Business Strategy, Human Capital, and Managerial Incentives

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We posit that the value of a manager's human capital depends on the firm's business strategy. The resulting interaction between business strategy and managerial incentives affects the organization of business activities. We illustrate the impact of this interaction on firm boundaries in a dynamic agency model. There may be disadvantages in merging two firms even when such a merger allows the internalization of externalities between the two firms. Merging, by making unprofitable certain decisions, increases the cost of inducing managerial effort. This incentive cost is a natural consequence of the manager's business-strategy-specific human capital.

1. Introduction

Much has been written about mergers and takeovers: even though many of them are thought to increase the firms' value, they often are resisted

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by managers. This resistance typically is explained through an appeal to agency problems and the managers' concern about changes in the firm(s). In this paper, we show that the opposite can occur: a merger may be desired by managers even though—indeed, because—a merger leads to changes in firm behavior.

To fix ideas, consider the effects of a merger between the American television networks CBS and ABC. There is strong "late-night" competition among CBS, ABC, and the third major network, NBC. Two of the networks, CBS and NBC, compete via entertainment shows (*The Late Show* with David Letterman and *The Tonight Show* with Jay Leno, respectively), while ABC broadcasts a "highbrow" news program *Nightline*, featuring Ted Koppel. It commonly is believed that the entertainment programs are substantially more profitable than the news program, and as a consequence, there are recurrent rumors that the news program might be replaced by a program that is more entertainment oriented.[1] Replacing or reorienting the program likely would have several effects. First, the combined profit of the three networks would decrease if the reduction in variety offered results in a smaller number of viewers of all networks combined. Second, the producer of *Nightline* could see a decline in the value of his human capital. He currently has a relationship with a large number of people who can be called upon to provide expertise for a wide variety of topics that might be covered on the program. Those relationships have dramatically lower value should ABC make a strategic change and reorient the news program to include more entertainment content.

The possible destruction of some of his human capital may provide the producer of *Nightline* an incentive, above and beyond any direct financial incentives, to make that program a success. The incentive is operative whenever it is optimal for the network to reorient *Nightline* after sufficiently low ratings. The threat of reorientation thus reduces the cost to ABC of inducing any given effort level from the producer.

We turn now to the effect of a merger of ABC with one of the other networks, say CBS. There is an obvious advantage of such a merger, namely the internalization of externalities. In the absence of any merger, by maximizing its stand-alone profits, each network ignores any cannibalization of the other network's audience. After a merger, cannibalization is taken into account, and any decision will maximize the joint profits of the two networks. For example, if ABC reoriented *Nightline*, ABC well might see its profits increase, but at least some of

1. Indeed, in February–March 2002, ABC tried to lure Letterman from CBS. A detailed discussion can be found in the articles "How ABC's Full-Court Press Almost Landed Letterman" and "Doubted as Business, Valued as Asset, Network News Will Be Hard to Displace," both in *the New York Times*, March 18, 2002, page C1.

the increase in profits likely would come from the rival networks. If the combined profit of ABC and CBS was reduced by such a reorientation, a merged firm would take this into account and would not reorient *Nightline*. But in this case, the producer of *Nightline* need not worry (or not worry as much) about a decrease in the value of his human capital in the event that the program performs poorly. The implicit (credible) threat that the program will be reoriented following poor performance has vanished, and consequently, direct financial incentives must be increased to induce the premerger effort level.

Whether or not a merger between ABC and CBS would create value and whether or not the producer has an incentive to resist it depends, *inter alia*, on the business-plan specificity of the human capital of Nightline's producer and the externality that any change in business strategy would exert on the other firm. This is illustrated in Figure 1. If the negative externality of a reorientation of Nightline's program on CBS is sufficiently small (region I), a merger between ABC and CBS would have no incentive effects on the producer of Nightline: even after the merger, the joint owner still would want to reorient the program following poor performance. On the other hand, if the cannibalization is sufficiently large (regions II and III), the negative externalities are sufficiently large that after a merger, reorientation no longer will be a viable option. In region II the costs to the firm from the diminution

