Director independence as strategic behavior

Alexander F. Wagner*

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Abstract

This paper analyzes the independence of boards of directors as an optimally chosen, non-contractible behavior. A board behaves loyally to a CEO when it agrees to a negative NPV-project, giving the CEO private benefits. While the CEO benefits from competent directors because they help him make better decisions, the analysis reveals that loyalty is endogenously easier to obtain from a less competent board. The model implies that shareholders face a tradeoff between higher CEO pay and more inefficient board loyalty. It also holds predictions for how firm characteristics, other corporate governance features, and the business environment affect endogenous board competence.

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*Comments welcome. Please do not cite or quote without permission. Assistant Professor of Finance and Financial Markets at the University of Zurich, Member of the Swiss Finance Institute, and Research Associate at the Kennedy School of Government, Harvard University. Office address: Plattenstrasse 14, CH-8032 Zurich, Phone: 0041-44-634-3963, Fax: 0041-1-274-2476, Email: wagner@isb.unizh.ch. Web: www.alex-wagner.com. This research was supported by the NCCR FINRISK and the University Research Priority Program "Finance and Financial Markets," a research instrument of the University of Zurich.

1 Introduction

CEOs benefit from interacting with directors who are able to give useful advice. They benefit because they may truly care about the firm's wellbeing, and in addition because part of their compensation is usually tied to firm performance. On the other hand, sometimes CEOs would prefer even better those directors who defend controversial corporate financial decisions, precisely when they may not be in the best interest of the shareholders, or who cover up for CEOs' abuse of perquisites. In other words, CEOs desire both competent and loyal boards. This paper explores the endogenous relation between these two valued qualities.

The feeling that boards act too much in line with CEOs' preferences, rather than with shareholders' preferences, and that boards consist too frequently of people exceedingly loyal to CEOs has led many countries to adopt new standards of corporate governance. Governance codices such as OECD (2004) prescribe, e.g., a certain number of "independent" directors. The potential inadequacy of these structural reforms is brought out perhaps most forcefully by the case of WorldCom. The board of WorldCom would have qualified as independent by today's standards (even the CEO and chairman positions were separated). However, as Kaplan (2005) points out, the directors "were not truly independent" (p. 7). But what is "true independence" (rather than *de iure* independence) as opposed to what one might describe as *de facto* loyalty or obedience?

This paper analyses director loyalty as a costly, optimally chosen behavior, not as a given trait that is determined by a director's status as an outsider or his character.[1] It posits that both insiders and outsiders, however defined, respond to incentives set in their relationship with the CEO. In particular, in section 2, I consider a firm where a male CEO (C) would like to implement projects (e.g., acquisitions) which sometimes have positive net present

[1] This is not to say that personality plays no role for loyalty; of course, it does. So do personal connections that exist between CEOs and boards (see, e.g., Nguyen-Dang (2005)). Moreover, even if competence and loyalty were independently distributed immutable personal characteristics, a CEO who focuses on loyalty will, on average, favor less competent directors than a CEO who focuses on competence. The analysis here demonstrates that there is an additional, endogenous cost of strategically optimal loyalty in terms of competence.

value (NPV) but sometimes are value-destroying. More competent boards (B) are better at helping C determine the quality of a proposed project. B (who is also taken to be male) is modeled as a unitary actor that fulfills both monitoring and advisory rules, as boards do in the US and other countries. C would like B to agree to any acquisition, even value-destroying ones, because he has an empire-building motive that may be stronger than the disincentives for value-destruction that are given by his stock ownership in the firm.[2] B also holds some stock in the firm, or cares about his career. Naturally, B will only agree to bad projects if he receives some loyalty rewards that compensate him for costly acts of loyalty. (For example, in the case of WorldCom, the board was co-opted with special gifts and perquisites.) C and B usually cannot write an explicit contract on the exchange of loyalty for rewards. Rather, they need to sustain this exchange through a self-enforcing contract. This simple framework provides several interesting predictions.

First, loyalty may be feasible only for less than fully competent boards, because highly competent directors require large rewards for loyalty, but these rewards may not be credibly promised by the manager. Although this finding is in itself not too surprising – it can be interpreted as a corollary of the Folk Theorem – its implication is relevant for the corporate governance debate: Ceteris paribus, where shareholders are powerful enough to elect a competent board, they will have to worry less about that board becoming too obedient to the CEO.

Second, the model predicts that while in difficult situations shareholders would prefer a competent board to help them identify the rare positive NPV projects, it is precisely in these situations that an empire-building CEO tends to prefer a less competent board.

Third, the model implies that we should expect a positive correlation between director competence on the one hand and measures of the power of C's and B's incentives, short-horizon interactions of C and B, difficulty of appropriation of private benefits by the CEO, and the volatility of outcomes of projects, respectively, on the other hand. Section 2 also

[2]Recent research indicates that CEOs frequently just want to live the quiet life (Bertrand and Mullainathan 2003). Even in-action is subject to (perhaps implicit) board approval, making the model applicable to that case as well.

provides evidence that supports some of the model's predictions, but several hypotheses remain to be tested. Section 3 discusses the model and some extensions.

Section 4 analyzes how shareholders would optimally incentivize (with linear contracts) the CEO in this setting.[3] I show that while shareholders can avoid inefficient board loyalty and obtain competent boards by increasing the CEO's pay-performance sensitivity, this comes at a cost: Because in expectation more good projects are realized, executive pay is higher. This reflects the notion that hard problems have costly solutions.

This paper contributes to the literature, going back to Mace (1986) and Jensen (1993), that studies the practical difficulties inherent in making boards perform their function as stewards of shareholders' interests. Most empirical research on the corporate performance effects of boards begins with the assumption that directors' effectiveness is a function of the board's independence from management, using proxies like size and the relative numbers of inside and outside directors as proxies for board structure and independence. The evidence for greater performance of boards with formally independent directors is surprisingly weak (see Becht, Bolton, and Roell (2003) and MacAvoy and Millstein (2003) for somewhat dated, but still highly relevant overviews), indicating that a piece of the picture seems to be missing. A growing, but still small, recent theoretical and empirical literature has analyzed boards as an endogenous institution.[4] For example, some theories imply that powerful and competent CEOs can make the board less independent (Hermalin and Weisbach 1998); that optimal boards employ larger numbers of outsiders when managers' private benefits are high and the cost of monitoring is low (Harris and Raviv 2005, Raheja 2005); and that CEO-board friendships may have advantages in terms of information revelation (Adams and Ferreira 2005). There is some empirical support for all of these predictions (Boone, Field, Karpoff, and Raheja 2006). Moreover, in complex environments, larger boards with more independent outsiders are prevalent, consistent with arguments put forward by Coles, Naveen, and Naveen

[3] Although the focus on shareholders implies that the paper most directly applies to anglosaxon countries (Allen and Gale 2002), the basic problem of the tradeoff between loyalty and competence of directors remains relevant even if other stakeholders are also considered.

[4] This is partially motivated by the early empirical study by Shivdasani and Yermack (1999) who found that CEOs appear to prefer insiders as directors.

(2006) and others. Director competence has not received similar attention as a variable of central interest in corporate governance, at least not in the context of what competence implies for the relation to the CEO.[5] This paper, therefore, adds to the existing body of knowledge by focusing on the long-term interactions between CEOs and directors in a context where both the advisory and the monitoring role of boards are relevant.[6] While in papers such as Hermalin and Katz (1998), independence is a preference parameter (namely, the inverse of disutility from monitoring), this paper studies independence as an optimally chosen behavior that depends on competence. In terms of the current corporate governance debate, the thesis here is that CEOs may be willing to choose *de iure* independent, but insufficiently competent and therefore *de facto* loyal boards of directors.

