Last revision: February 2003

The Costs of Permitting Managers to Sell Shares

Lucian Arye Bebchuk
Harvard Law School and NBER
(bebchuk@law.harvard.edu)

Oren Bar-Gill
Harvard Society of Fellows
(bargill@law.harvard.edu)

Abstract

This paper analyzes the costs of permitting corporate managers to sell shares they hold prior to the end of their service at the company. Permitting such selling has an adverse ex ante effect on managers' prior level of effort. This effect exists even when managers do not have private information about the firm's long-term prospects. The existence of such private information exacerbates the reduction in effort to an extent that depends on the volume of trading in the company's shares and on managers' disclosure obligations. Furthermore, permitting managers to sell shares also provides them with incentives to hide bad news. In setting optimal limits on managers' freedom to unload shares, the identified costs must be traded off against whatever liquidity or risk-bearing benefits might flow from permitting managers to sell shares. Our analysis provides testable predictions as well as corporate governance implications.

JEL classification:
Keywords: asymmetric information, agency costs, corporate governance, disclosure, myopia, short-termism, executive compensation, stock options, insider trading, reporting, financial statements.

1. Introduction

The recent "corporate governance crisis" has increased interest in the incentives that executive compensation contracts provide to managers. One common feature of compensation practices is the broad freedom given to managers to unload options and shares (Bebchuk, Fried, and Walker (2002)). In some notorious cases, such as Enron, managers used this freedom to unload shares before the market discovered rather bad news about the company. Subsequently, observers, including The Conference Board's Blue-Ribbon Commission on Public Trust and Private Enterprise, have called for companies to adopt greater restrictions on managerial selling. Indeed, Senator John McCain even called for tax incentives to encourage companies to go in this direction.

The benefits of permitting managers to unload options and shares are relatively straightforward. These sales might provide managers with diversification benefits. Such sales might also enable managers to meet liquidity needs. To be sure, liquidity needs can often be addressed also through loans secured by managers' options and shares, but such borrowing would produce a leveraged position that would impose risk-bearing costs on managers.

These risk-bearing and liquidity benefits, however, should be traded off against the costs of the potential adverse incentives produced by freedom to sell shares. This paper develops a model to identify the potential distortions and the factors that determine their magnitude. An understanding of these distortions is necessary to identify the optimal limits if any on managers' freedom to unload options and shares.

To study the subject, we examine a model with several stages. In the first stage, a firm's manager decides how much effort to invest in increasing the firm's long-term value. In the next stage, the manager might get a signal concerning the firm's expected long-term value. Trading subsequently takes place at the third stage. Finally, there is a (long-term) stage in which payoffs are realized.

Our interest lies in studying how the ex ante choice of effort level is affected by whether managers are permitted to sell some of their shares in the short-run trading stage. We begin with a benchmark case in which managers do not have at the intermediate trading stage any private information about the long-term value. In such a case, managerial selling of shares in the trading

period will occur only if the managers experience a liquidity shock. Even in this case, incentives to exert effort ex ante are diluted. Because managers can expect ex ante that they might sell some of their shares before the long-term value materializes, their incentives to maximize this long-term value are weakened. The more shares managers are permitted to sell, and the higher the probability that the managers will experience a liquidity shock, the greater the reduction in ex ante effort. In equilibrium, the short-term market price at the trading period fully reflects the reduction of long-term value caused by the dilution of ex ante incentives, but managers' ex ante incentives to exert effort are still weakened.

We next introduce the possibility of managers obtaining private information about long-term values prior to the intermediate trading stage. In this case, the manager might sell shares in the short-run not only due to liquidity needs but possibly also due to their getting negative information about the firm's prospects. As we show, the existence of such information-based selling operates to further reduce ex ante effort. The intuition is that the ability to sell shares in the event of bad news about long-term prospects softens the negative effect that a reduction in effort would otherwise have on the manager's payoff.

The extent to which managers' private information about long-term value dilutes incentives to exert effort depends on the managers' disclosure requirements and on the volume of trading relative to the amount managers are permitted to sell. In particular, we study three cases in which (1) the market has no ability to detect whether managers are engaged in selling because the selling is made to the company (as is the case in phantom stock plans) and is not registered in the market, (2) managers must sell shares on the market, thus enabling the market to draw inferences from the trading volume, but are not required to disclose their sales in advance, and (3) managers are required to disclose in advance their intention to sell and the market is thus fully aware of any selling. We find that the reduction in ex ante effort is most severe in case (1), least severe in case (3), and at an intermediate level in case (2).

We also study an additional cost of managers' short-term selling – the costs of increased incentives to suppress bad news. We assume that information is observable in principle, but that the manager can at a cost – in monetary investment, effort, or expected penalty – make the information unobservable by the market. We show that, when short-term selling is permitted, managers will have an incentive to suppress bad news. The

ranking of the above three cases in terms of this dimension is the same as their ranking in terms of the disincentive to exert effort, with the incentive to suppress bad news being strongest in case (1), least severe in case (3), and at an intermediate level in case (2).

The remainder of the paper is organized as follows. Section 2 presents the framework of the analysis. Section 3 studies the effects of freedom to sell in the intermediate trading stage on the equilibrium level of ex ante effort. Section 4 introduces the possibility of managers' having private information about long-term value and shows how it exacerbates the reduction in ex ante effort. Section 5 studies the effects of short-term selling on managers' incentives to suppress bad news. Section 6 discusses related literature. Section 7 offers concluding remarks and discusses possible extensions.

2. Framework of Analysis

2.1 Sequence of Events

The sequence of events in the model is as follows:

T=0: Initial situation with (initially) identical publicly traded firms each run by a manager.

T=1: Ex ante decisions – manager chooses effort level.

T=2: Learning of information – managers may learn information about the firm's expected cash flows at the final period.

T=3: Market trading.

T=4: Realization of payoffs.

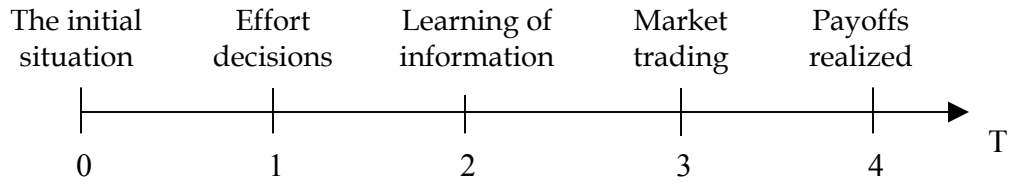

Fig. 1: Sequence of Events

We now describe in detail our assumptions concerning each one of the five stages.

