the agent. The latter will anticipate that the principal would like to induce high effort by making the agent believe that the re-hiring decision will only depend on output and to then monitor the agent along the way. How can the principal commit not to obtain precise information about the agent’s ability? A promise by the principal not to obtain such information is not very credible. Several papers have argued that the ownership structure of the firm provides such a commitment mechanism. In the next sub-section, we will discuss them.

3.2 Benefits of a Lack of Control by Shareholders

If ownership is dispersed, the monitoring incentives of shareholders are relatively low because the benefits are limited by the small sizes of the stakes of the different shareholders. Burkart, Gromb and Panunzi (1997) suggest that such a lack of monitoring and control by shareholders may in fact be beneficial for these shareholders because it reduces their incentives to interfere with the firm and to push for efficiency gains. This seems counterintuitive because agency problems between management and shareholders are driven by the incentives of management to deviate from value maximization.

Starting point of their analysis is that there exists some degree of congruence in the interests of management and shareholders. Management is useful because it can search for investment opportunities that are valuable to shareholders. At the same time, management and

103 Rajan (1992) and Dewatripont and Maskin (1995) also stress the benefits of arm’s length relationships but they consider settings where there is adverse selection. By producing information about the status of the firm through a close relation, a financier (such as a bank) can obtain more precise information about the firm than other parties have. In Rajan, this allows the investor to extract rents from the firm when it has to refinance itself because the firm is unable to turn to other investors who then have less information about the firm. In anticipation of the future rent extraction, the incentives of the firm’s insiders are distorted. In Dewatripont and Maskin, the information production of the financier creates a soft-budget constraint because the investor can no longer credibly commit not to refinance the firm if it is in distress.
shareholders will disagree about the investment opportunities they prefer to see carried out. Management may suggest to invest in a project out of personal motives and not because the project is the best one from the perspective of the shareholder. Loosely speaking, shareholders will be concerned that management neglects investment opportunities that are more valuable in terms of the return on investment. The congruence between the interests of management and shareholders however implies that shareholders expect to gain from a project that is proposed by management.

Assume now that searching for projects is costly for management. The harder they search, the higher the costs they incur but also the more likely it will be that they find a project that they prefer to see carry out. Because of the congruence, shareholders profit from these initiatives of management. Firm value is therefore increasing in the effort that management invests in searching for projects.

At the same time, shareholders know that the manager does not necessarily suggest the project that is most profitable to them. This gives them an incentive to search for valuable investment opportunities themselves. They can then intervene in the firm to enforce their own project choice whenever they believe that it is superior to the one that management proposes.

The interference of the shareholders will have two effects on firm value. The first one is a control effect, which is positive. It originates from overruling the manager whenever the shareholders have found a more valuable project. The second effect is a behavioral effect, which will have a negative impact on firm value. By overruling the manager if both parties have found a valuable project, shareholders lower the expected pay off from the initiatives of management to search for projects. With costly effort, the anticipation of the possibility of shareholder control will therefore lower managerial effort, which negatively affects firm value.

If shareholder interference is expected to occur frequently, this negative behavioral effect may dominate the positive control effect. In order to preserve managerial initiative, shareholders would then like to commit not to interfere too often. Burkart et al (1997) argue that the ability of shareholders to do so essentially depends on the ownership structure of the firm. With completely dispersed ownership, no shareholder will find it valuable to engage in a costly search for projects because the costs outweigh the increase in the value of their negligent stakes in the firm. The manager will then never be overruled and his incentives for initiative will be maximal. As ownership becomes concentrated, shareholders will have an incentive to search for improvements in corporate policy and therefore to interfere with the firm. The incentive of a single shareholder to do so increases monotonically with his stake in the firm. Consequently, managerial effort will be decreasing in the stake size of this shareholder.
Burkart et al (1997) show that firm value may be maximal at some intermediary level of ownership concentration. Beyond that level, the distortive effect of shareholder intervention on managerial initiative will dominate the control effect on corporate performance. For lower levels of ownership concentration, the lack of control over corporate policy is more costly than the gain from improved managerial incentives.

The analysis of Burkart et al (1997) therefore suggests that systems with high levels of ownership concentration may suffer from a lack of initiative from management because they anticipate to be overruled by controlling shareholders. As Burkart et al (1997) and Aghion and Tirole (1997) point out, the implications of the model are much broader. For example, it may not be optimal to have a board of directors whose interests are fully aligned with shareholders. Collusion between the board of directors and management, for example by passing up interventions that are only marginal improvements, may be beneficial. In that sense, the compensation of the board of directors should not be tied too closely to share prices. Also, insulating the firm from takeovers through the adoption of takeover defenses may be good for firm value. Another implication of the analysis of Burkart et al is that reducing the efficiency with which shareholders can produce information about corporate policy may be optimal. This implication is quite similar to the conclusion in Crémer (1995) that the ability to accurately monitor the agent may not always be valuable for the principal.

Myers (1998) and Acemoglu (1995) also present a model that stresses the benefits of dispersed ownership. Myers (1998) considers a two stage R&D project. The first stage consists of the initiation of the project, which requires the specific knowledge of a capable entrepreneur. If the project succeeds in the first stage, the value of the project will be fully embodied in the assets of the firm. Managing the firm is then relatively straightforward and the entrepreneur becomes redundant at that stage. It will then be optimal for the shareholders to fire the entrepreneur after making the firm a success because this economizes on the wages they have to pay. Ex ante, however, shareholders would like to commit not to remove the entrepreneur in the future. Anticipating that she might be fired whenever the project succeeds, the entrepreneur loses some of her incentives to make the project a success. Myers argues that this can be done by dispersing the shares in the early stage of the project through a public issue.

Acemoglu (1995) uses a similar argument to rationalize the optimality of a lack of control that is associated with dispersed ownership. In his model, the entrepreneur also becomes more or less redundant for running the firm at a later stage. The agency problem that shareholders worry about is that cash flows are not verifiable so that outsider control or compensation contracts are needed to prevent management from consuming the cash flows as perks. In itself, this agency problem aligns the interests of both parties. A good performance is
also in the interests of management because it implies high cash flows that can be diverted. Therefore, ex ante it may be optimal for shareholders to allow management to consume some perks in the future because this is good for their incentives. Such a promise potentially lacks credibility. Ex post, shareholders would like to prevent perk consumption and they can enforce this through exercising control. A commitment not to intervene can be obtained through a dispersion of shares. Compensation contracts can then be used to control perk consumption and to further induce effort.