2 *De facto* board independence or obedience

2.1 Setup

Consider the interaction between a (male) CEO (C) and a (male) board (B). Both agents are infinitely lived, with discount factors δ. The model does not consider interactions within the board, but rather treats the board as a unitary actor. This is of course an incomplete description of the rich interactions that characterize CEO-board relationships, but it helps to bring out the paper's point.

Every period, a project opportunity comes along. The projects meant here are sufficiently large for the board to be involved in decision-making. For example, one might consider acquisitions, strategy choices, and other large projects. With probability p, the project is

[5] Song and Thakor (2006) also provide a model, though in an altogether different setting, in which a CEO may desire a less able director. They study a career concerns setup where the CEO controls the board's screening information.

[6] A recent attempt to study extreme board obedience is Morck (2004). He makes the connection between directors' subservience and the innate psychological predisposition to obey authority that was famously demonstrated by Milgram (1974). He concludes that dissenting peers and independent directors are the solution. This paper serves as a formalization of some of the arguments, but also as a caveat to these conclusions. Independence and dissent are always (also) choice variables, not (only) given traits of character.

of high quality and yields an NPV $y_H > 0$ for the firm. With probability $(1-p)$, the project is low quality and yields an NPV $y_L < 0$ for the firm. The expected NPV is $Ey = y_L + p\Delta$, where $\Delta = y_H - y_L > 0$. We can allow Ey to be positive or negative.[7] $Ey > 0$ describes *easy* situations, and $Ey < 0$ indicates *difficult* situations. I concentrate on difficult situations and provide results for $Ey > 0$ in the Appendix. For example, although there is some discussion in the literature on the average wealth creation or destruction effect of acquisitions, one plausible case is that in some industries, acquisitions are on average a bad idea for shareholders.

Basic payoffs As is well-known, linear incentive schemes may not be optimal, but they are convenient to illsutrate the paper's point. Specifically, I assume that C and B both receive a fraction of output as compensation.[8] For some output y_i, C's and B's payoffs are ay_i and sy_i, respectively. I assume that the two agents' participation constraints are satisfied, e.g., because holding a position in the company is sufficiently rewarding in itself. Shareholders, who are assumed to behave passively for now (see section 4 for optimizing shareholders), are the residual claimants and receive $(1-a-s)\,y_i$.

C's private benefits The CEO does not observe project quality on his own; he requires the advice from the board. However, the CEO derives private benefits from implementing any project, be it positive or negative NPV. Denote these private benefits with $\psi > 0$. For example, a corporate jet may or may not be efficient for the firm to have,[9] but the CEO derives private benefits from it in either case. Similarly, an empire-building CEO likes acquisitions, and considers their true economic value only as an additional and perhaps even

[7] Besides the projects we analyze here, it is assumed that a firm has a business that generates sufficient profits to keep a firm in business even if it implements negative NPV-projects. It is of course not obvious that the expected NPV stays the same forever. In particular, there may be periods where Ey is positive and others where it is negative. We abstract from this complication here.

[8] That there is some degree of pay-for-performance for CEOs is not controversial. For directors, this assumption is a shortcut to model the various explicit incentives and career concerns documented by Yermack (2004).

[9] See Yermack (2006).

secondary factor.[10] I assume that $\psi + y_L < 0$. In other words, there is an incentive scheme $\hat{a}$ that falls short of selling the firm completely to C ($\hat{a} < 1$) such that C does not derive sufficiently large private benefits from implementing projects that he is willing to implement a bad project. Put yet another way: Negative NPV projects and board loyalty are also socially inefficient, even taking into account that C receives benefits from them. We will say that CEO incentives are (relatively) *high-powered* when $\psi + ay_L < 0$, and (relatively) *low-powered* when $\psi + ay_L > 0$. In this section, we consider the case where $\psi + ay_L > 0$, i.e., C wants to implement all projects. We turn to high-powered incentives in section 4.

B's actions When B dissents to a project, C's utility is reduced to what he would earn if he were fired. I assume that on average firms make 0 profit, thus C earns $a * 0 = 0$ as his reservation utility. In a less extreme version of the model, C has to expend effort to overcome resistance of B. In other words, a formal veto power for B is not required for B to be powerful.

Rewards for costly loyalty Given that B suffers costs from agreeing to a negative (expected) NPV-project, C has to offer B rewards if he consents nonetheless. I denote these rewards by x. Rewards may, for example, consist in C lauding B's abilities in his conversations with other CEOs such that B's chances for securing additional directorships are enhanced.[11] The CEO may also provide perquisites like planes (as in the case of WorldCom). To make matters as hard as possible for the CEO, I assume that he bears all the costs. Of course, to the extent that it is the company – or rather the shareholders – that pays, the CEO has an even greater incentive to try to induce loyalty.

The notion that loyalty is costly for board members and that CEOs have various options at their disposal for rewarding loyalty can be found frequently in the anecdotal and empirical

[10] Even though some acquisitions may create wealth for shareholders while they destroy value overall, many acquisitions are also likely to destroy wealth for acquiring shareholders. It is the latter case that the model speaks to most directly.

[11] Fich and Shivdasani (2006) calculate the median value of a directorship to be close $1 million, not taking into account the effort needed for the directorship.

literature on boards (see, e.g., Gerety and Lehn (1997)). For example, Lorsch and MacIver (1989) document that prestige and business contacts are very important, sometimes more important than explicit monetary rewards. Much like the rewards may be nonmonetary, in practice, the costs that B needs to bear in order to be loyal need not be restricted to the direct monetary cost of lower compensation. For example, to the extent that C requires B to participate in fraudulent behavior, the director may lose other directorships when a lawsuit is filed. Fich and Shivdasani (2006) provide evidence for this. Srinivasan (2005) finds that outside directors are penalized with a loss of directorships when their firms issue an accounting restatement, with the greatest loss in directorships for audit committee members and for the most severe earnings restatements.

Noncontractibility Rarely will C and B be able to write a court-enforceable contract about B's voting behavior and C's rewarding behavior. The essence of board - CEO loyalty lies in the non-contractibility of important aspects of their interaction. Because contracts are incomplete, and because literal slavery of B is (to the great dismay of some C's) not an option, the CEO can only aim to establish loyalty over time, through repeated interaction.

B's competence The board's competence is denoted by θ. I posit that θ is chosen by C. In many firms, this assumption, while probably exaggerating the power of executives, mirrors the dominant role CEOs frequently play vis-a-vis their shareholders.

The role of competence is to allow the board to identify the quality of projects that come the firm's way. In particular, with probability $\pi(\theta)$, B learns the project type. I also assume that B passes on this information to C; the only friction in the B-C-interaction is the non-contractibility of behavior.[12]

For simplicity, I let $\pi(\theta) = \theta$, and $(1-\theta)$ is the probability that B does not learn anything. Each period, there are thus 3 states: In *state H*, B has learned that the project type is High. In *state L*, B has learned that the project type is Low. And in *state U*, B

[12]It is possible that a board could try to extract bribes from the CEO by threatening to veto the project even if it is a good project. At least in the model presented here, this threat is not credible in the sense of being subgame-perfect.

remains ignorant. The stage payoffs in these three states are given by the following payoff matrices.

