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Abstract

In a corporate freeze-out, the controller is required to compensate minority shareholders for the no-freezeout value of their shares that are taken from them. This paper seeks to highlight the difficulties involved in determining this no-freezeout value when, as is often the case, the controller has private information. In particular, the analysis shows that the pre-freezeout market price of minority shares cannot be used as a proxy for the no-freezeout value that these shares would have in the absence of a freeze-out. It is shown that, under a regime in which frozen out minority shareholders receive a compensation equal to the pre-freezeout market price, the pre-freezeout market price will be set at a level below the expected no-freezeout value of minority shares. The reason for this is a "lemons effect" that arises when a controller uses her private information in deciding whether to effect a freeze-out. By showing how controllers are able to use their private information to effect freeze-outs at terms favorable to them, this paper demonstrates that freeze-outs can become a significant source for private benefits of control.

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I. INTRODUCTION

An important element in the governance scheme of a corporation is its ownership structure. Most publicly traded companies in the U.S. have a dispersed ownership structure: no single shareholder owns sufficient shares to control the company. A substantial minority of companies, however, have a controlling shareholder.¹ A controlling shareholder exercises powers that are available neither to the dispersed shareholders in a company without a controlling shareholder nor to the minority shareholders in a company with a controlling shareholder. As the Delaware Supreme Court recently summarized, a controlling shareholder can:

(a) elect directors; (b) cause a break-up of the corporation; (c) merge it with another company; (d) cash-out the public stockholders; (e) amend the certificate of incorporation; (f) sell all or substantially all of the corporate assets; or (g) otherwise alter materially the nature of the corporation and the public stockholders' interests.²

This article will focus on one of these enumerated powers -- the power to cash out, or "freeze out," the minority shareholders. Such freeze-outs are accomplished by a merger with a corporation wholly-owned by the controlling shareholder. After the freeze-out the controlling shareholder emerges as the sole equity holder of the company. In most states, mergers require the approval of the company's board of directors as well as of holders of a majority of outstanding shares.³ A shareholder who holds a majority of shares can effectively

¹ For example, Barclay and Holderness (1989) report that, in a randomly chosen sample of 394 publicly traded companies in 1986, 20 percent of the companies had a shareholder with a block exceeding 35 percent of equity.

²Paramount Communications Inc. v. QVC Network Inc., 637 A.2d 34 (Del. 1994).

³See, e.g., Delaware General Corporations Law, Sec. 251; Revised Model Business Corporation Act, Sec. 11.03.

control both approval prongs and thus unilaterally set the price at which minority shareholders are frozen out (the "freeze-out price"). The power to freeze out the minority shareholders at potentially unfavorable terms is one of several ways through which a controlling shareholder can derive benefits from control to the exclusion of, and at the expense of, the minority shareholders.⁴

While the power of the controlling shareholder to freeze out the minority shareholders and to set the freeze-out price is unfettered, minority shareholders have some remedies if they feel that the freeze-out price has been set too low. First, they can seek a judicial appraisal of their shares, in which case they will receive the value of their shares as assessed by the court (rather than the freeze-out price).⁵ Second, in some circumstances, minority shareholders can seek judicial review of the freeze-out merger under the "entire fairness" standard, in which case the court will award them damages if the value of the minority shares, as assessed by the court, exceeds the freeze-out price.⁶ While these two types of proceedings differ in certain respects, they both rely on a judicial assessment of the value of minority shares.⁷ Both types

⁴In addition to freeze-outs, a controlling shareholder can engage in self-dealing transactions with the controlled company; usurp corporate opportunities; structure the company's dividend policy to fit her tax situation or cash flow needs; or sell "control" to another shareholder. For formal models of sales of corporate control, *see* Bebchuk (1994); Kahan (1993).

⁵*See, e.g.*, Delaware General Corporations Law, Sec. 262(b); Revised Model Business Corporation Act, Sec. 13.02.

