

Synergies and Internal Agency Conflicts: The Double-Edged Sword of Mergers

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Latest Draft: January 2004

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The comments of an anonymous referee, an associate editor, and seminar participants at Columbia, Dartmouth College, CEPR symposium at Gerzensee, HEC at Jouy-en-Josas, IGIER at Bocconi, Northwestern, Ohio State, Stanford, the Universities of Amsterdam, California (Berkeley), Chicago, Florida, Michigan, Naples, North Carolina, Southern California, Turin, and Washington (Seattle), and the Meetings of the Western Finance Association, especially Eli Berkowitch, Harry DeAngelo, Bob Hodrick, Colin Mayer, Mark Mitchell, and René Stulz are gratefully acknowledged.

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Abstract**

This paper investigates the interaction between synergies and internal agency conflicts that emerges endogenously in multi-division firms. We show that synergies can alter the divisional manager's incentive to entrench herself through their effect on divestiture decisions. Further, the impact of merging on internal incentives is ambiguous and depends critically on the nature of divisional assets. In mergers of firms with a high degree of asset specificity, firms fear only a limited effect on internal incentives and may safely exploit expected synergies. In mergers of firms with a low degree of asset specificity, in contrast, a moderately positive expected synergy is sufficient to alter significantly the divisional divestiture decisions and induce an adverse effect on internal incentives. When the synergy and internal agency effects are of opposite sign, a circumstance we term "the double-edged sword of mergers," the gains from merging may not even be increasing in the expected synergies. We characterize when divisions should optimally be organized as stand-alone firms and when they should instead be part of a merged firm. Our model predicts an absence of diversifying mergers in industries characterized by limited asset specificity. It offers a novel explanation for the cross-sectional variation in post-merger valuation and a justification for observed patterns in the diversification discount.

Why do some mergers succeed while others fail? Why do some industries diversify while other stay focused? This paper predicts in which industries firms will merge and in which they will not. It offers a novel explanation for the cross-sectional variation in post-merger valuation and a justification for observed patterns in the diversification discount.

We achieve these and other predictions by investigating the interaction between two important aspects of merging: synergies and internal agency conflicts. Synergies, which may arise from a variety of sources, signify the incremental positive (or negative) cash flow consequences of being merged. Expectations of positive synergies, arising from economies of horizontal or vertical integration, the combination of complementary resources, tax effects, or enhanced monopoly power, are exemplified by the 1995 Disney purchase of Capital Cities/ABC, about which Disney's Michael Eisner predicted that synergies would be found "under every rock...one and one will add up to four" (Roger Lowenstein, *Wall Street Journal*, 8/3/95 page C1). Conversely, expectations of negative synergies, arising in the presence of diseconomies of scale or scope, are exemplified by the decision to split AT&T into its various businesses, predicting that "three mini-AT&Ts may be more nimble than one lumbering giant" (*The Economist*, 9/23/95 page 66).

Internal agency conflicts emerge from the hierarchical structure of an organization, as lower level managers act to protect their self-interests. As modeled in Milgrom (1988), Milgrom and Roberts (1990), and Meyer, Milgrom and Roberts (1992), these conflicts impair the smooth working of the organization and result in inefficient behaviors, or "influence costs," such as managerial entrenchment (Shleifer and Vishny, 1989, Bagwell and Zechner, 1993, and Edlin and Stiglitz, 1995), the mis-allocation of funds (Jensen, 1986), and rent seeking (Sharfstein and Stein, 1996). We model internal agency activities as entrenchment: to avoid personal costs, a divisional manager can reduce the probability of her division being divested by reducing its attractiveness to potential outside buyers. In our model, therefore, while synergies enhance a firm's internal cash flow, entrenchment activities affect a firm's external (resale) value.

The net success of a merger is the trade-off between the expected synergies and the challenge of managing multiple divisions. Traditionally, these two factors have been treated as having well-understood,

independent effects on firm value. Standard intuition suggested that, on the one hand, the gains from merging increase monotonically with expected synergies; on the other hand, increasing organizational complexity has been presumed to always exacerbate internal agency conflicts and thus to increase influence costs. For example, in McAfee and McMillan (1995) the gains from merging are diminished by an additively separable agency cost. Similarly, in Meyer, Milgrom and Roberts (1992, page 16), mergers add a new layer of hierarchy which causes "increased influence activities and costs".

