DISCLOSURE LAWS AND TAKEOVER BIDS

by

S.J. Grossman* and O.D. Hart**

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RODNEY L. WHITE CENTER
FOR FINANCIAL RESEARCH

University of Pennsylvania

The Wharton School

Philadelphia, PA   19104

*University of Pennsylvania

**Churchill College, Cambridge University

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## 1. Introduction

The Securities and Exchange Act not only prohibits the making of false statements, but also requires that parties to a takeover bid make positive disclosures. This paper discusses some of the effects of requiring positive disclosure as opposed to simply outlawing the making of false statements.

We begin in Section 2 by asking how much disclosure will be voluntarily forthcoming if lying is illegal but there is no positive disclosure requirement. Rather than starting with the complex problem of disclosure in takeover bids, we first consider the simpler case of a seller who knows something about the quality of the item he is selling. We show that if there is no transactions cost then it will always be in the seller's interest to disclose the quality of the item voluntarily. It is not an equilibrium for the seller to withhold information in an attempt to defraud. Section 3 uses the model of takeovers in Grossman and Hart [1978] to analyze the effect on the takeover bid process of requiring the firm carrying out the takeover (i.e., the acquiring firm) to make particular disclosures required by the Securities and Exchange Act. We focus on the effect of implicitly requiring the disclosure of any intention to dilute the rights of shareholders who do not tender. We show that this type of disclosure may overly hinder the takeover bid process. This will have an adverse effect on managerial efficiency.

## 2. Disclosure is Privately Optimal

Consider a seller of a commodity who knows something about the quality of

the commodity being sold. Suppose that prospective buyers do not know the quality of the commodity, but that they know that the seller has some information about the commodity's quality. For simplicity, let there be only a finite number of different possible qualities denoted $Q = 1,...,n$. We assume that the information of prospective purchasers can be represented by a probability vector $\pi = (\pi_1,...,\pi_n)$, where $\pi_i$ is the probability that the quality of the good supplied by this seller is $i$. We will refer to a commodity whose associated probability vector is $\pi$ as the package $\pi$.

We assume that there is a competitive market in the production of packages, in the sense that there are many purchasers and many sellers supplying different probability vectors $\pi$. We assume also that every $\pi$ is marketed, i.e., there is a price for every $\pi$, and that the qualities of commodities supplied by different sellers are independent. We will write the equilibrium price of the package $\pi$ as $V(\pi)$. Without loss of generality, we assume that $V(1,0,...,0) \leq V(0,1,0,...,0) \leq ... \leq V(0,0,...,0,1)$, so that $Q = 1$ is the lowest quality and $Q = n$ is the highest quality.

We now establish the following result: If (1) fraud (i.e., lying) is illegal and does not occur; (2) the cost of tranmitting information is negligible; then the seller will voluntarily disclose all the information he has about Q. That is, the seller has nothing to gain by withholding information, and hence all information will be disclosed even in the absence of a disclosure law.

The simplest case occurs when the seller knows $Q$ exactly. Suppose the seller discloses that $Q \in D$ where $D$ is some subset of $\{1,...,n\}$. A prospective buyer can think to himself: let $\underline{Q}$ be the lowest quality element in $D$. If the true quality of the item $Q$ exceeds $\underline{Q}$, then surely the seller could have obtained a higher price for the item by making the disclosure that $Q$ is in the set $D$ but $Q \neq \underline{Q}$. If buyers use the above logic, then the set $D$ which will maximize the sale price is the set which contains only the true $Q$. This

is because whenever there is more than one element in D, buyers assume that Q must be the smallest element in D. (Note that if lying is possible, then a seller with a low Q could make Q = n his one element disclosure set. However, since lying is assumed not to occur, the only possible one element disclosure set is the set which contains only the seller's true Q.)

As an example of the above, consider a seller of oranges who states that a box of oranges contains "at least 5 oranges." If I know that the seller knows the exact number of oranges, then I know there must be exactly 5 oranges per box, since if there were 6 per box, then the seller would have stated that there are "at least 6 oranges per box."

