A SIGNALING MODEL OF CONTROL BLOCK SALES BY ENTREPRENEURS

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ABSTRACT

In this paper, we present a model in which higher-valued managers signal their value by voluntarily submitting to shareholder oversight. If a manager is willing to sell enough stock to release voting control, he is perceived to be of higher quality than if he had defensively maintained control. The implication of the model is that voluntary/control sales by insiders can be good news for the firm. This is consistent with the share-price increases that follow the deaths of entrenched managers.

INTRODUCTION

To some investors, trades by insiders are like tea leaves. As the *Wall Street Journal*'s "street sleuth" recently put it: "Many analysts and investors study the trades of company insiders for cues to buy, hold, or sell shares, believing these individuals or larger shareholders have better insights into a company's prospects and the value of its shares." One popular notion among some of these voyeuristic investors is that insider sales are bad news: insider sales are "ominous" "warning signs" since "it is never encouraging when insiders sell stock," so a smart investor should "jettison any issues where there's been heavy selling."[1] This simplistic trading rule may be intuitively appealing, but its fatal flaw is in ignoring the circumstances motivating the trades. If an insider's sale has positive implications for corporate control, that sale can actually be *good* news for the firm. This is the sort of sale we consider in this paper.

Of course, some insider sales <u>are</u> bad news. Seyhun (1986), for example, finds that insider sales in his sample are followed by significant declines in their firms' stock prices. He asserts that insiders not only know when the market has mispriced their firms' stock, but that they take advantage of that mispricing. Lorie and Niederhoffer (1968), Pratt and DeVere (1970), Jaffe (1974), and Finnerty (1976) also present evidence suggesting that insider trades generate significant abnormal profits. Such evidence bolsters the negative interpretation of insider sales.

The problem with this general interpretation is that there is an important class of insider sales that is associated with share price *increases*: involuntary sales that "emancipate" a firm from the voting domination of a controlling insider. For example, Johnson *et al.* (1985) find significant abnormal stock price increases after the deaths of senior managers whose control had been protected by their founder status and/or their large shareholdings. Similarly, Slovin and Sushka (1993) find significantly positive share price responses to deaths of executives owning more than 10% of their firms' stock—enough stock to entrench these executives, in the authors' view—and that this effect gets stronger, the more stock the insiders held. Demsetz and Lehn (1985) report that the stock prices of Disney, Gulf + Western, and Chock Full O'Nuts rose 25%, 42%, and 22%, respectively, when their "dominant" owners died; Holderness and Sheehan (1988) note that James Crosby's death caused the stock of his "personal fiefdom," Resorts International, to rise from \$49 to \$67.25. Clearly, the market did not interpret these insiders' divestitures as attempts to parlay superior information into trading profits. Instead, the positive implications for corporate control translated these sales into positive changes in firm value.

In stark contrast to the types of sales studied by Seyhun, the "death" studies are about control. The insiders had been entrenched. If they chose to pursue activities that would increase their private benefits at the expense of outside shareholders' value, they could do so with impunity. If we characterize insider sales along two dimensions—voluntary v. involuntary and control potential v. none—we see that

Seyhun's results apply to the voluntary/no-control sales types. However, the contrary stock price response in the death studies (the involuntary/control sales) show that generalizing Seyhun's results to all insider sales ignores ignore crucial mitigating factors such as *who* is selling and *how much*.[2] In this paper, we consider those factors in a model of a third type of insider sale: a voluntary/control sale.

In this model, a manager's willingness to relinquish voting control, thereby exposing himself to meaningful oversight, can be a positive signal of his value. A manager who protects himself from shareholder scrutiny is perceived to be of low quality (like the managers whose deaths emancipate their firms). In the signaling equilibrium presented, the more stock a manager sells beyond a control threshold, the more valuable his shareholders expect him to be.

One of the factors influencing the manager's sale choice is the makeup of the shareholder base that would be newly able to monitor her. *To whom* would she be vulnerable? The possible reactions of other blockholders would be particularly important considerations. Most studies of blockholder behavior assume that firms have a single blockholder among a sea of atomistic outsiders. However, given the prevalence of block ownership in American corporations and the evidence that minority blocks as small as 5% can confer significant control,[3] it is likely that many companies have multiple blockholders and that interactions among them can affect corporate control. However, as Holderness (2003) notes, "[s]tudies infrequently address the stock ownership of outside shareholders who do not serve on the board of directors" (p. 53). In this paper, we make a first pass at incorporating multiple blocks in our description of ownership structure. Explicit consideration of the interaction among blockholders is one of the contributions of this model.

The paper is organized as follows. Section 2 presents the basics of the signaling model of control block sales. Section 3 describes a separating equilibrium in which larger sales signal higher-quality managers. Section 4 discusses the model and provides links between it and supporting literature. Section 5 concludes.

THE MODEL

We model a controlling shareholder's decision to sell enough of his stock to become vulnerable to outside oversight. The controlling manager, E, owns the proportion α_0 of his firm, which is enough to ensure his voting control. (We will therefore assume that $\alpha_0 > .50$.) There are two other types of shareholders: an outside blockholder, L, who owns the proportion α_L, and a set of atomistic outside shareholders who own the balance, $[1 - \alpha_0 - \alpha_L]$. E's action in the game is to decide how much, if any, of his stake he will sell to the atomistic shareholders. (We will call this proportion α.) Once he's chosen, the outside shareholders decide whether to challenge him; if he's successfully challenged, he is fired and replaced. The players' payoffs in the game depend upon the state of nature and the identity of the chosen manager (E or his replacement). The game is summarized in the schematic below.

0 1 time

Nature reveals state S to E; E chooses signal α	outsiders may receive signal ι; may choose to challenge E	manager determined; payoffs realized

E bases his sale decision on the state of nature and on his expectations about outside shareholders' reactions to his choice. We will consider the latter influence in the next section, where we describe our specific signaling equilibrium and show how E's decision is a best response to the market's beliefs. In this section, we will describe the more general aspects of the game.

