

ISSN 1045-6333

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AND SHAREHOLDER WEALTH

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Discussion Paper No. 179

2/96

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The Center for Law, Economics, and Business is supported by
a grant from the John M. Olin Foundation.

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Abstract

The agents to whom shareholders delegate the day-to-day management of corporate affairs may transfer value from shareholders to themselves through a variety of mechanisms, including self-dealing, insider trading, and taking of corporate opportunities. A common view in the law and economics literature is that such value diversion will not reduce shareholder wealth and, in fact, may enhance it; value diversion substitutes for potentially less efficient forms of managerial pay. We show, however, that the principal-agent framework underlying the law and economics view leads most naturally to the opposite conclusion about the desirability of value diversion. In a principal-agent setting, compensation influences managerial incentives; thus, adjusting compensation in response to opportunities for value diversion may impose significant costs on shareholders. Value diversion always reduces ex ante share value when such behavior operates as a pure wealth transfer between shareholders and managers. Value diversion may even reduce share value when it generates benefits for managers in excess of the direct costs to shareholders. We identify a threshold level for the difference between the benefits and the costs of value diversion, above which such behavior may, though it need not, enhance share value.

Introduction

The agents to whom shareholders delegate the day-to-day management of the typical large corporation have a variety of opportunities to transfer value from shareholders to themselves. These agents may take business opportunities presented to the firm and turn them to their own advantage; they may engage in classic self-dealing, selling assets to the firm or buying assets from it at non-arms'-length prices; they may trade in the firm's stock on the basis of inside information; or they may provide themselves with various perks not germane to their job responsibilities. Each of these actions provides managers with private benefits that increase the effective level of managerial pay above the level implied by salaries, bonuses, and other forms of direct compensation.

Much of corporate law is addressed to the problem of managerial value diversion in its various incarnations. State and federal rules curtail or regulate the taking of corporate opportunities, transactions between corporations and their managers, insider trading, and the provision of perks and other benefits to managers (Clark 1986, 166-79, 191-94, 225-30, 293-340). These legal rules reflect a background presumption that value diversion harms shareholders and should be discouraged. On this view, value diversion is undesirable (and appropriately curtailed by legal rules) absent some special reason to believe that such behavior produces offsetting gains for shareholders.

The law and economics literature has been largely critical of the traditional presumption against managerial value diversion (Manne 1966; Manne 1970; Scott 1980; Easterbrook and Fischel 1982; Carlton and Fischel 1983; Haddock and Macey 1987; Easterbrook and Fischel 1991). According to these authors, value diversion does not raise the distributional and fairness concerns that underlie the traditional disapproval of such behavior. Value diversion is instead

an alternative form of managerial compensation, a substitute for salaries, bonuses, and other forms of direct managerial pay. Benefits from value diversion will be offset by reductions in direct compensation, leaving total managerial pay and the total wealth enjoyed by shareholders unchanged. Just as "salaries, options, bonuses, and other compensation devices [do not] allow [managers] to profit at the expense of [shareholders] because these sums otherwise would have gone to shareholders," value diversion does not come "at the expense of" shareholders in any meaningful sense (Carlton and Fischel 1983, 881). Consequently, rational shareholders have no need for the protective (restrictive) legal rules imposed by current law. Indeed, a common view in the law and economics literature is that restrictions on value diversion may actually reduce share value by forcing shareholders to assign to themselves a right that managers value more highly. Thus, for example, restricting the taking of business opportunities of the firm may reduce share value if such opportunities have greater value in managers' hands than in the hands of the firm (Easterbrook and Fischel 1982).

One objection to the arguments against the traditional (anti-value diversion) presumption is that the process by which managers' direct compensation is set does not conform to the hypothetical ideal envisioned by the principal-agent paradigm underlying those arguments. It may be implausible to assume, as that underlying paradigm does, that the level of managerial pay is set by a disinterested agent seeking to maximize share value (Brudney 1985). The board of directors of the typical large corporation may be partial to managers' interests and therefore reluctant to pursue an aggressive strategy of lowering salaries and other forms of direct compensation in response to managers' ability to divert value from shareholders. Legal restrictions on value diversion may then be a pragmatic response to the consequences of value diversion in real-world settings.

This paper offers a different objection to the benign view of value diversion described above. We reexamine that view within its own analytical framework and show that value diversion often reduces ex ante share value even if the assumptions of that framework hold. The reason is that adjusting managers' direct compensation in response to value diversion—even if feasible—may impose significant costs on shareholders. These adjustment costs tilt the balance systematically away from lenient treatment of value diversion.

We show that value diversion always reduces share value when it operates as a pure wealth transfer between shareholders and managers (the costs of the behavior to shareholders just equal the benefits to managers). This conclusion provides support for the traditional legal presumption against value diversion. Furthermore, even when value diversion costs shareholders less than it benefits managers, it may reduce share value. We identify a threshold level for the difference between the costs and the benefits of the behavior, above which value diversion may enhance share value. However, even then, share value need not rise when value diversion is permitted; in some circumstances, share value will fall with value diversion no matter how large the gap between the costs of the behavior to shareholders and the benefits of it to managers.

The costs of adjusting managerial compensation in response to opportunities for value diversion result from the relationship between managerial compensation and incentives in a principal-agent setting. The compensation paid to managers in such a setting will typically depend significantly on firm performance. Bonuses, stock options, and other forms of performance-based pay tie managers' fate to shareholders' return. Against this backdrop, reducing managers' compensation in response to opportunities for value diversion will mean reducing the alignment of shareholders' and managers' interests. Shareholders are effectively faced with a catch-22; either they reduce managers' compensation in response to opportunities

for value diversion and bear the resulting costs of weakened incentives, or they leave compensation alone and enjoy no offsetting adjustment in direct compensation in response to value diversion.