The arguments generalize to the case where the seller does not have perfect information about Q. For example, suppose that a seller of boxed oranges sometimes knows exactly how many oranges his box contains (say 10 oranges sometimes and 20 oranges other times) and other times knows that there is a 50/50 chance of it containing 100 oranges or 75 oranges. Suppose his disclosure is that he does not know how many oranges his box contains. Then, since it is illegal to lie, all buyers will know that he has a 50/50 chance of either 100 or 75 oranges. On the other hand, if the seller states only "I know how many oranges my box contains," then buyers know that each box contains 10 oranges, since if the box contained 20 oranges, the seller would have said so. Finally, suppose the seller says nothing. In this case, buyers know that the seller must know how many oranges are in the box, because if the seller didn't know this he would surely have gotten a higher price by disclosing his ignorance. Once the buyers know this, they know that the seller must know that there are 10 oranges per box, since if there were really 20 the seller could have gotten a higher price by disclosing that there were 20 in the box. Note that the buyers need not be particularly sophisticated or have repeated experience with the seller in order to be

able to calculate the relationship between the particular disclosure and the value of $\pi$.[1] The buyer must just use the simple logic that the seller tries to be as optimistic as possible about his product subject to the constraint that he not lie.

We now give a general demonstration of the fact that the seller will disclose all his information in the case where the seller's information may be imperfect. It turns out that to do this we need an assumption about the function $V(\pi)$. We assume $V$ is convex in $\pi$; i.e.,

(1) $$V(\lambda\pi + (1 - \lambda)\pi') \leq \lambda V(\pi) + (1 - \lambda)V(\pi')$$

$$\text{if } 0 \leq \lambda \leq 1 \ .$$

We offer two justifications for this assumption. The first is based on the arbitrage principle. Suppose that (1) is violated. Then an entrepreneur can purchase a large number of packages $\pi,\pi'$ from different sellers, where the fraction of $\pi$ packages is $\lambda$ and of $\pi'$ packages is $(1 - \lambda)$, and market new packages which are obtained by picking randomly from these $\pi$ and $\pi'$ packages. Since these new packages are $\pi$ packages with proability $\lambda$ and $\pi'$ packages with probability $(1 - \lambda)$, they will sell for $V(\lambda\pi + (1 - \lambda)\pi') > \lambda V(\pi) + (1 - \lambda)V(\pi')$ and the entrepreneur will make money. A second justification is the following. Suppose that the commodity is divisible. Then, if consumers are risk averse, they will eliminate risk by purchasing small amounts of the commodity from many different producers with independent risks. Under these conditions, consumers will act as if they are risk neutral and $V(\pi)$ will be just $\sum_{i=1}^{n} \pi_i P_i$, where $P_i$ is the price of the commodity whose quality is $i$ with certainty. Since $V$ is linear in $\pi$, (1) will certainly be satisfied.[2]

We represent the general case of imperfect information as follows. We assume that the seller receives a signal $y$ which is correlated with the true quality $Q$. Let there be $K$ possible signals $y_1,\ldots,y_K$. We assume that pur-

chasers know that one of the signals $y_1, \ldots, y_K$ has been received (though not which one) and that they know the probability of each signal and the posterior probability that $Q = i$ given that $y = y_k$. We assume that the seller discloses to the purchasers a statement of the form: $y_k \in D$, where $D$ is some subset of $\{y_1, \ldots, y_K\}$. In the second example given above, we can think of there being three signals: $y_1$, that there are 10 oranges; $y_2$, that there are 20 oranges; $y_3$, that there are either 100 or 75 oranges. Disclosing that $y \in \{y_1, y_2, y_3\}$ in this case is the same as saying nothing.

Suppose that, for each $k = 1, \ldots, K$, when $y = y_k$, the seller finds it optimal to make the disclosure $y \in D_k$. Since lying is illegal, $y_k \in D_k$ for all $k$. If no two $D_k$'s are the same, then the purchasers can invert the function mapping $y$'s into the $D$'s to deduce $y_k$ from $D_k$, and so telling the purchasers that $y \in D_k$ is equivalent to disclosing what $y$ is. So assume that at least two of the $D_k$'s are the same, say equal to $D$. If the purchasers are told that $y \in D$, they will deduce that $y \in \{y_k | D_k = D\} \equiv Y(D)$. For each $y_k \in Y(D)$, let $\delta_k = \text{Prob}[y = y_k | y \in Y(D)] = \text{Prob}[y = y_k] / \sum_{y_j \in Y(D)} \text{Prob}[y = y_j]$. Then the value that purchasers will put on the seller's product is