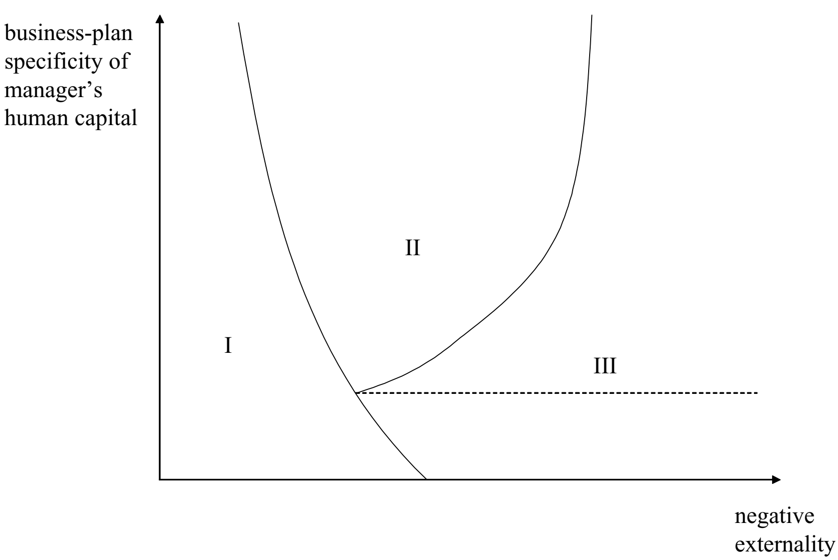

FIGURE 1. THE PROFITABILITY OF A MERGER

of managerial incentives caused by a merger outweigh the benefits of internalizing externalities. Here, the merger is unprofitable from the owner's point of view, although *Nightline*'s producer would benefit from it (for any given compensation scheme in place) since it eliminates the threat of reorientation. While unlikely, the reverse is conceivable as well: if a reorientation of the program were to increase, in fact, the value of the producer's human capital, the merger could be profitable and yet resisted by the producer because it would not lead to the (in this case desired) change in business plan; this would occur in region III below the hatched line.

At a more general level, the value jointly created by a firm and its workers depends upon the attributes of both the firm and the workers. Workers' attributes include their knowledge and various skills (human capital), and the firm attributes include both physical capital and business strategy (for example, product pricing, mix, and positioning). A worker's value to the firm (and hence her compensation) depends upon the degree of complementarity between her attributes and those of the firm. The literature typically has taken the attributes of the firm as either exogenous or determined before the worker is hired. However, firms do change their attributes over time, resulting in changes to the value of workers' human capital. The resulting interaction between firms' attribute choices and workers' incentives affects the organization of business activities, both the internal organization of the firm and the determination of firm boundaries.

A worker's human capital often is described as being firm specific when it complements the firm's attributes and when there are no close substitutes for the current employer. There has been considerable interest in the implications of firm-specific human capital on the holdup problem and, more recently, on the determination of the degree of specificity.[2] Since firms choose attributes, both the complementarity of a worker's human capital with firm attributes and the existence of close substitutes for the firm are endogenous.[3] We investigate the effect of the endogenous determination of a firm's attributes *over time* on managerial incentives in the presence of moral hazard. This impact is distinct from any holdup problem.

2. Lazear (2003) argues there are no convincing examples of firm-specific human capital, in the sense of human capital that only has value in a particular firm. He proposes an alternative approach in which workers have a portfolio of skills, and different firms differentially value different portfolios of skills (presumably due to different firm attributes). Such an approach complements our view that firm choice of attribute—in particular, business strategy—affects the value of workers' human capital.

3. Cole et al. (2001a, 2001b) and Felli and Roberts (2002) discuss the implications of this endogeneity for the holdup problem.

The optimality of any business strategy for a firm will depend upon many aspects of a firm. Changes in the structure of a firm (such as a merger) will affect the optimality of various business strategies. Since changes in business strategy alter the effectiveness of workers' human capital within the firm, such changes in the structure of the firm affect the optimal contracts within the firm. We illustrate and discuss the incentive effects that accompany such redeployment in the context of a merger between firms that allows for the internalization of externalities. While we focus on negative incentive effects, positive incentive effects also are possible.