Table 1: Payoff matrix in state where B learns that the project is High

State High (H): probability θp

	B consents	B dissents
C rewards	$ay_H + \psi - x,\ \ sy_H + x$	$-x,\ x$
C does not reward	$ay_H + \psi,\ \ sy_H$	$0,\ \ 0$

Table 2: Payoff matrix in state where B learns that the project is Low

State Low (L): probability $\theta\,(1-p)$

	B consents	B dissents
C rewards	$ay_L + \psi - x,\ \ sy_L + x$	$-x,\ x$
C does not reward	$ay_L + \psi,\ \ sy_L$	$0,\ \ 0$

Table 3: Expected payoff matrix in state where B does not learn project quality

State Unknown (U) : probability $(1-\theta)$

	B consents	B dissents
C rewards	$aEy + \psi - x,\ \ sEy + x$	$-x,\ x$
C does not reward	$aEy + \psi,\ \ sEy$	$0,\ \ 0$

Timing and assumptions Before the game starts, the shareholders set incentives a and s. We will endogenize them in section 4. As state earlier, let us assume that $Ey < 0$.

In period 0, C has to announce which x he is intending to pay for loyalty. He can only announce one reward, independent of the state.

In period 1, with probabilities $\{\theta p, \theta\,(1-p)\,, (1-\theta)\}$ the three states $\{H, L, U\}$ get realized. This is commonly observed.

In period 2, the agents play the game of the relevant stage in a simultaneous-move fashion.

In the case of repeated interaction, the economy restarts in period 0. Depending on the history of play, players optimize their strategies (on the strategies used to sustain cooperation see below).

2.2 Statically optimal behavior (spot interaction)

Consider first the case where the above game is played once only. To solve for the level of board competence that C prefers, then, requires us to determine the equilibria in each of the three possible states. It is easy to verify that the Nash equilibrium in state H is {not reward, consent}. In states L and U, it is {not reward, dissent}.

C's expected utility in spot interaction is therefore given by

$$Eu_C^S = \theta p\left(ay_H + \psi\right) + \theta\left(1-p\right)0 + \left(1-\theta\right)0, \tag{1}$$

Shareholder utility is given by

$$Eu_S^S = \theta p\left(1-a-s\right)y_H + \theta\left(1-p\right)\left(1-a-s\right)0 + \left(1-\theta\right)\left(1-a-s\right)0. \tag{2}$$

Clearly, in difficult environments ($Ey < 0$), $\theta = 1$ is optimal. Intuitively, C would rather avoid B possibly not learning the state of the world, because in case of doubt, B dissents. In other words, C is no worse off when B finds out that the state is L than if the state is U. Thus, C maximizes the probability that B finds out that the state is H.

In summary:

Proposition 1 *In spot interaction, the CEO prefers a maximally competent board.* $\theta_S^* = 1, Eu_C^S = p\left(ay_H + \psi\right),\ Eu_S^S = p(1-a-s)y_H$.

2.3 Repeated interaction

Because C derives private benefits that balance and sometimes outweigh his losses even from negative NPV projects, C would sometimes like B to agree to all projects. In other words, when C's incentives are low-powered, he would like him to consent in all three states, H, L, and U. (I will discuss C's preferred loyalty pattern when his incentives are high-powered in section 3.) Although B's loyalty to C may not be in the shareholders' interests, C may be able to secure loyalty by offering sufficient loyalty rewards x. However, since loyalty and its rewards are non-contractible, the only way to achieve this result is through repeated interaction and a relational (self-enforcing) contract. The crucial difference of this analysis

from that of a standard repeated Prisoner's Dilemma is that C can choose which amount x to offer and with whom to play the game.[13]

In this setting, I consider self-enforcing (relational) *loyalty with rewards* contracts. I concentrate on stationary contracts of the following form: B promises to be loyal to C. C promises to pay x in each period.[14]

The timing of events becomes relevant. In particular, we need to ask whether C can take ψ, but not pay x, and whether B can take x, but still dissent. That is, can the parties deviate from the loyalty agreement and still obtain the other side's cooperative contribution? In the standard Prisoner's Dilemma, the answer to this question is yes. Even when C and B do not literally move simultaneously, this is the correct assumption to make when they do not learn the other party's move until later in the period. I will therefore proceed under this assumption.[15]

2.3.1 Non-reneging constraints

I now present the conditions for loyalty with rewards to be an equilibrium supported by trigger strategies, i.e., strategies in which C and B promise each other allegiance and rewards, and any one-time deviation results in both players exerting the statically optimal behavior

[13] Some recent literature has analyzed mutual partner selection where purposeful matching replaces random or tournament matching. See, e.g., Orbell and Dawes (1991) and Morikawa, Orbell, and Runde (1995), among others. However, in these papers, being cooperative is assumed to be a trait and the problem is to learn about others' characters. Wagner (2005) presents a model where there is also a tradeoff between loyalty and competence. In his model, loyalty is always efficient, there are no shareholders that act as a counterweight to the "liege lord's" desires for loyalty, and the value of loyalty is independent of competence. Other models derive a loyalty-competence tradeoff in a static context (Glazer 2002, Friebel and Raith 2004, Egorov and Sonin 2006).

[14] Levin (2003) provides a general theorem that shows we can limit our attention to stationary contracts in settings like the one considered here. There would be state-varying payments if the outside wage were also state-varying (Thomas and Worrall 1988). That rewards are paid every period and not merely whenever loyalty is costly for B is a convenient assumption that is consistent with this literature.

[15] One can show that when only one of the players is tempted, the tradeoff between loyalty and competence derived momentarily is either attenuated or exacerbated.

in all future periods.[16]

Both agents know that on the reneging path, B will not agree to the project. C's non-reneging constraint, therefore, is,[17]

$$ay_L + \psi - x + \frac{\delta}{1-\delta}\left[\begin{array}{c}\theta p\left(ay_H + \psi - x\right) + \theta\left(1-p\right)\left(ay_L + \psi - x\right) + \\ \left(1-\theta\right)\left(aEy + \psi - x\right)\end{array}\right] \quad \text{(NR-C)}$$

$$\geq \quad ay_L + \psi + \frac{\delta}{1-\delta}\left[\theta p\left(ay_H + \psi\right) + \theta\left(1-p\right)\left(0\right) + \left(1-\theta\right)\left(0\right)\right], \tag{3}$$

which implies that

$$x \leq \delta\left(\psi + aEy\right) - \delta\theta p\left(\psi + ay_H\right). \tag{4}$$

That is, the maximal amount of rewards C can promise are decreasing in the board's competence.

For the board, honoring his promise of loyalty is preferred if and only if deviating today (and thus avoiding the negative NPV project) plus spot interaction going forward is dominated by suffering $sy_L < 0$, but obtaining x in each period. Formally, the board's non-reneging constraint (NR-B) is, in a state where B knows that the project is of low quality,[18]

$$sy_L + x + \frac{\delta}{1-\delta}\left[\begin{array}{c}\theta p\left(sy_H + x\right) + \theta\left(1-p\right)\left(sy_L + x\right) + \\ \left(1-\theta\right)\left(sEy + x\right)\end{array}\right] \quad \text{(NR-B)}$$

$$\geq \quad x + \frac{\delta}{1-\delta}\left[\theta p\left(sy_H + x\right) + \theta\left(1-p\right)\left(0\right) + \left(1-\theta\right)\left(0\right)\right]. \tag{5}$$

Simplifying yields

$$x \geq -\frac{sy_L}{\delta} - sp\left(y_H\left(1-\theta\right) - y_L\right). \tag{6}$$

[16] This is the standard assumption for self-enforcing contracts and has been used both in methodological research (Bull (1987), MacLeod and Malcomson (1989), Levin (2003)) and in applications such as Baker, Gibbons, and Murphy (2002). I assume away any psychic costs that a CEO or a director may have when they renege.

[17] In studying the non-reneging constraints, we can restrict ourselves to the case where we start in state L. That is the state where the reneging temptation is greatest for B. For C the reneging temptation in states L and U is the same.

[18] Note that the non-reneging constraint when B does not learn the project's quality is implied by NR-B.

Loyalty is costly for competent boards because they may know with greater certainty that a bad state was realized.