The state of nature influences E because it determines the value of the firm under his leadership. The state is high, medium, or low ($S \in \{H,M,L\}$), with higher firm values possible in higher states ($V^S \in \{V^H, V^M, V^L\}$; $V^H > V^M > V^L$). However, these higher values depend upon E's leadership: if he is fired, firm value is certain to be only V^L. E is uniquely able to generate value from the firm's assets in higher states. At the model's time 0, he learns the state, becoming perfectly informed about his marginal contribution to value.

In addition to being uniquely able to contribute to the firm's value, E is also uniquely able to extract his resources. We model his state-dependent compensation as b(S), where b(H) > b(M) > b(L) > 0. Should he be fired, his compensation at any other firm, and outside managers' compensation at his, would be zero. b(S) is meant to represent all elements of E's compensation. For example, b(S) incorporates Shleifer and Vishny's (1986) definition of compensation as "all transfers from shareholders that the manager negotiates with the board, including direct monetary compensation, expenditures on perquisites such as airplanes and charity, and pet projects the board accedes to while knowing they are wasteful" (p. 128).[4] These sorts of benefits could accrue to a controlling manager as a consequence of his voting control, for example, or from wage contract required by the founder when the firm was initially taken public.[5] However, b(S) may also include increased "leniency and lack of oversight by the board,"[6] especially if outside shareholders perceive that E's expertise is contributing to value. This sort of leniency can be valuable to E, even when he is majority holder, since shareholders could still affect his access to resources through different intensities of monitoring. (The activities of H. Ross Perot, Kirk Kerkorian, and Carl Icahn are examples of the potential influence outside shareholders can exert.) Wherever they come from, the benefits b(S) are unavailable at any other firm; E therefore must consider the value of this compensation when choosing his share-sale signal.

If E keeps his job and receives benefits, net firm value will be as follows:

$$V^H - b(H) > V^L \tag{1}$$

$$V^M - b(M) = V^L \tag{2}$$

$$0 < V^L - b(L) < V^L \tag{3}$$

In the low state, allowing benefits b(L) means that firm value is lower under E than it would be under his replacement. In the medium state, E is able to capture all of his marginal contribution to value; outsiders are different between his leadership and his replacement's. However, in the high state, some of E's contribution is shared with the outside shareholders (since (1) and (2) imply that $[V^H - V^M] > [b(H) - b(M)]$). Outsiders wish to retain E in this case, which will critically influence their choice of actions in the game.

The outside shareholders have two possible decisions to make in the game: first, they must decide if they should challenge E's leadership; second, they must vote on his ouster if they decide to challenge. Given (1), (2) and (3) above, it is obvious that:

if S=H, outside shareholders would not want to challenge E

if S=M, outside shareholders are indifferent to challenge

if S=L, outside shareholders would want to challenge E.

However, unlike E, outsiders do not know the state. Instead, they must update their priors based on information revealed during the game. Outsiders receive one or two signals. The first of these signals is E's share sale itself. The second is a noisy signal from nature about the state, which we will call ι. Outsiders will only receive this second signal if E sells enough stock to make himself vulnerable; if instead he chooses to retain voting control, no ι signal is provided.

Even if they receive the ι signal, outside shareholders are at a disadvantage relative to E. Either because they lack access to some relevant information, or because they lack the expertise to fully evaluate it, outsiders cannot perfectly distinguish the state of nature. Instead, their ι signal takes on only two values: h and l (high and low). It is always h in the high state and l in the low state. However, it can take on either value in the medium state; in this case, $\iota=h$ with probability h^M and $\iota=l$ with probability $l^M = [1 - h^M]$. (That is, ι is state-dependent: the probability, p, that $\iota=h$, given that S=H, is 1; however, $p(\iota=h|S=L) = 0$, and $p(\iota=h|S=M) = h^M$.) Thus, outsiders cannot distinguish between the medium and high states, given $\iota=h$, or between the medium and low states, given $\iota=l$. However, given their incentives, it is clear that the outsiders' best strategy is to:

challenge E if $\iota=l$ (since S = L or M)

do not challenge E if $\iota=h$. (since S = H or M).

This clarifies outsiders' evaluation of the first of their two decisions in the game.

Their second possible decision is the firing decision. If they challenge E, outsiders must then vote to keep or fire him. In our simple approach to modeling the interactions among the blockholders, we assume that the outside blockholder, L, is hostile and votes all of his α_L shares against E. E will then be fired if enough of the atomistic shareholders also vote against him. We assume that a given small shareholder is more likely to vote to fire in lower states of nature. Following Stulz (1988), we use the proportion $s(S, \alpha)$ to describe this voting behavior; s is distributed uniformly between d(S) and 1, and is larger in lower states (d(L) > d(M) > d(H)). Given this voting behavior, E will be fired if:

$$\alpha_L + s(S, \alpha)*(1 - \alpha_0 + \alpha - \alpha_L) \quad > \quad .50;$$

that is, if

$$s(S, \alpha) \quad > \quad (.5 - \alpha_L)/(1 - \alpha_0 + \alpha - \alpha_L) \quad \equiv \quad z(\alpha).$$

At least the proportion $z(\alpha)$ of the atomistic shareholders must vote against E for him to be fired. The probability of a successful challenge is therefore the probability that $s(S, \alpha)$ exceeds this minimum:

$$p[\text{fire}|\text{challenge}] \quad = \quad p[s(S, \alpha) > z(\alpha)] \quad = \quad [1 - z(\alpha)]/[1 - d(S)] \quad \equiv \quad F(S, \alpha).$$

Thus, E is more vulnerable the smaller is his initial block (α_0) and the larger is the block of the hostile outsider (α_L).