⁶*See* Weinberger v. UOP, 457 A.2d 701, 714-15 (Del. 1983) (discussing "entire fairness" standard in freeze-outs and its relations to appraisal rights); Revised Model Business Corporation Act, Sec. 13.02(b) (remedies beyond appraisal rights available if transaction is fraudulent or unlawful). At least in Delaware, a freeze-out merger where the price is unilaterally set by the controlling shareholder appears to allow minority shareholders to bring an "entire fairness" action. *See* Cede & Co. v. Technicolor, Inc., C.A. Nos. 7129 & 8358, slip op. at 15, 16 (Del. Ch. Jan. 13, 1987), rev'd on other grounds, 542 A.2d 1182 (Del. 1988) (appraisal is not an exclusive remedy where a breach of fiduciary duty is involved); Jedwab v. MGM Grand Hotels, Inc. 509 A.2d 584, 594 (Del. Ch. 1986) (courts apply entire fairness standard when a controlling shareholder "effectuate[s] a transaction in which [it has] an interest that diverges from that of the corporation or the minority shareholders").

⁸In general, the methodology for determining the value of minority shares is the same in entire fairness and appraisal proceedings. *See* Rosenblatt v. Getty Oil Co., 493 A.2d 929, 940 (Del. 1985); *but see* Cede & Co. v. Technicolor, Inc., 634 A.2d 345, 371 (Del. 1993) (noting that measure of loss under entire fairness standard is "not necessarily" limited to difference between appraised value and price offered in merger since chancellor has discretion to award rescissory damages if appropriate).

of proceedings can in principle, if the assessment is accurate, to protect minority shareholders from being denied the "no-freezeout value" -- the value that their shares would have in the absence of the considered freezeout.⁸

Our paper identifies and analyzes certain problems in the estimation of the no-freezeout value of minority shares. These problems arise from the fact that controllers, who decide whether to effect a freezeout, are also likely to have private information concerning the firm's value. As a result, the pre-freezeout market price of minority shares, which is often used by courts in the assessment of the minority shares' no-freezeout value, is likely to underestimate the no-freezeout value.

Our analysis is organized as follows. Part II contains a short discussion of the use of market prices to assess the value of minority shares in freeze-outs and a numerical example illustrating the "lemons effect" that results from such use. Part III contains a game-theoretic model demonstrating that, if a controlling shareholder can freeze out the minority shareholders at the pre-freezeout market price, that market price will reflect the per-share value of the company *assuming that the controlling shareholder has the worst possible private information about the value of the company*. A right to freeze out the minority shareholders at such a market price would therefore confer substantial profits on the controlling shareholder. The model uses several simplifying assumptions, but our work-in-progress suggests that its main result -- that the presence of private information enables a controlling shareholder to gain systematically at the expense of minority shareholders -- holds in a more general setting. Part IV provides a concluding discussion that reports on

⁹There is a large literature on whether providing minority shareholders in a freezeout with the no-freezeout value is enough or whether the standard to which they are entitled should be higher. For example, in two classic articles, Brudney and Chirelstein (1974, 1978) argue that minority shareholders should be given the no-freezeout value plus a fraction of the gains created by the freezeout. And Coates (1998) recently argues that minority shareholders in a freezeout should get their pro rata fraction of the company's value -- including their pro rata fraction of the controller's existing private benefits of control. Our focus in this paper is on problems with the protection of minority shareholders that arise from problems of estimation, even if one assumes, as many courts do, that minority shareholders are entitled only to the no-freezeout value of their shares.

some of the findings in our work-in-progress and considers the implications of our model on the controlling shareholder's incentive to pursue investment projects and to reveal information.

II. THE USE OF MARKET PRICES IN FREEZE-OUTS

For an economist, a natural approach in determining the value of the minority shares is to rely on the market price of those shares prior to the freeze-out. Economists generally believe that market prices provide the best estimate of the value of a share that can be formed on the basis of publicly available information -- or at least a much better estimate than the one that a judge may arrive at after listening to conflicting, and undoubtedly self-serving, testimony of experts hired by the controlling and the minority shareholders. Indeed, several scholars have proposed that courts use the market price as the measure of the value of the minority shares in a freeze-out.⁹ And courts presently look at the market price as an important, though not the exclusive, factor in appraising minority shares.¹⁰

As we show below, however, there is a fundamental flaw in using market prices to measure the value of minority shares in a freeze-out. The very power of a controlling shareholder to freeze out the minority shares -- and to set the freeze-out price equal to the pre-freezeout market price -- will depress the pre-freezeout market price of the minority shares. As a result, the pre-freezeout market price of minority shares will be substantially

⁹See Hermalin and Schwartz (1996) (presenting a model not including asymmetric information and arguing that awarding pre-freezeout market price in an appraisal proceeding creates efficient incentives to invest).