2.2 T=0: Initial Situation

At T=0, all companies are publicly traded, and each is run by a manager. Without loss of generality, we assume that, at T=0, each company has one issued share that is held by initial shareholders including the manager. The manager holds a fraction m of the company's stock. (The analysis can be readily adjusted, with results that are qualitatively similar, to the case where the manager has an option to purchase a fraction m of the company's stock.) The manager is assumed to be cash constrained and consequently unable to purchase additional equity.

We focus on the consequences of allowing managers to sell shares prior to the end of their tenure at the company. We therefore compare the case in which the manager is not permitted to sell any of her shares in the intermediate trading stage with the case in which the manager can sell up to s of her shares.

We shall assume that the manager will be making decisions for the firm in all of the model's periods. Thus, there is no possibility of a takeover and the model abstracts from the incentives provided by a takeover threat.

2.3 T=1: Ex Ante Decisions

At T=1, the manager of each company chooses an effort level $e \in \Re^+$. This effort level will increase the expected value of the final T=4 payoff from the firm's project. For concreteness, we assume that the final period payoff will be either low, 0, or high, H, with the probability of a high payoff depending on the manager's ex ante effort. In particular, we assume that the probability of a high value, $\theta(e)$, satisfies $\theta'(e) > 0$ and $\theta''(e) \le 0$. We further assume that e is unobservable and thus cannot be contracted on.

If the manager cannot sell shares at T=3, her choice of effort, e_{NS}, will be characterized by the FOC: $m \cdot \theta'(e_{NS}) \cdot H = 1$.

2.4 T=2: Learning of Information

At T=2, the manager may or may not obtain private information about the final T=4 value of the firm's project. Specifically, if the value of the company's project will be zero, the manager will get a "bad news" signal, B, with probability β. The case where $\beta = 0$ is the case in which the manager

never has private information. The private information signal might concern current revenues, costs, earnings, volume of activity, the establishment of strategic or other relations, and so forth.

In the case in which the manger might sometimes receive a private information signal, i.e., $\beta > 0$, if the manager receives the negative signal, B, she will know for sure that the project will fail. On the other hand, if the manager does not get the negative signal, the manager will still face uncertainty about the ultimate outcome but will be able to update upwards the probability of getting H.

2.5 T=3: Market Trading

At T=3, market trading takes place. Liquidity sellers place orders to sell an amount $l \sim U[0,\bar{l}]$. If the manager is permitted to sell shares, the manager might place an order to sell an amount $x \in [0,s]$. We denote by v the total supply of shares in the market. As is conventional, we assume that market makers observe the total supply, make whatever inferences might be possible from it, and then set a market price, P, that enables them to break even, i.e., to make zero expected profits.[1]

A manager may decide to sell shares for two distinct reasons. First, the manager may wish to sell shares for liquidity reasons. Specifically, we assume that, with probability λ, the manager experiences a liquidity shock that raises her immediate utility from cash by a multiple of $1+d$. Second, the manager may wish to sell shares in order to take advantage of her private information, i.e. the manager may wish to sell shares when she learns bad news about the company's prospects. Since managers' sales may be motivated by unfavorable private information signals, market makers will make inferences about what this private information is from disclosures of sales made by managers or, in the absence of such disclosures, from the observed volume of orders.

We assume that, if the manager is indifferent between selling and holding the shares, she will choose not to sell (because, say, selling involves

[1] The simple model of market trading that we use builds on the insights of the rich models that were developed to analyze trading when some traders have private information (see, e.g., Kyle (1985), Glosten and Milgrom (1985)) and where market makers try to make inferences as to whether such informed trading is taking place from the volume of orders. We use a simple version of such models because our interest is not in the trading stage itself but rather in how the prices set in it affect earlier managerial decisions.

some very small transaction costs). In the case in which indifference leads to selling, the cost of permitting short-term selling will be even larger than our analysis suggests.[2]

We assume that the volume of shares sold by liquidity traders is sufficiently large so that $\bar{l} > 2 \cdot s$. In our model, this assumption implies that, if a manager sells any shares, she will sell all the shares that she is permitted to sell. A lower level of liquidity trading may lead managers to sell at T=3 only part of the shares that they are permitted to sell at this period, which will complicate the analysis but will not qualitatively change the results.

2.6 T=4: Realization of Payoffs

At T=4, all cash flows are realized. The company's project produces cash flows of either 0 or *H*. The probability of high cash flows (*H*) is: $\theta(e)$. The final T=4 value of a company, i.e. the company's T=4 cash flows, are denoted P^f. The manager's payoff equals: $s \cdot P + (m - s) \cdot P^f - e$.

3. Managerial Selling and Ex Ante Effort

We first consider the case where $\beta = 0$, i.e. where managers never receive private information at T=2. The outcome in this benchmark case is described in the following proposition.

Proposition 1: *When managers never receive private information at T=2, i.e. when* $\beta = 0$ –

(i) The manager will sell all the shares she is permitted to sell at T=3 if and only if she experiences a liquidity shock.

(ii) The manager will choose an effort level, $e_S < e_{NS}$, *that satisfies:* $[(m - s \cdot \lambda) \cdot H] \cdot \theta'(e_S) = 1$.

(iii) The T=3 market price will be: $P_S = \theta(e_S) \cdot H$.

Remark: The intuition for this result, which is proved in the appendix, is as follows.

(i) In equilibrium, the market price will reflect the expected value of the final price. Therefore, if a manager does not experience a liquidity shock,

[2] See note 3 below.

there will be no reason for her to sell shares.[3] At the same time, if the manager experiences a liquidity shock, there will not be any reason not to sell shares for their true value, and thus the manager will sell whatever shares she is permitted to sell. .

(ii) The manager knows ex ante that with a certain probability she will sell part of her holdings at T=3 for the market price which is not expected to be affected by her (unobservable) choice of effort. As a result, her incentives to exert effort are diluted and the ex ante effort level is lower.

(iii) In equilibrium, even though the market does not observe effort, it correctly anticipates the manager's choice of a low effort level. As a result, the market price equals the true expected value of the company's project given the manager's choice of effort.[4]

Based on proposition 1, we can state the following corollary.

Corollary 1: *In the no private information case, i.e. when* $\beta = 0$*, the effort level,* e_S*, is decreasing in*

(i) the fraction of shares that the manager can sell at T=3, s; and

(ii) in the likelihood of a liquidity shock, λ*.*

Remark: The results stated in corollary 1 suggest the following testable predictions:

-- Other things equal, the value of a company, as measured for example by its Tobin's Q, can be expected to decrease in the magnitude of the short-term component in its manager's executive compensation contract.