4 General Discussion of Our Analysis

The analysis we put forth in the remaining part of this chapter has features of both strands of the literature that we discussed in the previous two sections. We focus on the behavior of a monitor whose task consists of detecting and correcting managerial failure. We assume that the monitor acts to maximize its reputation for being a capable monitor. One interpretation of this monitor is that it represents the board of directors. The monitor can detect managerial failure as early as possible when she is able to closely monitor the firm/managerial policy. However, our analysis shows that it may not always be optimal from the perspective of firm value to place the monitor in such a position. Shareholders may in fact be better if the monitor is in a position where she can never detect managerial failure at an early stage.

To see why this result arises, consider a setting where the monitor can correct managerial failure at two different stages, namely at an early stage or at a late stage. The ability of the monitor to detect and correct managerial failure at an early stage depends on two factors. The first one is the quality of the monitor. A good monitor is in general more likely to timely recognize managerial failure. The second factor concerns the distance between the monitor and the firm. If the monitor is put in a position where she can closely follow managerial decisions, she will be most likely to detect inefficiencies at this early stage. Generally speaking, the distance between the monitor and the firm is small in that case. Alternatively, if this distance large, the probability that any monitor (i.e. of low and high ability) will have detailed information about firm policy will be relatively small and recognition of managerial failure by the monitor is unlikely. In our model, maximal distance implies that no monitor will ever be able to detect managerial failure at an early stage.

Clearly, the scope for monitoring and early detection of managerial failure is then largest if the distance between the monitor and the firm is minimal, i.e. in case of intrusive monitoring. Minimal distance therefore has the benefit of facilitating early correction. Our analysis points out, however, that there are also costs of such intrusive monitoring. Allowing close monitoring implies that the differences in ability between monitors will manifest
themselves. The higher the quality of the monitor, the more likely she is able to detect
managerial failure in the early stage. As a result, allowing close monitoring implies that good
monitors are less likely to be confronted with an inefficient corporate policy in the late stage.
The state of the firm is therefore informative about the quality of the monitor. In a sense,
management and the monitor become jointly responsible for corporate policy. This may
adversely affect the incentives of the monitor to intervene in the firm at a late stage. The need
to intervene points at a lack of early correction of managerial failure, which in turn suggests
poor monitoring ability. When the monitor is concerned about her reputation, close
monitoring at an early stage therefore introduces what we refer to as a lack of objectivity of
the monitor. The monitor will then sometimes neglect adverse information about managerial
failure in order to conceal the ineffectiveness of early monitoring.

This lack of objectivity suggests that there is a benefit of putting the monitor in a
position where irrespective of the quality of the monitor, early detection of managerial failure
is unlikely. It preserves the objectivity of the monitor because the differences in ability to
detect managerial failure at an early stage are then irrelevant. The objectivity of the monitor
constitutes a benefit of creating distance between the monitor and the firm. Our analysis
reveals that the more one allows the monitor to observe managerial failure at an early stage,
the more the future state of the firm will be informative about the ability of the monitor and
the less objective the monitor will be in her future decisions. Minimizing the distance between
the monitor and the manager therefore intensifies reputational distortions, which suggests that
there is a trade off between early detection of managerial failure and preserving objectivity in
the future decisions of the monitor. In fact, our analysis reveals that it may be optimal for firm
value to completely preserve the objectivity of the monitor at the cost of a lack of early
correction of managerial failure.

Following Boot and Macey (1999), we refer to the distance between manager and
monitor as the proximity of the monitor. How should we interpret this proximity of the
monitor in the context of the different ways in which corporate governance takes place across
different countries? Consider how monitoring of management is shaped in Continental
European countries and in Japan. The general notion is that these systems are characterized by
close monitoring by large shareholders and independent (supervisory) boards. Blockholders
frequently appoint (supervisory) board members and cross-ownership of shares between firms
induces continuous monitoring of managerial decisions. As we argued in the introduction of
this chapter, one should not interpret this constellation as one where principals are monitoring
agents. Independent supervisory board members probably not only care about shareholder
wealth, but also about their reputation for being capable board members. The same applies for
board members who represent their family members or other large shareholders. A CEO of
one firm who is on the board of another firm in which the company of the CEO holds a stake, can hardly be considered to be a principal. The Continental European and Japanese corporate governance systems can therefore be characterized as systems where intrusive monitoring by agents is dominant and, according to our analysis, where objectivity of monitoring is relatively low.

The US system is characterized by a one tier board system and dispersed ownership. Several authors (e.g. Jensen 1993) have suggested that internal control by the board is basically absent because management effectively controls the board. Control takes place through takeovers and shareholder pressure. Monitoring by these governance mechanisms is of a less intrusive nature. The US system is therefore better interpreted as one where monitoring takes place in arm’s length relationships and where the objectivity of governance mechanisms in evaluating corporate policy is high.

Our model clearly points at a trade off between proximity and objectivity. This indicates that it might be impossible to combine the best of both systems into one robust governance arrangement. If one would like more timely correction of managerial failure by closing the gap between management and monitoring institutions, one necessarily incurs a loss in terms of a reduction in objectivity in corporate control.

We would like to stress that the set up of our model should not be interpreted as one that perfectly describes the differences in governance systems that we just referred to. Our main point is that monitoring entities are often agents themselves, in stead of principals and that this distinction sheds a different light on the effectiveness of governance with close and continuous monitoring than the one that is frequently suggested in the literature.

5 Outline of the Model

5.1 Timing of Events

Our (basic) model consists of three dates, \( t = 0, 1, 2 \). At \( t = 0 \), management makes a decisions about the policy of the firm. This decision can either be good or bad for the firm, where a bad decision of management represents an inefficient corporate policy from the perspective of the shareholders. The focus of our analysis is on the correction of such managerial failure, and not on disciplining of management or on reducing managerial moral hazard. We assume therefore that the \( t = 0 \) decision of the manager is unaffected by the manager’s expectations about future governance. We also assume that management will never correct its own failure because this is costly for them. Let \( \delta \in (0, 1] \) be the probability that management makes the wrong decision at \( t = 0 \).
At t = 1, the monitor can correct the inefficient policy that is initiated by management. To do so, the monitor must be informed about the exact characteristics of current policy and she must recognize the potential inefficiencies. If both these conditions are not satisfied, actions by the monitor to undo managerial failure are impossible. The probability that the monitor corrects managerial failure at t = 1 therefore depends on two factors. The first one relates to the distance between the firm and the monitor, i.e. the intrusiveness of monitoring. With minimal distance between the monitor and the manager, the monitor is most likely to be sufficiently informed about managerial policy. The larger the distance between the monitor and the manager, the less precise the information of the monitor about corporate activities will be. We capture the proximity of the monitor by the variable $p \in [0,1]$, where $p = 1$ stands for maximal proximity and $p = 0$ represents maximal distance. The proximity of the monitor is publicly known and it is not a choice variable for the monitor.