We endogenize the effect of synergies on internal agency conflicts in multi-division firms. We show that synergies can alter the divisional manager's incentive to entrench herself through their effect on divestiture decisions. A key observation of our model is that in the presence of synergies, optimal decision rules for one division of a merged firm often depend on the other divisions' circumstances. This link between divisional incentives creates an interaction between synergies and internal incentives that is novel in the literature. For example, while it has been presumed that merging exacerbates entrenchment, we identify those circumstances in which merging actually reduces entrenchment. This analysis predicts when divisions should optimally be organized as stand-alone firms and when they should instead be part of a merged firm.

We find that the degree of specificity of divisional assets affects both the size and the sign of the trade-off between synergies and internal agency conflicts. Williamson (1975, 1985) developed the notion that specialization may be necessary to adapt an asset to the specific needs of a firm. We characterize asset specificity as the difference between the value of assets in their current use and in an alternative use. We show how the presence of synergies, by modifying this difference, affects internal incentives.

The key intuition of the role of asset specificity is as follows. Divestiture decisions in a merged firm depend not only on the expected synergies but also on the value of each of the divisions in alternative uses, which in turn depends directly on the extent of asset specificity. Since the likelihood of divestiture affects the entrenchment behavior of managers, synergies and the specificity of assets together affect the divisional managers' incentive to entrench herself. For small to moderately positive expected synergies, the impact of merging on internal incentives is ambiguous and depends critically on the nature of divisional assets. In

mergers of firms with limited asset specificity, those having only a small difference between the value of assets in their current use and in an alternative use, a moderately positive synergy is sufficient to alter significantly the divisional divestiture decisions, thereby altering internal incentives. When the synergy and internal agency effects are of opposite sign, a circumstance we term "the double-edged sword of mergers," the gains from merging may not even be increasing in the expected synergies, as assumed in previous models. In mergers of firms with a high degree of asset specificity, those having a large difference between the value of assets in their current use and in an alternative use, firms fear only a limited effect on internal incentives and may safely exploit expected synergies. For sufficiently large (positive or negative) synergies, in contrast, the synergy effect dominates: asset specificity is irrelevant, and divisions are always kept if synergies are sufficiently positive and at least one is always divested if synergies are sufficiently negative.

Our model predicts an absence of diversifying mergers in industries characterized by limited asset specificity. It offers a novel explanation for the cross-sectional variation in post-merger valuation and a justification for observed patterns in the diversification discount. The prediction that post-merger valuation should be increasing in the degree of asset specificity for diversifying mergers is consistent with the Morck and Yeung (2002) finding that diversifying mergers increase share value only in the presence of intangible (highly firm-specific) assets. Further, our model can explain why mergers may be valuable ex ante while leading to successful divestitures ex post, as observed in the late 1960s.

Our paper contributes to the incomplete contracts approach to the theory of the firm, as represented by the seminal contributions of Williamson (1975), (1985), Grossman and Hart (1986), Hart and Moore (1990), and more recently Rotemberg and Saloner (1994) and Rajan and Zingales (1998). In our model, the choice of organizational form and the allocation of decision rights are the instruments used by the principals (the board of directors) to control the incentives of the multiple subordinate agents (the divisional managers) who make production decisions. Our paper also relates to the literature on internal capital markets which studies the implications of a given organizational form for the efficient allocation of funds and capital budgeting decisions. Stein (1997) argues that internal capital markets reallocate scarce resources from weaker

projects to stronger ones. Scharfstein and Stein (2000) show how divisional managers' rent-seeking behavior may undermine the benefits of internal capital markets. In a similar vein, Rajan, Servaes, and Zingales (2000) and Lamont and Polk (2002) show that diversity in resources and investment opportunities across divisions may lead to inefficient investment. Maksimovic and Phillips (2002) argue that the diversification discount emerges from differences in managerial abilities. Unlike the papers in this literature, we explicitly examine the interaction between synergies and internal agency conflicts to determine endogenously the number of firm segments.¹

The organization of the paper is as follows. Section I presents the basic model and analyses the first best outcome. Section II introduces internal agency conflicts. Section III examines the synergy-agency interaction, providing the core results of our paper. Section IV analyses the optimal organizational form. Empirical implications are presented in section V. Section VI confirms the robustness of the qualitative results, extending the model to include first debt financing and then more complex incentive compensation contracts. Section VII concludes. All proofs are contained in the Appendix.