¹⁰For examples in which market value plays a significant role in valuation, *see*, *Genesco, Inc. v. Scolaro*, 871 S.W.2d 487 (Tenn Ct. App. 1993); *McCauley v. Tom McCauley & Son, Inc.*, 724 P.2d 232 (N.M. Ct. App. 1986); *Friedman v. Beway Realty Corp.*, 638 N.Y.S.2d 399; *In re Glosser Brothers*, 555 A.2d 129 (Pa. Super. Ct. 1989); *In re Valuation of Common Stock of Libby, McNeill & Libby*, 406 A.2d 54 (Me. 1979); *Chokel v. First National Supermarkets, Inc.*, 660 N.E.2d 644 (Mass. 1986); *Hernando Bank v. Huff*, 609 F.Supp. 1124 (N.D. Miss. 1985). Indeed, market value is sometimes the most significant factor in determining fair value in appraising minority shares, *see e.g.* *Armstrong v. Marathon Oil* 513 N.E.2d 776 (Ohio 1987).

below the expected "intrinsic"¹¹ value of the minority shares absent a freeze-out. This is the case even if -- in fact, especially if -- capital markets are informationally efficient and fully process all publicly available information. Thus, the pre-freezeout market price is an unreliable guide for courts in appraising minority shares.

The reason for the discrepancy between the market price and the expected "intrinsic" value of the minority shares is that the controlling shareholder's power to effect a freeze-out creates a "lemons effect" that depresses the market price.¹² A controlling shareholder will generally have private information about the value of the company which is not available to the public. Absent the possibility to force a freeze-out, such private information would cause the market price to be inaccurate, but would not cause it to be systematically biased:¹³ the market price may sometimes be too high or too low, but would still constitute the best estimate of the value of the minority shares that can be formed on the basis of all public information. But if the controlling shareholder has the power to freeze out the minority shareholders by paying them the pre-freezeout market price, she will use that power strategically to effect a freeze-out only if her private information indicates that the value of the minority shares is above their market price. This strategic use of the power to effect a freeze-out results in a "lemons effect" that causes the market price of minority shares to spiral down.

¹¹We will use the term "expected 'intrinsic' value" to refer to the expected value of minority share a freeze-out is not possible.

¹²See Akerlof (1970). Other commentators have also suggested that the market price for minority shares will be depressed. These commentators, however, intimate that the depressed price is due to informational inefficiencies or to expectations of self-dealing. [cite] By contrast, we show that the market price is depressed even if the market price is set in a rational expectations equilibrium and the controlling shareholder does not derive private control benefits from self-dealing or, for that matter, from *any* source other than the power to freeze out the minority shares.

¹³Even absent a freeze-out, the controlling shareholder can buy shares at the market price in a regular market transaction. Freeze-outs, however, create greater possibility for insider trading. First, in a regular market transition the minority shareholders can protect themselves by not selling, at least not at times when they suspect that the controlling shareholder has a lot of private information. Second, the controlling shareholder can only buy a limited number of shares before her purchases are noticed and the market price increases.

Assume, for example, that the per-share value of XYZ Corp. can range from \$100 to \$200. On the basis of public information, any value in this range is equally likely. The expected "intrinsic" value of a share of XYZ Corp. is thus \$150. The controlling shareholder, however, knows the exact value of the company. The controlling shareholder can freeze out the minority shareholders at market price. If she does not effect a freeze-out, XYZ will be liquidated and minority shareholders will receive their proportional interest.

If a freeze-out were not possible, the market price of an XYZ share would be \$150 -- the value that the minority shareholders expect to receive in XYZ's liquidation. Now, however, consider the effect of the power to effect a freeze-out at the market price. To be in equilibrium, the market price must be equal to the average amount that the minority shareholders receive in a freeze-out or in XYZ's liquidation. Let us consider first whether \$150 can remain the equilibrium market price. At that price, the controlling shareholder will effect a freeze-out if she knows that XYZ's value is above \$150 per share and not effect a freeze-out if she knows that the value of an XYZ share is below \$150. Each possibility is equally likely, and the minority shareholders in the latter case would expect to receive \$125 in XYZ's liquidation.¹⁴ The expected value of the minority shares (given the possibility of a freeze-out) is \$137.50 per share -- and \$150 is therefore not an equilibrium market price.