-- Similarly, the value of a company will be smaller when the characteristics of its manager render her more likely to experience a liquidity shock. Managers with little outside wealth, for example, are more likely to have liquidity reasons for selling their shares.

The results stated in proposition 1 have implications for the optimal design of compensation contracts that are given in the following Corollary.

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[3] If we had assumed that in case of indifference the manager sells her shares, then a different equilibrium would obtain. In particular, the manager would choose an even lower effort level satisfying $\left[(m-s)\cdot H\right]\cdot\theta'(e)=1$.

[4] A similar result can be found in the literature on managerial shot-termism and myopia. See, e.g., Stein (1988, 1989) and Bebchuk and Stole (1993).

Corollary 2:

(i) *A contract* (m,s) *that allows the manager to sell s shares is less efficient than a contract* $(m,0)$ *that prohibits short-term selling if and only if* $[\theta(e_{NS})-\theta(e_S)]\cdot H-(e_{NS}-e_S)>s\cdot\lambda\cdot d\cdot\theta(e_S)\cdot H$.

(ii) *A contract* (m,s) *that allows the manager to sell s shares is Pareto inferior to a* $(m+s\cdot\lambda\cdot d,0)$ *contract that prohibits short-term selling and compensates managers with additional shares* $s\cdot\lambda\cdot d$ *whenever* $(1-(m+s\cdot\lambda\cdot d))\cdot[\theta(e_{NS}^{m+s\cdot\lambda\cdot d})-\theta(e_S)]>s\cdot\lambda\cdot d\cdot\theta(e_S)$.

(iii) *A contract* (m,s) *that allows the manager to sell s shares is Pareto inferior to a contract* $(m,0)$ *that prohibits short-term selling and compensates managers with an initial cash payment* $k=s\cdot\lambda\cdot d\cdot\theta(e_S)\cdot H/(1+\lambda\cdot d)$ *(financed by borrowing) whenever* $(1-m)\cdot[\theta(e_{NS})-\theta(e_S)]>s\cdot\lambda\cdot d\cdot\theta(e_S)/(1+\lambda\cdot d)$.

Remarks:

The intuition for these results, which are proved in the appendix, is as follows.

(i) On the one hand, allowing short-term selling produces liquidity gains. On the other hand, it reduces the manager's incentives to exert effort. When the latter effect is dominant, which is when the condition stated in part (i) of the corollary holds, allowing short-term selling is inefficient.

For the optimal contract to prohibit selling, however, it is not sufficient that such prohibition is efficient, as such prohibition might violate the manager's participation constraint. Therefore, we explore the question whether contracts prohibiting sales are optimal by identifying conditions under which such a contract is Pareto superior – making both shareholders and the manager better off – than the contract that permits selling.

(ii) One way to seek a Pareto superior contract is to prohibit short-term selling while compensating the manager through a higher stake in the company. In such a case, the shareholders surrender a larger stake of the company to the manager, but they gain from the increased effort induced by the manager's greater stake. The condition stated in part (ii) of the corollary ensures that the gain from increased effort is dominant and that the shareholders will be thus made better off.

(iii) Another way to compensate the manager for prohibiting short-term is by providing the manager with an additional up-front cash payment. The

condition stated in part (iii) of the corollary ensures that the gain to shareholders from increased effort exceeds the cost to them of the upfront initial cash payment.

(iv) The contracts specified in parts (ii) and (iii) of the corollary not only make shareholders better off, but also make managers better off. As specified, these contracts prevent any loss to the manager had the expected value of the company remained the same (i.e. as under the part (i) contract). However, the expected value of the company increases due to the higher level of effort induced by these contracts, thus making the manager positively better-off. This implies that the conditions stated in parts (ii) and (iii) of the corollary are sufficient but not necessary for the Pareto inferiority of a contract that permits short-term selling by managers.

(2) *Implications*: Our analysis implies that contracts with short-term components are less likely to be optimal when – (a) the likelihood and magnitude of a liquidity shock are smaller (which is the case when the manager has substantial outside wealth); and (b) corporate value is more sensitive to managerial effort.

If one assumes that current practices are optimal, then these implications lead to testable predictions. If one does not make this assumption, then these implications suggest how prevailing contracting practices may be improved.

4. Private Information

We next consider the case where $\beta > 0$, i.e. at T=2 managers may learn private information that the company's project is doomed to fail. Consequently, at T=2 the manager updates her prior beliefs regarding the probability that the project will succeed as follows. If she observed the *B* signal, she knows that the probability of success is: $\theta_B(e) = \Pr(H|B) = 0$. If she does not learn any bad news, she updates the probability of success to: $\theta_{NB}(e) = \Pr(H|\neg B) = \dfrac{\theta(e)}{\theta(e) + (1-\theta(e)) \cdot (1-\beta)}$.

We consider three cases: (1) the case where the manager can sell shares outside the market, e.g. the case in which the manager has a phantom stock plan; (2) the case where the manager can sell shares only through the market but does not have to disclose sales in advance; and (3) the case where the manager can sell shares only on the market and must disclose in advance her plan to place an order.

4.1 Selling Outside the Market

In this case, the manger's decision to sell will have no effect on the volume of sell orders and thus on the market price. The outcome will be as described in the following proposition.

Proposition 2: *When the manager can sell shares outside the market, there will be a unique equilibrium, where –*

(i) *The manager will sell all the shares she is permitted to sell at T=3 if and only if (a) she experiences a liquidity shock, and/or (b) she receives negative private information (i.e. observes a B signal).*

(ii) *The manager will choose an effort level,* e_S^{NM} *, that satisfies* $e_S^{NM} < e_S < e_{NS}$ *, and that is defined by:*

$$\left[(m - s \cdot \lambda) \cdot H - \beta \cdot s \cdot P_S^{NM}\right] \cdot \theta'\left(e_S^{NM}\right) = 1 .$$

(iii) *The T=3 market price will be:* $P_S^{NM} = \theta\left(e_S^{NM}\right) \cdot H$.

Remarks:

(1) *Intuition*: The intuition for this result, which is proved in the appendix, is as follows:

(i) If the manager receives a bad signal *B*, she knows that her company's project is worth nothing. However, since at T=3 the market does not know this information and also cannot infer anything from the manager's sale of shares, the T=3 market price will be positive. Hence, the manager will sell all the shares that she is permitted to sell. And, for the reasons discussed in the remarks following proposition 1, at T=3 the manager will sell all the shares that she is permitted to sell also when she experiences a liquidity shock.