I. The Basic Model

In this section we introduce the basic model. We examine two production units, or “divisions,” denoted F and T. Each division employs a manager, needed to oversee workers in the production process of her division, who has some discretion in making production decisions. These divisions may be either organized as two, independent stand-alone firms or integrated into a single multi-division firm. Each firm is governed by a board of directors representing the shareholders. As a starting point, we abstract from all agency considerations to characterize the first best outcome: there are no conflicts of interest between a

¹ In subsequent work, Berkovitch, Israel and Tolkowsky (2000) determine the number of segments by the trade off between an internal agency cost and the benefits of share price informativeness. Matsusaka and Nanda (2002) determine the number of segments by the trade off between a fixed cost of merging and the benefits of sharing internal resources in an internal capital market model. Instead, here the costs of merging emerge endogenously from the interaction between synergies and internal agency conflicts.

divisional manager and her employees, between a board of directors and its shareholders, or between a divisional manager and her board of directors.

The sequence of events is detailed in Table 1. In the first period, at time 0, the boards of directors choose the organizational form for a nascent firm. Specifically, they decide whether or not to merge the two divisions. If the two divisions are integrated into a multi-division firm with one board of directors, joint production may provide additional synergistic gains, with expectation R . These (positive or negative) synergies, which we take as given, measure the incremental expected joint production which a multi-division firm generates, and hence which it loses in the event of any subsequent divestiture. Alternatively, the divisions may be preserved as separate single-unit firms with distinct boards. Since boards act in the best interest of their shareholders, no merger with positive expected value is foregone. In the basic model we assume that firms are equity-financed. In section VI, we extend the basic model to allow capital structure (debt) to be chosen optimally at time 0 and confirm that the results developed herein are robust to the inclusion of debt financing.

At time 1, division F is known by all to be of a fixed value, F .² The manager of division T, in contrast, privately learns the productivity type of her division. Productivity is either “high,” denoted as type $T = H$, “medium,” denoted as type $T = M$, or “low,” denoted as type $T = L$, with $H > M > L$. The ex-ante probability that this division is of type T is denoted by $\theta_T > 0$. When internal agency conflicts are introduced in section II, entrenchment can be chosen by the type T divisional manager at this time.

At time 2, division T’s productivity is privately observed by its board of directors. We assume that while productivity is observable by the divisional manager and the board of directors, it is not contractible. The type T manager and the board also learn the attractiveness of the division’s assets in an alternative use. Williamson (1975), (1985) developed the notion that specialization may be necessary to adapt an asset to the

² This simplification models the interaction between synergies and internal agency conflicts in a parsimonious way by limiting the possibility of divestiture and entrenchment activities to only one division. A more general model with multiple divisions capable of entrenchment activities yields similar results. See Bagwell and Fulghieri (1995).

specific needs of a firm. In our model, the value of the divisional assets in their current use (net of potential synergies) is measured by the type T , while the value of the assets in an alternative use is measured by a “divestiture opportunity,” O . We subsume in “divestiture” all changes in organizational structure or ownership that involve the disposition of the division to alternative uses, including liquidation.³ The division may either face a good divestiture opportunity, denoted G , or a bad opportunity, denoted B , with $G > B$. The ex-ante probability that the divestiture opportunity is good is denoted by $\pi > 0$.⁴

At time 2 the board now decides whether to keep or to sell off (“divest”) each of its division(s). We assume, for simplicity, that division F is optimally never divested. For a single-division firm of type T , the divestiture decision depends exclusively on the comparison of the attractiveness of the division’s assets in their current use (where $T = H, M$ or L) and in an alternative use (where $O = B$ or G). We denote the choice of whether the board of directors divests the single-division firm with $\Phi(T, O)$, which takes the value one if division T is divested and zero otherwise. For a multi-division firm, the decision to divest division T depends on the level of expected synergies, R , in addition to the difference between the attractiveness of the division’s assets in their current use and in an alternative use. We denote the choice of whether the board of directors divests division T of a multi-division firm with $\Phi(T, O, R)$, which again takes the value one if division T is divested and zero otherwise.