We present the dynamic agency model in the next section and demonstrate the differences in the optimal contracts under different organizational structures. In section 3, we discuss related literature and then conclude, in section 4, with a general discussion.

2. Dynamic Agency

2.1 The Model

We first describe a dynamic principal–agent relationship in which the owner ignores any externalities. The manager exerts either high (H) or low (L) effort in each of two periods. At the end of each period, there is a binary signal stochastically related to that period's effort. We interpret the signal in period t, denoted y_t, as indicating the *success*, s, or *failure*, f, of that period's project. At the end of the first period, and knowing the realization of y_1, the owner either maintains the current business strategy (i.e., continues with the status quo) or introduces a new one. We refer to the former choice as the *passive action* and to the second as the *active action* (we also say that the owner is passive or active). The generic action is denoted $\alpha \in \{p, a\}$, with p denoting the passive action and a the active action. The manager knows whether the owner is active or passive when making his second-period effort choice.

The manager has *business-strategy-specific human capital*, in that the effectiveness of his human capital depends on the owner's strategy. Specifically, we assume the manager is more effective under the current business strategy than under the new business strategy. For example, part of the manager's human capital is his knowledge of current business practices, which may diminish drastically for some changes in strategy. A manager of a firm who has a personal relationship with all the major customers of the firm will be less valuable if the firm decides to have all sales done on the web or if the firm decides to outsource the marketing of the product. We assume success in the first period and

TABLE I.
PROBABILITY OF SUCCESS

e	Period 1 ρ_e	Period 2 passive, ρ_e^p	Period 2 active, ρ_e^a
low effort	0.3	0.3	0.1
high effort	0.9	0.9	0.7

TABLE II.
FIRM'S RETURNS

	Return $\pi(y_1 y_2 \vert \alpha)$			
	outcomes ff	outcomes fs	outcomes sf	outcomes ss
action (α)				
passive (p)	50	350	350	650
active (a)	50	450	200	600

in the second period are independent, and the respective probabilities, ρ_e, ρ_e^p, and ρ_p^a, are presented in Table I.

The determination of equilibrium contracts depends only on total returns and not the time profile of their accrual. These returns are illustrated in Table II. Finally, both agents are risk neutral, with the manager's disutility of high effort in any period given by 120.

For convenience of interpretation, however, we may think of the returns as follows: The action of the owner at the end of the first period affects first- as well as second-period returns. For example, the choice to be active (introduce a new business strategy) may require immediate asset reallocations by the owner. In the returns of Figure 2, we assume the new business strategy increases first period returns if the first signal is a failure. At the same time, the new business is riskier in that the payoffs are more extreme in the second period than under the original business strategy.

As in the standard moral hazard model, the effort level chosen by the manager is noncontractible. However, the outcome of each project (whether it was a failure or success) is observable to both the owner and manager and is verifiable to third parties. Crucially, we assume that the owner's action at the interim stage is both *ex-post* as well as *ex-ante* noncontractible.[4] This is similar to Aghion et al. (2001) and differs

4. This requires that the final payoffs to the firm are nonverifiable.

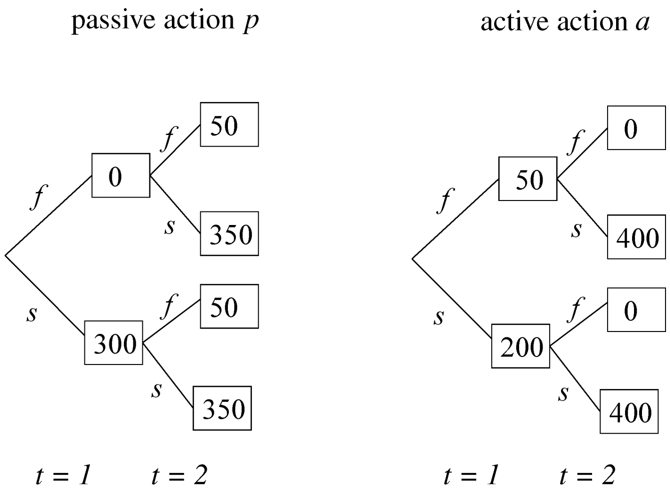

FIGURE 2. THE TIME PROFILE OF THE FIRM'S RETURN

from the Grossman-Hart-Moore models of incomplete contracts, where certain actions are *ex-ante* noncontractible but are *ex-post* contractible. This implies that in any contract, wages can only be a function of the realizations of the signals in the two periods, y_1 and y_2; wages cannot depend on the action of the owner.