(ii) As in the no private information case, the manager knows ex ante that with a certain probability she will sell part of her holdings at T=3 for the market price which is not expected to depend on her (unobservable) choice of effort. As a result, her incentives to exert effort are diluted. Moreover, the manager knows ex ante that if the project goes sour, there is a certain probability that she will still be able to get a positive price for her shares at T=3. As a result, even in the event that the manager does not experience a liquidity shock, she will not bear the full costs of project failure on the value of the shares she is allowed to sell. This effect further dilutes her incentives to exert effort.

(iii) The market price equals the true expected value of the company's project. In equilibrium, even though the market does not observe effort, it correctly anticipates the manager's chosen level of effort.

(2) *Comparative Statics*: The extra disincentive to exert effort caused by private information – beyond the disincentive caused by permitting managers to sell at T=3 even when they have no private information – will be larger when managers are more likely to receive private information, i.e. when β is larger.

4.2 Selling On the Market Without Advance Disclosure

When the manager can only sell her shares on the market, such sales would affect the total supply of sale orders. As long as managers do not have to disclose sales in advance, market makers will be trying to infer from the observed volume the likelihood that the managers are selling because of bad news. The outcome will be as described in the following proposition.

Proposition 3: *When the manager can only sell shares on the market and is not required to disclose trades in advance, if the liquidity gain in the event that the manager experiences a liquidity shock, d, is sufficiently large, then –*

(i) *The manager will sell all the shares she is permitted to sell at T=3 if and only if (a) she experiences a liquidity shock, and/or (b) she receives negative private information (i.e. observes a B signal).*

(ii) *The manager will choose an effort level,* e_S^M, *that satisfies* $e_S^{NM} < e_S^M < e_S < e_{NS}$, *and that is defined by:*

$$\left[(m - s\cdot\lambda)\cdot H - \beta\cdot s\cdot P_S^M\right]\cdot\theta'\left(e_S^M\right) = 1,$$

where $P_S^M < P_S^{NM}$ *is the expected price that selling managers can expect to receive at T=3.*

Remarks:

(1) *Intuition*: The intuition for this result, which is proved in the Appendix, is as follows.

(i) A manager who learns bad news will take advantage of her private information and sell at T=3 all the shares she is permitted to sell. If the manager receives a bad signal, she knows her shares have zero value. However, as long as the market cannot infer with certainty from the trading

that the manger is selling, the manager will be able to obtain a positive expected price for her shares.

The remaining question is whether the manager will sell her shares when she does not learn any bad information but suffers a liquidity shock. In this case, the manager will receive a price, which is lower than the true expected value of her shares. Still, if the liquidity motive is sufficiently strong (i.e. if d is sufficiently large), the manager will sell whenever she experiences a liquidity shock.

(ii) The manager's incentive to exert effort depends on the difference between her expected payoff in case of success and her expected payoff in case of failure.[5] In case of success the manager's payoff equals the expected number of shares that she retains until the final period, $m - s \cdot \lambda$, multiplied by the success value of the project, H. In case of failure, the manager's payoff will be limited to the expected value received from short-term selling based on private information (the B signal), which is equal to $\beta \cdot s \cdot P_S^M$.

The case of selling in the market (proposition 3) differs from the case of selling outside the market (proposition 2) in the T=3 price that the manager expects to receive. When the manager sells in the market, such a sale may reveal information to the market, resulting in a lower expected value for the T=3 price: $P_S^M < P_S^{NM}$. Consequently, $e_S^{NM} < e_S^M < e_S < e_{NS}$.

(2) *The Case in which liquidity motives are not sufficiently strong*: When d is not sufficiently large, the manager will still sell all her shares whenever she learns bad information. However, she will not sell her s shares when she experiences a liquidity shock but does not receive a B signal. In such a case, the liquidity gain form selling will not make up for the informational cost (as reflected in the T=3 price).

Since the manager's success payoff is higher than the success payoff in proposition 1, but the failure payoff is also higher, this effort level may be either lower or higher than e_S. And, clearly, the effort level will be higher than e_S^{NM} and the effort level characterized in proposition 3. The existence of private information and the resulting informational rent that the market imposes at T=3 eliminates some of the liquidity-based trading. For this reason the effort level may be as high or even higher than in the case where the manager has no private information. This conclusion, however, does not

[5] The liquidity gains, $s \cdot \lambda \cdot d \cdot P_S^M$, that the manager enjoys regardless of the project's success do not affect effort.

make allowing short-term selling especially attractive, for the elimination of some liquidity selling reduces the very benefits for which the freedom to sell shares might be used. Note, in any event, that the effort level is still lower than in the case where short-term selling is not permitted.

4.3 Selling On the Market With Advance Disclosure

When the manager can only sell her shares on the market and moreover must disclose in advance her intentions to sell, the outcome will be as described in the following proposition.

Proposition 4: *When the manager can only sell shares on the market and with advance disclosure, if the liquidity gains in the event that the manager experiences a liquidity shock, d, are sufficiently large, then –*

(i) *The manager will sell all the shares she is permitted to sell at T=3 if and only if (a) she experiences a liquidity shock, and/or (b) she receives negative private information (i.e. observes a B signal).*

(ii) *The manager will choose an effort level,* e_S^{M+D}, *that satisfies* $e_S^{NM} < e_S^M < e_S^{M+D} < e_S < e_{NS}$, *and that is defined by:*

$$\left[(m - s \cdot \lambda) \cdot H - \beta \cdot s \cdot P_S^{M+D}\right] \cdot \theta'\left(e_S^{M+D}\right) = 1,$$

where $P_S^{M+D} < P_S^M < P_S^{NM}$ *is the expected price that selling managers can expect to receive at T=3.*

Remark:

(1) *Intuition*: The proof is similar to the proof of proposition 3 and is therefore omitted. The intuition for this result is as follows. As explained in the remarks following proposition 3, a manager who learns bad information will surely sell shares at T=3. Also, if liquidity motives are sufficiently strong, the manager will sell shares at T=3 if she experiences a liquidity shock even absent bad information.

The advance disclosure requirement ensures that the market will always know whether the manger is selling and thus reduces the expected price that the manager expects to receive if and when she learns that her company's project is doomed to fail. Because the manager will be selling sometimes even in the absence of bad information, however, the market will not infer from an announcement of a sale that the manger has received a bad signal. As a result,

the manager will be able to get a positive price when she sells due to negative private information, which will result in an effort level below the effort level in the no-private-information case. Because the advance disclosure requirement reduces the price a selling manger can expect to obtain, however, it reduces the disincentive to exert effort produced by private information compared with the no-advance-disclosure case.