Combining the two NR's yields the maximum level of competence compatible with loyalty,

$$\theta \leq \frac{\delta^2 (\psi + aEy + sp\Delta) + sy_L}{\delta^2 p \left(\psi + ay_H + s\frac{\Delta}{\delta}\right)}. \tag{7}$$

Recall that θ cannot be negative. From this inequality, we can make the following observations.

Proposition 2 ***(Feasibility of loyalty)*** *Loyalty of too competent boards is infeasible.*

In other words, if a CEO is given a sufficiently competent board, or if his power in lobbying for a less competent board is limited, there will be no loyalty. This result is, of course, a specific version of a Folk Theorem. In particular, loyalty is feasible only if

$$\psi + y_L \left(a + \frac{s}{\delta^2}\right) + p(a+s)\Delta > 0, \tag{8}$$

in which case the numerator in expression (7) is positive.[19]

If the CEO is free to choose his board, he prefers zero competence of his board.[20] Let $\tilde{x}(0) = -\frac{sy_L}{\delta} - sp(y_H(1-0) - y_L) = -s\left(\frac{y_L}{\delta} + p\Delta\right)$. Thus, we find that spot interaction is preferred to loyalty if and only if

$$\begin{aligned} \Omega &\equiv Eu_C^S - Eu_C^L > 0 \Leftrightarrow \\ p(ay_H + \psi) &> aEy + \psi - \tilde{x}(0). \end{aligned} \tag{9}$$

Simplifying this condition and rearranging yields

[19] Note that, even as $s \longrightarrow 0$, and thus the required loyalty payments approach zero, only less than full competence may be compatible with loyalty. In particular, the precise condition for $\theta < 1$ even when $s \longrightarrow 0$ is that $\psi + ay_L < \frac{1}{1-p}$. The reason is that as long as B does not approve the project in the unknown state on the reneging path, C has to fear B's punishment.

[20] To see this, note that the CEO's expected utility is $spy_H(1-\theta)$, plus a term that does not depend on board competence.

Proposition 3 ***(Desirability of loyalty)*** *C prefers loyalty (which involves zero competence of B) to spot interaction (which involves maximal competence of B) if and only if*

$$(1-p)(\psi + ay_L) + s\left(\frac{y_L}{\delta} + p\Delta\right) > 0. \tag{10}$$

Figure 1 shows the condition in Proposition 3 graphically.

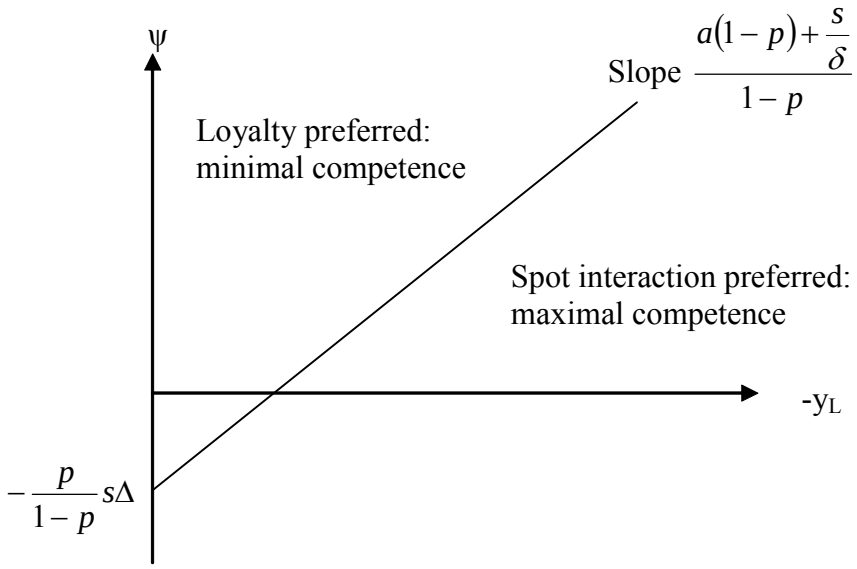

Figure 1: A CEO prefers board loyalty (and thus, board incompetence) when private benefits are high, incentives of the CEO and the board are low-powered, and when CEO-board interactions are sufficiently long-lasting.

Proposition 3 shows under which conditions loyalty is desirable, assuming that it is feasible. However, even when condition (10) is fulfilled, this does not mean that condition (8) holds as well. In particular, one can show that

Corollary 1 *Loyalty is feasible whenever it is desirable for C if and only if* $\delta > 1-p$ *and* $\frac{a}{s} > \frac{p}{1-p}$.

Proof. *See the Appendix.* ■

Graphically, the first condition ensures that the slope of the "desirability line" in Figure 1 is steeper than that of the "feasibility line," while the second condition ensures that the intercept of the "desirability line" is higher than that of the "feasibility line."[21] Economically, as long as C and B are patient enough, as long as the low state is not too unlikely, and as long as the CEO's pay-performance-sensitivity is sufficiently large compared to the directors', C can credibly promise to reward loyalty.

2.3.2 Comparative statics, empirical predictions, and evidence

The comparative statics thus imply that

Corollary 2 *(i) A CEO who has a greater stake in the firm's performance will less likely implement loyalty, i.e.,* $\frac{\partial \Omega}{\partial a} > 0$.
(ii) When the board has a greater stake in the firm's performance, C will less likely implement loyalty, i.e., $\frac{\partial \Omega}{\partial s} > 0$.
(iii) The more private benefits a CEO obtains from implementing projects, the more likely he is to implement loyalty, i.e., $\frac{\partial \Omega}{\partial \psi} < 0$.
(iv) For a given expected NPV $Ey < 0$*, the worse the bad project outcome gets, the less likely the CEO is to implement loyalty (if it even remains feasible), i.e.,*$\frac{\partial \Omega}{\partial(-y_L)} > 0$.
(v) Longer durations of interactions make loyalty more desirable, i.e., $\frac{\partial \Omega}{\partial \delta} < 0$.

The same factors that make loyalty less feasible also make it less desirable for C. Moreover, loyalty entails lower director competence. The key empirical prediction, therefore, is that

Corollary 3 *There is a positive correlation between director competence on the one hand and measures of the power of C's and B's pay-performance-sensitivities, short-horizon interactions of C and B, difficulty of appropriation of private benefits by the CEO, and a mean-preserving spread of outcomes of projects, on the other hand, respectively.*

[21] If the first condition fails, there is a range of low values of $-y_L$ where for some relatively low values of ψ loyalty is desirable but not feasible. If the second condition fails, there is a range of higher values of $-y_L$ where for some relatively low values of ψ loyalty is desirable but not feasible.

These variables are measurable, both in principle and in practice. Director competence can be gleaned (albeit imperfectly) from the director's educational background, his previous professional experience (perhaps in particular in the relevant sector), the level of positions attained in other companies, etc. There are various measures of pay-performance-sensitivities. The duration of the interaction may be proxied for with term lengths as well as the extent of interlocking relationships. Another measure could be the number of anti-takeover provisions; more such provisions tend to imply longer CEO and director tenure. Volatility of earnings and returns, either in the past for the same firm or concurrently for firms in the industry, may be appropriate measures of the potential downside, y_L, for a given expected future development. One might also consider a firm's number of business segments to proxy for complexity. Finally, for the difficulty of appropriation of private benefits by the CEO, one might use a firm's free cash flow or indices of other corporate governance qualities (Boone, Field, Karpoff, and Raheja 2006). For example, even if the board of directors fails to adequately reign in the CEO, the market for corporate takeovers may still put a limit on what the CEO can achieve. This would indicate that where the CEO is strongly protected against takeovers (through poison pills etc.), he can expect more private benefits (higher ψ) once he gets the board on this side.[22]

The model assumes that the CEO selects board quality. Of course, some firms have installed nominating committees, sometimes without CEO participation. To the extent that shareholders are able to influence the selection process more strongly, boards will be more competent. In a regression that aims to explain director competence, we thus expect a negative coefficient on an interaction effect between environment difficulty and CEO participation in the nomination process.