The manager's compensation (or wage) is denoted by $w(y_1y_2)$. The manager has *limited liability*, so $w(y_1y_2) \geq 0$ for all y_1 and y_2. The owner's payoff is

$$\pi(y_1 y_2 \mid \alpha) - w(y_1 y_2),$$

and the payoff of the manager is

$$w(y_1 y_2) - c(e_1) - c(e_2),$$

where $e_t \in \{L, H\}$ is the effort in period t and where $c(L) = 0$ and $c(H) = 120$.

We now calculate the owner's optimal take-it-or-leave-it offer $w(y_1y_2)$ to her manager. It is straightforward that the owner optimally pays the manager just enough to induce him to exert high effort in both projects. Moreover, the owner will take the passive action, p, in the event of success of the first project and the active action, a, in the event of failure.

To induce high effort in the second project, the owner optimally offers the minimum possible compensation in case the project turns out to be a failure. That is, $w(ff) = w(sf) = 0$. For the manager to exert high effort in the second project, wages in the event of success in the second period, $w(y_1 s)$, have to satisfy the following incentive constraints:

$$\rho_H^p w(ss) - c(H) \geq \rho_L^p w(ss), \tag{1}$$

and

$$\rho_H^a w(fs) - c(H) \geq \rho_L^a w(fs). \tag{2}$$

To provide optimal incentives for the first agency problem, the owner offers, in the event of failure in the first period, the minimum possible wage consistent with the incentive constraint of the second agency problem,

$$w(fs) = \frac{c(H)}{\rho_H^a - \rho_L^a} = \frac{120}{0.7 - 0.1} = 200.$$

It remains to determine the wage payment when both signals are successful. The wage $w(ss)$ will be chosen to satisfy the following incentive constraint (for the first agency problem) with equality:[5]

$$\begin{aligned} &\rho_H \rho_H^p w(ss) + (1 - \rho_H)\rho_H^a w(fs) - c(H) \\ &\quad \geq \rho_L \rho_H^p w(ss) + (1 - \rho_L)\rho_H^a w(fs). \end{aligned} \tag{3}$$

This wage thus is given by

$$\begin{aligned} w(ss) &= \frac{c(H)}{(\rho_H - \rho_L)\,\rho_H^p} + \frac{\rho_H^a}{\rho_H^p} w(fs) \\ &= 3400/9 \approx 377.78. \end{aligned}$$

It is useful to calculate the optimal wage contract *assuming* the owner is passive after any realization of the first-period signal. We denote this wage by $\hat{w}$. As in (3), it is immediate that

$$\hat{w}(ff) = \hat{w}(sf) = 0$$

and

$$\hat{w}(fs) = \frac{c(H)}{\rho_H^p - \rho_L^p} = \frac{120}{0.9 - 0.3} = 200.$$

Turning to the wage $\hat{w}(ss)$, we have

$$\hat{w}(ss) = \frac{c(H)}{(\rho_H - \rho_L)\,\rho_H^p} + \hat{w}(fs) = \frac{3800}{9} \approx 422.22.$$

5. Since the manager will exert high effort in the second period irrespective of the realization of the first-period signal, the disutility of second-period high effort can be ignored.

Note that (second-period) high effort is less effective with an active owner. If a first-period signal of f results in the owner being active, the opportunity cost of low effort in the first period is not only an increase in the probability of a first period signal of f but also is a reduction in the effectiveness of second-period effort and so is a further reduction in expected wages. On the other hand, if the owner is necessarily passive, this further reduction in expected wages from first-period low effort does not occur, and consequently the wage after ss must be increased to obtain the same incentive effect.