(2) *The Case in which liquidity motives are not sufficiently large*: When liquidity gains in the event of a liquidity shock are not sufficiently large, the unique equilibrium is for the manager to never sell shares, with the market assuming that out-of-equilibrium selling is due to the manger's having received a negative signal *B*.[6] Since the manager will never sell shares at T=3, the equilibrium effort level will be $e_S^{M+D} = e_{NS}$.[7] In this case, given that the manager will be always discouraged from selling shares, the contract permitting such selling would be practically equivalent to one prohibiting such selling.[8]

4.4 Implications

The analysis in the preceding sections of the case in which managers may learn some private information has the following implications. When managers have private information, allowing short-term selling has a further adverse effect on ex ante effort beyond the reduction identified in the no-private-information case (see corollary 2). Short-term selling based on private information leads to lower effort. Lower effort also implies a lower T=3 price and thus smaller liquidity gains.

Thus, the possible availability of private information operates to make contracts that permit short-term selling less attractive. The availability of

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[6] To see that this is the unique equilibrium, consider alternative market beliefs that a manager who sells shares has not observed a *B* signal. A manager, who actually did not observe a *B* signal, would not sell (recall that in case of indifference the manager will not sell). Hence, only managers, who observed a *B* signal, would sell, rendering these alternative beliefs irrational. (Using a similar argument it can be shown that any market beliefs that some managers, who did not observe a *B* signal, sell shares are irrational.)

[7] The result that managers will not sell shares at T=3 relates to the No Trade Theorems **(see Green, Stokey - Find)** that characterize conditions, under which there will be no trade between two parties, where one of the parties has private information.

[8] In a more general model in which the low value of the project is not zero but rather a positive amount, the unique equilibrium will be one in which the manager will sell if and only if she (a) experiences a liquidity shock, and (b) observes a *B* signal.

private information expands selling to situation in which managers are motivated solely by informational considerations and not by liquidity reasons, which reduces ex ante effort without any accompanying liquidity gains.

Consequently, in the presence of private information, it is more likely that a contract permitting short-term selling will be inefficient and Pareto dominated by contracts that restrict such short-term selling. Therefore, if existing contracts are optimal, then executive compensation contract in companies where managers have more private information should permit less short-term selling.

Moreover, for any given amount of shares that the manager can sell in the short-run, companies in which managers have more private information should suffer from greater disincentives to managerial effort and thus from lower firm value.

Given the existence of private information, the inefficiency of different compensation arrangements, market conditions and disclosure requirements can be ranked as follows. The case where managers can sell outside the market (e.g. where managers hold phantom stock) is the least efficient, since the market can infer nothing from managerial selling. When managers must sell in the market without advance disclosure, the market can draw some inference from managerial selling, thus reducing the adverse impact of the informational asymmetry. Specifically, as the ratio of managers' holdings (and short-term sales) to the ordinary level of liquidity selling in the market (i.e. $s/\bar{l}$) increases, the inference that the market can draw from the managerial sale improves, reducing the efficiency cost of managers' private information. Finally, when advance disclosure is required, the efficiency cost associated with the managers' private information is minimal. However, even when managerial selling is disclosed in advance, managers still have private information regarding the existence of a liquidity shock. Consequently, even advance disclosure cannot restore the level of efficiency obtained in the no private information case.

When the liquidity motivation is weak (low d), private information might entail an additional adverse effect – it might (partially) prevent liquidity selling, by reducing the price a manager can get for her shares at T=3. Therefore, when the liquidity motivation is weak, the adverse effect of private information on effort is smaller, but liquidity gains are also reduced. This result suggests the following testable prediction: When the liquidity

motivation is weak (e.g. when managers have significant outside wealth), there will be less short-term selling when managers have to sell shares in the market (compared to selling outside the market) and even less selling with advance disclosure.

The results derived in Section 4 suggest the following corporate governance implications: Recent legislation requires managers that sell shares to disclose their sales much more quickly following the sale than was previously the case. This requirement will ensure that the market will become aware much faster of any managerial attempt to sell a substantial amount of shares over a significant period of time. Our analysis indicates that this requirement will operate to increase managerial effort, which in turn will increase company value. This result also suggests the following testable prediction: the recent disclosure legislation should increase the average Tobin's Q in the market. Moreover, our analysis supports recent proposals to further enhance disclosure requirements, specifically to require advance disclosure.[9]

5. Incentives to Suppress Bad News

We have thus far assumed that the manager may receive a private signal *B* that is not observable to the market. Suppose, however, that bad news is observable in principle, but the manager at a cost *c* – in monetary investment, effort, or expected penalty – can render the information unobservable. In particular, assume that, at T=2, if the manager receives a bad news signal B, the signal will be observed also by the market unless the manager invests *c* and renders these bad news unobservable.

If the manager were prohibited from selling shares at T=2, then she would clearly have no motive to invest c to suppress a received negative signal. However, when short-term selling is permitted, the manager will have an incentive to suppress bad news. This result is stated formally below for the case where liquidity gains are sufficiently large to induce short-term selling whenever the manager experiences a liquidity shock (even when there is no bad news).

Proposition 5: *If a manager is permitted to sell shares at T=3, there is a unique equilibrium in which the manager will suppress bad news if and only if*

[9] The Conference Board's Blue-Ribbon Commission on Public Trust and Private Enterprise issued a report proposing (among other things) advance notice of executive stock sales. A detailed proposal for such advanced disclosure was put forward in the academic literature by Fried (1998).

$$c < s \cdot (1 + \lambda \cdot d) \cdot P,$$

where $P \in \{P_S^{NM}, P_S^M, P_S^{M+D}\}$. *The incentive to suppress bad news will be strongest when the manager can sell outside the market, weaker when the manager must sell on the market without advance disclosure, and weakest when the manager must sell on the market with advance disclosure.*

Remark:

(1) *Intuition*: The intuition for this result, which is proved in the appendix, is as follows. When managers are permitted to sell shares, their ability to suppress a negative signal enables them to profit from short-term selling based on private information. In essence the manager sells worthless stock for a positive price. However, the manager must invest *c* in order to hide the bad information. When the informational rent is sufficiently large, the manager will invest in rendering bad information unobservable.