The dilemma confronting shareholders in this setting may be illustrated with a simple numerical example. Suppose that a manager would receive compensation with an expected value of \$300,000 in the absence of value diversion. Imagine that value diversion, if permitted, would impose costs of \$200,000 on shareholders and yield benefits of \$200,000 to the manager. (Value diversion here is a pure wealth transfer.) If the shareholders respond to the prospect of value diversion by reducing the manager's direct compensation by \$200,000, then the manager's interests will be less aligned with those of shareholders (assuming that at least some portion of the original compensation package is performance-based). Ex ante share value will fall as a result. The adverse effect of adjusting compensation is reduced but not eliminated if compensation is decreased by some amount less than \$200,000 (say, \$100,000); the manager's incentives will still weaken, but by a smaller margin. On the other hand, if direct compensation is not reduced at all, managerial incentives will be unchanged, but shareholders will bear the full \$200,000 cost of value diversion. In all cases, shareholders are worse off when value diversion is permitted than when it is prohibited.

Similar reasoning suggests that value diversion may reduce ex ante share value even when the costs of the behavior to shareholders are less than the benefits to managers. Suppose, for example, that value diversion would impose costs of \$200,000 on shareholders, as in the pure transfer case examined above, but would yield benefits of \$300,000 (rather than \$200,000) for the manager, perhaps because it would produce desirable incentive effects. Shareholders could now reduce the manager's direct compensation by as much as \$300,000 if value diversion were

permitted, and the \$300,000 reduction would more than offset the \$200,000 cost of the behavior. However, a large reduction in the manager's direct compensation might significantly diminish performance incentives, and the resulting shareholder costs could outweigh the benefits of lower managerial pay. Value diversion thus may reduce share value even when the benefits of the behavior to managers exceed its costs to shareholders.

We develop these points about value diversion in principal-agent settings more fully below. Our focus is the effect on ex ante share value of restrictions on value diversion. The analysis abstracts from the question whether firms should be permitted to opt out of the legal rules chosen to govern value diversion; we emphasize instead the nature of the legal rules rational and informed shareholders would desire ex ante.¹

In analyzing the effects of value diversion on share value, we do not mean to suggest that all forms of value diversion could be successfully controlled by legal rules. Regulating certain forms of value diversion might involve enormous informational and enforcement costs, far greater than any conceivable benefit of a restrictive legal regime. Such forms of value diversion must effectively be taken for granted. In the case of other forms of value diversion, however, legal restrictions are feasible and, indeed, are commonly observed in practice. (Examples include restrictions on self-dealing and on the taking of corporate opportunities.) Of course, existing restrictions on value diversion may be too strict or not strict enough, and our analysis is motivated in part by the desire to shed light on that question.

Section I of the paper provides the framework for our analysis and describes the first-best

¹ The opting-out question has been extensively debated in the corporate law literature (Bebchuk 1989a; Bebchuk 1989b; Easterbrook and Fischel 1991). The debate over opting-out culminated in a November 1989 symposium issue of the *Columbia Law Review*.

outcome in our model. Section II characterizes optimal managerial contracts in settings without and with value diversion and then provides comparative results under the assumption that value diversion operates as a pure wealth transfer from shareholders to managers. Section III extends the analysis to the case in which value diversion produces benefits for managers in excess of the costs to shareholders. Section IV offers concluding remarks.

I. Framework

The framework for our analysis is the standard principal-agent framework, in which the profit earned by the principal (the shareholders of the firm) is a function of the level of effort exerted by the manager who runs the firm. The manager's effort level e is unobservable and, thus, subject to moral hazard. The firm's profit π is "high" ($\pi = \bar{\pi}$) with probability $P(e)$ and "low" ($\pi = \underline{\pi}$) with probability $1 - P(e)$, where $P(e)$ is increasing and concave in e ($P' \geq 0$, $P'' < 0$). The manager is risk-neutral but wealth-constrained; in particular, we assume that the manager's pay must be at least S_0 whatever the firm's profit level.² The manager has reservation wage W ($> S_0$) and objective function

$$P(e)\bar{I} + (1 - P(e))\underline{I} - e,$$

where \bar{I} is the compensation paid to the manager when the firm's profit is high, \underline{I} is the compensation paid to the manager when the firm's profit is low, and e is the cost of the manager's effort in dollar terms. We denote \underline{I} by S ; \bar{I} may then be written as $S + \alpha\Delta$, where

² Jolls (1995, ch. 3) shows that our results extend to the case of a risk-averse, non-wealth-constrained manager. With risk neutrality, the absence of a minimum wealth constraint would imply that the moral hazard problem in the principal-agent relationship could be solved simply by requiring the manager to make a large up-front payment to the shareholders in return for a residual claim on the firm's profit. For a discussion of alternative bases for the limited managerial wealth assumption, see Levitt and Snyder (1995).

Δ_x is the difference between the high and low profit levels for the firm ($\Delta_x = \bar{\pi} - \underline{\pi}$) and α is the manager's share of that difference.³ A managerial contract in our model is therefore a pair (S, α) , where S may be viewed as the manager's salary--the amount paid to the manager regardless of how the firm does--and α may be viewed as the profit-sharing component of the compensation scheme or, equivalently, the degree to which the manager shares in the firm's gain in moving from low to high profits.

Our addition to the standard principal-agent framework is the prospect of value diversion by the manager. In our model, the manager not only influences the likelihood that the firm realizes the high profit level ($\bar{\pi}$) but also may enjoy some control over how much of the firm's profit actually finds its way into shareholders' hands. Specifically, we imagine that with probability θ (> 0) the manager is able to divert an amount X of the firm's profit, producing benefits of $X + M$ for the manager. The probabilistic nature of the value diversion opportunity in our model reflects the characteristic windfall feature of many forms of value diversion (Scott 1980, 808). The pure transfer case implies $M = 0$; the costs of value diversion to shareholders just equal the benefits to the manager. Meanwhile, $M > 0$ implies that value diversion produces benefits to the manager in excess of the costs to shareholders.