For future reference, the expected payoff to the owner under the wage w is

$$\begin{aligned}
&\rho_H\{\rho_H^p(\pi(ss \mid p) - w(ss)) + (1 - \rho_H^p)(\pi(sf \mid p) - w(sf))\}\\
&\quad + (1 - \rho_H)\{\rho_H^a(\pi(fs \mid a) - w(fs)) + (1 - \rho_H^a)(\pi(ff \mid a) - w(ff))\}\\
&= 271,
\end{aligned}$$

while the expected payoff for a necessarily passive owner, i.e., the expected payoff under $\hat{w}$, is 230.

2.2 Internalizing the Externality

The choice of business strategy by the owner has implications for economic agents other than the manager. For example, a rival firm may be hurt by a new business strategy. Again, to keep things simple we assume that the new business strategy imposes a negative externality of 200 on another firm. Under separate ownership, the owner ignores this externality, as described previously offers the wage contract w to the manager, and after a negative first-period signal introduces the new business strategy.

We now consider the impact of joint ownership (where the two firms have the same owner) on both the manager and the owner of the firm. Note that, as in Grossman and Hart (1986), the ownership structure does not affect the set of variables upon which can be contracted. Ownership only changes the identity of the individual who has residual rights of control.

Joint ownership implies that the negative externality the active action imposes on the other firm will be internalized. Intuitively, the new business strategy is less attractive under joint ownership than under separate ownership. For the problem at hand, this will imply that joint ownership cannot replicate the outcome under separate ownership.

Suppose the owner offers the manager the wage contract w. After a negative first-period signal, the owner must decide between the passive and active actions. Denote by V the value of the second firm when the owner is passive. This value V is assumed to be independent of the ownership structure.[6] The expected payoff from the active choice (which is what the owner would do in the absence of the externality) then is given by

$$\rho_H^a(\pi(fs \mid a) - w(fs)) + (1 - \rho_H^a)(\pi(ff \mid a) - w(ff)) + V - 200 = V - 10,$$

while the expected payoff from being passive is

$$\rho_H^p(\pi(fs \mid p) - w(fs)) + (1 - \rho_H^p)(\pi(ff \mid p) - w(ff)) + V = V + 140.$$

(The payment of 200 after fs is sufficient to obtain high effort in the second period, irrespective of the action choice of the owner.)

Thus, the manager faced with a wage contract of w does not exert high effort in the first-period [since $w(ss) < \hat{w}(ss)$]. Consequently, the owner offers the manager the wage contract $\hat{w}$, always chooses the passive action, and since there is no externality from passive behavior, the expected payoff is

$$230 + V.$$

Under separate ownership, the firm imposes a negative externality on the other firm if and only if the first-period signal is negative. The expected value of the externality is thus $(1 - \rho_H)(-200) = -20$. The combined value of the two firms under separate ownership then is given by

$$271 + V - 20 = 251 + V,$$

and so the internalization of the externality results in a lower total value.

The prospect of the active (instead of the passive) action in the event of failure motivates the manager to exert high effort as it reduces the rent the manager can ensure himself in the continuing relationship with the owner. In this sense, the active action acts as a disciplining device. However, the active action no longer is credible under joint ownership. It follows that the manager must be paid more under joint ownership (if the owner wants him to exert high effort)—which more than outweighs the potential gain from joint ownership.

Observe that the merger will not occur, although it is "efficient" in that the sum of the managers' and owners' payoffs is higher under joint ownership than under separate ownership. This inefficiency arises because of noncontractibilities.

6. This assumption easily can be relaxed. For instance, our conclusion would be unchanged if both firms are symmetric. In this case, V would be higher under separate ownership than under joint ownership.

As pointed out in section 1, the profitability of the merger and the manager's incentive to resist it depend on the business-plan specificity of the manager's human capital and on the magnitude of the (negative) externality the active action imposes on the other firm. To illustrate these effects, it may be helpful to parameterize our model as follows. Let x denote the negative externality that a imposes on the other firm. The effect of the business-plan specificity of the manager's human capital can be captured by varying $r^a \equiv \rho_H^a/\rho_L^a$, holding fixed $\rho_H^a - \rho_L^a = \rho_H^p - \rho_L^p = 0.6$. If $r^a > \rho_H^p/\rho_L^p = 3$, the manager prefers the passive action to the active action, for any given compensation scheme. The reverse is true if $r^a < 3$.