Since the T=3 price that the manager gets for her shares is highest when she sells outside the market, lower when she must sell on the market without advance disclosure and lowest when she must sell on the market with advance disclosure, the incentive to suppress bad news follows the same ordering.

(2) *Empirical implications*: The result stated in proposition 5 is consistent with existing empirical findings, and they provide testable predictions for future empirical work:

(i) Misreporting of earnings is more likely to occur in those cases in which managers are not precluded – by law or by their compensation contract and other contracts with the firm – from selling shares in the short-run. Furthermore, misreporting is more likely to occur in sectors or companies where managers are permitted to sell a larger fraction of their initial holdings.

Bergstresser and Philippon (2002) find evidence that managers whose compensation is more directly tied to share prices are more likely to manipulate earnings (see also Yablon and Hill (2001)). Because compensation schemes generally permit managers to unload vested options (Bebchuk, Fried, and Walker (2002)), we view these findings as generally consistent with the predictions of our model.

Ke (2002) also finds that managers with stock and exercisable stock options tend to engage in earnings manipulation. He also finds no evidence that managers with large amounts of unexercisable stock tend to manage earnings. This pattern sits well with the predictions of our model: it indicates that it is not more options and shares – but rather more options and shares

that the manager may sell in the short-run – that produce incentives to engage in misreporting (see also Bebchuk and Bar-Gill (2002)).

More generally, the result stated in proposition 5 is consistent with recent evidence reported in Beneish, Press and Vargus (2003) that insider-trading opportunities increase the incidence of earnings management.

(ii) If managers can only sell shares in the market, then other things equal misreporting will be less likely to occur when the market can better identify managerial selling. In particular:

(a) When the volume of shares offered by liquidity sellers is smaller relative to the volume of shares that managers are permitted to sell in the short run, misreporting will be less likely to occur.

(b) Tightening disclosure requirements, and in particular requiring prompt disclosure by managers following a sale of shares, will reduce the incidence of misreporting.

(iii) The result stated in proposition 5 suggests that the recent disclosure legislation should reduce the incidence of suppression of bad news.

6. Related Literature

There is a large body of work on how executive compensation arrangements can be best designed to induce optimal effort. This work, starting with the classic papers on principle-agent theory (e.g., Holmstrom (1979, 1982), Grossman and Hart (1983) and Holmstrom and Milgrom (1987)), has produced a substantial body of research. Gibbons (1996) and Prendergast (1999) survey this work as part of their surveys of contract theory in organizations, and Murphy (1999) surveys both the theoretical and empirical work on the optimal design of executive compensation contracts. The literature on executive compensation has largely focused on what the manager's payoff should be as a function of the shareholders' payoff.[10] In contrast, our focus is on how effort is influenced by the ability of managers to sell their claim on the shareholders' payoff before it is realized.

A second relevant literature is the myopia literature which studies how managerial concerns about short-term prices affect their ex ante choices between doing what is good for the long run and doing what will improve signals that would be publicly observable in the short run (see Stein (1988,

[10] Some noteworthy contributions include Homstrom and Costa (1986), Baker (1992, 2000), Baker, Gibbons and Murphy (1994), Diamond (1998), Jenter (2001), Baker and Hall (forthcoming).

1989) and Bebchuk and Stole (1993)). This managerial ex ante decision is different from the effort decision on which we are focusing; although reducing effort would hurt the final long-run payoff, its benefit to the manager would not come through improving short-term results. Furthermore, whereas in the myopia literature managers are assumed to give some exogenously stipulated weight to short-run and long-run stock prices, our model derives managers' decisions from their compensation contracts and holdings. In contrast to an analysis that assumes that managers attach some given weight to short–run prices, our analysis shows how managers care about short-term prices in some circumstances but not in others. How managers will be influenced by short-run prices depends, among other things, on whether managers expect to receive in the short-run private information about the success of their prior efforts and on what profits managers can expect from selling shares when their private information is negative, which in turn depends, among other things, on disclosure requirements and the volume of liquidity sales.

While our analysis focuses on effects on ex ante effort decisions, we also study the effect of compensation contracts on incentives to suppress information. Here we reinforce and generalize the message suggested by the models of Benabou and Laroque (1992) and Bebchuk and Bar-Gill (2002) that the insiders' ability to sell shares might provide incentives to hide information from the market. We extend the analysis in these papers by studying the issue using a model in which managers sell for both liquidity and private information reasons and in which market makers might try to infer from the volume of sales the likelihood that insiders are also selling, which enables us to identify the effects of contract structures, disclosure requirements, and trading volumes.

7. Concluding Remarks

[to be added]

Appendix

Proof of Proposition 1:

We first demonstrate that the outcome described in proposition 1 is an equilibrium:

(1) Assuming that the market anticipates an effort level $\hat{e} = e_S$, and the manager sells if and only if she experiences a liquidity shock, then the manager will choose an effort level that solves $\max_e \langle [(m-s)+s\cdot(1-\lambda)]\cdot\theta(e)\cdot H + s\cdot\lambda\cdot(1+d)\cdot\theta(\hat{e})\cdot H - e\rangle$, i.e. she will choose $e = e_S$.

(2) Assuming that the chosen effort level is e_S and that $P_S = \theta(e_S)\cdot H$, absent a liquidity shock the manager is indifferent between holding her shares and selling at T=3 and will therefore decide not to sell. Hence, the manager will sell if and only if she experiences a liquidity shock.

(3) Assuming that the chosen effort level is e_S, the market sets $P_S = \theta(e_S)\cdot H$ in the rational expectations equilibrium.

We next show that the outcome described in proposition 1 is the unique equilibrium. Suppose that there is an equilibrium in which the manager chooses $\hat{e} \neq e_S$. In this equilibrium the market price would be $P = \theta(\hat{e})\cdot H$, and the manager would thus sell at T=3 if and only if she experiences a liquidity shock. Under these conditions, however, it would not be optimal for the manager to choose $\hat{e} \neq e_S$ (she would choose e_S), which contradicts the assumption that this is an equilibrium.[11] QED

Proof of Corollary 2:

(i) Comparing overall value when T=3 selling is and is not permitted, we find that short-term selling is inefficient if and only if $\theta(e_S)\cdot H + s\cdot\lambda\cdot d\cdot\theta(e_S)\cdot H - e_S < \theta(e_{NS})\cdot H - e_{NS}$, which (after some rearranging) yields the condition stated in corollary 2(i).