A good reason for a firm not to hire the most competent director available in the market is that he may just be too expensive. This consideration has, with perfect labor markets and identical firm technologies for using board competence, no effect on the desired competence level. The reason is that the marginal product of director competence would be exactly

[22] Separating through which channel anti-takeover provisions affect optimal board competence – through δ or ψ – would seem a challenging and perhaps not that central task.

offset by the higher wage. Thus, one could only possibly include a measure of whether a director's skills put him into a quasi-monopolistic position. Clearly, this is a challenging task for the empirical analysis.

Little direct evidence is as of now available on how board competence affects the choice of boards, on how board competence affects performance, and on whether CEO's choices of boards take the loyalty-competence tradeoff into account. But one can begin piecing together some elements of the puzzle. Gerety, Hoi, and Robin (2001) find that stock markets react less favorably to the adoption of director incentive plans when the CEO has greater influence over the director selection process. Because shareholders' welfare is increasing in director competence, the stock market effect is likely to capture, at least to a substantial extent, lower competence of directors. DeFond, Hann, and Hu (2005) find that the market reacts favorably to the appointment of accounting financial experts when corporate governance is strong, i.e., when not much x can be paid. Fich and Shivdasani (2006) provide evidence that directors in companies where fraud is alleged retain fewer additional directorships. Since additional directorships give directors additional utility, this indicates that the cost of loyalty even for those directors whose compensation is not tied to firm performance may be substantial. Markarian and Parbonetti (2005) provide preliminary evidence that firms choose directors who have more expertise in the business field when the environment is complex. The findings of all of these papers are consistent with the model laid out in this paper. Finally, there is some anecdotal evidence of the loyalty-competence tradeoff "the other way around," namely that chairmen of boards, when they "move up" from the CEO's chair, do not want too competent CEOs because they may break with their preferred strategy for the firm.[23]

[23] An already classic case in point is Volkswagen. Ferdinand Piëch strongly wanted to induce his successor as CEO, Bernd Pischetsrieder, to keep to the strategy designed by Piëch. In fact, some argued at the time that Piëch favored Pischetsrieder precisely because he was not the most competent CEO available (Manager-Magazin, October 18, 1999, August 19, 2000, January 21, 2001, and February 28, 2001.) It turned out that Pischetsrieder did not behave loyally enough. After a prolonged (and probably costly) struggle, Piëch forced Pischetsrieder out. Some argue that the relationship between the former CEO and current chairman of the board of Siemens, Heinrich von Pierer, and the current CEO, Klaus Kleinfeld, is beginning to shape up in the same way (Financial Times, December 14, 2006). One needs to keep in mind that Germany of course

Again, more systematic tests, guided by the hypotheses developed in this paper, would be desirable.

3 Discussion

One normative interpretation of the model is that to the extent that the CEO is not completely in charge of selecting his own board, shareholders can reap potentially significant benefits from pushing for highly competent directors. These directors will thus be especially valuable for shareholders whose company faces a difficult environment. In this section, we first discuss whether the results are robust to alternative modeling assumptions. We then consider extensions.

3.1 Robustness

There are two ways in which we can deviate from the basic model.

Partial loyalty. First, consider the possibility that C may engage in a loyalty agreement with B only in some states. It is useful to introduce some terminology for the following results. A *comprehensive loyalty agreement* describes the case where B is loyal in all states and C rewards in all states. This is the type of agreement we have considered so far. A *partial loyalty agreement* describes the case where C rewards loyalty only in either state L, or state U, or in states U and L, and B is loyal in the rewarded states. (B consents to the project in state H even without additional rewards.)

Denote with EU_C^{CL} the CEO's expected utility under complete loyalty with rewards, with EU_C^{PL} the CEO's expected utility under partial loyalty with rewards and with EU_C^S the CEO's expected utility under spot interaction. The proof of Proposition 4 reveals that if condition (10) holds, then $EU_C^{CL} > EU_C^{PL} > EU_C^S$. If condition (10) does not hold, then $EU_C^S > EU_C^{CL} > EU_C^{PL}$. This result is surprising at first. Indeed, the CEO can get a fully competent board member to engage in loyalty in only the low state. The reason for

has some peculiarities in terms of its corporate governance, but these cases are nonetheless instructive.

this is that the minimum loyalty rewards are lowest for the most competent boards, and the maximum loyalty rewards C can promise are highest for the most competent boards. Loyalty and competence are thus complements in feasibility here. But the expected costs of loyalty turn out to be too high relative to the gains from loyalty.

Suppose now that C pays B to be loyal in states L and U. (B acts loyally out of his own interest in state H.) In this case, the minimum required loyalty rewards can be shown to be increasing in board competence, while the maximum rewards C can offer are, under some conditions, decreasing in board competence. Thus, feasibility of this type of partial loyalty is limited. It also is true, however, that the CEO's welfare is increasing in board competence and the loyalty rewards. The maximally attainable utility for the CEO, therefore, occurs for maximal board competence. Even that outcome, however, is dominated by the case where C pays for loyalty of an incompetent board in all three states.

We can summarize these results in the following way:

Proposition 4 *If the CEO prefers implementing any loyalty, then a comprehensive loyalty agreement is preferred. In this case, the CEO prefers an incompetent board. Otherwise, spot interaction with a fully competent board is preferred. The CEO never implements a partial loyalty agreement.*

Proof. See the Appendix. ■

Sequential moves. The simultaneous-move assumption made so far is appropriate when the CEO needs to engage in rewarding actions before the board meeting, which are sunk at the time the meeting takes place, but the board cannot observe whether the actions have been taken until it has taken a decision whether to support the CEO or not. But there may be instances where especially the CEO is tempted to renege on a promised loyalty reward, particularly if they are delayed rewards.[24] Even so, the basic predictions of the model remain intact. We will say that *only C is tempted*, if only C's non-reneging constraint needs

[24] Building a reputation for rewarding loyalty certainly is one option, but this is outside the present model.

to hold, whereas for B, only individual rationality, is required, i.e., the loyalty rewards must be greater than the expected costs of loyalty. First, we find that

Proposition 5 *If only C is tempted, a comprehensive loyalty agreement of a too competent B may be infeasible. A partial loyalty agreement is more likely to be feasible for a competent B, but it may also be infeasible.*

Proof. See the Appendix. ■

Specifically, the condition for comprehensive loyalty to be feasible is quite similar as before: $\theta \leq \frac{\delta(\psi+aEy)+sEy}{\delta(p\psi+apy_H)}$. By contrast, the condition for partial loyalty to be feasible is $-sy_L(1-\delta) \leq \delta\theta(1-p)[ay_L+\psi+sy_L]$. If the term in square brackets is positive, this condition is more likely to hold for more competent boards; if it is negative, i.e., if the CEO and the board jointly care about output enough ($a+s$ is large enough), loyalty is infeasible.[25]

Moreover, when C is allowed to pick his preferred board, one can show that the outcome now depends on whether

$$(\psi + ay_L)(1-p) + sEy > 0. \tag{11}$$

In particular, we have

Proposition 6 *Suppose condition (11) holds and only C is tempted. Then the CEO implements a comprehensive loyalty agreement with an indeterminate degree of board competence. If (11) does not hold, the CEO prefers spot interaction with a maximally competent board. The CEO never implements a partial loyalty agreement.*

Proof. See the Appendix. ■

The intuition for the result that the degree of competence is indeterminate in the first case is the following: Here, the costs of loyalty are independent of the board's competence, because the board has no commitment problem as before. Therefore, C's welfare is independent of board competence. This is similar in flavor to Proposition 4. The empirical predictions of Corollary 4 are thus slightly weakened, but overall they still go in the same direction.