Outsiders' two decisions in the game stem from their incentive to try to get rid of E if they think they would be better off with another manager. E must consider this incentive when determining his own action in the game, the amount of stock he will sell. He can only be challenged by his shareholders if he gives them the opportunity—that is, if he sells enough stock. He therefore will only risk a challenge if taking that risk makes him better off.

E makes his α choice after he learns the state of nature, and his choice maximizes his expected wealth, given that state. His expected wealth depends on three things: the value of his post-sale holdings in the firm (the proportion $[\alpha_0 - \alpha]$); the proceeds from any share sales; amount of his compensation, b. His objective function takes the following form:

$$\max E_0^{E}(W_1|S) = (\alpha_0 - \alpha)*E_0^{E}\{V^S - E_0^{M}[b|\iota, \alpha]|S, \alpha\}$$
$$+ \alpha*E_0^{E}\{E_0^{M}(V^S - b|\iota, \alpha)|S, \alpha\} + E_0^{E}\{E_0^{M}(b|\iota, \alpha)|S, \alpha\}. \quad (4)$$

(The *M* superscript on a variable indicates that the argument depends on shareholders' perception of the state, which is not necessarily the true state.) We can clarify the tensions driving E's actions by rearranging (4) this way:

$$E_0^{E}(W_1|S) = \alpha_0*E_0^{E}(V^S|S, \alpha)$$
$$+ \alpha*\{E_0^{E}[E_0^{M}(V^S|\iota, \alpha)|S, \alpha] - E_0^{E}(V^S|S, \alpha)\}$$
$$+ (1- \alpha_0)*E_0^{E}\{E_0^{M}(b|\iota, \alpha)|S, \alpha)\}. \quad (5)$$

The first term of equation (5) represents the value of E's shares. This depends both on the state and on the manager: if E keeps his job, his firm will be more valuable in higher states, but if he is fired, it will only be worth V^L. If he chooses to become vulnerable, he may lose his job and sacrifice his positive marginal contribution to value.

The second term in equation (5) represents E's trading profits. As we will see below, as long as he takes actions along the equilibrium path—signals truthfully—these profits will be zero. However, he may be tempted to falsely signal a higher state, gambling that he will keep his job, generate trading profits, and receive higher benefits. In order for the signaling equilibrium to obtain, any expected gains from such a false signal must be outweighed by the expected costs of losing his job.

Those costs include losing all of his benefits, b(S). The third term in equation (5) represents these benefits (adjusted for E's own contribution to them as a shareholder himself). In order to receive any benefits, E must convince his outside shareholders that he is more valuable than any potential replacement—that is, that the state is not low. Signaling a higher state, however, means becoming vulnerable. Again, this is the primary tension driving the model: in order to increase his benefits, E must risk losing his job, which would eliminate all of his own marginal compensation and doom his firm to its lowest possible (gross) value.

This section has described the basics of the signaling game played by E and his shareholders. We can summarize this game as follows. At time 0, Nature reveals unambiguously to E what time 1 firm value will be under his leadership (V^S); E must then decide what proportion of his shares to sell (α). He will choose the α that maximizes his expected wealth, considering his share ownership, his managerial compensation, and his trading profits. Shareholders then use E's action, along with any ι signal from Nature, to update their priors over the states and to decide whether to challenge E's leadership. If they successfully challenge him, time 1 firm value will be V^L, and managerial compensation will be zero. In all other cases, time 1 value is V^S and managerial compensation is positive; however, E's marginal contribution to shareholder wealth can be positive, negative, or zero, depending on the state.

Having described the basics of the model, we now go on to consider in detail a potential separating signaling equilibrium, in which E signals higher states with higher share sales.

A SEPARATING SIGNALING EQUILIBRIUM

Model Description and Development

To establish an equilibrium, we must specify a self-sustaining set of actions in which both players' choices are a best response to the action of the other player. To describe such a set, we will first specify a set of beliefs that govern the choices of the outside shareholders. These beliefs must be sustainable in the sense that they are rational, given the outsiders' information set. We then demonstrate that E's best responses to the shareholders' actions cause their beliefs to be self-fulfilling; the chosen strategy for each player is then optimal given the strategy of the other, and the equilibrium is established.

In the signaling equilibrium we consider, E sells more shares in higher states. Outsiders believe that a higher-valued manager does not need to protect his job with voting control; only a low-valued manager would be afraid of scrutiny. Outsiders codify their beliefs by translating E's share sales as follows:

α

0 $\quad$ α^{M*} $\quad$ α^{H*} $\quad$ α_0

↑ nothing sold $\quad$ ↑ complete liquidation

market's beliefs:

| S=L | S=M | S=H |

α is in range described as:

Thus, if E sells an amount less than α^{M*}, shareholders believe that S=L and will allow E compensation of only b(L) as long as he is manager; on the other hand, if E signals by selling an amount greater than α^{H*}, he will receive b(H) if he keeps his job.

In the proposed equilibrium, outsiders set the α^{M*} and α^{H*} bounds so that if E inconsistently signals a state higher than the true state, he will be fired *if he is challenged*. (A schematic illustrating our proposed equilibrium is presented in Figure 1.) For example, using these bounds, falsely signaling the high state ensures that a challenged medium-state manager will be fired (that is, α^{H*} sets $F(\alpha^{H*}, M) = 1$). We can solve for this signal by setting the minimum proportion of outsider votes against E in the medium state, d(M), equal to the proportion required for ouster, $z(\alpha^{H*})$:[7]

$$z(\alpha^{H*}) \quad = \quad (.5 - \alpha_L)/(1 - \alpha_0 + \alpha^{H*} - \alpha_L) \quad \equiv \quad d(M).$$

This equality implies that:

$$[(.5 - \alpha_L) - d(M)*(1 - \alpha_0 - \alpha_L)]/d(M) \quad = \quad \alpha^{H*}.$$ [8]

Similarly, to ensure that a low-valued manager will be fired if he chooses a medium-state signal, we set $z(\alpha^{M*}) = d(L)$, which implies that:

$$[(.5 - \alpha_L) - d(L)*(1 - \alpha_0 - \alpha_L)]/d(L) \quad = \quad \alpha^{M*}.$$

Because $d(L) > d(M)$, α^{H*} is always greater than α^{M*}, so that E must sell more stock if he wishes to signal the higher state. Also, since $(\alpha_0 - \alpha^{M*}) < .50$, signaling either the high or medium state forces E to relinquish majority ownership.[9] If this were not so, there would be no risk to falsely signaling a higher state—no cost to a truthful signal—since the signal would not leave E vulnerable.

