Independent Boards and Innovation: A Theory Model

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Abstract

Much research has suggested that independent boards of directors are more effective in reducing agency costs and improving firm governance. However, by limiting managerial discretion, independent boards may prevent the manager from engaging in more exploratory strategies, which require flexibility. Friendly boards can thus be optimal to induce exploration by the manager.

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1 Introduction

The board of directors has an important role in the governance of corporations. Charged with overseeing and advising managers, it can effectively reduce agency costs that arise from the separation of ownership and control.

Several authors have argued that independent directors, with no ties to the company other than their directorship, are better suited to perform this role as they can credibly limit managerial discretion and are thus more likely to produce decisions that are consistent with shareholder-wealth maximization. (e.g. Fama and Jensen, 1983; Williamson, 1983).

These ideas received broad support and had an impact on regulations. In the early 2000's, stock exchanges and the Sarbanes-Oxley Act (SOX) required firms to have a majority of independent directors.

We argue, however, that limited managerial discretion induced by an independent board may have unintended effects on corporate innovation. A manager with limited discretion may be reluctant to engage in exploratory projects, since the value of those projects depends on the flexibility to adapt after observing outcomes. Friendly boards, whose interests are aligned with the manager, guarantee managerial discretion and may be more effective in motivating exploration and innovation.

We develop a simple two-period model to illustrate this phenomenon. Shareholders hire a manager and appoint a board to supervise the manager. In each period, the manager may propose to exploit a conventional business strategy or to explore an innovative business strategy. To implement the strategy, the manager needs approval from the board.

We show that an independent board, who does not necessarily agree with the manager, makes exploration less attractive to the manager since it may prevent the manager from adapting strategies after observed outcomes. An independent board is thus effective when the goal is to motivate the manager to pursue conventional strategies.

Friendly boards, on the other hand, always approve managerial strategies. This managerial discretion encourages the manager to explore, since being able to freely adapt to observed outcomes allows the manager to take full advantage of exploration. A friendly board is effective when the goal is to motivate the manager to pursue more exploratory strategies.

2 Related Literature

Most previous research argues that limiting managerial discretion is effective in reducing agency problems. There are a few exceptions. Aghion and Tirole (1997) and Burkart,

Gromb, and Panunzi (1997) argue that allowing managerial discretion may enhance initiative. In their model, managers are willing to exert more effort to become informed if they know that they will have effective control. Adams and Ferreira (2007) argue that managerial discretion encourages the manager to share information with the board, improving the advisory role of the board. The above papers discuss different ways to allow managerial discretion, such as dispersed shareholder ownership or a friendly board of directors.

We provide an alternative role for managerial discretion based on the nature of the search and innovation process. In contrast to conventional projects, innovation is the result of experimentation with new ideas (Schumpeter, 1934; Arrow, 1969; Weitzman, 1979). The central tension that arises with experimentation is the one between "exploitation" and "exploration." Managerial discretion is an important instrument in motivating exploration since it allows the manager to change course depending on outcomes, which is essential to fully capture the value of exploration.

In a setting where innovation arises from experimentation, Manso (2011) finds that optimal incentive schemes that motivate exploration exhibit substantial tolerance or even reward for early failure and reward for long-term success. Moreover, job security and timely feedback on performance are essential to motivate exploration. While Manso (2011) studies optimal compensation, termination, and feedback policies, the current paper studies the optimal allocation of control between the principal and the agent.