Alas, for similar reasons, \$137.50 is not an equilibrium market price either. The controlling shareholder will effect a freeze-out if XYZ's value is above \$137.50 per share (62.5% probability); and if there is no freeze-out, the minority shareholders expect to receive \$118.75 in XYZ's liquidation. The expected value of the minority shares is then \$130.47 per share — and \$137.50 is not an equilibrium price. But at a market price of \$130.47, a freeze-out will occur if XYZ's value exceeds \$130.47, and absent a freeze-out minority shareholders

¹⁴Since any per-share value between \$100 and \$200 is equally likely, the expected value conditional on the value being below a certain level \$X (with \$X being between \$100 and \$200) is halfway between \$X and \$100. The expected value conditional on the value being below \$150 is thus \$125.

expect to receive \$115.24. The expected value of the minority shares thus is \$125.83 per share (\$130.47 times 69.53% plus \$115.24 times 30.47%); and so on.

Following this spiral downwards, it turns out that the highest equilibrium price is \$100 -- the lowest possible value of an XYZ share. For any market price above \$100, minority shareholders will sometimes receive the market price (if the controlling shareholder knows that XYZ's value exceeds the market value) and sometimes less (if he knows that XYZ's value is less than the market value) -- meaning that they receive, on average, less than the market price per share. As a consequence, no market price above \$100 is an equilibrium. If the market price is \$100, however, the controlling shareholder will always effect a freeze-out (or be indifferent if XYZ's value is exactly \$100 per share), and minority shareholders always receive \$100.

As the example suggests, the power to freeze out the minority shares can be an important source of private benefits that a controlling shareholder gains at the expense of minority shareholders. The ability to use private information to gain in a freeze-out -- and, importantly, the market's expectation that a controlling shareholder will use private information in this fashion -- comes in addition to, and is independent of, any private benefits that a controlling shareholder gains from self-dealing, salaries, etc.

III. A MODEL OF FREEZE-OUTS UNDER ASYMMETRIC INFORMATION

A. The Framework of Analysis

Shares of the company are held by one controlling shareholder and a large number of minority shareholders. Let Y be the value of the company's equity and $\alpha < .5$ be the fraction of shares held by the minority shareholders. Let n be the number of outstanding shares of the company.

At $t=1$, a minority shareholder has to sell one share for liquidity reasons. The sale

(market) price is established by an English auction among m bidders with $m \geq 2$, and P is the market price times the number of outstanding shares. Bidders do not own any other shares of the company. Bidders do not know the exact value of Y , but know that Y is distributed in $[Y_L, Y_H]$ with an expected value of \bar{Y} . At $t=1$, the controlling shareholder derives private control benefits $B \geq 0$ from her control. The aggregate expected value of the company to the controlling and the minority shareholders is thus

$$\bar{V} = \bar{Y} + B.$$

At $t=2$, the controlling shareholder receives a signal s regarding the value of Y on the basis of which the controlling shareholder forms \bar{Y}_s as an unbiased estimate of Y . Without loss of generality, assume that s is distributed in $[0, 1]$ with $\bar{Y}_i \geq \bar{Y}_j$ for $i > j$. In the “no possibility of freeze-out” case, no further action occurs at $t=2$. In the “possibility of freeze-out” case, the controlling shareholder has the right to freeze out the minority shares by paying a freeze-out price per share equal to the market value per share.

At $t=3$, Y becomes known, the company is liquidated and Y is distributed pro rata to its (then) shareholders.

For simplicity, assume that the discount rate is 0, that all shareholders are risk neutral, that there are no transaction costs in trading shares or effecting a freeze-out, and that the value of B is known. Further assume that a freeze-out has no effect on the values of Y and B .

B. The Value of Minority Shares in a Regime Without Freeze-Outs

Proposition 1: If the controlling shareholder does not have the power to effect a freeze-out, the equilibrium market price of the minority shares is \bar{Y}/n ; that is $P = \bar{Y}$.