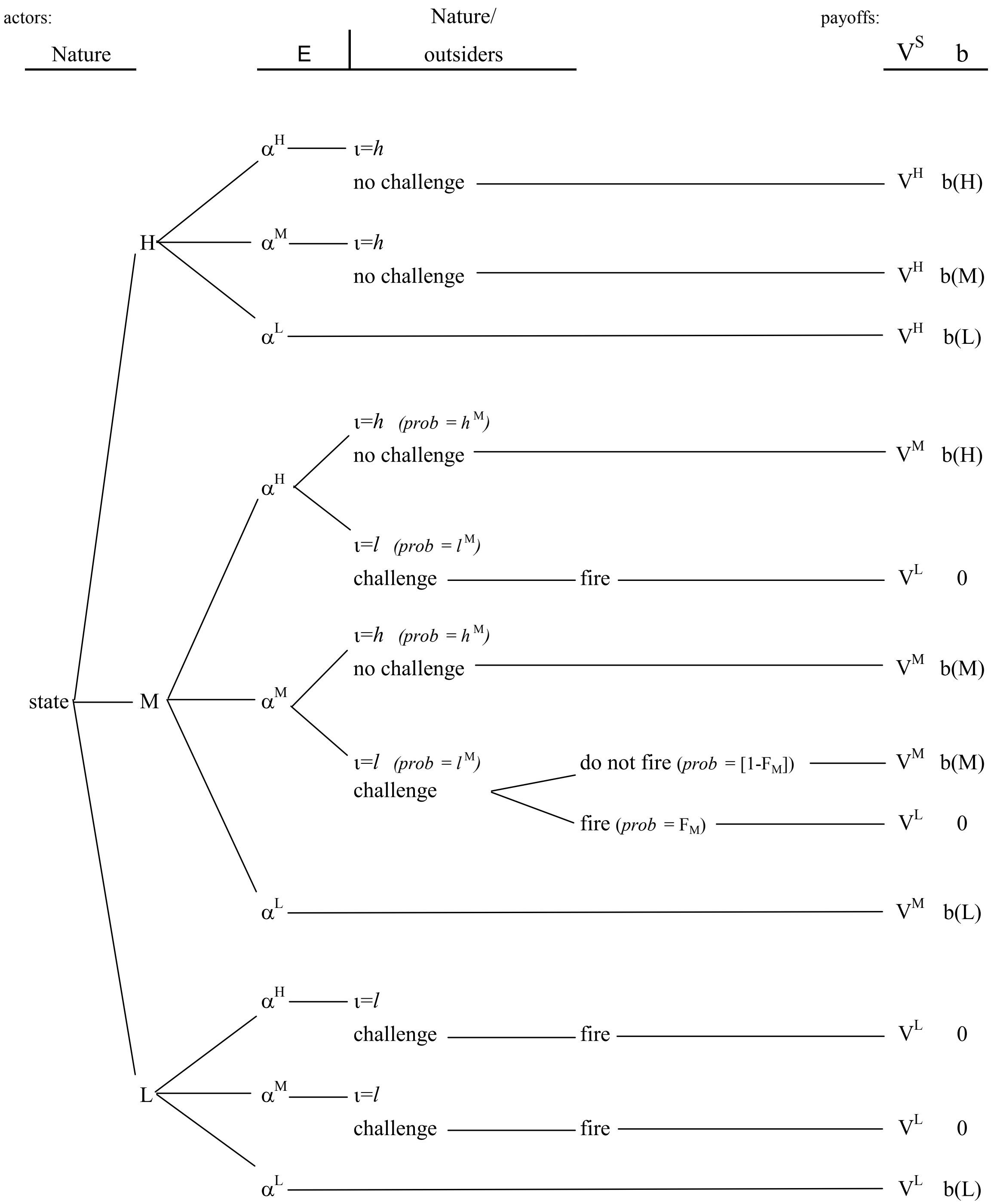
To finish our description of the market's beliefs, we must specify their interpretation of out-of-equilibrium actions by E. Some of these actions are easily detected by outsiders, since they must be inconsistent with outsiders' exogenous ι signal. For example, if a low-valued manager signals the high state, outsiders will receive an inconsistent $\iota=l$ signal; outsiders will then know that the true state is either medium or low. Similarly, if a high-valued manager signals the low state, their inconsistent $\iota=h$ signal will tell the outsiders that the state is actually medium or high. In order for their beliefs to be sustainable in these cases, outsiders' updating must consider only the states that are consistent with their observation of ι. Consistent with Welch (1989), we will specify that outsiders assume the worst when E sends an inconsistent signal: they assume that S=M when $\iota=h$, and that S=L when $\iota=l$.

Having described the market's beliefs, we must now show that E maximizes his expected wealth when his actions are consistent with those beliefs. We will then have established the separating signaling equilibrium. Figure 1 helps us visualize the necessary comparisons.

For both the low and high states, a consistent signal clearly dominates E's choices. A low-state manager has only one way to receive positive compensation: keeping his job. However, inconsistently signaling that S=M or S=H means getting fired. Only by choosing the consistent α^L signal will he earn b(L) and maximize his expected wealth. On the other hand, in the high state, E knows he will never be challenged, since outsiders are certain to receive the exogenous signal $\iota=h$. Thus, if he were to choose not to signal S=H, he would simply lower both his expected compensation (b(H)) and his trading price on every share he sells. Again, he maximizes his expected wealth by choosing the consistent signal, α^H.