Finally, for any division not divested at time 2, a cash-flow is realized at time 3, at which point all investors are paid off and the firm ceases to exist. The time 3 cash flow equals the cash flows generated by each non-divested division plus any realized synergies jointly produced if the firm has multiple divisions. The time 3 cash flow generated exclusively by division F is the fixed value F , while the time 3 cash flow

³ For notational simplicity, we assume that the value of the division’s divestiture opportunity is identical whether the “divestiture” involves liquidation or some other disposition. In Bagwell and Fulghieri (1995), we show that the results in this paper extend naturally when we allow that different methods of disposition may yield different asset values for the division.

⁴ For simplicity, we assume that the likelihood and magnitude of the division’s divestiture opportunities are independent of its productivity. Our main results, however, can be extended to allow for correlation between the divestiture opportunity and the productivity of a division.

generated exclusively by division T depends on its productivity type, with expected value T.⁵

We assume universal risk neutrality, and the risk-free rate is normalized to zero. To ensure a rich analysis, we make the following parametric assumptions.

Parametric Assumptions. $\theta_H H + \theta_M M + \theta_L L > \pi G + (1 - \pi)B$ and $L < B < M < G < H$.

The first parametric assumption guarantees that the expected productivity for the nascent division T standing alone is greater than the expected value of its divestiture opportunities. The second guarantees that while divisional assets are expected to be more valuable in their current use, in realization division T's assets may be employed more or less productively by others. As a result, a type L single-division firm should always be divested (since both B and G exceed L), a type M should be divested only if facing the good divestiture opportunity (since $B < M < G$), and a type H should always be kept (since H exceeds both B and G).⁶ As will become apparent in the analysis below, this parameterization allows for the broadest set of possibilities: mergers may either increase, leave unchanged, or reduce the extent of entrenchment chosen by the division.

We now characterize the first best outcome for division T organized as a stand-alone entity. The first best value, V, is given by

$$V \equiv \theta_H H + (1 - \theta_H) \pi G + (1 - \pi) [\theta_L B + \theta_M M]. \quad (1)$$

This time 0 value reflects that with probability θ_H the division will be of type H and should be kept. If the division is not of type H, then the division should always be divested either if the outside opportunity is good, which happens with probability $(1 - \theta_H) \pi$, or if the outside opportunity is bad and the division is of type L, which happens with probability $(1 - \pi) \theta_L$. The division should be kept if it is of type M facing a bad outside

⁵ We specify that each division's time 3 cash flow is unaffected by the choices made at time 0. For a more complex analysis, see Bagwell and Fulghieri (1995).

⁶ Moreover, this assumption guarantees that a type H division will never be divested in the presence of a positive synergy.

opportunity, which happens with probability $(1 - \pi)\theta_M$.

In a firm where divisions F and T have been merged, this divestiture policy for division T remains optimal in the absence of synergies, in which case the time zero value of the merged firm is $V_m = F + V$. In the presence of synergies, however, the divestiture policy for division T may differ from its stand-alone counterpart because the decision to divest division T entails a loss of the expected joint product, R. Rather than making a divestiture decision for that division in isolation, therefore, the divestiture policy for the merged firm must be formulated to maximize the total expected payoff of the firm. If division F is kept while division T is divested, then the expected payoff is $F + O$. If both divisions are kept, then synergies are realized and the expected payoff is $F + T + R$.

We denote each permutation of division's T type and its divestiture opportunity as (T, O) , $T = H, M, L$; $O = G, B$. The 6 possible permutations, with the expected payoffs corresponding to each divestiture decision, are given in Table II. The board of directors' divestiture policy must specify a decision upon observing each of the possible permutations for the expected synergies, R. Whether or not in equilibrium the board of directors divests the division of type T, as given by $\Phi^*(T, O, R)$, is determined by their maximization of the expected payoffs. Unlike for a single division, the parametric assumptions no longer guarantee that the divestiture decision for the type T division in a merged firm is determined solely by its type and its realization of the outside opportunity. Rather, the presence of synergies implies that there generally exists no dominating divestiture decision for division T in any of the possible (T, O) combinations.