A large literature studies the role and influence of board characteristics (for an overview see Adams, Hermalin, and Weisbach, 2010; for the economic relevance of boards see Ahern and Dittmar, 2012). Much of the literature focuses on the role of independent board members (most recently e.g. Masulis and Mobbs, 2014; Brochet and Srinivasan, 2014). Several studies have analyzed how independent directors influence CEO compensation (e.g. Faleye, Hoitash, and Hoitash 2011; Coles, Daniel, and Naveen, 2008; Denis and Sarin, 1999; Core, Holthausen and Larcker, 1999), CEO appointments and dismissals (Knyazeva, Knyazeva, and Masulis, 2013; Guo and Masulis, 2011; Borokhovich, Parrino, and Trapani, 1996; Weisbach, 1988), adoption of antitakeover defenses (Brickley, Coles, and Terry, 1994) or takeover premiums (Cotter, Shivdasani, and Zenner, 1997; Byrd and Hickman, 1992). From these studies the picture emerges that independent board members increase board oversight. Whether such intensified board monitoring is beneficial or detrimental to shareholder wealth is much harder to answer though, and the correct answer seems to depend on the complexity of a firm's operations (Faleye, Hoitash, and Hoitash, 2011; Duchin, Matsusaka, and Oguzhan, 2010; Nguyen and Nielsen, 2010).

3 The Model

Shareholders hire a manager to run a firm for two periods. To supervise the manager, shareholders appoint a board of directors. In each period, the manager reports to the board of directors, proposing a strategy, which the board decides whether or not to approve.

Firm output in each period is either S ("success") or F ("failure"). The manager can always propose a conventional business strategy, which has a known probability p of success. At the beginning of the first period, the manager finds out whether a new business strategy is available, in which case he may propose it to the board in place of the conventional strategy. The new strategy has an unknown probability q of success, which may be either q_L or q_H, with $q_H > q_L$. Manager, board of directors, and shareholders may disagree about the distribution of q. They believe that q is equal to q_H with probability μ_M, μ_B, and μ_S respectively. The only way for them to learn about q is if the firm explores the new strategy.

All agents are risk-neutral and have a discount factor of one. They own shares in the firm, and thus maximize at each point in time the present value of the firm's future output.

We first consider the case of a friendly board, whose beliefs are aligned with the manager's beliefs ($\mu_B = \mu_M$). In this case, the problem turns into a standard bandit problem, since the manager and board have the same interest and beliefs, and thus act as if they were a single agent.

Proposition 1 *Under a friendly board, the firm explores the new strategy if and only if*

$$\mu_M \geq \frac{(1+q_L)(p-q_L)}{(1+q_L+q_H-p)(q_H-q_L)} \tag{1}$$

Proposition 1 shows that the firm engages in exploration if and only if the manager is sufficiently optimistic about the prospect of the new business strategy.

Now we consider the case of an independent board. In this case, the manager needs to consider the reaction of the board in deciding whether to propose a new business strategy.

Proposition 2 *Under an independent board, the firm explores the new strategy if and only if*

$$\mu_M \geq \frac{p-q_L}{q_H-q_L} \quad and \quad \mu_B \geq \frac{(1+q_L)(p-q_L)}{(1+q_L+q_H-p)(q_H-q_L)} \tag{2}$$

or

$$\frac{(1+q_L)(p-q_L)}{(1+q_L+q_H-p)(q_H-q_L)} \leq \mu_M \leq \frac{p-q_L}{q_H-q_L}$$

$$and \quad \frac{(1+q_L)(p-q_L)}{(1+q_L+q_H-p)(q_H-q_L)} \leq \mu_B \leq \frac{p-q_L}{q_H-q_L} \quad (3)$$

or

The manager will only propose a new business strategy if the board is optimistic enough to approve it. However, if the board is too optimistic about the new strategy, the manager may not propose it, since the board could compel the manager to stick with the strategy even after failure. In sum, the loss of control over future strategies of the firm imposed by an independent board makes a manager less likely to explore new business strategies.

Figure 1 shows the parameter regions in which the firm engages in exploration under different board structures. The shaded are represents the parameter region in which the firm engages in exploration under a friendly board. The dotted area represents the parameter region in which the firm engages in exploration under an independent board. As the figure illustrates, there is more exploration under a friendly board than under an independent board.

For most of the empirical analysis we will be studying how changes in board type induce exploration/exploitation. Propositions 1 and 2 show that more independent (friendly) boards motivate more exploitation (exploration).

Another relevant question is which type of board should shareholders appoint. As Proposition 3 below shows, this will depend on whether the problem faced by shareholders is to motivate managers to be more or less innovative.