E's choice is not so clear in the medium state. When S=M, a consistent signal makes E vulnerable. However, unlike in the S=H case, this vulnerability actually means something: only the proportion $z(\alpha^{M}*)$ of outsiders must vote against him for him to be fired, and $z(\alpha^{M}*) \equiv d(L) < 1$. Thus, E risks losing his job if he signals consistently. (To simplify the exposition below, we define this probability that a medium-valued manager will be fired if he signals consistently as F_M [so that $F(\alpha^{M*}, M) \equiv F_M$]; substituting, we find that F_M simplifies to $[1-d(L)]/[1-d(M)]$.)

Figure 1: Schematic Tree Illustrating Separating Signaling Equilibrium



To complete the demonstration of the proposed equilibrium, we must show that choosing $\alpha = \alpha^{M*}$ is E's best response when S=M, despite this risk. Table 1 below gives the value of his objective function (equation (5)) for each of his three possible actions. To help clarify the relevant trade-offs, we will consider each of these choices in turn.

Table 1: E's Expected Wealth, Given S=M ($E_0^E(W_1|M, \alpha)$)

α Signal	**Expected Wealth if $\iota = l$**	**Expected Wealth if $\iota = h$**
$\alpha = \alpha^H$	$\alpha_0{*}V^L$	$\alpha_0{*}V^M + \alpha^{H}{*}(V^H - V^M) + (1 - \alpha_0){*}b(H)$
$\alpha = \alpha^M$	$\alpha_0{*}V^M + (1 - \alpha_0 - F_M){*}b(M)$	$\alpha_0{*}V^M + (1 - \alpha_0){*}b(M)$
$\alpha = \alpha^L$	$\alpha_0{*}V^M + (1 - \alpha_0){*}b(L)$	$\alpha_0{*}V^M + (1 - \alpha_0){*}b(L)$

First, consider a medium-state manager who chooses to signal the low state, selling α^L. This would force him to take a loss on every share he sells, since shareholders will set their price given both E's α^L signal and their own received ι. If $\iota=l$, E's signal is confirmed, and shareholders expect that $V^S=V^L$. If, however, they receive $\iota=h$, they expect the lower value consistent with h, V^M. E's expected price is therefore between V^L and V^M. However, since outsiders assume that the probability that $V^S = V^L$ is 1 if $\iota=l$, while E knows that value will be low only if $\iota=l$ *and* he is actually fired, outsiders will determine a lower price than is warranted.

In addition to these trading losses, the inconsistent α^L signal would also restrict E's benefits to b(L) if he kept his job; if he lost it, of course, he would receive nothing. Thus, since his trading profits are negative for any positive α^L, and since his expected compensation falls with α^L, the optimal level of α^L is zero. Choosing this inconsistent signal then leaves E majority holder, with an expected wealth of:

$$E_0^E(W_1|S=M, \alpha=\alpha^L) = \alpha_0{*}(V^M) + (1 - \alpha_0){*}b(L). \quad (6)$$

This must be lower than what E would expect from a truthful α^M signal, if the equilibrium is to obtain.

An out-of-equilibrium α^L signal is defensive, since E can be sure to keep his job, to receive positive compensation, and to have shares worth V^M. His other inconsistent action, however, is aggressive: signaling the high state in search of trading profits and excess compensation. This strategy is riskier, though, since signaling α^H means he will be fired—losing all benefits and making his shares worth only V^L—if the market's exogenous information refutes him (if $\iota=l$). Using the payoffs in Table 1, we can see that these trade-offs result in an expected wealth from an inconsistent α^H signal of:

$$E_0^E(W_1|S=M, \alpha=\alpha^H) = h^{M}{*}\{\alpha_0{*}V^M + \alpha^{H}{*}[V^H - V^M] + (1 - \alpha_0){*}b(H)\} + l^{M}{*}(\alpha_0{*}V^L) \quad (7)$$

Again, for our equilibrium, this must be lower than what E expects from a consistent signal.

What would E expect from an α^M signal? If he keeps his job, the firm will be worth V^M and he will receive benefits of b(M); if he is challenged (as he will be if $\iota = l$) *and* fired, firm value is V^L and benefits are zero. Substituting into equation (5), we see that this implies that E's expected wealth is:

$$\alpha_0 * \{V^M - (V^M - V^L) * F(\alpha^M, M) * l^M\} + (1-\alpha_0) * b(M)\{1 - F(\alpha^M, M) * l^M\},$$

which, using (2), simplifies to:

$$E_0^E(W_1 | S{=}M, \alpha{=}\alpha^M) \quad = \quad \alpha_0 * (V^M) + b(M) * [1 - \alpha_0 - F(\alpha^M, M) * l^M]. \qquad (8)$$

This will be maximized when F is minimized, so if E chooses to signal that S=M, he will do so by selling as few shares as possible (by setting $\alpha = \alpha^{M*}$). However, since $[\alpha_0 - \alpha^{M*}] < .5$, even this minimum sales amount will still require him to relinquish majority ownership and risk being fired.

Having described E's incentives when S=M, we can determine the parameter restrictions that will permit the signaling equilibrium. Since E will prefer a consistent α^M signal to the low signal when (8) > (6), we have the following restriction (after rearranging and utilizing the definition $h^M = [1 - l^M]$):

$$h^M \quad > \quad 1 - [(1 - \alpha_0)/F_M] * [1 - b(L)/b(M)]. \qquad (9)$$

Similarly, he will choose α^M over a high signal if (8) > (7), which reduces to the following requirement:

$$h^M \quad < \quad b(M) * (1 - F_M) / \{\alpha_0 * [(V^H - V^M) - (b(H) - b(M))] + b(H) - b(M) * F_M\}. \qquad (10)$$

Together, these restrictions characterize the parameter values that permit the equilibrium, and give us the following theorem: A separating signaling equilibrium, in which higher share sales signal states of nature, will exist in this signaling game as long as h^M falls between the bounds described by equations (9) and (10).