As Figure 1 illustrates, if the negative externality x is sufficiently small, as in region I, the merger has no effect at all: the owner continues to choose a even after failure of the first-period project. For intermediate values of x (region II), the incentive costs of the merger outweigh the internalization of externalities, and the merger is unprofitable. Only if x is sufficiently large (as in region III) will the merger be profitable from the owner's point of view. In region III below the hatched line, $r^a < 3$, and so the manager actually would prefer the active action to the passive action (for any wage contract in place), but a merger would imply that the active action never is taken. In the numerical example just discussed, $r^a = 7$ and $x = 200$, and so we are in region II: the merger is unprofitable and yet would be welcomed by the manager (holding fixed his compensation scheme).

3. Related Literature

While our focus is on the interaction between a firm's attribute choices and managerial incentives, there is a literature related to our merger application. Seminal work on the boundaries of the firm include Williamson (1975, 1985), Klein et al. (1978), Grossman and Hart (1986), and Hart and Moore (1990). Hart (1995) provides a nice survey of this literature. The main insight of the modern property rights approach, pioneered by Grossman and Hart (1986), is that property rights (and hence ownership) matter when contracts are incomplete. In more recent work on relational contracts, Halonen (2002) and Baker et al. (2002) show that this insight continues to hold even in a repeated game setting. While we also consider a dynamic agency problem, in our setting, the owner's decision (following the first agency problem) constitutes a state variable that alters the continuation game that players subsequently play. Thus, in our model, players are engaged in a *dynamic game*, in contrast with most previous literature, which typically employed repeated games. This distinction is important because the phenomenon under study arises precisely from the change in the continuation game induced by the owner's behavior.

It should be noted that the conflict between the owner and the manager in our model is not the result of a holdup problem, unlike much of the related literature.[7] We also depart from much of the property rights literature by focusing on the link between agency problems and firm boundaries.

In recent work, Hart and Holmstrom (2002) extend the property-rights model of the owner-managed firm to nonowner-managed firms. They present a model in which workers receive private benefits from firm policies, which may or may not be aligned with managers' benefits. In their model, integration may not be optimal since workers' and managers' preferences are, by assumption, more difficult to align in an integrated firm. Hart and Holmstrom (2002) emphasize nonstandard aspects of employment such as job satisfaction, whereas in our model managers and owners have preferences only over money and the disutility of effort as in the standard moral hazard problem. A second distinction is that, unlike Hart and Holmstrom (2002), agency problems are at the heart of our paper.

Our paper also is related to the recent finance literature on internal capital markets (see, for example, Scharfstein and Stein, 2000; Stein, 1997; and in particular Brusco and Panunzi, 2001). This literature shows that "winner picking" among different investment projects in a conglomerate firm may reduce managers' incentives to exert effort.[8] As in our paper, there may be a reallocation of assets after the outcome of the agency problem is observed. Brusco and Panunzi (2001) analyze a model in which after a successful realization of the project there is a chance that some of the returns are allocated to other projects and, consequently, that the nonpecuniary benefit accruing to the manager is diminished. This is reminiscent of the owner's decision to reallocate assets in our model. As in Hart and Holmstrom (2002), these finance papers incorporate variables in the utility function in addition to those in the standard moral hazard model (money and effort). In contrast, in our model, there are no psychic benefits.

Closest to our model is Rotemberg and Saloner (1994), who analyze a model similar to the winner-picking models in the finance literature,

7. It has been argued recently that there has been an overemphasis on the holdup problem in understanding organizational structure: "It seems to us that the theory of the firm, and especially work on what determines the boundaries of the firm, has become too narrowly focused on the holdup problem and the role of asset specificity" (Holmstrom and Roberts, 1998, p. 91).