Proof: The market price is set by bidders' bidding strategies at $t=1$. In an English auction with symmetric information, a bidder k 's strategy is defined by x_k , the highest amount the bidder is willing to bid up to (if necessary) for one share. It is a dominant strategy for each bidder to set x to \bar{Y}/n .

Let \hat{x} be the highest x chosen by all other bidders other than bidder k . Bidder k 's payoff will depend on the values of x_k and \hat{x} . For any $x_k < \hat{x}$, bidder k will lose the auction and its payoff is 0. For $x_k > \hat{x}$, bidder k will win and purchase the share at $\hat{x} + \epsilon$, with ϵ having an infinitesimal positive value. For $x_k = \hat{x}$, the winning bidder is randomly determined; that is, bidder k will either lose or purchase the share for \hat{x} .

For $\hat{x} < \bar{Y}/n$, bidder k 's expected profits are maximized by purchasing the share at $\hat{x} + \epsilon$; that is, by setting $x_k > \hat{x}$. For $\hat{x} > \bar{Y}/n$, bidder k 's expected profits are maximized by not purchasing the share; i.e., by setting $x_k < \hat{x}$. For $\hat{x} = \bar{Y}/n$, bidder k is indifferent between not purchasing the share or purchasing the share for \bar{Y}/n ; that is, by setting $x_k \leq \hat{x}$.

The only value of x_k that maximizes bidder k 's profits in all three cases is $x_k = \bar{Y}/n$. Any value $x_k < \bar{Y}/n$ fails to maximize bidder k 's profits for some $\hat{x} < \bar{Y}/n$; any value $x_k > \bar{Y}/n$ fails to maximize bidder k 's profits for some $\hat{x} > \bar{Y}/n$. Setting $x_k = \bar{Y}/n$ is thus the weekly dominant strategy for bidder k . By the same rationale, setting $x = \bar{Y}/n$ is the dominant strategy for any other bidder.

C. The Value of Minority Shares in a Regime with Freeze-Outs

If a freeze-out is possible, the equilibrium market price is determined by the strategic interactions among the bidders and between the bidders and the controlling shareholder.

Proposition 2: The only set of Nash equilibria in undominated strategies results in $P = \bar{Y}_0$.

Proof: The proof of Proposition 2 follows from the following Lemmas.

Lemma 1: The controlling shareholder has two dominant strategies (with P determined by the bidders' strategies):

1. Effect a freeze-out if and only if $\bar{Y}_s \geq P$; and
2. Effect a freeze-out if and only if $\bar{Y}_s > P$.

The controlling shareholder's expected profit from effecting a freeze-out is $\bar{Y}_s - P$,

and the controlling shareholder's expected profit from not effecting a freeze-out is 0. For $\bar{Y}_s > P$, the controlling shareholder maximizes its expected profit by effecting a freeze-out; for $\bar{Y}_s < P$, the controlling shareholder maximizes its expected profit from not effecting a freeze-out; for $\bar{Y}_s = P$, the controlling shareholder is indifferent between effecting and not effecting a freeze-out. Any other strategy is dominated by these two strategies as they would entail either the possibility of effecting a freeze-out when not effecting a freeze-out maximizes expected profits, or not effecting a freeze-out when effecting a freeze-out maximizes expected profits.

Lemma 2: For any bidder, setting $x < \bar{Y}_0/n$ is weakly dominated by setting $x = \bar{Y}_0/n$.

Bidder k 's bid matters to bidder k only if the controlling shareholder does not effect a freeze-out and if $x_k \geq \hat{x}$. (Otherwise, bidder k makes profits of 0 regardless of its bid.)

Assume, therefore, that $\hat{x} \leq \bar{Y}_0/n$ and that the controlling shareholder does not effect a freeze-out.

If $\hat{x} = \bar{Y}_0/n$, setting $x_k = \bar{Y}_0/n$ means that bidder k will sometimes buy a share for \bar{Y}_0/n . The payoff from buying a share for \bar{Y}_0/n is $Y/n - \bar{Y}_0/n \geq 0$, and thus dominates the payoff from setting $x_k < \bar{Y}_0/n$ and not buying a share (which is always 0). (Recall that, in assessing the dominance of strategies, one does not assume that the controlling shareholder plays its dominant strategy.)