We can now determine the time 0 value of a multi-division firm in the presence of synergies. This value equals the value of the two divisions as stand-alone entities plus the time 0 incremental value due to the presence of synergies, which is denoted by $S(R)$:

$$V_m(\mathbf{R}) \equiv F + V + S(\mathbf{R}). \quad (2)$$

The synergy term, $S(\mathbf{R})$, quantifies those circumstances in which the optimal divestiture policy for division T is altered by the presence of synergies. It is given by:

$$S(R) = E_{T,O} [\max(T+R, O) - \max(T, O)]. \quad (3)$$

Notice that this term is an increasing function of the level of expected synergies R , with $S(0) = 0$ and $S(R) > 0$ if and only if $R > 0$.

The choice of the optimal organizational form is made by the board of directors at time 0 based on a comparison between the value of the two divisions when merged into a single firm and the value if instead they are kept as stand-alone units. Predictably, since the synergy term S is of the same sign as R , the two divisions should be merged if and only if $R > 0$, else left as stand-alone divisions if $R < 0$.

II. Internal Agency Conflicts in Isolation

In this section we extend the basic model to include an internal agency conflict between the division T manager and her board of directors. In the next section we examine the critical interaction between the expected synergies and the manager's behavior. Throughout the analysis, we continue to abstract from conflicts of interest other than between the divisional manager and her board of directors. That is, we continue to assume that the managers and employees within a division act collectively, and that the board of directors acts in the best interest of the company's shareholders.

We introduce a disagreement between the divestiture policy preferred by the divisional manager and that which maximizes firm value by assuming that divestitures are personally costly for her. There are several reasons why this might be so. Managers might have developed firm-specific human capital which is devalued if the division is divested. Alternatively, if there is a distribution of managerial skill, and if the value of a division may be correlated with its manager's skills, then the divestiture of a division may negatively affect its manager's reputation and harm her external market value. Certainly, there may also be benefits of divestiture (such as the spin-offs in Aron (1991)). In balance, however, we believe that the disadvantages often dominate for the manager, and we evaluate the consequences of such costs here. We model the personal

loss incurred by a manager upon divestiture as a non-pecuniary cost which we normalize to 1.⁷

Since the time 2 divestiture decision for division T depends on its divestiture opportunity, a manager may decrease the likelihood of incurring personal cost by reducing the attractiveness of the divestiture opportunities. This may be achieved by engaging in costly entrenchment activities that serve to make the divisional manager "irreplaceable." As shown in Shleifer and Vishny (1989) or Edlin and Stiglitz (1995), divisional managers may invest in assets with returns dependent on their own information or attributes in order to entrench their position within the company.⁸ Internal agency activities, rather than providing an entrenchment function as modeled here, could instead serve to increase a division's budget, as in Scharfstein and Stein (1996) and Rajan, Servaes, and Zingales (2000). Such an alternative notion of agency is a complement, rather than a substitute, to the entrenchment modeled here, since in both cases continuation is made relatively more attractive for the divisional manager who engages in these activities at the expense of the firm. In our model, continuation is made relatively more attractive because costly divestiture is less likely. In those models, it is an increased budget that makes continuation relatively more attractive.

We modify the basic model as follows. At time 1, the type T manager has the option to engage in activities that influence the future divestiture decisions made by her board of directors. For simplicity, we assume that the chosen level of entrenchment activities, denoted by i , can take only the discrete values 0 (no activity) or the level $I > 0$; $i \in \{0, I\}$. We assume that these entrenchment activities reduce the probability of the occurrence of the attractive divestiture opportunity G by $\Delta \pi = \pi - \pi(I)$, with $0 \leq \pi(I) < \pi$, and correspondingly increase the probability of the low divestiture value B from $1 - \pi$ to $1 - \pi(I)$. These activities are costly for the manager and, if pursued, they impose a personal cost z . This cost captures the insight that it takes personal effort or resources to alter the firm's divestiture opportunities, for example by altering the composition of divisional assets. Furthermore, if a manager must acquire firm-specific skills to

⁷ For simplicity, we assume that this cost is the same whether the division is divested from a multi-division or a single-division firm.