The normative perspective on which we focus is the perspective of maximizing ex ante share value. This is the perspective that those who set up a firm and take it public would adopt; they would want value diversion to be prohibited or permitted according to whether it decreased or increased the initial value of the firm. The focus on ex ante share value is consistent with the normative orientation of the existing law and economics literature on value diversion (see,

³ More generally, \bar{I} may be written as $S + Y$ for any Y . We set $Y = \alpha \Delta_x$ for expositional convenience.

for example, Easterbrook and Fischel 1982). For completeness, however, we also discuss, though more briefly, the desirability of prohibiting versus permitting value diversion from managers' perspective and from the perspective of the shareholder-manager unit.

The first-best outcome in our model is achieved when the manager's effort level e maximizes the expected benefit of effort, $P(e)\bar{\pi} + (1 - P(e))\underline{\pi}$, minus the cost of effort, e . We assume that the difference between the expected benefit and the expected cost of effort at the first-best effort level e^{FB} is greater than or equal to the reservation wage W ; otherwise hiring the manager could never be profitable. We further assume that the benefit-cost difference is greater than or equal to $W - S_0$; this condition follows directly from the prior one if S_0 (the minimum wealth level for the manager) is non-negative. In the first-best environment, the division of surplus between the shareholders and the manager is then determined by the levels of S and α .

In a second-best world, it is not possible to both ensure the choice of the first-best level of effort and maintain complete freedom to adjust the manager's salary and profit share as distributional considerations dictate. As a result of the link between managerial compensation and incentives, value diversion may have significant effects on ex ante share value.

Throughout our analysis of value diversion, we illustrate our general conclusions by reference to a simple numerical example. The probability that the firm's profit is high in the example is given by $P(e) = e^{1/10}$, and the two profit levels are given by $\bar{\pi} = \$2,000,000$ and $\underline{\pi} = \$1,000,000$. The minimum wealth level for the manager is $S_0 = \$0$; the reservation wage is $W = \$300,000$; and the expected value of the amount diverted from the firm if the manager is able to engage in value diversion is $\theta X = \$200,000$.

II. Value Diversion as Pure Wealth Transfer

We begin by comparing restrictive and permissive treatment of value diversion under the assumption that such behavior is a pure transfer of wealth from shareholders to managers. In the pure transfer case, the costs of value diversion to shareholders are just equal to the benefits to the manager ($M = 0$). Section III below examines the case in which the benefits of value diversion to managers exceed the costs to shareholders ($M > 0$). For expositional ease, we focus on two polar approaches to value diversion: absolute prohibition and absolute permission. Our conclusions would be unaffected by a focus instead on the degree of restrictiveness of the legal regime.

A. Managerial Contracts When Value Diversion Is Prohibited.

When value diversion is prohibited, ex ante share value is the difference between the firm's expected profit, $\pi + P(e)\Delta_*$ ($= P(e)\bar{\pi} + (1 - P(e))\underline{\pi}$), and the compensation owed to the manager under the compensation contract (S, α) . The contract design problem involves maximizing ex ante share value subject to incentive compatibility, participation, and minimum wealth constraints for the manager:

$$\begin{aligned} \max_{e, S, \alpha} \quad & \{ \pi + P(e)\Delta_* - S - P(e)\alpha\Delta_* \} \\ \text{s.t.} \quad & e \in \operatorname{argmax} \{ S + P(e)\alpha\Delta_* - e \}; \\ & S + P(e)\alpha\Delta_* - e \geq W; \\ & S \geq S_0. \end{aligned} \tag{1}$$

Standard conditions ensure that a solution to this problem involves a profit share α between zero

and one.⁴ In turn, $\alpha > 0$ implies that the incentive compatibility constraint in (1) (which requires that the choice of e maximize the manager's objective function given α) reduces to the first-order condition $P'(e)\alpha\Delta_x - 1 = 0$, or, equivalently, $e = e(\alpha)$, where $e(\alpha)$ is the effort level defined by the first-order condition. The problem in (1) therefore simplifies to

$$\begin{aligned} \max_{S, \alpha} \quad & \{ \pi + P(e(\alpha))\Delta_x - S - P(e(\alpha))\alpha\Delta_x \} \\ \text{s.t.} \quad & S + P(e(\alpha))\alpha\Delta_x - e(\alpha) \geq W; \\ & S \geq S_0. \end{aligned} \tag{2}$$

The function $e(\alpha)$ is increasing in α ($de/d\alpha = -P'(e(\alpha))/P''(e(\alpha))\alpha > 0$), since higher values of α increase the manager's payoff from working hard and, hence, increase the manager's optimal effort choice.

A managerial contract (S, α) that solves the simplified contract design problem in (2) must involve paying as much of the manager's compensation as possible in the form of profit sharing. Profit-based compensation encourages managerial effort, whereas straight salary payments do not. In our model, if the salary S exceeds the minimum level S_0 , then S can be

⁴ If $\alpha \geq 1$, then the term $P(e)\Delta_x - P(e)\alpha\Delta_x$ in the shareholders' objective function is zero or negative, whereas lowering α to a level slightly below one would cause that term to turn positive. Meanwhile, the level of managerial effort induced by $\alpha \geq 1$ is $e(\alpha)$ defined by $P'(e(\alpha))\alpha\Delta_x = 1$, and at this level of effort the manager's participation constraint is slack, by the assumption that $S_0 + P(e^{FB})\Delta_x - e^{FB} \geq W$ and the fact that the manager's payoff is increasing in $\alpha \geq 1$. So lowering α from any $\alpha \geq 1$ would not violate the participation constraint. Meanwhile, it would have no effect on the minimum wealth constraint. It follows that a solution to (1) cannot have $\alpha \geq 1$.