[25] One way to frame these results is to say that competence and *comprehensive* loyalty are substitutes, while competence and *partial* loyalty are complements.

The proof of the Proposition also reveals that even though loyalty and competence are complements in a partial loyalty agreement, the comprehensive loyalty agreement is preferred.

3.2 Discussion

The model's parameters of course do not capture everything that determines the degree of board loyalty to CEOs. For example, anecdotes indicate that CEOs prefer to have their school buddies on boards. Nevertheless, competence, the power of incentives and the characteristics of the business environment are likely to be additional key determinants of loyalty. Similarly, the insider-outsider-dichotomy cannot capture the rich interactions between CEOs and directors. Neither can this model, but at least it provides a first step towards highlighting additional, measurable drivers of actual board behavior.[26] A number of extensions can provide richer predictions or a better understanding of the model's implications.

First, in this paper, director loyalty is only inefficient. Thus, if loyalty is infeasible, this is beneficial for the shareholders here. In an extended model, it may also be costly if loyalty is infeasible. In particular, loyalty may be efficient if, for example, information sharing that depends on a working loyalty agreement. This would be in the spirit of Adams and Ferreira (2005).

Second, Smale, Patricof, Henderson, Marcus, and Johnson (1995) cite Alan Patricof, a leading venture capitalist, as arguing: "Deep down [CEOs] really wish they didn't have boards." This is only partially true in this paper. CEOs recognize that boards have a useful advisory function, but they know that competent directors are hard to induce to loyalty. Of course, some CEOs are very convinced that what they are doing is in the best interest of the firm. In other words, we would also expect overoptimistic CEOs (and overconfident CEOs, who underestimate the volatility of their forecasts) to prefer less competent boards, because their advice is not valued so highly.

Third, we have worked under the assumption that $\psi + ay_L > 0$, i.e., C prefers loyalty in

[26] The treatment of the board as a unitary actor is of course limiting. One relevant policy option is whether a country should have a one-tier or two-tier board structure. See Graziano and Luporini (2006). Studying the implications for feasible and desirable loyalty agreements is beyond the scope of this paper.

state L (if it is not too costly). When $\psi + ay_L < 0$, i.e., when C has high-powered incentives, C does not actually derive net benefits from B's loyalty in the low state. We could, therefore, again envision a loyalty agreement that demands B's loyalty only in uncertain states. Note, however, that this would not allow for greater ultimate board competence. To the contrary: A highly competent board would rarely be in the position of an uncertain state. Thus, when such a state does arise, such a board has a very high reneging temptation, because it can be confident that it does not lose out greatly compared to the case where it behaves loyally. The reason is that the worst punishment C can threaten the board with – no more loyalty rewards in uncertain states – is not so bad for B at all, as these states are rarely expected.

Thus, with high-powered incentives, neither partial nor full loyalty are attractive options for C. Therefore, high-powered incentives for the CEO can provide a lever for shareholder control over the extent of board loyalty, as section 4 will describe in more detail.

Finally, it is instructive to consider the (unrealistic) case of contractible loyalty, i.e., the case where C and B can in fact write a binding contract about loyalty. Rarely would a court enforce such a contract, as it directly violates the director's duty of loyalty to *shareholders*. If it were nonetheless possible, the cheapest way for C to obtain obedience is to pay B $-sy_L$ in state L, and $-sEy$ in state U. Plugging into the objective function for C reveals that he maximizes utility by maximizing

$$\psi + (a + s) Ey - \theta spy_H. \tag{12}$$

Clearly, $\theta = 0$ is optimal. Comparing the utility C obtains in this case, $\psi + (a + s) Ey$, with the utility he obtains from spot interaction with a very competent board, $p(ay_H + \psi)$ reveals that loyalty is preferred if and only if

$$(1 - p)(\psi + ay_L) + s(y_L + p\Delta) > 0. \tag{13}$$

This is similar to the condition for the case of non-contractibility (Proposition 3). However, comparing the two we find

Corollary 4 *If non-contractible loyalty is preferred to spot interaction, so is contractible loyalty, but the opposite does not hold.*

Apart from adding realism to the model, the assumption of non-contractibility thus brings out the role of the repeated interaction between CEOs and boards. Moreover, there are cases when non-contractible loyalty would be desirable, but is infeasible (Proposition 2). By contrast, contractible loyalty is, by definition, always feasible. For the CEO and the board, non-contractibility may even be preferred: If loyalty is contractible and they agree on it, shareholders or potentially interested investors could take them to court over it.

4 Optimal linear incentives

We have so far assumed that shareholders act passively. In reality, shareholders – in particular, activists like hedge funds, private equity groups, and institutional investors – aim to shape their relationship with directors such that it suits their interests.[27] CEOs will in turn recognize this "problem." This section analyzes the optimal compensation policy that shareholders should set in the context of this model. Of course, compensation policy is, like board selection, frequently an issue partially captured by the CEO. The analysis here serves to make the point that even if 1) board obedience is non-contractible (which makes life harder for the CEO) and 2) shareholders have full control over the incentives they set for the CEO and the directors (and even unlimited liability is allowed), there is still a bound on shareholder value that is determined by the relative size of the CEO's private benefits and the potential downside of bad projects.[28] This analysis also helps to further check the

[27] In the post-Enron era, Thomas and Cotter (2005) find that boards become more responsive to majority vote proposals with directors implementing more of the actions called for by shareholders. Ertimur, Ferri, and Stubben (2005) provide evidence on how the implementation decision is related to the extent of shareholder pressure, the governance characteristics, and the performance of targeted firms. Not all dominant shareholders favor strong boards, though, as documented by Dahya, Dimitrov, and McConnell (2006).

[28] An alternative way for shareholders to approach the problem would be to try to establish a competing loyalty contract with directors. By the same arguments as in section 2, this contract also would be less feasible and less desirable than the perfect contract we are examining here. Analyzing strategic interaction between CEOs, directors, and shareholders would, however, require to draw on and expand insights in the literature on common agency and in particular collusion. On the one hand, CEOs may have more effective means of rewarding directors for personal allegiance. On the other hand, shareholders may be able to promise

theoretical robustness of the empirical predictions.

To develop the results, let us return to the model setup as in section 2. For a given incentive package $\{a, s\}$ the shareholders' welfare when the CEO can implement loyalty with an incompetent director is $Eu_S^L = (1 - a - s) Ey < 0$. By contrast, for the same incentive package, if spot interaction were the outcome, their welfare would be $Eu_S^S = \theta p (1 - a - s) y_H \geq 0$. Thus, in difficult environments, shareholders would optimally try to avoid loyalty. In reality, they may not succeed, for various reasons. For example, they may not be able to solve their collective action problem in addressing the issue. The purpose of the analysis here is to determine what would happen to shareholder welfare when shareholders can in fact do what is best for them.[29] To simplify the analysis, I will assume $1 < p\frac{\delta}{1-\delta}\frac{y_H}{-y_L}$. One way to interpret this assumption is to recognize that it requires δ to be sufficiently large. For example, even when the upside is exactly the same size and has exactly the same probability as the downside $\left(p = \frac{1}{2},\ y_H = -y_L\right)$, $\delta > \frac{2}{3}$ suffices.