If $\hat{x} < \bar{Y}_0/n$, setting $x_k > \hat{x}$ means that bidder k will buy a share for $\hat{x} + \epsilon$, with a payoff of $Y/n - (\hat{x} + \epsilon) > 0$. This payoff dominates the payoff from setting $x_k \leq \hat{x}$. Setting $x = \bar{Y}_0/n$ thus weakly dominates setting $x < \bar{Y}_0/n$.

Lemma 3: If the controlling shareholder plays one of its dominant strategies, no strategy of bidders that results in $P > \bar{Y}_0$ is a Nash equilibrium.

If the controlling shareholder plays one of its dominant strategies, the payoff to the winning bidder is:

$$[\text{Prob}(\bar{Y}_s \geq P) * P + \text{Prob}(\bar{Y}_s < P) * E[Y | \bar{Y}_s < P] - P]/n$$

This payoff is negative since $E[Y|\bar{Y}_s < P] < P$. The winning bidder would thus prefer to lower its bid to below \bar{Y}_s (with a payoff of 0). The strategies are therefore not in Nash equilibrium.

Lemma 4: The following strategy profiles are Nash equilibria:

1. Each bidder sets $x = \bar{Y}_0/n$; and the controlling shareholder effects a freeze-out if and only if $\bar{Y}_s \geq P$.

2. Each bidder sets $x = \bar{Y}_0/n$; and the controlling shareholder effects a freeze-out if and only if $\bar{Y}_s > P$.

Both of these Nash equilibria result in $P = \bar{Y}_0$.

The controlling shareholder cannot profit from changing her strategy since she plays a dominant strategy. Since either a freeze-out is effected or $P = Y$, all bidders make zero profits. No bidder can thus profit from reducing its bid. No bidder can profit from raising his bid since raising one's bid results in $P > \bar{Y}_0$, with a negative expected payoff to the winning bidder (Lemma 3).

Lemmas 1 to 3 show that the strategies of the bidders and of the controlling shareholder are undominated.

It should be noted that there are an infinite number of Nash equilibrium strategies with the features of (i) $P < \bar{Y}_0$ and (ii) the controlling shareholder is always effecting a freeze-out. (In fact, any combination of strategies with these features is in Nash equilibrium.) The strategies resulting in such Nash equilibria, however, are not undominated.

Remark: The intuition behind the result that the equilibrium market price will be equal to the worst possible expected value of the company given the controlling shareholder's set of potential signals lies in the "lemons effect" of the freeze-out power. The minority shareholders receive the market price if a freeze-out takes place at $t=2$. If no freeze-out takes place at $t=2$, the minority shareholders can deduce that, given the information available to the controlling shareholder, the value of the minority shares is below their market price;

therefore, they would expect to receive less than the market price. (They never *expect* to receive more than the market price.) Thus, if the market price is sufficiently high so that the controlling shareholder will sometimes not pursue a freeze-out, the amount that the minority shareholders expect to receive is below the market price. No such price can be in equilibrium at $t=1$. On the other hand, no price below the expected value of the company if the controlling shareholder were to receive the worst possible signal can be in equilibrium since the minority shareholders expect to receive *at least* this amount whether or not a freeze-out takes place.

The degree to which \bar{Y}_0 -- the expected value of the company assuming that the private information of the controlling shareholder is the worst possible -- differs from \bar{Y} -- the expected value of the company absent private information -- depends on the strength of the signal received. In one extreme case where the signal reveals the actual value of the company ($\bar{Y}_s = Y$), the equilibrium price drops to Y_L . In another extreme case where the signal conveys no information ($Y_0 = Y_1 = \bar{Y}$), the equilibrium price is equal to \bar{Y} .

Rather than by the absolute level of private information, however, the market price is determined by the extent to which the controlling shareholder's private information is regarding elements that have an *adverse* effect on the company's value -- that is, elements that drive down the value of \bar{Y}_0 (even if they do not affect any other \bar{Y}_s). In other words, the market price falls with (and the controlling shareholder benefits from) a more accurate signal only if the signal is negative, not if the signal is positive. In the extreme, it is sufficient to have the market price drop to Y_L (the lowest possible value of the company) if the controlling shareholder receives a binary signal: a perfectly accurate signal indicating that the company's value is Y_L , and a highly imprecise signal indicating only that the company value is not Y_L .