8. Meyer et al. (1992) present an early model showing why winner picking may have adverse incentive effects (namely, by encouraging influence activities at the expense of productive effort).

absent psychic benefits. They show that the focus on a narrow business strategy may be beneficial for the firm. In their model, a manager can be rewarded only for his effort in generating a good idea if the idea indeed is implemented ex post. Since contracts are incomplete, the firm will implement the idea only if it is profitable to do so *ex post*, which can reduce the *ex-ante* incentives for the manager. This agency problem may be exacerbated if the scope of the firm is broad. A broader firm has a larger number of ideas to implement ex post and so is less likely to implement the idea that it should implement from the ex-ante perspective of providing incentives. While we focus on the impact of the business plan on the manager's human capital in a dynamic agency model, Rotemberg and Saloner's (1994) static model is based on the assumed inability of firms to condition payments on the manager's output. Finally, the two models have quite different implications. In our model, the firm's owner (or senior management) would like to maintain a credible threat that it will change its business strategy if current management is unsuccessful. This raises the possibility that the owner invests in an alternative business strategy (the active action a) so as to make this threat credible, rather than narrowing its business strategy.[9]

It has been observed before that structural changes that improve efficiency ex post may reduce efficiency overall in a dynamic setting due to adverse effects on ex-ante incentives (see, e.g., Cremer, 1995; Meyer and Vickers, 1997; Meyer et al., 1996; Mumcu, 1999; Olsen, 1996; Olsen and Torsvik, 1995). The closest to our work is Olsen (1996), who shows that (vertical) integration may not be profitable even though it facilitates the realization of complementarity gains: by changing the set of *ex-post* efficient actions, integration can aggravate the ratchet effect. In contrast, in our model the agent (manager) has no private information. Here, what makes the integration potentially disadvantageous is that agency costs increase following a merger due to a reduction of the manager's business-strategy specific human capital.

4. Discussion

4.1 Summary

We analyzed a model in which the value of a manager's human capital is affected by changes in the firm's business strategy. Because of the link between firm organization and the value of managers' human capital, the internalization of externalities affects *ex-ante* incentives by altering the set of actions that will be taken *ex post*. If the internalization

9. We thank a referee for this last observation.

of externalities is not contractible, organizational structure can have *ex-ante* incentive effects by affecting the extent to which externalities will be internalized *ex post*. While we have focused on incentive *costs*, these incentive effects in general either can be positive or negative. In our model, a certain (disciplining) action that imposes a negative externality on both the rival firm and the manager is optimal for the owner in the event of failure under separate ownership but not under joint ownership. In contrast, a positive incentive effect of internalizing externalities would have resulted if we had assumed that the active action (which reduces the manager's rent in the ongoing relationship) imposes a *positive* externality on the rival firm and is taken only under joint ownership in the event of failure of the first-period project. More generally, the incentive effects of internalizing externalities either could be positive or negative depending on (1) whether the active action imposes a positive or negative externality on the rival firm; (2) whether the active action increases or reduces the manager's rent in his ongoing relationship with the owner; and (3) whether the internalization of externalities affects the action taken by the owner in the event of failure or in the event of success of the first period project.

4.2 Internal Organization

It is not just mergers that can affect the value of managers' human capital and, consequently, their incentives; a similar issue may arise between two divisions within a single firm. Consider a situation with a single firm with two divisions, each with a two-level managerial structure. Replace the owners of the two firms in our model with top-level managers, each with a low-level manager as in our model. Suppose that these top-level managers have an effort choice, and to induce efficient effort, the managers must be given an equity share of their division and that the structure of the payoffs when the managers take these efficient effort choices is as in our model.

When there are two separate top managers, the cost of providing incentives for the low-level managers is as in our analysis. However, if one institutes a different firm structure with a single top manager, it becomes more costly to induce efficient effort choices for the low-level manager. The reason is precisely as in our model: a single top manager necessarily (by assumption) will have his compensation tied to the performance of each of the divisions he controls. But in this case, for any decision he contemplates within one division, he will internalize the externalities of that decision on the other division. By the same logic as in our previous analysis, the set of actions that credibly might be taken by managers may be smaller with a single top manager than with separate managers for the divisions.