The second factor that determines whether managerial failure is corrected depends on the ability of the monitor to recognize that corporate strategy is inefficient. We assume that the monitor can be of high or low ability and denote this by $\alpha \in \{a_h, a_l\}$. Let $0 \leq a_l < a_h \leq 1$ and let the ability of the monitor represent the probability that this monitor is able to recognize managerial failure when the distance between the monitor and the firm is minimal.

Together, the ability and proximity of the monitor determine whether or not the monitor is able to correct managerial failure at t = 1. We assume that if distance is maximal, the monitor will never be able to correct corporate policy at t = 1 because she is in no position to recognize inefficiencies. Similarly, for a given ability of the monitor, early correction is most likely when the distance between the monitor and the firm is minimal. We let the interaction between proximity and ability capture whether or not managerial failure is corrected. This implies that $p \cdot a_{hl}$ represents the probability that the monitor corrects at t = 1. The probability that managerial failure remains uncorrected by the monitor is therefore equal to $1 - p \cdot a_{hl}$.

In our analysis, we will not distinguish between the situation where the monitor is informed about managerial policy but is unable to recognize inefficiencies and the situation where the monitor is simply not informed about current policy. One can create this distinction by letting $p$ present the probability that a monitor is informed about the exact characteristics of corporate policy and by letting $a_{hl}$ presents the probability that conditional on being informed, the monitor recognizes the inefficiencies. Although this approach seems more general than ours, it creates an additional decision node for which we need to derive an equilibrium strategy of the monitor. The results are similar however, both qualitatively and quantitatively.
At $t = 2$, the monitor is perfectly informed about the state of the firm (and therefore about any inefficiencies). When managerial failure has remained uncorrected until this date, the monitor can intervene in the firm to prevent that corporate policy remains inefficient for yet another period. For simplicity, we simply assume that intervention is not possible if managerial failure did not occur or if the monitor was able to correct managerial failure at $t = 1$. All our results hold if we drop this assumption.

Any period that the firm operates under the inefficient policy is costly. The loss in firm value from inefficient operation from $t = 0$ to $t = 1$ is irrelevant from our analysis. We will therefore neglect it and express all the losses relative to the situation where early correction of managerial failure takes place. Let $X$ represent the loss if the firm operates inefficiently from $t = 1$ to $t = 2$ while intervention takes place at that last date. Abstaining from intervention if failure is not corrected at $t = 1$ costs $Y$, relative to early correction. Let $0 < X < Y$, so that the persistence of managerial failure from $t = 0$ all the way to $t = 2$ is most costly.

### 5.2 Objectives of the Monitor and Information Structure

We assume that the monitor receives a wage at the end of the game. This wage is based on the monitor’s reputation, which is the market’s perception of the probability that the monitor is of high ability. Let $q_t$ denote this probability at time $t$. The wage of the monitor is increasing in her reputation at the end of the game. The monitor’s objective is then to maximize her wages by maximizing $q_2$.

The market will use all observable information that is valuable to update its beliefs about the ability of the monitor. We assume that the market can only observe whether or not intervention takes place. Early correction is not visible to outsiders. Changing corporate policy in an early stage presumably requires re-assessing decisions such a whether or not to enter certain markets or to develop certain products. These types of decisions are less visible to outsiders. At a later stage, corporate policy has been fully implemented. Correction of corporate policy than requires drastic actions such as reorganizations, divestitures and closure of divisions. Such intervention in corporate policy cannot take place unnoticed by outsiders.

Our setting implies the market can only update the reputation of the monitor after having observed whether or not intervention at $t = 2$ took place. Let $\pi \in (0, 1)$ be the prior that the board is of high ability (i.e. the fraction of good monitors in the economy) at $t = 0$. The posteriors after observing the intervention decision of the monitor are determined using Bayes’ rule. Defining $q_2^I$ and $q_2^N$ as the reputation of the monitor after observing intervention and no-intervention at $t = 2$, these posteriors are
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\[ q_2' = \Pr(\alpha_H|I) = \frac{\pi \cdot \Pr(I|\alpha_H)}{\pi \cdot \Pr(I|\alpha_H) + (1 - \pi) \cdot \Pr(I|\alpha_L)} \]

and

\[ q_2^{NI} = \Pr(\alpha_H|NI) = \frac{\pi \cdot \Pr(NI|\alpha_H)}{\pi \cdot \Pr(NI|\alpha_H) + (1 - \pi) \cdot \Pr(NI|\alpha_L)}. \]

6 The Trade-off between Proximity and Objectivity

We are now in a position to analyze how the intervention strategy of the monitor will depend on the distance between the monitor and the firm. The setting that we have outlined above represents a signaling game where the informed agent (the monitor) moves first, and the uninformed (the market) will use the move of the informed to rationally update his beliefs about the type of the informed agent. We use the concept of a Perfect Bayesian Equilibrium to solve this game, which is suitable for such a setting (see Gibbons 1992).

To characterize the equilibria, we need to specify the strategies of both types of monitors. These strategies are in fact the probabilities that a monitor of a given type will intervene whenever she learns that managerial failure has remained uncorrected in the early stage. Let \( \gamma \) and \( \beta \) denote the probability that respectively a high or a low ability monitor intervenes at \( t = 2 \) if the firm policy is inefficient at that time. We assume that the monitor knows her own type.\(^{104}\) We first give a general description for all plausible equilibria in Result 1.\(^{105}\)

**Result 1:** Assume that at \( t = 2 \) managerial failure has remained uncorrected by the monitor. With some proximity, i.e. with \( p \in (0,1] \), in all plausible Perfect Bayesian Equilibria, a high ability monitor intervenes with probability \( \gamma \in [\gamma,1] \), where \( \gamma > 0 \), while a low ability monitor intervenes with a strictly lower probability \( 0 < \beta < \gamma \). With maximal distance, i.e. for \( p = 0 \), \( \beta = \gamma \) is the only plausible Perfect Bayesian Equilibrium. Also, in equilibrium, \( \beta \) is monotonically increasing in \( \gamma \).

**Proof:** See Appendix.

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\(^{104}\) The analysis would not be very interesting if the monitor didn't know its own type. In that case, it would never be optimal to intervene (see Boot and Macey 1999).