(2)
$$V(\hat{\pi}_1, \hat{\pi}_2, \ldots, \hat{\pi}_N) = V\left( \sum_{y_k \in Y(D)} \delta_k \lambda_k \right) \leq \max_{y_k \in Y(D)} V(\lambda_k) \quad ,$$

where $\hat{\pi}_i = \text{Prob}[Q = i | y \in Y(D)]$, $\lambda_{ik} = \text{Prob}[i | y = y_k]$ and $\lambda_k = (\lambda_{1k}, \ldots, \lambda_{nk})$. Furthermore, there is strict inequality in (2) unless $V(\lambda_k)$ is constant for all $y_k \in Y(D)$. If (2) holds with equality, then full disclosure is again optimal. If (2) holds with inequality, however, then for those $y_k \in Y(D)$ which maximize $V(\lambda_k)$ it is better for the seller to disclose the true $y_k$ rather than to disclose $y \in D$, which contradicts the assumption that it is optimal for the seller to disclose $D_k$. This completes the proof that full disclosure is optimal.

In the next section we will apply the above result to analyze the affects of the provisions of the Williams disclosure act on the takeover bid process.

There we will be concerned with a single well informed buyer and many relatively uninformed sellers. It should be noted that the argument given above shows that a buyer will always disclose all of his information in order to minimize the price he pays for the item being purchased.

Thus far, we have been concerned with showing that, even without a positive disclosure law, there will be full disclosure when there are no transactions costs of making disclosures. Section 14(e) of the Securities and Exchange Act of 1934 states that "It shall be unlawful for any person to make any untrue statement of a material fact or omit to state any material fact necessary in order to make the statements made, in the light of the circumstances under which they are made, not misleading..." That is, the Securities disclosure laws are not designed to force market participants to collect costly information and disseminate that information. They are designed to prevent non-disclosures which occur with an intent to defraud. The disclosure of this type of information usually has negligible cost relative to the item being sold.

However, if disclosure is costly, disclosure laws affect the production of information in a complex way. Thus the purpose of a disclosure law more generally may be not to prevent fraud but instead to try to affect the efficiency of the production and distribution of information.

Consider a simple example where there are costs of disclosure. Suppose there are 100 sellers with exogenously given items for sale. Assume that simple observation by a buyer will not identify the quality of a seller's commodity. Let 95 of the sellers have "good" commodities, for which $V = 100$, and 5 have "bad" commodities, for which $V = 50$. Suppose that any seller can purchase certification or an outside inspection at a cost of 10. Alternatively, 10 may be the transaction cost of communicating a seller's quality to a buyer.

What would happen if there is no law requiring any disclosure? In equilibrium all the good sellers will spend 10 each to certify themselves for a total

social cost of $95 \times 10 = 950$. None of the bad sellers will spend anything and will remain uncertified. To see that this is an equilibrium, consider first a good seller and see whether he would desire to change his strategy. Suppose that consumers think that a seller is good if and only if he certifies that he is good. Then if a good seller decides not to become certified, he saves the 10 units he has to spend to get certified, but since consumers think he is a bad seller he gets 50 instead of 100 for his product. Hence it is optimal for each good seller to spend 10 to be certified. Since lying is assumed impossible none of the bad sellers certify themselves as good. They also have no reason to certify that they are bad, since anyone without certification is assumed bad.

It is important to note that it is not an equilibrium for all the good sellers to spend nothing on certification, and for all the bad sellers to certify that they are bad. This is because any bad seller would be better off if he did not certify himself as bad and thus became identified with the good sellers.

Note that in the equilibrium where all the good sellers spend transaction costs on certification, there is a large social cost of the certification, i.e., 950. Suppose a positive disclosure law is passed which requires only bad sellers to identify themselves. Ignoring enforcement costs, we see that this scheme has a transaction cost of $5 \times 10 = 50$ and yields consumers the same information as the previous equilibrium at a much lower cost. (See Diamond [1978] for analogous phenomena in search theory.)


3.  The Role of Disclosure in Takeover Bids

Before discussing the relevance of disclosure to takeover bids, it is useful to review the takeover bid model of Grossman and Hart [1978].