Likewise, a solution to (1) cannot have $\alpha \leq 0$. At $\alpha \leq 0$, the manager's objective function is everywhere decreasing in e (as $P'(e)\alpha\Delta_x - 1 < 0$), so the manager has no incentive to exert any effort. If α were increased to a level slightly above zero, then the manager's objective function would be maximized at $e(\alpha)$ defined by $P'(e(\alpha))\alpha\Delta_x = 1$, implying that the manager will exert at least some effort. The technical assumptions that $\lim_{e \rightarrow \infty} P'(e) = \infty$ and $\lim_{e \rightarrow \infty} -P''(e) < \infty$ then imply that the value of the shareholders' objective function increases with an increase from $\alpha \leq 0$ to α slightly greater than zero. The manager's payoff also rises with the increase in α , so the increase loosens the participation constraint. Meanwhile, it has no effect on the minimum wealth constraint. It follows that a solution to (1) cannot have $\alpha \leq 0$.

lowered, and α raised, without violating either the participation constraint or the minimum wealth constraint, and this change would increase ex ante share value, implying that the original managerial contract could not have been optimal.⁵ $S = S_0$ in turn implies that the optimal profit share α maximizes the objective function in (2) subject to the participation constraint with $S = S_0$. The participation constraint (with $S = S_0$) is satisfied for all α above a threshold value $\hat{\alpha}$ defined by

$$S_0 + P(e(\hat{\alpha}))\hat{\alpha}\Delta_x - e(\hat{\alpha}) = W.^6$$

It follows that the optimal share α is given by the unconstrained maximand α^* of the objective function in (2) if that value satisfies the participation constraint and by the minimum value that satisfies the participation constraint otherwise:

$$\begin{cases} \alpha^* & \text{if } \alpha^* \geq \hat{\alpha} \\ \hat{\alpha} & \text{otherwise} \end{cases}.$$

Thus, either the manager is paid more than the reservation wage to induce high effort ($\alpha = \alpha^*$), or the manager's profit share is the minimum share permitted by the managerial participation constraint ($\alpha = \hat{\alpha}$). Since $S_0 < W$ by assumption, the minimum share permitted by the participation constraint is positive; the manager must be given at least some share of the firm's profit to attain the reservation wage W .

⁵ Let α' denote the higher level of α under the alternative contract with $S = S_0$, and imagine that α' is chosen so that the manager's expected payoff ($S + P(e(\alpha))\Delta_x - e(\alpha)$) is the same as under the original contract. The change in the manager's expected compensation (given that the expected payoff stays the same) is $e(\alpha') - e(\alpha)$. The change in ex ante share value is then

$$P(e(\alpha'))\Delta_x - P(e(\alpha))\Delta_x - [e(\alpha') - e(\alpha)].$$

This difference is positive, as $e(\alpha') > e(\alpha)$, $d(P(e)\Delta_x - e)/de > 0$ for $e < e^{FB}$, and $e(\alpha) < e^{FB}$ for all $\alpha < 1$. So lowering S and increasing α would increase the value of the objective function in the problem in (2) without violating either the participation constraint or the minimum wealth constraint, as asserted in the text.

⁶ The derivative of the manager's expected payoff with respect to α is $P(e(\alpha))\Delta_x > 0$ (as $P'(e(\alpha))\alpha\Delta_x - 1 = 0$ by the definition of $e(\alpha)$). Thus, if the participation constraint is satisfied at $\hat{\alpha}$, then it must be satisfied at $\alpha > \hat{\alpha}$.

In the numerical example described above, the manager's optimal choice of effort is given by $e(\alpha) = (100,000\alpha)^{1/0.9}$ (solving $P'(e)\alpha\Delta_x - 1 = 0$ for e). The unconstrained maximand α^* of the objective function in (2) is 0.1, while the minimum profit share $\hat{\alpha}$ permitted by the managerial participation constraint is 0.1176. The optimal managerial contract in the example therefore involves $S = S_0 = 0$ and $\alpha = \hat{\alpha} = 0.1176$.

B. Managerial Contracts When Value Diversion Is Permitted.

We now characterize the optimal managerial contract when value diversion is permitted. We then compare this contract to the optimal managerial contract when value diversion is prohibited. As noted above, we begin by focusing on the case in which value diversion is a pure wealth transfer; section III below relaxes that assumption and describes the effects of value diversion in settings in which such behavior produces benefits to managers in excess of the costs to shareholders.

The contract design problem when value diversion (assumed to be a pure wealth transfer) is permitted is:

$$\begin{aligned} \max_{e, S, \alpha} \quad & \{ \pi + P(e)\Delta_x - S - P(e)\alpha\Delta_x - \theta X \} \\ \text{s.t.} \quad & e \in \operatorname{argmax} \{ S + P(e)\alpha\Delta_x - e + \theta X \}; \\ & S + P(e)\alpha\Delta_x - e + \theta X \geq W; \\ & S \geq S_0. \end{aligned} \tag{3}$$

This problem is similar to the problem in (1). The only difference is that the shareholders now get $\pi + P(e)(1 - \alpha)\Delta_x - S - \theta X$ (rather than $\pi + P(e)(1 - \alpha)\Delta_x - S$) of the firm's profit on an expected basis, while the manager now earns $S + P(e)\alpha\Delta_x + \theta X$ (rather than $S + P(e)\alpha\Delta_x$) on

an expected basis. These differences in payoffs reflect the prospect of value diversion by the manager; the shareholders' payoff is now lower by θX , and the manager's higher by that same amount. The additional θX in the manager's expected payoff means that the manager may now earn more than the reservation wage W even when $S = S_0$ and $\alpha = 0$. (In contrast, as noted above, when value diversion is prohibited, the manager earns less than W when $S = S_0$ and $\alpha = 0$.)

Because the problem in (3) differs from the problem in (1) only by constant terms in the objective function and the incentive compatibility and managerial participation constraints, a solution to (3) must have $e = e(\alpha)$, $S = S_0$, and α given by

$$\begin{cases} \alpha^* & \text{if } \alpha^* \geq \tilde{\alpha} \\ \tilde{\alpha} & \text{otherwise} \end{cases},$$

where α^* is the unconstrained maximand of the objective function in (3) and $\tilde{\alpha}$ is the minimum profit share permitted by the managerial participation constraint (with $e = e(\alpha)$ and $S = S_0$) when value diversion is permitted:

$$\tilde{\alpha} = \text{minimum } \alpha (\geq 0) \text{ such that } S_0 + P(e(\alpha))\alpha\Delta_x - e(\alpha) + \theta X \geq W.$$

The unconstrained maximand α^* is the same as above because the objective function in (3) differs from the objective function in (1) only by a constant. However, the minimum profit share $\tilde{\alpha}$ differs from the minimum profit share when value diversion is prohibited; the addition of θX to the manager's compensation when value diversion is permitted reduces the profit share needed to bring the manager up to the reservation wage W . Indeed, when value diversion is permitted, the minimum profit share may be zero; this will occur whenever $S_0 + \theta X \geq W$.