\(^{105}\) With 'plausible' equilibria, we mean equilibria that are not supported by 'implausible' off-equilibrium path beliefs. For example, an equilibrium where no monitor ever intervenes can be supported by the belief of the market that if a monitor actually does intervene, it will be a low ability monitor. The perfect Bayesian Equilibrium does not rule out such an equilibrium because it does not restrict off-equilibrium path beliefs.
Result 1 shows that if there is some proximity of the monitor, low ability monitors will intervene less often if they are confronted with uncorrected managerial failure than high ability monitors. The intuition behind this distortion in the intervention policy is straightforward. With some proximity, a high ability monitor is more likely to correct managerial failure at an early stage. They are therefore less often confronted with the need to rely on late intervention to undo managerial failure. Assume now that low-ability monitors would intervene just as often as good monitors, implying that $\beta = \gamma$. Because low-ability monitors are more likely to be in a situation where intervention is needed, they would intervene relatively more frequent than good monitors. Intervention would then become a signal for a poor ability to monitor. Both types are better off in that case if they would never intervene in the firm in order to avoid the reputational loss associated with intervention. Therefore, identical strategies for the low and high ability monitors can never be an equilibrium outcome. Result 1 shows that to reach an equilibrium, the strategy of the low ability monitor requires intervening less frequently when early correction failed than high ability monitors do.

Note that with maximal distance between the monitor and the firm, both types are equally likely to end up in a situation where early correction failed and intervention is required. Identical intervention strategies then no longer results in a signal of poor monitoring. The last part in Result 1 states that the strategies of both types need to be the same in order to ensure that there are no reputational effects associated with intervention.

Result 1 only provides a general description of the intervention policies of both types of monitors. The reason is that there are multiple equilibria for every distance $p$ between the monitor and the firm. Any pair of strategies $(\gamma, \beta)$ that ensures that outsiders can't learn about the ability of the monitor from the intervention decision of the monitor will support an equilibrium. More precisely, as long as the intervention policies are such that $q_i' = q_i''$, these strategies constitute a Perfect Bayesian Equilibrium. Result 1 merely states that with some proximity of the monitor, this requirement implies that a bad monitor is less likely to intervene after a lack of early correction than a good monitor.

For the remainder of this paper, we will assume that only the most efficient equilibria will prevail. Because $\beta$ is monotonically increasing in $\gamma$, the most efficient equilibria are those where a high ability monitor always intervenes if managerial failure is uncorrected at $t = 2$. Only the intervention incentives of the low ability monitors are then potentially distorted by reputational concerns. Note however that when there is no proximity, the coincidence of the intervention strategies of the low and high ability monitors implies that intervention can always take place because reputational distortions are then absent. Assuming that high ability
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monitors always intervene, we derive a closed form solution that reveals how the distance to the firm affects the incentives of a low ability monitor. We first calculate the posteriors after observing intervention \( (q_2') \) and observing no-intervention \( (q_2^N) \). With \( \gamma = 1 \), these become

\[
q_2' = \frac{\pi[\delta(1 - \rho a_H)]}{\pi[\delta(1 - \rho a_H)] + (1 - \pi)[\delta(1 - \rho a_L)\beta]} \tag{1}
\]

and

\[
q_2^N = \frac{\pi[(1 - \delta) + \delta \rho a_H]}{\pi[(1 - \delta) + \delta \rho a_H] + (1 - \pi)[(1 - \delta) + \delta \rho a_L + \delta(1 - \rho a_L)(1 - \beta)]} \tag{2}
\]

Recall that \( \delta \) is the probability that managerial failure occurs and that \( \pi \) represents the prior for the probability that the monitor is of high ability (i.e. the reputation of the monitor just before intervention becomes relevant).

In equilibrium, any monitor will be indifferent between intervening and foregoing intervention after learning that managerial failure has remained uncorrected. That is, in equilibrium the strategy of the low ability type has to be such that, given that good monitors always intervene when this is necessary, ‘intervention’ and ‘no intervention’ have similar consequences for the reputation of the monitor. We therefore need to equate \( \Pr (a_H | I, \gamma = 1) = \Pr (a_H | N, \gamma = 1) \), which are given in (1) and (2). Solving these, we obtain Result 2.

**Result 2:** The probability that a low ability monitor intervenes when she learns that uncorrected managerial failure has occurred is given by

\[
\beta = \frac{1 - \rho a_H}{1 - \rho a_L}.
\]

Note that a low ability monitor in fact mimics the intervention behavior of a good monitor. The probability that there will be intervention when a firm is monitored by a low ability monitor equals \( (1 - \rho a_L)\beta = (1 - \rho a_H) \). This is exactly the probability that there will be intervention when the firm has a good monitor. The reputation of the monitor at the end of the game is always equal to the prior, i.e. \( q_2' = q_2^N = \pi \). This is of course the best the low ability monitor can expect to obtain in equilibrium because she is able to fully undo the intervention decision from information about the quality of the monitor.

Result 2 reveals that the intervention strategy is independent of the likelihood of managerial failure \( (\delta) \) and of the fraction of low ability monitors in the economy \( (\text{the prior } \pi) \). The likelihood of managerial failure only affects the probability of reaching the initial stage of the game where monitoring becomes relevant and it is unrelated to the ability of the monitor.
As such, it is irrelevant to the low ability monitor when she wants to mimic a good monitor. The same applies for the relative amount of low and high ability monitors.

Now that we have a closed form solution for the intervention strategy of a low ability monitor, we can easily analyze how this strategy is affected by the proximity of the monitor. Differentiating the probability that a low ability monitor intervenes after uncorrected managerial failure with respect to proximity shows that

\[
\frac{\partial \beta}{\partial p} = -\frac{\alpha_n - \alpha_l}{(1 - p \alpha_l)^2} < 0 \quad \forall \quad p \in [0,1].
\]

Clearly, the incentives of a low monitor to intervene are always worsened as proximity increases. The reason is that as the distance between the monitor and the firm decreases, the ability of a monitor becomes increasingly relevant for the future state of the firm. The response of a low ability monitor then is to increasingly neglect information that indicates at an inefficiency of corporate policy. We interpret this a loss of objectivity of the monitor. Result 3 restates these findings.

Result 3: The incentives of a low ability monitor to intervene always become worse as proximity increases, indicating a loss of objectivity. As a consequence, objectivity in monitoring is lowest when the distance between the monitor and the firm is minimal.