Suppose that at the time of a raid (i.e., takeover bid) shareholders know the profit (or market value) of the firm which will be realized if the raid is successful. Denote this by V. The raider (i.e., acquiring firm) is assumed to

maximize profit in reorganizing the firm, and so V is just maximum profit. If status quo management is producing profits equal to q, where V > q, then it might be thought that a successful raid is possible at a tender price V > p > q. This is false because if the raider offers a price low enough so that he can make money from the price appreciation of the shares he purchases (after he improves the firm), then each shareholder can make money by not tendering his shares. We are assuming that each shareholder is small and realizes that his tendering decision will not affect the outcome (i.e., the success or failure) of the tender offer. Given this assumption, the only way to get around the above free rider problem is to permit a raider to exclude shareholders from completely sharing in the benefits of improving the corporation. That is, the only way to prevent shareholders from holding out for p = V is to give shareholders who do hold on less than their pro rata share of the improved company. Shareholders who anticipate that this will happen will be willing to tender shares at a price lower than V, say V - $\phi$, where $\phi$ is the maximum permissable exclusion. This exclusion represents a dilution of the property rights of shareholders who do not tender, i.e., of those who are in the minority after a successful takeover bid. Such dilutions will in general be in the shareholders' interest, however, since if they are permitted, a manager who deviates from the profit maximum can be removed by a takeover bid. This is because with some dilution permitted a raider can make enough profit to cover the cost of the takeover bid. Later in this section we will elaborate on the "real world" methods used to constitutionally encourage or restrict dilutions.

In Grossman and Hart [1978], we used the above ideas to analyze the distortion which would be caused if there were only one raider. Under the assumption that shareholders are risk neutral, then the tender price p must satify

(A)  $p \geq \max (V - \phi, q)$ ,

for shareholders to find it in their interest to tender shares independently of their beliefs about the outcome of the bid. If there is only one raider, then he need never pay more than this amount:

(B)  $p = \max(V - \phi, q)$ ,

for a successful raid. A raider will find it in his best interest to raid if $V - p > c$, where $c$ is the cost of the raid. Thus from (B) a raid occurs if

(C)  $\min(\phi, V - q) > c$ .

We assume that the status quo manager faces an incentive scheme such that if he is not removed he gets utility $U(q)$ and if he is removed he get $\bar{U}$, which, without loss of generality, can be set equal to 0. We assume that at the time the manager chooses $q$ he does not know $V$ or $c$, but that he does know the probability distribution of $(V, c)$. Thus $q$ is chosen to maximize $U(q)\text{Prob(No Raid)} + 0 \times \text{Prob(Raid)}$, where $\text{Prob(No Raid)} \equiv$ probability that $(\tilde{V}, \tilde{c})$ has a realization $(V, c)$ such that $\min(\phi, V - q) \leq c$, and where we write $\tilde{V}, \tilde{c}$ instead of $V, c$ in order to indicate that these are random variables for the manager. Let $q(\phi)$ denote the maximizer of $U(q)\text{Prob(No Raid)}$. It was shown that $q(\phi)$ is increasing in $\phi$. That is, when shareholders permit more dilution, the increased threat of a takeover bid makes the manager choose a higher profit level $q$.

Shareholders in writing a corporate charter attempt to set a dilution level $\phi$ to maximize $r(\phi) \equiv q(\phi)\text{Prob(No Raid)} + E[\max(\tilde{V} - \phi, q(\phi)) \mid \text{Raid}] \times \text{Prob(Raid)}$, where Raid is the event that $\min(\phi, \tilde{V} - q) > \tilde{c}$, i.e., that (C) is satisfied. The idea behind this is that the initial shareholders realize that they will get a profit level $q(\phi)$ if there is no raid and that if there is a raid they will get a tender price $p = \max(\tilde{V} - \phi, q(\phi))$. It is assumed that at the time the corporate charter is written shareholders do not know $\tilde{V}$ or $\tilde{c}$, but only the prob-

ability distribution of these random variables. If the law does not constrain
the choice of $\phi$, shareholders will maximize $r(\phi)$ taking into account the fol-
lowing trade-offs: (1) an increase in $\phi$ increases $q$, which is good for share-
holders. (2) an increase in $\phi$ increases the probability of a raid for a given
$q$. This is also good for shareholders because the tender price is never lower
than the status quo market value $q$, and so shareholders never lose and in
general gain from a raid. (3) For a given $q$, an increase in $\phi$ lowers the
tender price shareholders get in the event of a raid, because of the assumed
lack of competition among raiders. This is bad for shareholders. Therefore
shareholders increase $\phi$ until the marginal benefits of better management and
more raids equals the marginal cost of the reduction in the tender price caused
by an increase in $\phi$.