(ii) Comparing the payoffs under the two contracts, we find that the manager is always better off under the $(m+s\cdot\lambda\cdot d, 0)$ contract, since $(m+s\cdot\lambda\cdot d)\cdot\theta(e_{NS}^{m+s\cdot\lambda\cdot d})\cdot H - e_{NS}^{m+s\cdot\lambda\cdot d} > m\cdot\theta(e_S)\cdot H + s\cdot\lambda\cdot d\cdot\theta(e_S)\cdot H - e_S$ (note that the

[11] For completeness we rule out also the possibility that the manager sells at T=3 regardless of the occurrence of a liquidity shock. This cannot be an equilibrium given the assumption that in case of indifference, the manager will not sell.

manager can always choose $e_{NS}^{m+s\cdot\lambda\cdot d} = e_S$). And, the shareholders are better off under the $(m+s\cdot\lambda\cdot d,0)$ contract whenever $\left[1-(m+s\cdot\lambda\cdot d)\right]\cdot\theta(e_{NS}^{m+s\cdot\lambda\cdot d})\cdot H > (1-m)\cdot\theta(e_S)\cdot H$. This condition (after some rearranging) yields the condition stated in corollary 2(ii).

(iii) Comparing the payoffs under the two contracts, we find that the manager is always better off under the $(m,0)$ contract with an initial cash payment $k = s\cdot\lambda\cdot d\cdot\theta(e_S)\cdot H/(1+\lambda\cdot d)$, since $m\cdot\theta(e_{NS})\cdot H + (1+\lambda\cdot d)\cdot k - e_{NS} > m\cdot\theta(e_S)\cdot H + s\cdot\lambda\cdot d\cdot\theta(e_S)\cdot H - e_S$ (note that the manager can always choose $e_{NS} = e_S$). And, the shareholders are better off under this contract whenever $(1-m)\cdot\theta(e_{NS})\cdot H - k > (1-m)\cdot\theta(e_S)\cdot H$. This condition (after some rearranging) yields the condition stated in corollary 2(iii). QED

Proof of Proposition 2:

Existence and uniqueness of the equilibrium described in proposition 2 is proved as detailed in the proof of proposition 1, subject to the following adjustments:

(i) As in proposition 1, the manager will sell her shares if she experiences a liquidity shock. With private information, however, the manager will also sell her shares if she observes the *B* signal. After observing *B*, the manager knows that $\theta_B(e) = 0$ and that her shares if held until the final period will be worthless. On the other hand, since the market learns nothing, the manager can get $P_S^{NM} = \theta\left(e_S^{NM}\right)\cdot H$ by selling at T=3.

(ii) If the company's project succeeds, the manager receives: $\left[(m-s)+s\cdot(1-\lambda)\right]\cdot H$. If the project fails, the manager receives: $\beta\cdot s\cdot P_S^{NM}$.[12] Therefore, the manager chooses her effort level to solve: $\max_e \left\langle \theta(e)\cdot\left[(m-s)+s\cdot(1-\lambda)\right]\cdot H + (1-\theta(e))\cdot\beta\cdot s\cdot P_S^{NM} - e \right\rangle$. The FOC is: $\left\{\left[(m-s)+s\cdot(1-\lambda)\right]\cdot H - \beta\cdot s\cdot P_S^{NM}\right\}\cdot\theta'\left(e_S^{NM}\right) = 1$. Comparing this FOC to the FOC stated in proposition 1, we find that $e_S^{NM} < e_S < e_{NS}$. QED

Proof of Proposition 3:

[12] The manager also enjoys a liquidity gain of $s\cdot\lambda\cdot d\cdot P_S^{NM}$, which is independent of the project's success.

(i) After observing a *B* signal the manager will sell all *s* shares (even absent a liquidity shock). To see this note that absent a liquidity shock, a manager who learns bad news will sell a number of shares *x* that solves:

$$\max_x \; x \cdot \left[\Pr\left(l + x > \bar{l}\right) \cdot P_1 + \Pr\left(l + x \le \bar{l}\right) \cdot P_2 \right].$$

We can rewrite the manager's objective function as: $x \cdot \left[x/\bar{l} \cdot P_1 + \left(1 - x/\bar{l}\right) \cdot P_2 \right]$, or $x \cdot P_2 + \left(x^2/\bar{l}\right) \cdot \left(P_1 - P_2\right)$. Taking the derivative of the objective function with respect to x we obtain: $P_2 - 2 \cdot \left[\left(P_2 - P_1\right)/\bar{l} \right] \cdot x$, or $P_1 + \left(P_2 - P_1\right) \cdot \left(1 - 2 \cdot x/\bar{l}\right)$. Since $s < \bar{l}/2$, the manager will sell all her shares.[13] The manager will also sell all *s* shares when she does not learn any bad news if she experiences a liquidity shock. To see this note that in such a case the manager will sell a number of shares *x* that solves:

$$\max_x \; x \cdot \left[x/\bar{l} \cdot P_1 + \left(1 - x/\bar{l}\right) \cdot P_2 \right] \cdot (1 + d) + (s - x) \cdot \theta_{NB} \cdot H .$$

The derivative of the objective function with respect to x is: $\left[P_1 + \left(P_2 - P_1\right) \cdot \left(1 - 2 \cdot x/\bar{l}\right) \right] \cdot (1 + d) - \theta_{NB} \cdot H$. When d is sufficiently large, this derivative is always positive, implying that the manager will sell all her shares.

(ii) If the company's project succeeds, the manager receives: $\left(m - s \cdot \lambda\right) \cdot H$. If the project fails, the manager receives: $\beta \cdot s \cdot P_S^M$.[14] Therefore, the manager chooses her effort level to solve: $\max_e \left\langle \theta(e) \cdot \left[(m - s \cdot \lambda) \cdot H \right] + \left(1 - \theta(e)\right) \cdot \beta \cdot s \cdot P_S^M - e \right\rangle$. The FOC is: $\left\{ \left[(m - s \cdot \lambda) \cdot H \right] - \beta \cdot s \cdot P_S^M \right\} \cdot \theta'\left(e_S^M\right) = 1$. Comparing this FOC to the FOCs stated in propositions 1 and 2, we find that $e_S^{NM} < e_S^M < e_S < e_{NS}$. In particular, note that $P_S^M < P_S^{NM}$. Specifically, $P_S^M = \Pr\left(v > \bar{l} \middle| sell\right) \cdot P_1 + \Pr\left(v \le \bar{l} \middle| sell\right) \cdot P_2$, where $\Pr\left(v > \bar{l} \middle| sell\right) = \Pr\left(l + s > \bar{l}\right) = s/\bar{l}$, $\Pr\left(v \le \bar{l} \middle| sell\right) = \Pr\left(l + s \le \bar{l}\right) = 1 - s/\bar{l}$,