Result 3 does not necessarily imply that increasing proximity always proves to have be negative effect on future intervention. There is also an opposing effect of creating proximity: it allows the monitor to correct managerial failure at an early stage, reducing the need to rely on intervention. Despite that increasing proximity aggravates the incentives to intervene, the probability that managerial failure escapes both early correction and intervention may in fact go down as proximity increases. If this would be true, increasing proximity does not necessarily come at a cost in terms of a loss of objectivity because the reduced need to rely on intervention may compensate for the loss in objectivity when corporate policy requires intervention.

We can check whether this indeed the case by calculating the probability that managerial failure remains both uncorrected and un-intervened. Result 4 shows that the loss in objectivity always manifests itself so that proximity always comes at a cost of a loss of objectivity.

Result 4: The probability that managerial failure remains both uncorrected and un-intervened is given by

\[
\delta(1 - \pi)(1 - p \alpha_l)(1 - \beta) = \delta(1 - \pi)p(\alpha_n - \alpha_l),
\]
which is strictly increasing in proximity. As a result, there is always a trade-off between proximity and objectivity.

Our analysis thus shows that while increasing proximity leads to more early correction by the monitor, it also increases the probability that managerial failure is left unaddressed by the monitor because of a lack of objectivity. There are no parameter regions for which this trade-off does not prevail. Results 4 therefore shows that one can never obtain the benefits from increasing proximity without incurring a loss that results from lower objectivity.

Does there exist an optimal degree of proximity that balances these costs of a loss of objectivity with the benefits of early correction? It turns out that in our framework, there isn’t. To see this, let us write down the value of the firm \( V' \), using \( V^C \) to denote firm value if early correction takes place. Without loss of generality, assume that managerial failure has taken place. Firm value \( V \) is then equal to:

\[
V = p\alpha V^C + \pi(1 - p\alpha_H)\left[V^C - X\right]
+ (1 - \pi)(1 - p\alpha_L)\beta\left[V^C - X\right] + (1 - \pi)(1 - p\alpha_L)(1 - \beta)\left[V^C - Y\right]
\]

where \( X (Y) \) presents the loss in firm value from having (no) intervention in stead of early correction. Using Result 2, we can rewrite this as

\[
V = V^C - (1 - p\alpha_H)X - (1 - \pi)p(\alpha_H - \alpha_L)Y
\]

Firm value is therefore linear in proximity so that either maximal or minimal proximity is optimal for firm value. This provides the following result.

**Result 5:** Firm value is highest under minimal proximity of a monitor, i.e. \( p^* = 0 \), if \( \alpha_H X < (1 - \pi)(\alpha_H - \alpha_L)Y \). Otherwise, it is optimal to maximize proximity, implying \( p^* = 1 \).

To see where the condition in Result 5 comes from, one can derive it using a different line of reasoning. Assume that managerial failure took place. The probability of observing intervention is given by \( \pi(1 - p\alpha_H) + (1 - \pi)(1 - p\alpha_L)\beta \), which simply equals \( 1 - p\alpha_H \) (see Result 2). So, the marginal effect of increasing proximity on the probability of observing intervention is constant. From Result 4, we know that the probability that managerial failure escapes both early correction and monitoring is given by \( (1 - \pi)(\alpha_H - \alpha_L)p \). This probability is also linear in proximity. These two probabilities exactly describe the costs and benefits from increasing proximity and if we add the losses from lack of early correction and
intervention to them we obtain equation (3). Their linearity implies that there is no way to balance them and that the optimum is either maximal or minimal proximity.

The conditions that favor minimal proximity are quite straightforward. If the gains from early intervention are relatively small compared to the losses from foregoing future intervention (X is relatively small compared to Y), objectivity is crucial. Also, a small difference in monitoring abilities favors proximity because the loss in objectivity will be small. Finally, as the fraction of low ability monitors decreases, the probability of a loss in objectivity decreases as well, which favors proximity.

The relative importance of late intervention is likely to differ across industries. In industries where early mistakes are costly because of large sunk investments in assets that are not very deployable, early monitoring is probably crucial as the costs of late intervention are relatively small with respect to the costs of a lack of early correction. Our analysis therefore suggests that different industries require different governance structures with respect to the organization of monitoring institutions. This contrasts sharply, however, with the interpretation that we gave earlier about the dominance of intrusive monitoring of the governance ‘systems’ in Continental European countries and in Japan.

7 Control by Non-Monitoring Parties: Shareholder Activism

7.1 Introduction

In the previous section we focussed on the effectiveness of control by parties who monitor the firm in order to identify managerial failure. Throughout the analysis, we assumed that non-monitoring parties (or outsiders) have no information about the status of the firm other than the intervention decision of the monitor. In this section, we enrich this framework by allowing for the possibility that non-monitoring parties also receive information about the efficiency of corporate policy. These non-monitoring parties can then decide to exercise control over the firm. One can best interpret these outsiders as shareholders who do not intensely monitor the firm, but who might become active after observing publicly available information about the firm.\(^{106}\) We also refer to this as shareholder activism.

Our analysis concentrates on the interaction between outsider control and a lack of objectivity from monitoring parties. Anticipating a lack of objectivity of the monitor, outsiders may interfere themselves in the firm after they have received unfavorable information about the state of the firm. Shareholder activism thus provides a potential

\(^{106}\) More generally formulated, these non-monitoring parties can be considered as the principals who for exogenous reasons (for example because this is too costly) are unwilling to monitor the firm themselves.
substitute for (objective) control by the monitor. If this works well, the trade-off between
proximity and objectivity is less immediate than was suggested by the previous section and
the benefits of close monitoring might be achieved without strong distortions in the future
intervention policy.

Our results suggest that this may not be the case. Even if the objectivity of the monitor
is low, outsiders may decide to remain inactive after receiving unfavorable information about
the firm. The reason for this is that the uncertainty about the effectiveness of early monitoring
might discourage outsiders because they are afraid of interfering in the firm while monitoring
has been effective. Shareholder activism may therefore serve as a poor substitute for the
objectivity of the monitor.

7.2 Outline of the Extended Model

We extend the setting that we used in the previous section by introducing a publicly
observable signal. This signal is received after the monitor has potentially corrected
managerial failure but before the intervention decision is made. We denote this date by $t = 1.5$
to distinguish the timing of the signal from the dates at which the monitor can correct
managerial failure or intervene in the firm. This assumption about the timing of the signal is
not innocuous and we will discuss its implications at the end of this section. We assume that
the signal points at uncorrected managerial failure but that it is noisy in the sense that even
when there was early correction by the monitor, the signal may be observed. Let $\underline{s} \in (0,1)$ be
the probability that outsiders observe a signal while managerial failure has already been
corrected by the monitor and $\bar{s} \in (0,1)$ represent the probability of receiving a signal if the
monitor indeed failed to correct it. Informativeness of the signal implies that $0 < \underline{s} < \bar{s} < 1$.