In the numerical example from above, the unconstrained maximand α^* is 0.1, and the minimum profit share permitted by the participation constraint when value diversion is permitted

is $\tilde{\alpha} = 0.0438$. The difference between $\tilde{\alpha}$ and $\hat{\alpha}$ (which is equal to 0.1176 in the numerical example) reflects the additional \$50,000 that the manager gets when value diversion is permitted; a smaller profit share is now needed to bring the manager up to the \$300,000 reservation wage. Because $\alpha^* > \tilde{\alpha}$, the optimal managerial contract when value diversion is permitted has $\alpha = \alpha^* = 0.1$. The manager's profit share is thus equal to the unconstrained maximand α^* . This outcome contrasts with the no value diversion outcome, which involves the minimum share $\hat{\alpha}$ permitted by the managerial participation constraint.

C. Effect of Value Diversion on Ex Ante Share Value.

Our characterization of optimal managerial contracts without and with value diversion permits us to assess the competing claims about value diversion and ex ante share value described in the introduction. Proposition 1 shows that value diversion always reduces ex ante share value when it operates as a pure wealth transfer from shareholders to managers.

Proposition 1: When value diversion is a pure wealth transfer ($M = 0$), permitting such behavior reduces ex ante share value.

Proof: It is useful to distinguish three cases, based on the relationship between α^* , $\hat{\alpha}$, and $\tilde{\alpha}$. The cases considered below exhaust the set of possibilities because, as noted above, $\tilde{\alpha} < \hat{\alpha}$.

Case 1: $\alpha^* \leq \tilde{\alpha} < \hat{\alpha}$. In this case the optimal managerial contract has $\alpha = \hat{\alpha}$ when value diversion is prohibited and $\alpha = \tilde{\alpha}$ when value diversion is permitted. Ex ante share value is $\pi + P(e(\hat{\alpha}))\Delta_x - W - e(\hat{\alpha})$ when value diversion is prohibited and $\pi + P(e(\tilde{\alpha}))\Delta_x - W - e(\tilde{\alpha})$ where value diversion is permitted (substituting $-(W + e(\hat{\alpha}))$ or $-(W + e(\tilde{\alpha}))$ from the managerial participation constraint for the sum of expected compensation payments and value

diversion profits in the shareholders' objective function). The change in ex ante share value with a move from forbidding to permitting value diversion is therefore given by

$$[P(e(\tilde{\alpha}))\Delta_* - e(\tilde{\alpha})] - [P(e(\hat{\alpha}))\Delta_* - e(\hat{\alpha})]. \quad (4)$$

This expression is negative, as $e(\tilde{\alpha}) < e(\hat{\alpha})$, $d(P(e)\Delta_* - e)/de > 0$ for $e < e^{FB}$, and $e(\alpha) < e^{FB}$ for all $\alpha < 1$, where e^{FB} is the first-best effort level defined above. So ex ante share value is lower in the presence of value diversion than in its absence.

Case 2: $\tilde{\alpha} < \alpha^* \leq \hat{\alpha}$. Here the optimal managerial contract has $\alpha = \hat{\alpha}$ when value diversion is prohibited and $\alpha = \alpha^*$ when it is permitted. Ex ante share value is $\pi + P(e(\hat{\alpha}))\Delta_* - W - e(\hat{\alpha})$ when value diversion is prohibited and (since the managerial participation constraint is slack when value diversion is permitted) is less than $\pi + P(e(\alpha^*))\Delta_* - W - e(\alpha^*)$ when value diversion is permitted. The change in ex ante share value with a move from forbidding to permitting value diversion is therefore less than the difference in (4) with $\tilde{\alpha} = \alpha^*$. That difference is negative or zero (as $\alpha^* \leq \hat{\alpha}$), so ex ante share value is again lower in the presence of value diversion than its absence.

Case 3: $\tilde{\alpha} < \hat{\alpha} < \alpha^*$. In this case the optimal managerial contract has $\alpha = \alpha^*$ when value diversion is prohibited and also when it is permitted. Since managerial compensation is not adjusted at all with a move from forbidding to permitting value diversion, ex ante share value falls by θX (the expected cost of value diversion to shareholders) with such a move.

Q.E.D.

Remarks: (1) *Intuition.* Proposition 1 shows that value diversion reduces ex ante share value in spite of shareholders' ability to adjust the manager's direct compensation in response. The intuition for this result is that adjusting managerial compensation to offset profits from value

diversion imposes costs on shareholders due to the incentive effects of such adjustments. If direct compensation could be adjusted by lowering the manager's salary, then managerial incentives would not be affected. However, the manager's salary will already be at the minimum feasible level (S_0) under an optimal managerial contract without value diversion; further decreases are not possible. Adjusting the manager's direct compensation therefore requires lowering the profit share α , as occurs whenever $\alpha^* \leq \hat{\alpha}$ in our model (cases 1 and 2 above). Lowering the profit share lowers the level of effort that the manager will exert, which adversely affects ex ante share value. Lowering α may in fact be so costly that shareholders prefer not to do it; this is the case when $\alpha^* > \hat{\alpha}$ in our model (case 3 above). If α is not adjusted to offset profits from value diversion, then managerial incentives remain at their previous level, but ex ante share value falls by the full amount θX diverted by the manager.