Since the threat of raids encourages good management and raids only occur
in events where the company is worth more to the raider than it is currently
worth, there is no reason, on efficiency grounds, for society to restrict raids.[3]
Grossman and Hart [1978] show that the distortion caused by the existence of
only a single raider implies that shareholders overly restrict raids by making
dilutions more difficult than would be desirable from an efficiency point of
view. The remainder of this section will be devoted to showing that the disclo-
sure provisions of the Williams Act may exacerbate the above problem. It will be
shown that the disclosure provisions of the act may make dilutions more difficult
and hence, far from reversing the restrictions on raids imposed by shareholders,
carry these restrictions even further.

The direct dilution of shareholder property rights is a violation of state
law in virtually every state. However, there are many subtle means for accom-
plishing dilution. The most prevelant method can be understood by the following
example. Company R successfully gains voting control of Company T through a

tender offer. Company R knows that Company T's assets are worth say 100. Since R has voting control over T, R can vote a merger of T into R for say 60. In this way the minority shareholders of T suffer a 40% dilution. It should be pointed out that in most states the minority shareholders have rights of dissent and appraisal. If the minority can convince a court that T is worth 100, then R will not succeed in diluting.

The Williams Amendment to the Securities Exchange Act of 1934 recognizes that "minority squeeze outs" play a role in the takeover process. The Amendment requires that at the time of the raid the raider disclose "if the purpose of the purchase or prospective purchase is to acquire control of the business of the issuer of the securities, any plans or proposals which such persons may have to liquidate such issuer, to sell its assets to or merge it with any other persons, or to make any other major changes in its business or corporate structure."[4]

The other section of the Williams Amendment of interest to us is Section 14(e), which requires positive disclosure of information. The Supreme Court has interpreted this section as requiring the raider and management to disclose all the information they possess which is material to shareholders in their tender offer or voting decisions.[5]

In order to analyze the above laws, we drop our assumption that the raider and the shareholders know the true value of the firm under the new management, V, at the time of the raid. We assume instead that V is a random variable and decompose $\tilde{V}$ as follows:

$$(3) \qquad \tilde{V} = E[\tilde{V}|\tilde{a}] + \tilde{z} \, ,$$

where a represents the raider's information at the time of the raid; i.e., the raider is assumed to know the value of the random variable $\tilde{a}$. It follows from (3) that

(4) $\qquad E[\tilde{z}|\tilde{a} = a] = 0 \quad \text{for all } a \ .$

Without loss of generality, we assume that $E[\tilde{V}|\tilde{a} = a] = a$, so (3) becomes

(5) $\qquad \tilde{V} = \tilde{a} + \tilde{z} \ .$

If the raider succeeds in getting control of the company, he will attempt to dilute the property rights of any minority shareholders. We assume that after the raider gets control he attempts to buy out the shares of the minority shareholders by voting for a merger or liquidation of the company's assets into a company that the raider _alone_ owns. In this case the raider will have to make a valuation of the company's assets. His fiduciary responsibility requires him to make a fair valuation of the company's assets. We assume, however, that he tries to give the minority shareholders as low a value as possible subject to the disclosure laws and the rights of appraisals and dissent which minority shareholders are guaranteed by the corporate charter and state laws. We assume that these rights are exercised by having an independent audit of the value of the firm. This audit can be of varying quality. We model an economy in which disclosure and appraisal laws are very rigorous by assuming that a very careful audit must be made of the value of the company. Similarly, if there are weak disclosure laws, we assume a poor audit of the value is made.