⁸ For evidence of entrenchment activities in both focused and diversified firms, see Khanna and Tice (2001).

become irreplaceable to the firm, such specialization would require additional effort on the part of the manager.⁹

Finally, we assume that each divisional manager receives a fixed wage, which we normalize to zero, and that she has no stake in the corporation.¹⁰ If contracts contingent on the realization of the type parameter are unenforceable, then the conflicts of interest between divisions and the board of directors cannot in general be completely resolved. In section VI, we confirm that the results developed herein are robust to the inclusion of contracts contingent either on the divestiture of a division or on its cash flow realization.

A divisional manager of type T chooses at time 1 whether or not to entrench herself, to maximize her expected utility, given by

$$E[U(T, i)] = -\phi(T, i) - zi, \quad (4)$$

where $\phi(T, i)$ is the time 1 probability assessment that her division of type T will be divested when the manager chooses entrenchment activities of level i. In making the entrenchment decision, the divisional manager compares the marginal benefit of making her divestiture less likely, by reducing $\phi(T, i)$, to the marginal cost of undertaking these activities, captured with z. To create a possible motive for entrenchment, we assume in what follows that $zI < \Delta \pi$ and that, if indifferent, the divisional manager chooses not to entrench herself.

We now assess the optimal entrenchment level chosen by the type T manager standing alone at time 1. As argued in section I, given that by the parametric assumptions both B and G exceed L, the board of directors should always divest a type L division. As a result, the manager of a type L division never finds it optimal to engage in costly entrenchment and sets $i = 0$ in equilibrium. Furthermore, since H exceeds both

⁹The main intuition of our paper is clearly robust to more complex specifications of the model. For example, rather than a discrete entrenchment choice set, a manager could face a continuum of choice levels. Also, rather than having a constant cost-benefit tradeoff, the entrenchment tradeoff could depend on managerial type, with entrenchment easier for better types.

¹⁰The use of a fixed wage payment is common in contexts such as those modeled here, for example, Stulz (1990), Meyer, Milgrom and Roberts (1992), and Bagwell and Zechner (1993).

B and G, the division of type H is never divested. This has two implications. First, its manager never finds it optimal to engage in costly entrenchment and sets $i = 0$ in equilibrium. Second, since this division is never divested, any entrenchment activities would be irrelevant to firm value. Finally, for a division of type M, $B < M < G$ implies that this division should be divested by the board of directors only if it faces the good divestiture opportunity, which occurs with probability $\pi(i)$. Therefore, the divisional manager of type M may reduce the probability of being divested from π to $\pi(I)$ by engaging in entrenchment activities. The expected utility of a single-division manager of type M is given by

$$E[U(M,i)] = -\pi(i) - zi. \quad (5)$$

Examination of equation (5) reveals that the type M manager of a stand-alone firm optimally engages in entrenchment, since

$$E[U(M,I)] - E[U(M,0)] = \Delta\pi - zI > 0, \quad (6)$$

given $zI < \Delta\pi$. Hence, the maintained assumptions guarantee that the unique equilibrium for a single-division firm of type T is characterized by the manager of the type M choosing to entrench herself while the managers of the type L and H divisions do not: $i_M^* = I$, $i_H^* = i_L^* = 0$. This is summarized in the following proposition.

Proposition 1: For a division of type T standing alone, the unique equilibrium has $i_M^* = I$ and $i_H^* = i_L^* = 0$.

The time 0 value of division T, given in equation (1) absent agency conflicts, now depends as well on the level of entrenchment chosen by its manager. Recall that the first best value V is the expected value of a stand-alone division absent internal agency conflicts. This value, however, does not correspond to an equilibrium in the presence of agency conflicts. As derived in Proposition 1, $i_M^* = I$ is the unique equilibrium response for a manager of type M. Therefore, the time zero value of division T standing alone always will be less than V , due to possible entrenchment activities. The ex ante value of division T standing alone, $V_s(0, I, 0)$, can be written as

$$V_s(0, I, 0) \equiv V - A_M(I), \quad (7)$$

where $V_s(0, 0, 0) \equiv V$ as given in equation (1), and where the agency term

$$A_M(I) \equiv \theta[\pi - \pi(I)](G - M) \quad (8)$$

represents the reduction in expected firm value due to the anticipated type M entrenchment. Since in equilibrium a division of type L optimally chooses not to engage in entrenchment, her agency term is equal to zero. Moreover, since a division of type H would never be divested even when facing the good outside opportunity, her entrenchment activities are irrelevant to firm value and her agency term is zero as well.