After observing the signal, shareholders can decide to become active and interfere
with the firm. The potential for control by outsiders originates from the anticipation of a lack
of objectivity of the monitor. Fearing a lack of objectivity of the monitor, they can intervene
themselves in the firm in stead of relying on the monitor. We assume that outsider control and
intervention by the monitor are equally effective in terms of firm value so that outsiders are in
principle indifferent between intervention by the monitor and interference by themselves.
There is, however, also a potential cost of interference by outsiders. Their decision to interfere
is based on publicly available information about the firm, which may erroneously point at
uncorrected managerial failure. If managerial failure was indeed already corrected, the change
in corporate policy that is enforced by the outsider will be inefficient. Let $Z$ be the loss in
value if an outsider exercises control based on a wrong signal, where $Z$ is measured relative to the value of the firm after early correction by the monitor.

Throughout the analysis, we will implicitly assume that outsider interference is only relevant after receiving a public signal. We could endogenize this by assuming that if there is no signal, there is a sufficient chance that management succeeded in designing an optimal strategy and that intervention would be extremely costly in that case. To concentrate on the interaction between outsider control and the effectiveness of monitoring, we simply assume that managerial failure always takes place and that outsiders will remain passive if there is no adverse public information about the firm.

To summarize our new setting, the sequence of the events and the decisions taken by the different parties is now as follows. At $t = 0$, managerial failure takes place. At $t = 1$, managerial failure may or may not be corrected by the monitor. At $t = 1.5$, outsiders receive or do not receive a signal that indicates that managerial failure has remained uncorrected and they decide whether or not to exercise control. If outsiders do not exercise control at $t = 1.5$ and if the monitor was unable to correct managerial failure at $t = 1$, the monitor observes at $t = 2$ that managerial failure has occurred and makes her intervention decision. If outsiders interfere at $t = 1.5$, the monitor has no further decision to make. Finally, the monitor gets paid based on its reputation.

### 7.3 Analysis

Let us first inspect the implications of the information structure that we have imposed by analyzing the probability that outsiders observe a signal and the quality of this signal. Consider the probability of observing a signal. Define $\alpha$ as the average ability of the monitors in the economy (i.e., $\alpha = \pi \alpha_M + (1 - \pi) \alpha_L$). The probability of receiving a signal is then given by $p\alpha_s + (1 - p\alpha)s = s - p\alpha(s - s)$. Note that this probability is declining in the proximity of the monitor. This is quite natural because if proximity is minimal, managerial failure will never be corrected at $t = 1$ and the probability of receiving a signal that is suggestive about such failure is than maximal.

Now consider the precision of the signal. Let $'G'\text{'}$ denote the event that the firm is in a good state, i.e. the event that managerial failure has already been corrected by the monitor and let $'s'\text{'}$ denote the event that outsiders receive a signal. The probability that a signal is false is then given by

$$
\Pr(G \mid s) = \frac{p\alpha_s}{p\alpha_s + (1 - p\alpha)s}
$$
Remark that without proximity, early correction never occurs so that the signal is never false. Taking the derivative with respect to $p$ shows that the probability of a false signal is increasing in proximity. So, the quality of the signal tends to decline as the distance between the monitor and the firm becomes larger. Result 6 summarizes these findings.

**Result 6**: Increasing proximity reduces the likelihood that outsiders receive a signal that indicates that the firm policy is inefficient and lowers the quality of the signal.

Note that the first part of Result 6 is nothing more than the observation that because of monitoring, the firm is less likely to be in bad shape when proximity increases. The second part of Result 6 points at the uncertainty that proximity introduces about the state of the firm, which in turn will be crucial for the willingness of outsiders to interfere in the firm. In fact, it reveals that when the scope for control of outsiders is the largest because objectivity is minimal, the information on which they have to base their decision is the least reliable.

With Result 6 in mind, we now analyze how the incentives of outsiders to interfere interact with the proximity of the monitor. We first determine how the intervention strategy of a monitor is affected by the extension of our framework. Will the strategy of the low ability monitor be different from the one presented in Result 2? The answer is no. If the distance between the monitor and the firm is less than maximal, the reputation of the monitor at the time she will have to make the intervention decision will depend on whether or outsiders observed a signal. Good monitors are then less likely to receive a signal than bad monitors. Remember, however, that in equilibrium, the strategy of a low ability monitor was aimed at undoing the informational content of the intervention decision and that preserving her reputation is the best the monitor can do at that stage. Therefore, mimicking the behavior of a good monitor by intervening relatively as often remains the optimal strategy. Result 7 presents this result and the formal prove of it is given in the appendix.

**Result 7**: The intervention strategy of allow ability monitor is unaffected by the possibility that outsiders receive a signal.

**Proof**: See Appendix.
if the expected gains from avoiding a lack of future intervention are larger than the expected loss from erroneous interference.

We first calculate the expected loss from erroneous outsider interference. This loss is simply the probability \( \Pr(G|s) \) that the firms is in a good shape, multiplied with the expected loss from erroneous interference, which is \( Z \). The expected gain from outsider interference is less easy to calculate. It consists of four components: (i) the probability that managerial policy is uncorrected, (ii) the probability that the monitor is a low ability monitor if managerial policy is uncorrected, (iii) the probability that such a monitor will not intervene and (iv) the loss from a lack of intervention. We will now derive each of these components. Let \( B \) denote the event that early correction by the monitor did not take place. Observe that the probability that managerial policy is uncorrected after observing the signal is given by

\[
\Pr(B|s) = \frac{(1 - p\alpha)s}{p\alpha s + (1 - p\alpha)s}
\]

In turn, the probability that after observing a signal, the monitor is of low ability is given by

\[
\Pr(\alpha|B) = \frac{(1 - \pi)(1 - p\alpha)}{(1 - \pi)(1 - p\alpha) + \pi(1 - p\alpha)}
\]

The probability that a low ability monitor does not intervene at \( t = 2 \) if early correction did not take place and outsiders did not interfere at \( t = 1.5 \) is equal to \((1 - \beta)\). Finally the loss from a lack of intervention in that case is \((Y - X)\), which equals the gain from having intervention if managerial has remained uncorrected. So, interference by outsiders after observing a signal is beneficial if the following condition holds:

\[
\Pr(B|s) \times \Pr(\alpha|B) \times (1 - \beta)(Y - X) - \Pr(G|s)Z
\]

Note that besides the anticipated lack of objectivity of the monitor, there will two important factors that determine whether outsider interference is beneficial. These are (i) the loss \( Z \) from erroneous interference relative to the intervention benefit \( Y - X \) and (ii) the probability of an erroneous signal for a given level of proximity \( p \).