To make loyalty undesirable for the CEO, shareholders need to obtain

$$(1 - p)(\psi + ay_L) + s\left(\frac{y_L}{\delta} + p\Delta\right) \leq 0 \tag{14}$$

First note that the assumption that $1 < p\frac{\delta}{1-\delta}\frac{y_H}{-y_L}$ implies that the term on the left hand side of the inequality falls faster with a than with s. Since a and s are perfect substitutes in the shareholders' welfare function, we find that:

Lemma 1 *To induce the CEO to favor a competent director and forego loyalty, shareholders will only use CEO incentive pay. That is* $s = 0$ *and* $a = \frac{-\psi}{y_L}$.

Shareholders will chose the minimal a that suffices to make the inquality hold. This a is equal to $\frac{-\psi}{y_L} = k$.[30] Note that in this case, even though the CEO could achieve loyalty at zero cost (because the board is not hurt by bad projects), the CEO does not benefit from it.

rewards more credibly, at least to the extent that they have a longer time horizon than some CEOs. See Guercio, Wallis, and Woidtke (2005) for evidence on how directors' reputation can be targeted by 'vote no' campaigns, even though there are few direct effects on directors' ability to hang on to their board seats.

[29] In the extreme, of course, a board would become obsolete. To motivate the existence of a board, assume, for example, that the shareholders cannot gather the information on the project quality.

[30] When the assumption $1 < p\frac{\delta}{1-\delta}\frac{y_H}{-y_L}$ is violated, it should in fact be the directors who are more strongly

In response to incentives $a = k$, the CEO will choose $\theta = 1$, which leads to

$$\begin{aligned} Eu_c^S &= p(\psi + ky_H) \text{ and} \\ Eu_S^S &= py_H(1-k) > 0. \end{aligned} \tag{15}$$

Since the shareholders realize positive welfare, they will prefer this outcome to the loyalty outcome. Finally, we can show that

Lemma 2 *Making loyalty infeasible is more costly for the shareholders than making it undesirable.*

Proof. See the Appendix. ■

This analysis can be summarized in the following

Proposition 7 *Shareholders optimally implement high-powered CEO incentive pay which induces the CEO to favor competent directors who behave independently. This is costly for shareholders, but less costly than the inefficient loyalty incompetent directors would offer their CEO.*

To the extent that shareholders can incentivize their CEO perfectly, they can avoid inefficient board-CEO loyalty, but only at a cost. High executive pay, especially when the CEO is powerful, can thus partially be explained as a solution to the excessive board loyalty problem. (Of course, there are other reasons, like more traditional versions of moral hazard, but these are absent in this model. See Albuquerque and Miao (2006) for an alternative model with a similar result.)

Finally note that to the extent that shareholders can use only compensation techniques with some bound on CEO liability in bad states (e.g., when equity-based compensation goes hand in hand with an option program), their welfare loss compared to a case where there are no private benefits for the CEO would be even greater because the CEO would have a more powerful incentive to push for an incompetent director.

incentivized than the CEO. This is counterfactual for most firms, but it does raise the interesting point that when interactions are rather short-lived, excessive loyalty is best avoided by making loyalty costly for directors, while when interactions are long-lived, inefficient loyalty is best addressed by incentivizing the CEO.

5 Concluding remarks

Much research on corporate governance has discussed the importance of an effective board. The recent debate has focused on the advantages and disadvantages of independent directors. Surprisingly, studies of the impact of the composition of boards have not found consistent effects of the number of *de iure* independent outsiders on economic performance of companies. This paper interprets "independence" of directors to mean that they should be loyal to shareholders, but not overly so to the CEO. To allow the sharpest focus, the paper only studies inefficient loyalty of boards to CEOs (or *de facto* obedience). The central thesis of this paper, which was derived in a repeated game framework, is that in a wide range of plausible circumstances, more competent boards will behave less loyally to the CEO, i.e., will be less willing to faithfully succumb to the CEO's every demand. While this result, once proven, is not extremely surprising in itself, it implies that shareholders who are powerful enough to install a sufficiently competent board will reap the rewards of a board that is *endogenously* less dependent on the CEO. The paper also shows that even when a CEO could implement loyalty, a self-interested CEO may after all be better off with more competent board members, because loyalty is costly. The primary empirical predictions that flow from these considerations are that: 1) greater CEO's and the directors' pay-performance-sensitivities, 2) shorter horizon interactions of C and B, 3) more difficult appropriation of private benefits by the CEO, and 4) more volatile investment returns lead the CEO to favor higher director competence. Future work should test these predictions and extend the theoretical framework in the directions indicated throughout the paper.

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6 Appendix

6.1 Results for "easy environments": $Ey > 0$

6.1.1 Spot interaction

The full expression for C's expected utility in spot interaction is given by

$$Eu_C^S = \theta p \left(a y_H + \psi\right) + \theta \left(1 - p\right) 0 + \left(1 - \theta\right) I \left\{Ey > 0\right\} \left(aEy + \psi\right), \tag{16}$$

where $I \left\{Ey > 0\right\}$ is an indicator variable equal to unity if $Ey > 0$ and zero otherwise. Shareholder utility is given by

$$Eu_S^S = \theta p \left(1 - a - s\right) y_H + \theta \left(1 - p\right) \left(1 - a - s\right) 0 + \left(1 - \theta\right) \left(1 - a - s\right) I \left\{Ey > 0\right\} Ey. \tag{17}$$

For the case of $Ey > 0$, C solves

$$\max \theta (1-p) [-\psi - ay_L] + aEy + \psi.$$

Thus, either $\theta = 0$ is optimal, when $\psi + ay_L > 0$, or $\theta = 1$ is optimal, when $\psi + ay_L < 0$. In summary:

Proposition 8 ***(Spot interaction)*** *In easy environments with high-powered incentives ($Ey > 0$ and $\psi + ay_L < 0$), we have: $\theta_S^* = 1, Eu_C^S = p(ay_H + \psi)$, $Eu_S^S = (1-a-s)py_H$*
In easy environments with low-powered incentives ($Ey > 0$ and $\psi + ay_L > 0$), we have: $\theta_S^* = 0, Eu_C^S = aEy + \psi$, $Eu_S^S = (1-a-s)Ey$
In difficult environments, we have: $\theta_S^* = 1, Eu_C^S = p(ay_H + \psi)$, $Eu_S^S = p(1-a-s)y_H$.

6.1.2 Repeated interaction

The CEO finds loyalty with rewards forever more attractive than reneging on loyalty today but reverting to statically optimal behavior in the future if

$$x \leq \delta\theta (1-p)(ay_L + \psi). \tag{18}$$

Thus, C can only promise less than the expected value of the net gain of loyalty $(ay_L + \psi)$ in the bad state. Second, C's ability to promise rewards is increasing in B's competence.[31] Intuitively, here, higher competence implies that B identifies state L more frequently. Thus, higher competence generates a greater value of loyalty. Therefore, C can promise higher x, especially if the bad state is likely, that is, if p is small.

Similary, the board prefers ongoing loyalty to exploiting C once and reverting to spot interaction after if

$$\delta x \geq -sy_L (1 - \delta + \delta\theta (1-p)). \tag{19}$$

Not surprisingly, B's minimum required rewards from loyalty are increasing in B's competence.

[31] This is different than, e.g., Wagner (2005), where the upper bound on the manager's ability to reward loyalty derives only from the value of loyalty to the manager, but where the value of loyalty does not depend on the worker's competence.