III. The Interaction Between Synergies and Internal Agency Conflicts

We now consider the interaction between synergies and internal agency conflicts and provide the core results of the paper. Define $\phi(T, i, R)$ as the type T manager's assessed probability of being divested when choosing entrenchment level i , given the divestiture policy Φ and expected synergies R . We denote i_{TR}^* as the equilibrium level of entrenchment activities chosen by the type T manager in the merged firm with expected synergy R , recognizing that the expected synergy may alter the optimal divestiture policy and therefore may alter the manager's optimal entrenchment choice. The expected utility of a divisional manager of type T in a multi-division firm is:

$$E[U(T, i, R)] = -\phi(T, i, R) - zi. \quad (9)$$

We characterize parameter regions based on the interaction between the expected synergy and the critical thresholds determining entrenchment choices.

Region 1: Sufficiently negative expected synergies: $R \leq \max \{ G - H ; B - M \}$;

Region 2: Small negative expected synergies: $\max \{ G - H ; B - M \} < R \leq 0$;

Region 3: Small to moderately positive expected synergies and high asset specificity: $0 < R \leq B - L$;

Region 4: Small to moderately positive expected synergies and low asset specificity: $B - L < R < G - L$;

Region 5: Sufficiently positive expected synergies: $R \geq G - L$.

We observe that in equilibrium a type H division in a merged firm may choose to engage in entrenchment activities only for a subset of the sufficiently negative expected synergies in Region 1, else $i_{HR}^* = 0$. Since her choice to entrench herself is the direct consequence of our parametric assumptions, we characterize equilibria only by the equilibrium behavior of type M and L managers, (i_{MR}^*, i_{LR}^*) , and obtain the following proposition.

Proposition 2. In a multi-division firm, the existence of (pure strategy) equilibria depends on the level of expected synergies, R , relative to the extent of specificity of the divisional assets, $T - O$, as follows:

Region 1, Sufficiently negative expected synergies: There are only equilibria of types $(I, 0)$ or $(0, 0)$ and the type H division may or may not engage in entrenchment. Further, if $R \leq B - H$, the type H division never engages in entrenchment.

Region 2, Small negative expected synergies: There are only equilibria of type $(I, 0)$. Internal incentives in the merged firm, therefore, are the same as in the stand-alone firm.

Region 3, Small to moderately positive expected synergies and high asset specificity: There are only equilibria of types $(I, 0)$ or $(0, 0)$. Internal incentives in the merged firm, therefore, are the same or better than in the stand-alone firm.

Region 4, Small to moderately positive expected synergies and low asset specificity: There are only equilibria of types $(0, I)$ or (I, I) . Internal incentives in the merged firm, therefore, always differ from those in the stand alone firm and may be strictly worse.

Region 5, Sufficiently positive expected synergies: There are only equilibria of type $(0, 0)$. Internal incentives in the merged firm, therefore, are strictly better than in the stand-alone firm.

Proposition 2 provides two of the key insights of the paper. First, once the divestiture decision

depends not only on the comparison of the divisions' asset values in alternative uses, but also on any synergies expected to be generated in the event of merger, synergies can alter the incentive for the divisional manager to entrench herself through their effect on divestiture decisions. The impact of merging and thus increasing organizational complexity is therefore not a foregone conclusion; rather, merging may increase, leave unchanged, or actually reduce the extent of the agency conflict.¹¹ As modeled here, this corresponds to the observation that the type L manager may choose to engage in entrenchment when part of a multi-division firm, whereas she would never do so as a single-division firm. Analogously, the type M manager may choose not to engage in entrenchment when part of a multi-division firm, whereas she would do so in isolation. Finally, the type H manager may be driven to engage in entrenchment when synergies are negative.