The above formula is quite messy to work with without explicit assumptions about the values of the parameters. However, we can obtain some basic results quite easily. The first question we wish to consider is whether it is possible (and likely) that while objectivity of the monitor is minimal, outsiders will still neglect negative information about the firm and abstain from interference. We therefore check whether under fairly general parameter constellations, interference can be detrimental to firm value with \( p = 1 \). Result 8 states that this is indeed the case.
Result 8: With minimal objectivity, i.e. $p = 1$, there exists a whole range of parameter values for which interference by outsiders at $t = 1.5$ does not enhance firm value.

Proof: Assume that $\pi = 0.5$, $\alpha = 0.5, \alpha_{il} = 0.75$ so that $\alpha_t = 0.25$. In addition, let $\theta$ represent the loss from erroneous interference relative to the benefit of avoiding a lack of intervention, i.e. $\theta = (Y - X)/Z$. With $p = 1$, whether or not there is a gain from outsider interference after they observe a signal then depends on the sign of

$$0.5 s - s \delta,$$

where negativity of the above expression corresponds with an expected loss from interference.

Result 8 implies that even if the potential for outsider interference is high because the objectivity of monitor is minimal, non-monitoring shareholders remain passive in interfering with corporate policy. Interestingly, this reluctance originates from the same source that introduces a lack of objectivity, namely, the uncertainty that proximity creates about the effectiveness of monitoring. As a result, outsiders will stand the risk of interfering in the firm while in fact current corporate policy is optimal. This suggests that outsider control may be a poor substitute for objectivity of the monitor and that it is not generally true that the trade-off between proximity and objectivity can be broken down by allowing for control by non-monitoring parties.

Another interesting implication of our analysis is that it suggests that outsider interference might be observed more frequently if proximity is low, rather than high. To see why, recall that the probability of receiving a signal is decreasing in proximity. Assume now that the effect of outsider interference on firm value is positive after receiving a signal, irrespective of the proximity. Outsiders will then always interfere after observing a signal. From Result 6, we know that the probability of observing a signal is decreasing in proximity. Consequently, the probability of observing outsider interference will be decreasing in proximity as well.

One may conjecture therefore that our model predicts that non-monitoring shareholders will generally be more active in corporate governance in a system where proximity of the monitor is low. Because of the complexity of (4), we are unable to verify this conjecture rigorously. However, the next result shows that there exists a large set of quite
reasonable parameter constellations for which a "low" degree of proximity leads to a higher probability that outsiders will interfere than a "high" degree of proximity.

**Result 9:** Assume that $\pi = 0.5$, $\alpha = 0.5$, $\alpha_H = 0.75$ so that $\alpha_L = 0.25$. In addition, assume that the other parameters are such that

$$0.5 - \frac{5}{s} \theta > 0$$

There then exists a $p \in (0, p]$ with $p \in (0, 1)$ for which the probability of observing outsider interference is higher than for any $p^* \in (p, 1]$.

**Proof:** Differentiating (4) with respect to proximity $p$ and evaluating it at $p = 0$ shows that if the above condition holds, the benefit from interference after observing the signal is increasing in proximity at $p = 0$. Recall that this benefit is equal to zero at $p = 0$. Let $p$ be any value such that $p \in (0, 1)$ and that for any $p \in (0, p)$, the benefit of outsider interference is positive. From Result 6, we know that the probability of receiving a signal is declining in $p$. This implies that even if at some $p^* \in (p, 1]$ the benefit of interference is positive after observing a signal, the probability of observing interference at $p^*$ is still lower than at $p \in (0, p)$.

One may argue that Result 9 is mainly driven by our assumption that outsider interference precedes intervention by the monitor. This assumption is quite immaterial, though. Outsiders have nothing to gain from deferring interference until the monitor has made her intervention decision. Recall that whether or not the monitor intervenes is uninformative to outsiders because of the reputational distortion in the intervention policy. Therefore, the trade-off between correcting a lack of objectivity and erroneous interference will be unaffected by delaying the interference decision. Moreover, we have imposed that outsider interference and intervention by the monitor are equally effective. It seems more natural, though, to assume that deferring interference is costly because the firm will operate longer under the inefficient policy. Hence, if we would alter the setting by making interference at $t = 1.5$ slightly better than late intervention by the monitor and outsiders, the ambiguity would be dissolved.

Our assumption about the timing of the signal is less innocuous. Consider what would happen if the signal would be received after the intervention decision of the monitor. Result 7 will then no longer hold because the intervention strategy of the low ability monitor will be
affected by the presence (and informativeness) of the signal. To see this, assume that if early correction takes place, there will never be a signal, implying \( S = 0 \). If the low ability monitor would decide not to intervene at \( t = 2 \) after learning that managerial failure has remained uncorrected, she would lose all of her reputation if these is a signal. Therefore, the low ability monitor will now run the risk of being 'caught' if she does not intervene. This will mitigate the reputational distortions in the intervention policy. As long as the information about the state is sufficiently noisy, the trade-off between objectivity and proximity will of course persist. Note also that the sources that induce a reluctance of outsider to interfere will remain intact. We conjecture therefore that in a setting where outsiders act on the basis of untimely information about the status of the firm, a result similar to our Result 8 can be derived.

8 Conclusion

In this chapter, we have focussed on some recent theoretical insights on the effectiveness of corporate governance. The literature that we discussed provided two elements of corporate governance that are not very well understood. The first one concerns the role and effectiveness of board control. The board of directors/supervisory board is best considered as a separate entity whose interests are unlikely to be perfectly aligned with either shareholders or management. As a consequence, when studying the corporate governance in a theoretical framework it may be crucial to explicitly model the incentives of the board of directors. The second element relates to the dominant notion that more control or more effective monitoring on behalf of the principal will be beneficial for the latter. It turns out that this may not be generally the case: the principal may in fact be better of is she is able to commit not to monitor and control the agent intensively.