DISCUSSION

In this section, we discuss how literature on blockholdings, trading by insiders, and the dynamics of family firms can be related to the comparative statics of the theorem just presented. We focus on the model's implications for state-dependent firm value and benefits, blockholder interactions, and the size of the controlling manager's stake.

Firm Value and Private Benefits

Some of the inequalities in the theorem affirm the obvious: E is more likely to truthfully signal the medium state the lower are the benefits from signaling the low state and the temptations to signal the high state. Thus, the signaling equilibrium is more likely to obtain when b(L), b(H), and V^H are relatively low (so that b(M) and V^M are relatively high).[10] The key motivator here is the benefits, so we will focus on them in this section. However, since benefits are necessarily bounded by firm value, we first briefly note some evidence relating firm value and the willingness of controlling insiders to make significant sales.

Truthful signaling implies that higher-state managers should be more willing than low-valued managers to sell significant amounts of stock. There is some empirical support for this proposition. For example, Demsetz and Villalonga (2001) propose that some of their empirical results may suggest that "management choose[s] to hold fewer shares when firms seem to be doing well" (p. 228). In a specific test of this relationship, Livingston (2002) relates a firm's operating cash flow (a proxy for firm value) to its controlling manager's willingness to sell enough stock to fall below a control threshold (where this threshold is set at three different levels, 5%, 10%, and 25%). Operating income is measured both at its level, as its percentage of total assets, and as its percentage of annual sales. She finds that significant sales are associated with higher operating cash flow.[11] Although the results are not significant at conventional levels, the fact that 88.9% of the regression coefficients are positive is suggestive: good performance alone may help insulate managers from shareholder discipline, making large shareholdings unnecessary. This is especially interesting given Barclay and Holderness's (1989) evidence suggesting that blocks are more valuable in firms with higher cash flow. In this sample, managers appear to be releasing control just when that control would be most valuable.

Higher firm value may imply higher potential control benefits. Our model's defensive behavior, in particular, is consistent with empirical and anecdotal observations that link benefits with control. We now briefly revisit the forms that these benefits may take and some research that relates those benefits to control.

There is a large literature describing control benefits, some of which served as our motivation for the b(S) construct. For example, Demsetz and Lehn (1985) suggest that a controlling manager may derive nonpecuniary income from the "ability to deploy resources to suit [his] personal preferences"; he may also enjoy the "amenity potential" of his current job.[12] He may derive utility from his ability to "exercise authority, dictate strategy, and choose which investments the firm will undertake" (Schulze *et al.*, [2003]). More in keeping with our model, however, are the pecuniary benefits of control—perhaps the ability to "pay himself an excessive salary, negotiate sweetheart deals with other firms he controls, invest in negative net-present-value projects, or simply withdraw corporate funds" (Holderness and Sheehan [1988]). For example, Holderness and Sheehan (1988) find some evidence that individual majority owners who are also CEOs tend to pay themselves higher salaries than do CEOs of non-majority owned firms, even though the majority-owned firms tend to underperform. This ability to extract resources from a firm increases the relative compensation that the manager receives, making his employment there more attractive to him (increasing b(L)). The desire to retain the access to those resources can lead to defensive behavior, consistent with the "death" studies discussed in the introduction. In those cases, b(L) could be interpreted as the amount by which the firms' value rose after the firms were "emancipated."

High private benefits from control discourage managers from releasing control. However, even if b(L) is relatively small (so that b(M) is relatively large, encouraging a medium-valued manager to signal consistently), the manager still must contend with the possibility of being fired. We can see from the theorem that lower values of F_M make the signaling outcome more likely. An important determinant of F_M is the amount of stock owned by the hostile outside blockholder, α_L: unsurprisingly, the more he owns, the less likely it is that the controlling manager will allow himself to become vulnerable. We will now briefly consider how the literature on blockholdings, including that on minority blocks, may inform our model.

<u>Interactions among Blockholders</u>

Most previous research on blockholdings considers only single blocks, despite the evidence that multiple blocks may not be uncommon. For example, Barclay and Holderness (1989) cite a 1984 Securities and Exchange Commission survey that shows that among NYSE, AMEX, and OTC corporations, approximately 20% have "*at least one* nonofficer who owns more than 10% of the common stock, and approximately 15% have at least one officer" who owns that much (emphasis added). These authors also refer to a 1989 study by Mikkelson and Partch, who found an average voting concentration of 20% among officers and directors in their 240-firm sample. Similarly, Demsetz and Lehn (1985), in a sample of 511 firms (a sample "heavily weighted by Fortune 500 firms, precisely the firms that are supposed to suffer from diffuse ownership structures"), find that the five and twenty largest shareholders own an average of 24.8% and 37.7%, respectively, of their firms' stock. It therefore may be quite common to find several blockholders in a single firm.

If multiple blocks are common, then interactions among their owners may be important determinants of firm value. Pagano and Roell (1999) recognize this when they suggest that a controlling blockholder's incentives can be effectively monitored by other large blockholders. Barclay and Holderness (1989) note that "a blockholder's effective control of a corporation will almost certainly be less if he is one of two large-block shareholders than if he is sole blockholder." This control effect may influence a manager's behavior. In Barclay, Holderness, and Pontiff (1993), for example, the authors consider how controlling managers of closed-end fund behave in the face of share concentrations in hostile or friendly hands. The defensive actions taken by the controlling managers in these funds are consistent with those that E may take in our model. For example, if the closed-end fund has a discount, opening the fund would eliminate the discount and increase share value; unfortunately for the outside shareholders, though, controlling managers are presumed to prefer keeping the fund closed, protecting their access to fund resources. For both these fund managers and for E, the temptation to choose such value-decreasing actions is exacerbated by the presence of hostile outside blockholders. However, the outsiders may prevent acting on that temptation. In the closed-end funds, outsiders may accumulate blocks, attempting to amass enough power to take the fund public; similarly, in our model, L's voting of his block facilitates firing a low-valued manager, increasing firm value by releasing b(L).