Proposition 3 *If the manager is optimistic relative to shareholders about innovation ($\mu_M > \mu_S$), then shareholders will appoint an independent board with $\mu_B = \mu_S$ to restrict exploration by the manager. Otherwise, if the manager is pessimistic relative to shareholders about innovation, then shareholders will appoint a friendly board ($\mu_B = \mu_M$) to motivate exploration by the manager.*

If the manager is more optimistic than shareholders about innovation ($\mu_M > \mu_S$), then shareholders need to restrict exploration by the manager. It is thus optimal for shareholders to appoint an independent board with $\mu_B = \mu_S$. An independent board with $\mu_B = \mu_S$ prevents the optimistic manager from exploring strategies that only the manager thinks are profitable.

If the manager is more pessimistic than shareholders about innovation ($\mu_M < \mu_S$), the manager explores too little and shareholders need to motivate the manager to ex-
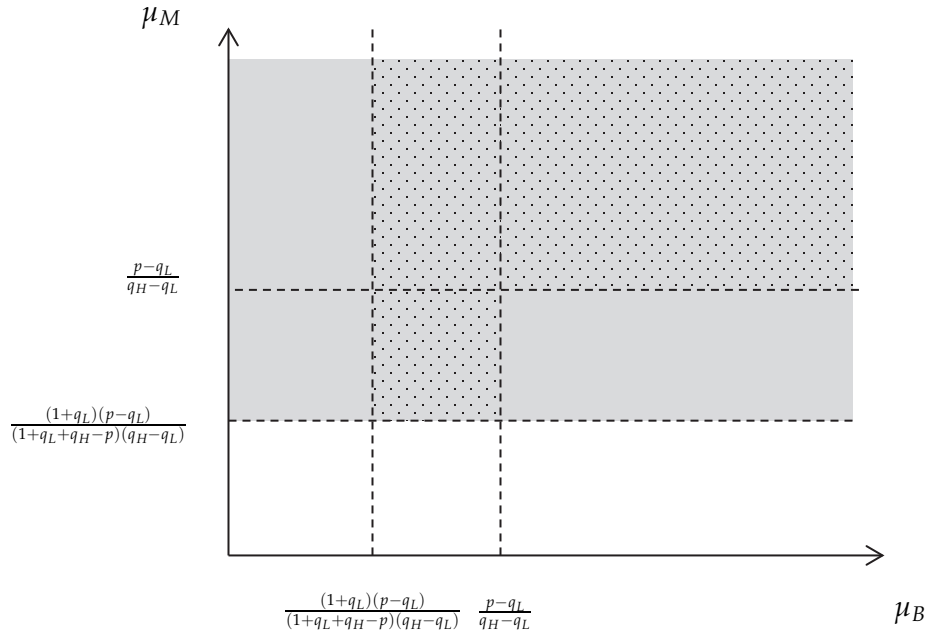
Figure 1: **Exploration region under different board structures.** The shaded area represents the parameter region in which the firm engages in exploration under a friendly board. The dotted area represents the parameter region in which the firm engages in exploration under an independent board.

plore more. It is thus optimal for shareholders to appoint a friendly board. A friendly board prevents managers from hiding novel strategies from the board due to a lack of managerial discretion to effectively implement these strategies.

Throughout this section we assumed that the board of directors and manager maximize firm value and we investigated how shareholders should choose board composition to provide incentives to the manager. Could shareholders do better if they offered compensation packages to motivate the manager?

It turns out that when the manager is more optimistic than shareholders about innovation ($\mu_M > \mu_S$), the optimal board composition derived in this section achieves first-best. Therefore, an incentive contract could at best be equivalent to optimal board composition, but would be more costly and thus dominated.

It is only when the manager is more pessimistic than shareholders about innovation ($\mu_M < \mu_S$) that there may be a role for a compensation package that aligns incentives. In that case, a contract that insures the manager in case of failure could be structured to make the manager indifferent between outcomes, inducing the manager to propose even new strategies that the manager thinks are inferior, as long as shareholders believe these are profitable. Such contract is costly though and would only be implemented if

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the benefit from new ideas that the manager would otherwise hide outweighs the cost of insuring the manager.