Our approach combined these two recent insights into one model. We analyzed the effectiveness of a monitor who is concerned about her reputation as a capable monitor. Our analysis pointed at the existence of a trade-off between the proximity of the monitor and preserving her future objectivity in evaluating corporate policy. Proximity allows for more efficient monitoring in terms of a timely recognition of managerial failure. However, it also creates a situation where the monitor and management become jointly responsible for corporate policy, introducing a lack of objectivity in monitoring.

Our analysis also revealed that the lack of objectivity that is induced by close and intrusive monitoring might be accompanied by a reluctance of non-monitoring shareholders to interfere with the firm. The source of this inactivity is the uncertainty about the effectiveness of intrusive monitoring, which in fact also facilitates the lack of objectivity of the monitor in the first place. Therefore, outsider interference such as shareholder activism may not be very
viable as a substitute for the objectivity of the monitor. We also showed that the probability of observing shareholder activism might be lowest in a system where objectivity of the monitor is minimal. Hence, shareholder activism that is driven by concerns about the objectivity of the monitor might be less frequently observed in corporate governance systems where objectivity is low. This might explain why shareholders are relatively passive in Continental European countries (Franks and Mayer 1990, 1997b).

We believe that our results provide a new perspective on the effectiveness of governance. When monitoring and control take place through close and intrusive monitoring by parties such as non-executive directors (or supervisory board members) and (representatives of) large shareholders, these parties do not *de facto* behave as principals. As a consequence, their involvement in monitoring corporate policy may be associated with both benefits and costs. Our analysis therefore suggests a disclaimer for the popular notion that agency problems are more efficiently controlled in governance systems where large shareholders and non-executive board members are closely involved in monitoring corporate policy.
Appendix

Proof of Result 1:

To prove Result 1, we follow the proof of Theorem 1 in Boot (1992). We first define a Perfect Bayesian (Nash) Equilibrium (PBE). Then we show that identical intervention strategies by both types of monitors can never be an equilibrium if there is proximity, and we will characterize how the equilibrium strategies will depend on each other.

To define a PBE, we first need to introduce some notation. Let the type of the monitor be represented by \( \tau \in \{L, H\} \) and let \( \sigma \in \Psi \) be the intervention strategy of a monitor at \( t = 2 \), with \( \Psi \) representing the set of strategies. We denote the actions 'intervention' (I) and 'no intervention' (NI) by \( a(\sigma) \in \{I, NI\} \).

Definition: A pair of strategies \( [\sigma, \forall \tau; q^a(\sigma), \forall \sigma \in \Psi] \) constitutes a PBE if

1. a monitor of type \( \tau \) chooses his strategy \( \sigma \), optimally in maximizing \( q_2 \), anticipating the beliefs \( q^a(\sigma) \);
2. \( q^a(\sigma) \) is translated into a wage such that this wage is increasing in \( q^a(\sigma) \);
3. the market's belief \( q^a(\sigma) \) following an equilibrium move is a Bayesian posterior of \( \pi \) given \( a(\sigma) \).

Note that the second requirement represents the response of the uninformed (the market) to the action of the informed (the monitor).

Let \( \gamma \in [0,1] \) and \( \beta \in [0,1] \) represent the probability that a respectively a high and a low ability monitor will intervene if the monitor learns that managerial failure has remained uncorrected until \( t = 2 \). The posteriors of \( \pi \) after observing the intervention decision by the monitor are then:

\[
q_z^{it} = \frac{\pi[\delta(1-p\alpha_H)]\gamma}{\pi[\delta(1-p\alpha_H)\gamma]+(1-\pi)[\delta(1-p\alpha_L)\beta]} \tag{A1}
\]

\[
q_z^{hL} = \frac{\pi[(1-\delta)+\delta p\alpha_H+\delta(1-p\alpha_H)(1-\gamma)]}{\pi[(1-\delta)+\delta p\alpha_H+\delta(1-p\alpha_H)(1-\gamma)]+(1-\pi)[(1-\delta)+\delta p\alpha_L+\delta(1-p\alpha_L)(1-\beta)]} \tag{A2}
\]
where we have used Bayes Rule to construct these probabilities.

Now conjecture an equilibrium where $\gamma = \beta > 0$, implying an equilibrium where both type of monitors intervene with positive probability. Substituting for $\beta$ in (A1) and (A2) shows that $q_2^I < q_2^{NI}$ if $p > 0$ and that $q_2^I = q_2^{NI}$ if $p = 0$. Therefore, $\gamma = \beta$ satisfies our definition of a PBE if $p = 0$. If $p > 0$, $\gamma = \beta$ can never be a PBE because the monitor will strictly prefer not to intervene, in stead of intervening with probability $\gamma = \beta > 0$.

We now characterize how $\gamma$ and $\beta$ will depend on each other in equilibrium when $p > 0$. These properties almost immediately follow from the next three results:

1. $q_2^I$ is monotonically decreasing (increasing) in $\beta$ ($\gamma$);
2. $q_2^{NI}$ is monotonically increasing (decreasing) in $\beta$ ($\gamma$);
3. For all $\gamma \in (0,1]$ and $\beta \in (0,1]$, $q_2^I$ and $q_2^{NI}$ are continuous in $\gamma$ and $\beta$.

One can easily verify these results from (A1) and (A2). Note that as a consequence, with $p > 0$, $\gamma > \beta$ is required to obtain $q_2^I = q_2^{NI}$ and that $\beta$ is monotonically increasing in $\gamma$. Finally, we need to establish that there indeed exists an equilibrium in which $0 < \beta < \gamma \leq 1$. Let $\gamma = 1$. Note that $\lim_{p \to 0} q_2^I \bigg|_{\gamma=1} = 1$ while $q_2^{NI} < 1$. Result (1) and (2), together with the continuity suggested by result (3) then imply that there must exist some value $\beta \in (0, \gamma)$ for which $q_2^I = q_2^{NI}$.

Note that there are no out-of-equilibrium moves, so that our proof is complete.
**Proof of Result 7:** Let $q(s)$ denote the updated probability that the monitor is of high ability after the market observes a signal (i.e., $q(s)$ is the reputation of the monitor at $t = 1.5$). Substituting $q(s)$ for $\pi$ in (1) and (2) and evaluating $q_2^I$ and $q_2^{NI}$ using the strategy proposed in Result 2 shows that $q(s) = q_2^I = q_2^{NI}$. The strategies $\gamma = 1$ and $\beta = \frac{1 - p\alpha_u}{1 - p\alpha_x}$ therefore still satisfy the equilibrium conditions that are stated in the proof of Result 1.

The proof for the case when there is no signal is analogue to the one presented here.