The role of the outside blockholder L in our model is also consistent with some of the conjectures in the literature about the role and valuation impacts of minority blocks. There are at least three points of contact between this literature and our model. First, there is the incorporation of private costs of control (see, for example, Bolton and Von Thadden [1998]). Control benefits are critical to our model, but if E also faces unique control costs, these may affect not only his desire to sell a substantial amount of stock, but also the market's response to his sale. We have not considered such costs explicitly in the model, and they do not enter into E's objective function. However, such costs, if present, may be incorporated in b(L), which distinguishes E's worst-case situation at his own firm from that in alternative employment. Extending our interpretation of b(L) to include these costs should not change the implications of the model.

The second thread from the minority-block literature that may inform our model is the question of how the minority block was accumulated. Again, our model abstracts from this concern, as we take L's block as a given. Had we modeled outside block formation as endogenous, it is almost impossible to imagine that anyone would undertake to accumulate a block, given the severely restricted liquidity that already characterizes the firm, the stranglehold that E has on private benefits from control, and the impossibility of meaningful monitoring. However, there may nonetheless be a link between our model's signals and those implied by minority-block accumulation.

We appeal here to Hertzel and Smith's (1993) evaluation of discounts on private equity placements, in which they attempt to reconcile the observed discounts on these placements—which, at around 30%, can be substantial—with the resultant positive stock price responses. The authors reason that, if a buyer must incur significant due diligence costs in evaluating his purchase, he may require a discount as compensation. However, his willingness to undertake the purchase sends a good signal to the market, leading to the positive market reaction. The outside blockholder is essentially certifying the quality of the firm through his purchase. This certification is similar in spirit to the signal in our model, in that E's share sale provides a meaningful, costly signal of firm value, which simultaneously opens the door to certification by outsiders. For us, though, just the opportunity for certification is enough. This brings us to the third and most important link between our model and the minority-block literature: monitoring.

Outside blockholders beget monitoring potential. As Demsetz and Villalonga (2001) note, "[t]he greater is the degree to which shares are concentrated in the hands of outside shareholders, the more effectively management behavior should be monitored and disciplined" (p.221). With respect to the minority-block literature, if this monitoring is costly, the discounts observed on minority blocks may reflect a compensating reward. For example, while Hertzel and Smith's (1993) main conclusion about private placements relates to the signaling/information effect just discussed, they also find evidence that the purchasers of the placements perform valuable monitoring functions. They assume that this monitoring is most pronounced in sales to individuals. While in our model E sells not to an individual, but rather to the atomistic shareholders, his sale nonetheless increase the relative size of L's block, resulting in the "material increase in ownership concentration" that Hertzel and Smith associate with enhanced monitoring. Note also that this increase in relative concentration does not require that an outside block be created, which, as noted above, can be costly to the accumulator; rather, since L's block already exists, its increased importance is an immediate consequence of E's sale. E's willingness to accept this monitoring is the very basis for our model's signal.

The sorts of relationships among blockholders that we model through E and L can have special significance in family-owned firms. These firms often have concentrated control, multiple large block shareholdings, and significant competing interests; they may therefore provide useful illustrations of the control and valuation effects of blockholder interactions. For example, Barontini and Caprio [2004] suggest that a family may not be able to act "autonomously" when the firm has other large shareholders. Similarly, Villalonga and Amit (2004) find that having non-family blockholders negatively affects a family firm's value. Even when the blockholders are all family members, there can be conflicts. Schulze *et al.* (2003) describe obstructive behavior that can occur in the "sibling partnership" stage of a family firm's lifecycle (for example, when siblings with similar large stock holdings but different preferences for consumption disagree over the deployment of firm resources, sometimes even paralyzing the firm through "hostage taking"). Family firms, then, may be fruitful candidates for observing E/L–type interactions.

Livingston (2007) provides a direct test of the model's application to family firms. Using three control benchmarks (5%, 10%, and 25%), she runs logit regressions in which the dependent variable is a dichotomous indicator that equals 1 if a manager makes a sale that leaves him below a benchmark (and 0 otherwise). In these tests, family holdings represented our model's outside blockholder L. Rather than consider family members' holdings as substitutes for their own votes, managers in firms with second-generation family members defensively maintained their control, as if their family were a hostile bloc. In fact, over the 14-year study period, managers in these firms, in contrast to their nonfamily counterparts, actually increased their stock holdings, solidifying their control.

<u>The Size of the Control Block</u>

Having discussed results touching on benefits and outside blockholders, we turn now to the size of the manager's own block. The comparative statics on α and on α_0, respectively, give us the most empirically interesting implications of the model: that firm value increases when an owner releases control (and—given the beliefs specified in our equilibrium—increases *more*, the more that owner sells [α]), but that he is less likely to do this, the more stock he starts with (α_0). We will now briefly mention previous work that touches on these two implications.

Being less likely to release control means acting more defensively. Empirical findings that large blocks are unlikely to be broken up are consistent with this type of defensive behavior (see, for example, Denis and Denis [1993]). Barclay and Holderness (1992) provide a link between this behavior and shareholdings, finding that the more stock the largest blockholder owns, the less likely he is to break up his block. These sorts of results broadly support the secondt implication above: that the likelihood of a control sale falls as α_0 rises. In a direct test of this implication, Livingston (2007) uses initial shareholdings to explain a controlling manager's willingness to make a significant control sale (again using the 5%, 10%, and 25% benchmarks). Using data from 81 firms with a controlling manager, as well as from its mutually exclusive family-owned and "nonfamily" subsamples, all coefficients on α_0 were negative. Managers with higher initial stakes are less likely to allow their holdings to fall below a control threshold; larger blocks were less likely to be broken up. As noted above, this tendency was particularly marked in family-owned firms, which were also characterized by higher average initial managerial shareholdings, significantly higher average terminal shareholdings, and significantly higher maximum terminal shareholdings. Managers in these family firms increased their holdings to defend their control.