To sum up, we show that under an independent board, the manager loses control over the future strategies of the firm. This reduces the appeal of exploration, since exploration requires adaptability when implemented. A friendly board, on the other hand, allows discretion to managers and is thus effective in motivating exploration. Shareholders should appoint an independent board when they need to restrict exploration by the manager and a friendly board when they need to motivate exploration by the manager.

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4 Appendix

Proof of Proposition 1: Under a friendly board, the manager proposes a new strategy when she believes that its payoff is higher than the conventional strategy. Because the board and manager share similar beliefs, such proposal will be approved by the board.

There are two action plans to consider: exploring the new strategy in the first period and switching to the conventional strategy in case of failure or exploring the new strategy in both periods.

For an agent with belief μ, exploring the new strategy and switching in case of failure is better than exploiting the conventional strategy iff

$$f(\mu)S + (1 - f(\mu))F + f(\mu)\left(f\left(\frac{\mu q_H}{\mu q_H + (1 - \mu)q_L}\right)(q_H S + (1 - q_H)F)\right.$$
$$\left. + \left(1 - f\left(\frac{\mu q_H}{\mu q_H + (1 - \mu)q_L}\right)\right)(q_L S + (1 - q_L)F)\right) +$$
$$(1 - f(\mu))(pS + (1 - p)F)$$
$$\geq 2(pS + (1 - p)F) \quad (4)$$

where $f(x) = xq_H + (1 - x)q_L$. Equation (6) is equivalent to:

$$\mu \geq \frac{(1 + q_L)(p - q_L)}{(1 + q_L + q_H - p)(q_H - q_L)} \quad (5)$$

Exploring the new strategy in both periods regardless of outcomes is better than exploiting the conventional strategy iff

$$2(f(\mu)S + (1 - f(\mu))F) \geq 2(pS + (1 - p)F). \quad (6)$$

In (6), we use the fact that by Bayes' rules beliefs follow a martingale. Equation (6) is equivalent to:

$$\mu \geq \frac{p - q_L}{q_H - q_L} \quad (7)$$

Condition (5) is more stringent than (7). ∎

Proof of Proposition 2: From the proof of Proposition 1, if an agent believes that exploring the new strategy in both periods regardless of output dominates exploiting the conventional strategy, then the agent also believes that exploring in the first period and switching to exploitation in case of failure also dominates exploiting the conventional strategy. Therefore, a manager who believes that exploring in both periods is optimal will propose the new strategy as long as the board approves exploration at least in the

first period. This gives rise to condition (2).

However, if the manager is only optimistic to implement exploration in the first period but switch to exploitation in case of failure in the second period, he does not propose the new strategy if the board is optimistic to the point of wanting to implement exploration of the new strategy in both periods. This gives rise to condition (3). ∎

Proof of Proposition 3: If the manager is optimistic relative to shareholders about innovation ($\mu_M > \mu_S$), an independent board with $\mu_B = \mu_S$ induces the manager to propose any project with

$$\mu_M \geq \frac{(1+q_L)(p-q_L)}{(1+q_L+q_H-p)(q_H-q_L)}$$

as long as the project is profitable to shareholders:

$$\mu_S \geq \frac{(1+q_L)(p-q_L)}{(1+q_L+q_H-p)(q_H-q_L)}$$

If the manager is pessimistic relative to shareholders about innovation ($\mu_M < \mu_S$), we know from Proposition 2 that the manager may be reluctant to propose the new strategy if an independent board is likely to force him to stick to the new strategy even after failure. A friendly board ($\mu_M = \mu_S$) solves this problem, inducing the manager to propose a new strategy as long as

$$\mu_M \geq \frac{(1+q_L)(p-q_L)}{(1+q_L+q_H-p)(q_H-q_L)}.$$

Because shareholders are more optimistic than the manager about innovation, they always want to implement exploration under the above conditions. ∎