$$P_1 = \Pr\left(H \middle| v > \bar{l}\right) \cdot H = \frac{\theta \cdot \lambda}{\theta \cdot \lambda + \left(1 - \theta\right) \cdot \left(1 - (1 - \lambda) \cdot (1 - \beta)\right)} \cdot H$$ and

$$P_2 = \Pr\left(H \middle| v \le \bar{l}\right) \cdot H = \frac{\theta \cdot \left[(1 - \lambda) + \lambda \cdot \left(1 - s/\bar{l}\right) \right]}{\theta \cdot \left[(1 - \lambda) + \lambda \cdot \left(1 - s/\bar{l}\right) \right] + \left(1 - \theta\right) \cdot \left[(1 - \lambda) \cdot (1 - \beta) + \left(1 - (1 - \lambda) \cdot (1 - \beta)\right) \cdot \left(1 - s/\bar{l}\right) \right]} \cdot H .$$

Therefore, $P_S^M < P_S^{NM}$.

QED

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[13] In fact, a weaker condition would suffice: $s < \left[1 + P_1/\left(P_2 - P_1\right) \right] \cdot \bar{l}/2$.

[14] The manager also enjoys a liquidity gain of $s \cdot \lambda \cdot d \cdot P_S^M$, which is independent of the project's success.

Proof of Proposition 5:

When the manager learns bad information and does not invest c in rendering the information unobservable to the market, she will not sell at T=3 and end up with zero.[15] When the manager learns bad information and invests c in rendering the informational unobservable to the market, she will sell shares at T=3, earning $s \cdot (1 + \lambda \cdot d) \cdot P$. Therefore, the manager will invest suppressing bad news if and only if $c < s \cdot (1 + \lambda \cdot d) \cdot P$. QED

[15] In a more general model in which the low value of the project is not zero but rather a positive, the manager will sell if she experiences a liquidity shock, gaining $\lambda \cdot d \cdot P$.

References

Baker, George P. (1992), "Incentive Contracts and Performance Measurement." *Journal of Political Economy*, 100, 598-614.

Baker, George P. (2000), "The Use of Performance Measures in Incentive Contracting," *American Economic Review* 90, 415-420.

Baker, George P., Gibbons, Robert and Murphy, Kevin J. (1994), "Subjective Performance Measures in Optimal Incentive Contracts," *Quarterly Journal of Economics*, 109, 1125-1156.

Bergstresser, Daniel and Philippon, Thomas (2002), "CEO Incentives and Earnings Management: Evidence from the 1990s," mimeo, Harvard Business School.

Bebchuk, Lucian A. and Bar-Gill, Oren (2002), "Misreporting Corporate Performance," discussion paper no. 400, Olin Center for Law, Economics & Business, Harvard Law School.

Bebchuk, Lucian A., Fried, Jesse and Walker, David (2002), "Managerial Power and Rent Extraction in the Design of Executive Compensation," *University of Chicago Law Review*, 69, 751-846.

Bebchuk, Lucian A. and Stole, Lars (1993), "Do Short-Term Managerial Objectives Lead to Under- or Over-Investment in Long-Term Projects?" *Journal of Finance*, 48(2), 719-729.

Benabou, Roland and Guy Laroque (1992), "Using Privileged Information to Manipulate Markets: Insiders, Gurus, and Credibility," *Quarterly Journal of Economics*, 107, 921-958. Beneish, Messod D., Press, Eric and Vargus, Mark E. (2003), "Overlooked Incentives: Insider Trading Opportunities as a Motivation for Earnings Management," mimeo, Kelley School of Business, Indiana University.

Diamond, Peter (1998), "Managerial Incentives: On the Near Linearity of Optimal Compensation," *Journal of Political Economy*, 106, 931-957.

Fried, Jesse (1998), "Reducing the Profitability of Corporate Insider Trading through Pretrading Disclosure," *Southern California Law Review*, 71, 303-392.

Gibbons, Robert (1996), "Incentives and Careers in Organizations," in Kreps, David and Wallis, Ken (eds.), *Advances in Economics and Econometrics: Theory and Applications* (Cambridge University Press, Cambridge, UK).

Glosten, Lawrence R. and Milgrom, Paul R. (1985), "Bid, Ask, and Transaction Prices in a Specialist Market with Heterogeneously Informed Traders," *Journal of Financial Economics*, 14, 71-100.

Grossman, Sanford and Hart, Oliver (1983), "An Analysis of the Principle-Agent Problem," *Econometrica*, 51, 7-45.

Holmstrom, Bengt (1979), "Moral Hazard and Observability," *Bell Journal of Economics*, 10, 74-91.

Holmstrom, Bengt (1982), "Moral Hazard in Teams," *Bell Journal of Economics*, 19, 324-340.

Holmstrom, Bengt and Milgrom, Paul (1987), "Aggregation and Linearity in the Provision of Intertemporal Incentives," *Econometrica*, 55, 303-328.

Holmstrom, Bengt and Costa, Joan Ricart I. (1986), "Managerial Incentives and Capital Management," *Quarterly Journal of Economics*, 101, 835-860.

Jenter, Dirk (2001), "Understanding High-Powered Incentives," Harvard NOM Working Paper No. 01-06, Harvard Business School.

Ke, Bin (2002), "The Influence of Equity Compensation on CEO's Incentives to Manage Earnings," working paper, Pennsylvania State University.

Kyle, Albert S. (1985), "Continuous Auctions and Insider Trading," *Econometrica*, 53(6), 1315-35.

Murphy, Kevin J. (1999), "Executive Compensation," in Ashenfelter, O. and Card, D. (eds.), *Handbook of Labor Economics*, Vol. 3 (North Holland).

Prendergast, Canice (1999), "The Provision of Incentives in Firms," *Journal of Economic Literature*, 37, 7-63.

Stein, Jeremy (1988), "Takeover Threats and Managerial Myopia," *Journal of Political Economy*, 96, 61-80.

Stein, Jeremy (1989), "Efficient Capital Markets, Inefficient Firms: A Model of Myopic Corporate Behavior," *Quarterly Journal of Economics*, 104, 655-669.

Yablon, Charles M. and Hill, Jennifer (2001), "Timing Corporate Disclosures to Maximize Performance-Based Remuneration: A Case of Misaligned Incentives?" *Wake Forest Law Review*, 35, 83-122.