These sorts of changes in concentration bring us to our model's change variable, α. The evidence on share-price increases following executive deaths—the involuntary/control sales discussed in the introduction—suggest that value can increase when control is released.[13] In fact, Slovin and Sushka's (1993) work also finds that these valuation increases are positively related to the controlling executives' shareholdings. This result is the involuntary analogue to our model's α implication. In a direct test of α's relationship to significant sales, Livingston (2002) presents event-study results from control sales from ten public firms. These sales are defined relative to same three thresholds. Abnormal returns are defined using both a market model and a decile model, and event periods are both one- and two-day windows around significant sales events. The results, while not statistically significant, nonetheless were primarily positive: eleven of twelve test statistics were positive, as were 57% of the firm-level prediction errors. A test on the proportion of positive statistics cannot reject the null hypothesis that π=.50. Consistently with our model's signaling story—or at least inconsistently with conventional wisdom—there was no suggestion whatsoever that the market interpreted these sales as bad news.

CONCLUSION

Voters like politicians' lives to be an "open book": candidates are perceived to be trustworthy if they act as if they have nothing to hide.[14] A controlling manager's willingness to undergo scrutiny could send the same positive signal to outside shareholders. Managers who use unassailable voting control to defend their jobs—and thus their privileged access to corporate resources—may be afraid to let other shareholders determine whether or not their managerial skills compensate for their higher cost. In this paper, we present a signaling model in which higher-valued managers are more willing to release voting control. This positive view of one type of insider sale, the voluntary/control type, runs counter to the conventional wisdom that insider sales are bad news. Not all insider sales are bids for trading profits motivated by negative private information. Instead, sales that are also control events must be evaluated as opportunities to benefit both from increased ownership dispersion and from increased productive monitoring.

ENDNOTES

1. The first four quotations here come from the following four sources, respectively: "Bad News Bulls? How Insider Buying May Be Good," by Serena Ng, *Wall Street Journal*, 11/30/06; David Coleman, editor of Vickers Weekly Insider Report, quoted in "Stock Sales by Insiders Reach High" (*Wall Street Journal*, 9/3/97); Praveen Gottipalli, quoted in "Some Stock Funds Beat Rivals by Following Insiders' Trades" (*Wall Street Journal*, 1/27/97); and Jack Pickler of Prudential Securities, quoted in "VF's Chairman, Two Others Sell Company Stock" (*Wall Street Journal*, 1/28/98). The fifth quotation discusses a strategy of the Schwab Analytics Fund, as described in "Some Stock Funds Beat Rivals by Following Insiders' Trades" (*Wall Street Journal*, 1/27/97).

2. One can very occasionally find recognition of this fact in the popular press. For example, in 1993, the Wall Street Journal quoted "many money managers" as predicting that a breakup of the 57% block owned by Dart, Inc.'s founder Herbert Haft would "spark a big rise" in Dart's shares. Indeed one such analyst suggested that the $83.50 Dart shares would be worth as much as $170 if the Hart family holdings were broken up. (*Wall Street Journal*, 8/23/93)

3. On the control potential of small blocks, see, for example, Barclay and Holderness [1991] and Morck, Shleifer, and Vishny [1988]; also note that the SEC's reporting threshold for significant ownership is 5%. On the prevalence of blocks in American corporations, see Barclay and Holderness [1989] and Demsetz and Lehn [1985].

4. For a further discussion of the forms that these activities and benefits can take, see, for example, Livingston (1996), Demsetz and Lehn (1985), Jensen and Ruback (1983), Harris and Raviv (1988a), and Holderness and Sheehan (1988).

5. See, for example, Barclay and Holderness (1989) and Johnson, *et al.* (1985).

6. Shleifer and Vishny (1989), p, 129.

7. Setting α^{H*} in this way is consistent with the outsiders' beliefs about S, given out-of-equilibrium behavior by E (discussed later in the text): given an α^{H*} signal and a contradictory *l* signal, outsiders believe that S=L. Thus, they are better off firing E, since firm value is lower under his leadership than it is under a replacement (V^L - b(L) < V^L).

8. Note that for α^{H*} to be less than α_0, we must have $(.5 - \alpha_L)/(1 - \alpha_L) < d(M)$. This parameter restriction is intuitively plausible, since it implies that the larger is α_L, the smaller can be the proportion of atomistic shareholders voting against E in a successful challenge. We will assume that this inequality holds.

9. $(\alpha_0 - \alpha^{M*}) < .5 \rightarrow d(L)/[1 + d(L)] < .5$, which is true since $.5 < d(L) < 1$. Note that this is broadly consistent with Bolton and Von Thadden's (1998) model: for them, "when control is the overriding concern, then even a small reduction in block size below [the proportion that ensures control] involves a discrete upward jump in costs of control loss" (p. 18).

10. In Livingston (1996), we describe the low-end pooling equilibrium in which all managers keep voting control.

11. Firms with higher capital expenditures were less likely to have managers who made significant sales. Tests using operating income were mixed.

12. See also Jensen and Ruback (1983), Spence (1973), Barclay, Holderness, and Pontiff (1993), and Harris and Raviv (1988a). Williams and Linder (2002) provide an example of the recognition of the value of control from the professional literature. They assert that "[i]t stands to reason that blocks of stock than cannot control the direction of the company… would be less valuable than stock that does" (p.27); they then go on to suggest that the appropriate discount for small blocks relative to controlling blocks is 23%.

13. There is also evidence that firm value can increase simply as ownership dispersion increases, even if there is not "control event" involved. (See Slovin, Sushka, and Lai [2000].)

14. I thank Larry Schall for this analogy.

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