(2) *Example.* The effects of value diversion on ex ante share value in a principal-agent setting may be illustrated by reference to the numerical example developed above. Ex ante share value in the absence of value diversion is given by the value of the objective function in (1) with $e = e(\alpha)$ ($= (100,000\alpha)^{10/9}$), $S = 0$, and $\alpha = 0.1176$ (see sub-section A above). Ex ante share value when value diversion is permitted is given by the value of the objective function in (3) with $e = e(\alpha)$, $S = 0$, and $\alpha = 0.1$ (see sub-section B). The difference in ex ante share value between the two settings is \$199,746, which represents the reduction in ex ante share value when value diversion is permitted.

In the numerical example, the relationship between α^* , $\hat{\alpha}$, and $\tilde{\alpha}$ is given by $\tilde{\alpha} < \alpha^* \leq \hat{\alpha}$ (case 2 above). If, however, the reservation wage were $W = \$500,000$ instead of $W = \$300,000$, then the minimum profit share permitted by the managerial participation constraint when value diversion is prohibited would be $\hat{\alpha} = 0.1863$, and the minimum share when value

diversion is permitted would be $\tilde{\alpha} = 0.1176$. (The unconstrained maximand α^* would be unaffected.) Thus, the relationship between α^* , $\hat{\alpha}$, and $\tilde{\alpha}$ would be given by $\alpha^* \leq \tilde{\alpha} < \hat{\alpha}$ (case 1 above). The optimal managerial contract would involve $\alpha = \hat{\alpha}$ when value diversion is prohibited and $\alpha = \tilde{\alpha}$ when value diversion is permitted. Ex ante share value in the absence of value diversion would be given by the value of the objective function in (1) with $e = e(\alpha)$, $S = 0$, and $\alpha = 0.1863$, and ex ante share value in the presence of value diversion by the value of the objective function in (3) with $e = e(\alpha)$, $S = 0$, and $\alpha = 0.1176$. The reduction in ex ante share value with a move from forbidding to permitting value diversion would be \$126,439.

Likewise, if the reservation wage were $W = \$100,000$ instead of $W = \$300,000$, then the minimum profit share permitted by the managerial participation constraint when value diversion is prohibited would be $\hat{\alpha} = 0.0438$, and the minimum profit share when value diversion is permitted would be $\tilde{\alpha} = 0$, implying $\tilde{\alpha} < \hat{\alpha} < \alpha^*$ (case 3 above). Managerial compensation would not be adjusted at all with a move from forbidding to permitting value diversion. Ex ante share value when value diversion is prohibited would be given by the value of the objective function in (1) with $e = e(\alpha)$, $S = 0$, and $\alpha = 0.1$; ex ante share value when value diversion is permitted would be given by the value of the objective function in (3) with the same parameter values. The reduction in ex ante share value with value diversion would therefore be \$200,000 ($= \theta X$).

D. Magnitude of the Value Diversion Effect.

Our next result relates the magnitude of the fall in ex ante share value with value diversion to the amount of the firm's profit that the manager is able to divert.

Proposition 2: When value diversion is a pure wealth transfer ($M = 0$), the reduction in ex ante share value with value diversion is an increasing function of the expected transfer θX .

Proof: The size of the expected transfer θX has no effect on the optimal managerial contract when value diversion is prohibited. It may, however, affect the optimal managerial contract when value diversion is permitted, and it is useful to distinguish two cases on that basis.

Suppose first that $\tilde{\alpha} < \alpha^*$ (cases 2 and 3 in the proof of proposition 1). An increase in θX then has no effect on the optimal managerial contract when value diversion is permitted, as the manager's profit share is already above the minimum share permitted by the managerial participation constraint. The change in ex ante share value with a move from forbidding to permitting value diversion, for a given θX , is

$$P(e(\alpha^*))(1 - \alpha^*)\Delta_* - \theta X - P(e(\hat{\alpha}'))(1 - \hat{\alpha}')\Delta_*,$$

where $\hat{\alpha}' = \max < \alpha^*, \hat{\alpha} >$ is the manager's profit share under an optimal managerial contract when value diversion is prohibited. It follows that as θX increases, the change in ex ante share value when value diversion is permitted falls (becomes more negative).

Suppose now that $\tilde{\alpha} \geq \alpha^*$ (case 1 above); the managerial participation constraint now binds when value diversion is permitted, so increasing θX reduces the manager's profit share under an optimal managerial contract (either to a new value of $\tilde{\alpha}$ or to the unconstrained maximand α^*). Substituting for expected compensation payments and value diversion profits in the shareholders' objective function, the change in ex ante share value with a move from forbidding to permitting value diversion, for a given θX , is less than or equal to

$$[P(e(\tilde{\alpha}'))\Delta_* - e(\tilde{\alpha}')] - [P(e(\hat{\alpha}))\Delta_* - e(\hat{\alpha})],$$

where $\tilde{\alpha}' = \max < \alpha^*, \tilde{\alpha} >$ is the manager's profit share under an optimal managerial contract

when value diversion is permitted. This difference gets smaller (equivalently, more negative) as $\tilde{\alpha}'$ shrinks, which occurs as θX rises. Q.E.D.

Remark: As an illustration of the result in proposition 2, consider again the numerical example from above. Suppose that the expected value that the manager is able to divert from the firm increases from $\theta X = \$200,000$ to $\theta X = \$300,000$. Since $\tilde{\alpha} < \alpha^*$, the optimal managerial contract when value diversion is permitted does not change; the only effect of the increase in θX is that \$100,000 less of the firm's profit ends up in shareholders' hands. The reduction in ex ante share value with a move from forbidding to permitting value diversion is therefore greater with $\theta X = \$300,000$ than with $\theta X = \$200,000$.

E. Managerial Payoffs and Shareholder-Manager Welfare.

1. Effect of Value Diversion on Managerial Payoffs.

Propositions 1 and 2 above show that value diversion, operating as a pure wealth transfer, reduces ex ante share value and does so to a larger degree when the magnitude of the expected transfer (θX) is greater. These conclusions suggest that even within the analytical framework employed by much of the law and economics literature on value diversion, the traditional legal presumption against such behavior is appropriate. In principal-agent settings, adjusting managerial compensation in response to value diversion is costly for shareholders (sometimes so costly that shareholders prefer to do nothing in response). Permitting value diversion reduces ex ante share value as a result.