Combining the two conditions, we find that loyalty is feasible if and only if

$$\theta \geq \frac{S}{G} \frac{1-\delta}{\delta (1-p)}$$

where $S = -sy_L > 0$ and $G = \delta\psi + y_L (\delta a + s)$ which may be positive or negative. In other words:

Lemma 3 *If $Ey > 0$, there is a lower bound on competence compatible with loyalty, i.e., loyalty may not be feasible for too incompetent Bs.*

Given that C selects B, it is likely that he is able to capture most of this surplus. In fact, I assume he can capture all of it, implying that he will set $x = -\frac{1}{\delta} sy_L (1 - \delta + \delta\theta (1-p))$. Then, C maximizes

$$aEy + \psi + \frac{sy_L (1-\delta)}{\delta} + \theta (1-p) sy_L,$$

which implies that C would like θ to be as small as possible, i.e., zero. But this may not be feasible, as just shown. In particular, the constrained optimal competence level is $\theta = 0$ if $G < 0$ and $\theta = \max \left[\frac{S}{G} \frac{1-\delta}{\delta(1-p)}, 1 \right]$ if $G > 0$.

Comparing the optimal utility achievable under these two conditions with Eu_C^S above, we can show

Proposition 9 *In easy environments, the CEO always prefers spot interaction to loyalty.*

Proof. It suffices to show that spot interaction is preferred even when $\theta = 0$ is feasible under loyalty. Suppose first that $\psi + ay_L < 0$. Then we know that $\theta_S^* = 1$. In this case, spot interaction is preferred to loyalty if and only if

$$pay_H + p\psi > pay_H + (1-p) ay_L + \psi + \frac{sy_L (1-\delta)}{\delta}.$$

It is easy to verify that this always holds.

Suppose now that $\psi + ay_L > 0$, implying $\theta_S^* = 0$. It is immediate that

$$aEy + \psi \geq aEy + \psi + \frac{sy_L (1-\delta)}{\delta}.$$

■

Intuitively, because B has an attractive reneging option, C would have to promise significant loyalty rewards. But because C knows that B will agree to the project even when project quality remains unknown, C's reneging temptation is very strong as well. While C would like minimum competence, loyalty is only sustainable with sufficiently competent boards.[32]

6.1.3 Optimal linear incentives

Shareholders' optimal policy boils down to determining whether they should make $\psi + ay_L$ greater or less than zero. In order to achieve $\psi + ay_L > 0$, the best policy is $a = 0$, in which case $Eu_C^S = \psi$ and $Eu_S^S = Ey$. (The shareholders would not give the directors any compensation.) Alternatively, in order to achieve $\psi + ay_L \leq 0$, the best policy is $a = k = \frac{\psi}{-y_L}$, in which case $Eu_C^S = p\psi\left(1 - \frac{y_H}{y_L}\right)$ and $Eu_S^S = py_h\left(1 - k\right)$. We can now compare the shareholders' welfare levels in the two scenarios. Define

$$R = \left(\frac{\psi}{y_L}\right)\left(\frac{p}{1-p}\frac{y_H}{y_L}\right)$$

as a measure of the importance of loyalty for the CEO relative to the full social cost of a bad project, weighted by a term that compares the expected upside to the expected downside of a project. We find

Proposition 10 *In easy environments, high-powered incentives for the CEO* $(a = k)$ *maximize shareholder value when* $R < 1$. *In this case, the CEO hires a highly competent board* $(\theta = 1)$.

[32] A notable feature of the model is that, when $\psi + ay_L > 0$, i.e., when C has low-powered incentives, a C who is unconstrained with respect to his ability to induce B to loyalty would like incompetent board members, irrespective of the expected value of projects. But the reasons are different: In easy environments ($Ey > 0$), board competence does not add value because in expectation the projects are of positive value. In difficult environments ($Ey < 0$), by contrast, less competent board members require lower loyalty rewards. When $Ey > 0$, C can typically not make the board incompetent enough for loyalty to be more attractive than spot interaction. We would expect to see short-term interaction with incompetent boards in this case. By contrast, when $Ey < 0$, we expect to see highly competent boards when private benefits are not too large, or when C's compensation is sufficiently closely tied to firm performance.

When $R > 1$, low-powered incentives for the CEO ($a = 0$) and incompetent directors are optimal. In either case, boards behave independently.

Thus, for relatively small private benefits, it pays for the shareholders to give the CEO powerful incentives and induce high director competence.

Proof. When $\theta = 0$, expected shareholder welfare is Ey. When $\theta = 1$, shareholder welfare is $py_H\left(1 - \frac{\psi}{-y_L}\right)$. It is easy to verify that

$$Ey < py_H\left(1 - \frac{\psi}{-y_L}\right)$$

is equivalent to

$$1 > \frac{p}{1-p}\psi\frac{y_H}{(y_L)^2} = R.$$

Note that because $Ey > 0$, we have $\left|\frac{p}{1-p}\frac{y_H}{y_L}\right| > 1$. ■

6.2 Proofs for section 3

Proposition 4: If the CEO prefers implementing any loyalty, then a comprehensive loyalty agreement is preferred. In this case, the CEO prefers an incompetent board. Otherwise, spot interaction with a fully competent board is preferred. The CEO never implements a partial loyalty agreement.

Proof. Available on request. ■

Proposition 5: If only C is tempted, a comprehensive loyalty agreement of a too competent B may be infeasible. A partial loyalty agreement is more likely to be feasible for a competent B, but it may also be infeasible.

Proposition 6: Suppose condition (11) holds and only C is tempted. Then the CEO implements a comprehensive loyalty agreement with an indeterminate degree of board competence. If (11) does not hold, the CEO prefers spot interaction with a maximally competent board. The CEO never implements a partial loyalty agreement.

Proof. (of both Proposition 5 and 6). If only C is tempted, this means that only C's NR constraint is relevant. The NR for a comprehensive loyalty agreement takes exactly the same form as before:

$$x \leq \delta(\psi + aEy) - \delta\theta p(\psi + ay_H).$$

For B, C just has to ensure that

$$x \geq -sEy,$$

leading to

$$\theta \leq \frac{\delta(\psi + aEy) + sEy}{p(\delta\psi + \delta ay_H)},$$

as stated in the text. That is, there is an upper bound on competence compatible with comprehensive loyalty, as stated in Proposition 5. Conditional on comprehensive loyalty being feasible, the payoff to C is

$$EU_C^{comp} = (a + s)Ey + \psi,$$

which is independent of θ. The reason for this independence is that the costs C incurs for inducing B to loyalty are independent of B's type, as B has no commitment problem.
By contrast, consider a partial loyalty agreement where C only pays for (and only receives) loyalty in state L. C's NR constraint in this case is

$$x_L \leq \frac{\delta\theta(1-p)(ay_L + \psi)}{1 - \delta(1 - \theta(1-p))},$$

which can be easily shown to be increasing in θ, implying that partial loyalty and competence are complements for C. Whether loyalty is, in fact, feasible depends, however, on whether

$$-sy_L \leq x_L(\theta).$$

Plugging in $\theta = 1$, we can see that if

$$(\psi + ay_L)(1-p) + sEy > 0,$$

then partial loyalty is feasible. Otherwise, loyalty is not feasible, as stated in Proposition 5. C's utility from optimal partial loyalty (with $\theta = 1$) is

$$EU_C^{partial} = aEy + \psi + s(1-p)y_L,$$

implying that full loyalty (which as shown above happens with an indeterminate degree of competence) is always preferred to partial loyalty. ■

6.3 Proofs for section 4

Lemma: Making loyalty infeasible is more costly for the shareholders than making it undesirable.

Proof. To make loyalty infeasible, the shareholders need to obtain

$$\psi + y_L \left(a + \frac{s}{\delta^2} \right) + p\,(a+s)\,\Delta < 0.$$

First, note that it is cheaper to use only CEO incentive pay: The slope on a is $Ey < 0$, which is smaller than the slope on s, $Ey + \frac{y_L}{\delta^2} - y_L$. Thus, the shareholders have to set a such that

$$\psi + aEy < 0$$

or

$$a > -\frac{\psi}{Ey} > \frac{\psi}{-y_L} = k.$$

■