It is of some interest to distinguish between the Federal disclosure require-ments in Sections 13 and 14 of the Securities and Exchange Act and the laws of the various states. State laws specify the fiduciary responsibility of manage-ment, the disclosure requirements for paticipants involved in a takeover bid, and fair price provisions in mergers and liquidations.[6] State laws which require that minority shareholders receive a fair price during a merger or liquation (a) cause the directors to make a better appraisal of the company's assets for fear of being prosecuted for not giving shareholders the fair value; (b) give the

minority shareholders a greater incentive to pay for a good appraisal since
the courts will have a legal basis for sustaining their claims of mistreatment.
Federal securities law does not protect minority shareholders directly. However, to the extent that dilution is a violation of state law, it may be a
material omission under Section 14(e) for the raider to fail to disclose his
intention to squeeze out minority shareholders during the planned merger which
is to follow the successful takeover bid.[7] This fact also increases the incentives for minority shareholders to seek a better appraisal, since if the
appraisal reveals that they have not received fair value then they can sue the
directors in the Federal court for their failure to disclose their intention to
dilute at the time of the takeover bid. For these reasons, we model stringent
disclosure and fiduciary responsibility laws as if they cause a more precise
audit to occur.

The minority shareholders would like to know the value of $\tilde{V}$ at the time
of a liquidation or merger of the raider company into the parent company of the
raider. We assume that the audit or appraisal reveals some information, $\tilde{n}$, which
is correlated with $\tilde{V}$. For example, if the appraisal is perfect, then $\tilde{n} \equiv \tilde{V}$.
In order to simplify the following arguments, we assume that the information
revealed by the appraisal is better than the information possessed by the raider
at the time of the raid. That is, we assume: (A1) the conditional distribution
of $\tilde{V}$ given $\tilde{n}$ and $\tilde{a}$ is the same as the conditional distribution of $\tilde{V}$ given
$\tilde{n}$.

Consider a shareholder at the time of a takeover bid. We can now compute
the expected value of holding on to a share, i.e., of not tendering. Suppose
that the raider who learns that $\tilde{a} = a$ discloses that $\tilde{a}$ lies in the set $D(a)$
at the time of the raid. Suppose further that at a later date when the raider
attempts to merge or liquidate the company an appraisal of quality $\tilde{n}$ will take
place. Therefore, at the date of the attempted dilution, shareholders know they

will get $E[\tilde{V}|n,D(a)] = E[\tilde{V}|n]$ by (A1). We assume that at the time of the attempted dilution the raider knows $\tilde{V}$. Since the raider can decide not to "squeeze out" minority shareholders if $\tilde{V} < E[\tilde{V}|n]$, i.e., not to go through with the merger or liquidation, the minority will get

$$(6) \qquad \tilde{V}_m = \begin{cases} E[\tilde{V}|n] & \text{if } \tilde{V} \geq E[\tilde{V}|n] \\ \tilde{V} & \text{if } \tilde{V} < E[\tilde{V}|n] \end{cases} \quad .$$

That is,

$$(7) \qquad \tilde{V}_m = \min(E[\tilde{V}|n],\tilde{V}) \quad .$$

At the time of the tender offer shareholders do not know what the appraisal will reveal (only the quality of the appraisal) and also they do not know $\tilde{V}$. For the raid to be successful the tender price $p$ must be at least as big as the expected value a shareholder would get by not tendering. That is, given that a raider who knows that $\tilde{a} = a$ reveals $a \in D(a)$,

$$(8) \qquad p \geq E[\tilde{V}_m|D(a)] \equiv E[\min(E[\tilde{V}|n],\tilde{V})|D(a)] \quad .$$

The raider would like to make the disclosure $D(a)$ which minimizes $E[\tilde{V}_m|D(a)]$ subject to the constraint that he not lie.

Clearly this is the same disclosure problem analyzed in the last section. As therein, if the raider fails to make a full disclosure, then shareholders will overestimate $V_m$ and he will be worse off. Therefore the raider voluntarily discloses all his information about $\tilde{V}$. Hence at the time of the raid shareholders think that the company will be worth $E[\tilde{V}_m|\tilde{a} = a]$ to them after a successful bid. Therefore (8) becomes

$$(9) \qquad p \geq E[\tilde{V}_m|\tilde{a} = a] = E[\min(E[\tilde{V}|n],\tilde{V})|\tilde{a} = a] \quad .$$