D. The Effect of Freeze-Outs on Private Control Benefits

On the basis of Propositions 1 and 2, we can calculate the respective equilibrium

values of the minority shares and the control block in the absence and the presence of the possibility of a freeze-out.

In a regime without freeze-outs, the aggregate expected value of the minority shares is:

$$\alpha \bar{Y},$$

and the expected value of the control block (at t=1) will be:

$$(1-\alpha) \bar{Y} + B.$$

Relative to the respective pro rata fraction of \bar{V} , the value of the minority shares is:

$$\alpha \bar{V} - \alpha B,$$

and the value of the control block is:

$$(1-\alpha) \bar{V} + \alpha B.$$

With the possibility of a freeze-out, the value of the minority shares is:

$$\alpha \bar{Y}_0,$$

and the expected value of the control block (at t=1) is:

$$(1-\alpha) \bar{Y} + \alpha(\bar{Y} - \bar{Y}_0) + B.$$

Relative to the respective pro rata fraction of \bar{V} , the value of the minority shares is:

$$\alpha \bar{V} - \alpha(\bar{Y} - \bar{Y}_0) - \alpha B,$$

and the value of the control block is:

$$(1-\alpha) \bar{V} + \alpha(\bar{Y} - \bar{Y}_0) + \alpha B.$$

Thus, as a result of the possibility of a freeze-out, the value of the minority shares decreases by

$$\alpha(\bar{Y} - \bar{Y}_0),$$

and the value of the control block increases by the same corresponding amount.

The expression $\alpha(\bar{Y} - \bar{Y}_0)$ represents the expected value (at t=1) of the amount that the controlling shareholder can divert from the minority shareholders by the strategic exercise of the freeze-out option. This adds to other sources of private control benefits (B).

IV. CONCLUDING DISCUSSION

In this article, we presented a simple model of corporate freeze-outs where the controlling shareholder has the option to pay the pre-freezeout market price to the minority shareholders. We have shown that this option has substantial value to the controlling shareholder when she has private information about the value of the company. Our work-in-progress preliminarily indicates that the results of the simple model discussed here are robust to several variations of the model that render the model more complex and more general. In particular, we analyze freeze-out pricing rules where the freeze-out price is not, or not exclusively, determined by the pre-freeze-out market price; we examine the case where the freeze-out produces efficiency gains and losses (i.e., increases or decreases the company's value); and we extend the analysis to multiple periods where, in each period, new private information becomes available to the controlling shareholder and prior private information becomes available to the market. Although the specific results derived for the value of the minority shares and the control block vary with each of these extensions, the general result of the model -- that the freeze-out option can be highly valuable to the controlling shareholder -- continues to hold.

The fact that the freeze-out option is valuable, and that the per-share value of the minority shares is below the per-share value of the control block, has important policy implications. First, since the value of the freeze-out option depends on the extent of the controlling shareholder's private information, a controlling shareholder has excessive incentives (from the social perspective) to obtain private information, or equivalently, to obtain information earlier than the market. Since obtaining private information is costly, a controlling shareholder will expend excessive resources on acquiring information.

Second, once private information is obtained, the controlling shareholder has excessive incentives to withhold such information from the market. These incentives result in social losses to the extent that it is socially desirable to have a more-informed market and

to the extent that the controlling shareholder expends resources in actively hiding information.

Third, the desire to obtain private information skews the investments that the controlling shareholder would have the company undertake. Different investment projects provide the controlling shareholder with different levels of private information, and the controlling shareholder has an incentive to choose investment projects that yield greater private information even if the projects have a negative net present value. Moreover, as explained before, private information related to adverse developments is particularly valuable. Thus, a controlling shareholder has an incentive to have the company invest in projects that potentially (i) have a substantial downside and (ii) supply the controlling shareholder with private information regarding whether that downside is realized.

Finally, the presence of private control benefits (of any sort) means that a party has a socially excessive incentive to become (or remain) a controlling shareholder. This excessive incentive results in social losses of two types: the transaction costs incurred in assembling a control block of shares, and the reduction in diversification benefits due to the fact that one may have to hold an undiversified portfolio in order to hold a control block in a company. Additionally, any source of private control benefits is of concern if a goal of the legal system is to ensure that all shareholders participate proportionally in the value of the company.

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