Permitting value diversion may have a partially offsetting effect on the manager's expected payoff, however. First, if $\alpha^* \leq \tilde{\alpha} < \hat{\alpha}$ (case 1 above), then the managerial participation constraint binds when value diversion is prohibited and also when it is permitted,

so the manager's expected payoff is W in either case (value diversion has no offsetting effect). Second, if $\tilde{\alpha} < \alpha^* \leq \hat{\alpha}$ (case 2 above), then the managerial participation constraint binds when value diversion is prohibited but is slack when value diversion is permitted, so the manager's expected payoff is equal to W in the former environment and is greater than W in the latter environment. Finally, if $\tilde{\alpha} < \hat{\alpha} < \alpha^*$ (case 3 above), then the manager's profit share is $\alpha = \alpha^*$ both when value dimension is permitted and when it is prohibited, so the manager's expected payoff is higher by θX when value diversion is permitted. The manager's expected payoff is therefore either the same (case 1) or greater (cases 2 and 3) when value diversion is permitted than when it is prohibited.

2. Effect of Value Diversion on Shareholder-Manager Welfare.

As noted above, the normative focus of the existing law and economics literature on value diversion, and hence the normative focus of our analysis, is the maximization of ex ante share value. The foregoing discussion suggests, however, that permitting value diversion may increase the manager's payoff, even as it decreases share value. A natural question to ask, then, is whether the increase in the manager's payoff could ever exceed the fall in share value; if it could, then permitting value diversion might enhance the joint welfare of shareholders and managers, in spite of hurting shareholders as a group.

In fact, the increase in the manager's expected payoff with value diversion will never exceed the reduction in ex ante share value. If $\alpha^* \leq \hat{\alpha}$ (cases 1 and 2 above), then managerial effort falls from $e(\hat{\alpha})$ to $e(\tilde{\alpha}')$, where $\tilde{\alpha}' = \max < \alpha^*, \tilde{\alpha} >$ is the manager's profit share when value diversion is permitted, with a move from forbidding to permitting such behavior. The reduction in effort moves the firm further away from the first-best ($e(\tilde{\alpha}') < e(\hat{\alpha}) < e^{FB}$) and

therefore reduces the joint welfare of the shareholder-manager unit. Meanwhile, if $\alpha^* > \hat{\alpha}$ (case 3 above), then managerial effort is the same ($e(\alpha^*)$) whether value diversion is forbidden or permitted, so the joint welfare of the shareholders and the manager is the same in both environments. Thus, although the manager's expected payoff may rise when value diversion is permitted, the welfare of the shareholder-manager unit either falls or, at best, remains at the same level as before.

III. Efficiency Benefits from Value Diversion

The analysis in section II assumed that value diversion operates as a pure wealth transfer, imposing costs on shareholders equal to the benefits for managers. In some settings, however, value diversion may cost shareholders less than it benefits managers ($M > 0$ rather than $M = 0$). This section analyzes such settings. With $M > 0$, there is a possible counterweight to the costs of value diversion identified above; the behavior produces independent efficiency benefits, perhaps because it yields desirable incentive effects (Easterbrook and Fischel 1982). Nevertheless, permitting value diversion reduces ex ante share value unless the countervailing efficiency benefits reach a threshold level identified by our analysis. Furthermore, permitting value diversion reduces ex ante share value regardless of the magnitude of the efficiency benefits if the manager is paid more than the reservation wage W to induce managerial effort when value diversion is prohibited.

A. Managerial Participation Constraint Binds.

We begin by considering the case in which the manager is not paid more than the reservation wage when value diversion is prohibited; the managerial participation constraint

binds under an optimal managerial contract. This case corresponds to cases 1 and 2 in the analysis of section II.

Proposition 3. If the managerial participation constraint binds under an optimal managerial contract when value diversion is prohibited, then permitting value diversion reduces ex ante share value if the difference θM between the expected benefits and the expected direct costs of the behavior to shareholders satisfies

$$\theta M < [P(e(\hat{\alpha}))\Delta_{\star} - e(\hat{\alpha})] - [P(e(\tilde{\alpha}'))\Delta_{\star} - e(\tilde{\alpha}')], \quad (5)$$

where $\tilde{\alpha}' = \max \langle \alpha^*, \tilde{\alpha} \rangle$.

Proof. Since the managerial participation constraint binds under an optimal managerial contract when value diversion is prohibited, the manager's profit share is $\alpha = \hat{\alpha}$, and ex ante share value is $\pi + P(e(\hat{\alpha}))\Delta_{\star} - W - e(\hat{\alpha})$. Meanwhile, when value diversion is permitted, the manager's profit share is $\alpha = \tilde{\alpha}'$, and ex ante share value is less than or equal to $\pi + P(e(\tilde{\alpha}'))\Delta_{\star} - W - e(\tilde{\alpha}') + \theta M$. Therefore, a sufficient condition for lower ex ante share value when value diversion is permitted than when it is prohibited is

$$P(e(\tilde{\alpha}'))\Delta_{\star} - e(\tilde{\alpha}') + \theta M < P(e(\hat{\alpha}))\Delta_{\star} - e(\hat{\alpha}).$$

Rearranging this inequality yields the condition in (5).

Q.E.D.

Remarks. (1) *Intuition.* The intuition for the result stated in proposition 3 is as follows. If the managerial participation constraint binds under an optimal managerial contract when value diversion is prohibited, then moving to an environment in which such behavior is permitted induces shareholders to reduce the degree of managerial profit sharing (measured by α) to either α^* or $\tilde{\alpha}$. This reduction drives managerial effort further away from the first best level e^{FB} . If

the cost of the reduction in effort exceeds the efficiency benefits from value diversion (given by θM), then ex ante share value will fall. The condition that the cost of the reduction in effort exceed the efficiency benefits from value diversion is precisely the condition in (5). Since $\hat{\alpha} > \bar{\alpha}'$, the right-hand side of (5) is positive, implying that θM must be not only positive but also sufficiently large in magnitude to outweigh the costs imposed by value diversion.