As in Grossman-Hart [1978], we assume that the tender price must be at

least as high as the status quo price, q, for the raid to be successful. Since the raider will never set  p  any higher than is necessary for success, it follows that the raider's tender price is given by

$$(10) \qquad p = \max(E[\tilde{V}_m | \tilde{a} = a], q) \ .$$

If we define  $\phi$  as follows, then we can get a perfect analogy between a corporate charter which permits dilution of level  $\phi$  and a corporate charter which requires an audit of quality  $\tilde{n}$  to be made.  Let

$$(11) \qquad \tilde{e} \equiv \tilde{V} - E[\tilde{V}|\tilde{n}], \text{ and } \phi \equiv E[\max(\tilde{e}, 0)|a]. \text{ Then}$$

$$(12) \qquad E[\tilde{V}_m | \tilde{a}] = E[\tilde{V}|\tilde{a}] - \phi \equiv a - \phi. \text{ Thus (10) becomes}$$

$$(13) \qquad p = \max(a - \phi, q) \ .$$

From (11) it can be seen that dilution occurs when  $\tilde{e}$  is positive.  In this case the raider pays shareholders  $E[\tilde{V}|\tilde{n}]$  when the assets are really worth a greater amount,  $\tilde{V}$.  The average amount of dilution thus depends on how much and with what probability  $\tilde{V}$  deviates from  $E[\tilde{V}|\tilde{n}]$.  If the appraisal is perfect, then  $E[\tilde{V}|\tilde{n}] = \tilde{V}$, and so  $\tilde{e} \equiv 0$  and  $\phi \equiv 0$.

In order to see the relationship between the precision of the appraisal and the level of dilution  $\phi$, let  $\tilde{n}_1$  and  $\tilde{n}_2$  be two alternative appraisals and assume that  $(\tilde{V}, \tilde{n}_1, \tilde{n}_2, \tilde{a})$  are jointly Normally distributed.  Let  $\tilde{e}_i \equiv \tilde{V} - E[\tilde{V}|\tilde{n}_i]$  for  i = 1,2.  Note that  $E[\tilde{e}_1|a] = E[\tilde{e}_2|a] = 0$  by (A1).  Since  $\max(0, \tilde{e})$  is a convex function of  $\tilde{e}$, if  Variance  $(\tilde{e}_1|a) <$ Variance  $(\tilde{e}_2|a)$  then  $E[\max(0, \tilde{e}_1)|a] < E[\max(0, \tilde{e}_2)|a]$; i.e.,  $\phi$  is lower under  $\tilde{n}_1$  than under  $\tilde{n}_2$.  The fact that  Variance  $(\tilde{e}_1|a) <$ Variance  $(\tilde{e}_2|a)$  follows immediately, however, if  $\tilde{n}_1$  is a more informative experiment than  $\tilde{n}_2$  in the sense of Blackwell.[8]  Equivalently, if  Var  $(\tilde{V}|\tilde{n}_1) <$ Var  $(\tilde{V}|\tilde{n}_2)$  then there will be less dilu-

tion associated with an audit of quality $\tilde{n}_1$ than with an audit of quality $\tilde{n}_2$. Thus the effect of a more stringent disclosure law is to reduce the level of dilution, raise the raider's tender price and decrease the threat of a takeover bid.

## 4. Conclusions

The takeover bid process is quite complicated because of the fact that a corporation is a common property to its shareholders. The acquiring company must have some method of excluding minority shareholders from fully sharing in the benefits (without paying for any of the transactions costs) of the improvement of the target corporation. The successful raider can accomplish this exclusion (and thus cover takeover costs) by merging the target company into his own company after the takeover bid at a price which is unfavorable to minority shareholders of the target. This exclusion is necessary to encourage takeovers even if there is competition among raiders (contrary to our maintained assumption in Section 3). Any law which restricts exclusion lowers the takeover bid threat and this decreases the efficiency of the corporate sector. However, the situation is worse when there is only one raider. In this case, shareholders overly restrict takeover bids by corporate charter provisions which make exclusion of minority shareholders difficult. Securities laws which make exclusion difficult further exacerbate the situation.

There is, of course, a totally different aspect of disclosure laws in that they may give shareholders more information. In Section 2 we showed that an antifraud law alone (i.e., a law against lying) will cause firms to make complete disclosures, if there are no transactions costs. We also showed that the presence of transactions costs in making disclosures means that disclosure laws can affect which parties bear the costs of disclosure. To the extent that the government can costlessly enforce laws, it can force the lowest cost firms to make disclosures, and thus reduce the social transactions costs of disclosure.