While we can translate our model to this case of multiple divisions within the firm, there is an important difference between the two cases. If the top-level decision-maker is a manager rather than an owner, the question of renegotiation arises. At the point where the top manager is to take the active action, the owner will not want him to take this action, since the owner cares about the negative externality this action imposes on the other division. This contrasts with the merger case in which the top-level decision-maker is the owner and consequently is unaffected by the external effects of the active action. If the active action is contractible *ex post*, it will not be taken, and hence the potential disciplinary effect of the existence of the active action disappears. The only way there can remain a disciplinary effect of the active action is if that action is not *ex-post* contractible. In many situations this is likely to be the case. Consider, for example, the Buick and Oldsmobile divisions of General Motors. The top manager of the Buick division may understand well that design changes he or she is effecting might increase demand for Buicks at the expense of the Oldsmobile division. It is difficult to imagine a contract between the owners of General Motors and the head of the Buick division that would eliminate the incentive to encroach on Oldsmobile's customer base, while still providing the Buick head incentives to increase sales in general.

4.3 Firing the Manager

The possibility that a decrease in business-strategy-specific human capital creates an incentive for the manager to exert effort raises the question of whether a similar incentive effect could be achieved by firing the manager after project failure. Firing the manager would seem to be the ultimate in decreasing the value of his human capital. However, even if the project fails, the manager still may have substantial firm-specific human capital that the firm would be reluctant to lose. Hence, the firm and the manager would find it in their interest to write a new contract following termination, and consequently contracts that threaten termination are not renegotiation-proof.

4.4 Contractnal Incompleteness

For organizational structure to have any effect on decisions, it must be the case that some actions cannot be contracted on. We discuss briefly the issue of noncontractibility and the role it plays in our model.

A central issue is whether the manager(s) and the owner(s) can renegotiate at the interim stage to take the efficient action, namely the passive action (independently of the outcome of the project). We assume that such renegotiation is infeasible since the owner's action is *ex-post* nonverifiable (which implies that it is neither *ex-ante* nor *ex-post* contractible). It follows that *ex-post* efficiency may not be obtainable.[10] Our assumption of noncontractibility is motivated by the observation that, in many circumstances, it is intrinsically hard to describe the "right" action in sufficient detail to distinguish it from many seemingly similar actions with quite different payoff consequences. If it is intrinsically hard to describe the desired action, contracting to induce that action may be impossible even after the state of the world is realized. Moreover, in many contexts, it seems plausible that the owner of the firm (or the agent responsible for taking the action) not only may choose from a large array of similar actions but that she also may have *private information* about the payoff consequences of the different actions. This should limit, or even eliminate, any scope for contracts. It is for simplicity that we assume that no contract can be written about the owner's action.[11]

Note that our assumption is different from (but, as we see it, complementary to) what commonly is assumed in the literature on property rights and the theory of the firm. Following Grossman and Hart (1986), much of the literature focuses on the holdup problem and (*ex-post*) renegotiation. Consequently, the literature typically assumes that certain actions are *ex-ante* noncontractible but *ex-post* contractible. It follows that, in contrast to our model, *ex-post* efficiency can be achieved easily via renegotiation. Grossman and Hart's (1986) assumption of *ex-ante* noncontractibility and *ex-post* contractibility often is motivated by reference to the idea that the (*ex-post* efficient) action may be difficult and/or costly to describe *ex ante*, possibly due to unforeseen contingencies. However, once the state of the world is realized, the efficient action is describable and verifiable easily.

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10. As is well known, *ex-post* inefficiency in certain states of the world may provide *ex-ante* incentives. In our model, this is the case under separate ownership: it is the *ex-post* inefficient (active) action—in the event of failure—that motivates the manager *ex ante*. Under joint ownership, the inefficient action no longer is credible, and the manager has to be motivated by a larger monetary compensation in the event of success.

11. Note that our assumption on contractibility is similar to standard moral hazard models in which the agent's effort is neither *ex-ante* nor *ex-post* contractible. In a recent paper, Aghion et al. (2001) also explore the assumption of *ex-ante* and *ex-post* noncontractibility. However, they consider the case where control over a noncontractible action is transferable.

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