(2) *Example.* The effect of value diversion on ex ante share value in the case examined in proposition 3 may be illustrated by reference to the earlier numerical example. Imagine that value diversion now benefits the manager by \$300,000 (\$100,000 more than above) while imposing costs of \$200,000 on shareholders. The unconstrained maximand is $\alpha^* = 0.1$; the minimum profit share permitted by the managerial participation constraint when value diversion is prohibited is $\hat{\alpha} = 0.1176$; and the minimum share permitted by the managerial participation constraint when value diversion is permitted is $\bar{\alpha} = 0$ (the manager gets the full reservation wage of \$300,000 just from diverting value from the firm). The optimal managerial contract therefore involves $\alpha = \hat{\alpha}$ when value diversion is prohibited and $\alpha = \alpha^*$ when value diversion is permitted. Ex ante share value is given by the value of the objective function in (1) with $e = e(\alpha)$, $S = 0$, and $\alpha = 0.1176$ when value diversion is prohibited and by the value of the objective function in (3) with $e = e(\alpha)$, $S = 0$, and $\alpha = 0.1$ when value diversion is permitted. The reduction in ex ante share value when value diversion is permitted is \$199,746.

B. Managerial Participation Constraint Is Slack.

We now consider the case in which the managerial participation constraint does not bind under an optimal managerial contract when value diversion is prohibited. Here the manager is paid more than the reservation wage to induce managerial effort. This case corresponds to case

3 in the analysis of section II.

Proposition 4. If the managerial participation constraint does not bind under an optimal managerial contract when value diversion is prohibited, then permitting value diversion always reduces ex ante share value.

Proof. If the managerial participation constraint does not bind under an optimal managerial contract when value diversion is prohibited, then the manager's profit share when value diversion is prohibited is $\alpha = \alpha^*$, which implies $\alpha^* > \hat{\alpha}$ and, hence, $\alpha^* > \tilde{\alpha}$. The manager's profit share under an optimal managerial contract when value diversion is permitted is therefore $\alpha = \alpha^*$ as well. The difference in ex ante share value between the environment in which value diversion is permitted and the environment in which it is prohibited is thus $-\theta X$, which is always negative. Q.E.D.

Remark. Intuitively, when managers are paid more than their reservation wage to induce them to exert effort on shareholders' behalf, permitting value diversion causes no adjustment in their other compensation. Ex ante share value therefore falls by the full expected transfer θX , regardless of the magnitude of the efficiency benefits of value diversion.

Our results suggest that value diversion often reduces ex ante share value even when it costs shareholders less than it benefits managers. It follows that assigning to shareholders a right that managers value more highly (for example, the right to take business opportunities of the firm) need not reduce ex ante share value; it may well enhance it. Higher value of the right in managers' hands does not imply that the right belongs in those hands if the goal is maximizing ex ante share value.

C. Managerial Payoffs and Shareholder-Manager Welfare.

Permitting value diversion, even when it imposes direct costs on shareholders less than the benefits to managers, may also be undesirable from the perspective of maximizing joint shareholder-manager welfare. To be sure, assigning the right to the manager in our model (i.e., permitting value diversion) will often increase the manager's expected payoff. In the case considered in proposition 3 (in which the managerial participation constraint binds under an optimal managerial contract when value diversion is prohibited), the manager's expected payoff increases with value diversion if the optimal profit share when value diversion is permitted is α^* , and it is unchanged if the optimal profit share when value diversion is permitted is $\tilde{\alpha}$. Meanwhile, in the case considered in proposition 4 (in which the managerial participation constraint does not bind under an optimal managerial contract when value diversion is prohibited), permitting value diversion does not produce any offsetting adjustment in the manager's direct compensation, so the manager's expected payoff increases by θX . In either case, however, the increase in the manager's expected payoff may be insufficient to offset the decrease in ex ante share value. In the case considered in proposition 3, managerial effort falls from $e(\hat{\alpha})$ to $e(\tilde{\alpha}')$, where $\tilde{\alpha}' = \max \langle \alpha^*, \tilde{\alpha} \rangle$, with the move from prohibiting to permitting value diversion, and the decrease in effort moves the firm further away from the first-best. The cost of the reduction in managerial effort from the standpoint of the shareholder-manager unit is $[P(e(\hat{\alpha}))\Delta_x - e(\hat{\alpha})] - [P(e(\tilde{\alpha}'))\Delta_x - e(\tilde{\alpha}')]$, and this cost exceeds the efficiency benefits of value diversion whenever the inequality in proposition 3 holds. On the other hand, in the case considered in proposition 4, managerial effort is $e(\alpha^*)$ whether value diversion is prohibited or permitted, so the only effect of permitting the behavior is to transfer a right to the party who

values it most highly. In that case, permitting value diversion enhances the joint welfare of the shareholders and the manager, due to shareholders' failure to attempt to mitigate their losses from value diversion by adjusting managerial compensation in response.

IV. Conclusion

A common view in the law and economics literature is that managerial value diversion either has no effect on ex ante share value or actually enhances shareholder wealth as a result of independent efficiency benefits of such behavior. This paper questions that common view. We show that even within the analytical framework employed by proponents of this view, permitting value diversion often reduces ex ante share value. Share value always falls when value diversion is a pure wealth transfer, and it also falls when value diversion generates independent efficiency benefits if managers are paid more than the reservation wage to induce managerial effort when value diversion is prohibited. Share value may also fall if managers are paid the reservation wage when value diversion is prohibited; it is certain to fall if the efficiency benefits of value diversion are below the threshold level identified by our analysis. The effects of value diversion in a principal-agent setting therefore provide support for the traditional legal presumption against such behavior.

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