However, Section 2 does emphasize that there is a distinction between disclosure laws which attempt to correct inefficiencies in the production of information, and disclosure laws which are designed to reduce fraud caused by the omission of information. Section 2 shows that the commonly held view that firms withhold information (which it is free to release) in order to mislead traders into giving them better terms is false.

## Footnotes

1    This distinguishes our results from models such as those of Kihlstrom [1974], Gonnedes [1978], Ross [1978]. In those models, a seller gives the buyer some signal $\tilde{s}$. Buyers have enough experience to learn the joint distribution of $Q$ and $s$. When the seller makes a particular announcement such as $\tilde{s} = s$, then buyers can compute $E[\tilde{Q}|\tilde{s} = s]$ and thus are never misled by the seller. Thus if sellers and buyers have a lot of experience together then even a law against lying is irrelevant. We show that for transactions where buyers don't have much experience with sellers, then a law against lying is useful, but a disclosure law is redundant. See Williamson [1979] for a careful analysis of types of transactions where legal intervention seems necessary.

2    A more general argument showing that (A1) will hold even if full diversification of risks is not possible can be established using the analysis of Hart [1979].

3    A socially efficient $\phi$ is one which maximizes $R(\phi) = q(\phi)\text{Prob(No Raid)} + E[\tilde{V} - \tilde{c}|\text{Raid}]\text{Prob(Raid)}$, where $R(\phi)$ is to be thought of as the social return to setting up this firm. If the firm is raided, then its social value is $\tilde{V} - \tilde{c}$ since this is the net output of the firm. Notice that $R(\phi)$ differs from $r(\phi)$ in that the latter contains the tender price (because this is the benefit to shareholders if there is a raid) while the former contains the net value of the improved firm (because this is the social value of the resources).

4    This is Section 13(d)(1)(C) of the 1934 Securities and Exchange Act. The Williams Amendment to this Act in 1968 included what is now Section 14(d)(1) of the Act. Section 14(d)(1) requires that prior to the consumation of the tender offer, the raider disclose all the information required under Section 13(d) of the 1934 Act. Prior to the Williams Amendment, Section 13(d) applied, but this Section insists on disclosure after the share purchase of more than 5% of a corporation.

5    See the Supreme Court decision in TSC Industries, Inc. vs. Northway, Inc. 96 S. Ct. 2126 (1976), where the courts stated: "An omitted fact is material if there is a substantial likelihood that a reasonable shareholder would consider it important in deciding how to vote." This may seem clear, but there is some controversy as to what disclosures are really required. One reason for this is that

Section 14(e) states that

> (e) It shall be unlawful for any person to make any untrue statement of a material fact or *omit to state any material fact necessary in order to make the statements made, in light of the circumstances under which they are made, not misleading* or to engage in any fraudulent, deceptive, or manipulative acts or practices, in connection with any tender offer or request or invitation for tenders, or any soliciations of security holders in opposition to or in favor of any such offer, request, or invitation...

(The italics are ours.) Herzel and Hagan [1977] argue that the Northway decision simply defines "material." It does not require raiders to disclose all material information; instead it requires the disclosure of all material information which if omitted would make statements made misleading. In Ash vs. Brunswick Corporation, 405 F. Supp. 234, 245-246 (D. Del 1975), the court upheld the view given by Herzel and Hagan. However, in Boyertown Burial Casket Co. vs. Amedco Inc. (1976, D.C., Pa.) 407 F. Supp. 811, the court ruled that the overriding purpose of 14(e) is to protect investors by fair disclosure of certain basic facts relating to tender offers to enable them to make informed decisions whether to retain or sell stock.

6
   See Brudney and Chirelstein [1978] for a review of state law regarding the fiduciary responsibility of management toward minority shareholders. See Aranow, Einhorn and Berlstein [1977] for a review of state and federal disclosure laws.

7
   See Tanzer vs. Haynie (1976, D.C. NY) 405 F. Supp. 650, and Securities and Exchange Com. vs. Parklane Hosiery Co. (1976, D.C. NY) 422 F. Supp. 477.

8
   See Grossman, Kihlstrom and Mirman [1977], pp. 539-540.

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