The synergy effect dominates when synergies are either large and negative (Region 1), such that it is always optimal to divest division $T = M, L$, or large and positive (Region 5), such that all divisions are optimally kept. As would be expected, extreme synergies eliminate the need for managers to engage in entrenchment. For small to moderately negative synergies (Region 2), including the neighborhood around $R = 0$, synergies have no impact on divestiture decisions and therefore have no effect on internal agency conflicts; internal incentives in the merged firm are the same as in stand-alone divisions.

With small to moderately positive synergies (Regions 3 and 4), the impact of merging on internal incentives is ambiguous and depends critically on the nature of divisional assets. This offers the second key insight of the paper. In these regions the divestiture decision for a merged firm depends not only on the size of the expected synergies but also on the difference between the value of each of the divisions' assets in alternative uses, which in turn depends directly on the extent of asset specificity.

Assets with high specificity have a large difference between the value of assets in their current use

¹¹An additional consequence of the divestiture decisions being interdependent is that managerial incentives become linked across divisions when both divisions have uncertain outcome as modeled in Bagwell and Fulghieri (1995). We show there that when expected synergies are non-zero, the tie between the divestiture decisions of different divisions induces a strategic link between the marginal benefits to the individual managers of engaging in entrenchment activities. This leads directly to the possibility of multiple equilibria.

and in an alternative use. As exemplified in Region 3, a moderately positive expected synergy is insufficient to alter the divestiture policy for the type L division. This guarantees that incentives are no worse for the merged firm than for the divisions standing alone. The synergy may also be large enough to eliminate the risk of divestiture for the type M division, dissuading her from engaging in costly entrenchment. Incentives, therefore, may actually be improved for the merged firm.

Assets with limited specificity, in contrast, have only a small wedge between their internal and external values. As exemplified in Region 4, a moderately positive expected synergy is sufficient to alter the divisional divestiture decision, thereby altering internal incentives for L and M divisions in important ways. As was true in Region 3, merging may or may not stop the type M manager from engaging in entrenchment. In addition, merging may induce the type L manager to engage in entrenchment activities that would not take place in the stand-alone firm. Observe that if the incentives in the merged firm are worsened, then mergers with positive synergies generate synergistic and internal agency effects of opposite sign.

IV. Optimal Organizational Form

We now assess the optimal organizational form that the board of directors chooses at time 0 for the nascent firm. From section III we know that in the presence of synergies, a multi-division firm may exhibit more, less or the same level of entrenchment activities as would comparable stand-alone divisions. The ex ante value of the merged firm, $V_m(i_{HR}^*, i_{MR}^*, i_{LR}^*, R)$, is given by

$$V_m(i_{HR}^*, i_{MR}^*, i_{LR}^*, R) \equiv F + V - A_H(i_{HR}^*) - A_M(i_{MR}^*) - A_L(i_{LR}^*) + S(i_{HR}^*, i_{MR}^*, i_{LR}^*, R), \quad (10)$$

where the agency terms $A_T(i_{TR}^*)$, $T = H, M, L$, are defined to be

$$A_T(i_{TR}^*) \equiv \theta_T[\pi - \pi(i_{TR}^*)](\max\{T; G\} - \max\{T; B\}). \quad (11)$$

These agency terms represent the reduction in firm value directly due to the anticipated entrenchment choices detailed in section III. Note specifically that if entrenchment is unaffected by merging such that $i_{TR}^* = i_R^*$ for

all T, then these agency terms are identical to those given in section II for the stand-alone division.

The synergy term S, which quantifies those circumstances in which the optimal divestiture choice is altered by the presence of synergies, while incorporating the effect of entrenchment on the probability of observing particular divestiture opportunities, is given by:

$$S(i_{HR}^*, i_{MR}^*, i_{LR}^*, R) = \Sigma_T \theta_T \left(\pi(i_{TR}^*) [\max\{T+R, G\} - \max\{T, G\}] + [1 - \pi(i_{TR}^*)] [\max\{T+R, B\} - \max\{T, B\}] \right). \quad (12)$$

Note specifically that, as given in equation (2), $V_m(0,0,0,R) = F + V + S(R)$, since $S(R) = S(0,0,0,R)$, and since $S(0) = 0$, $V_m(0,0,0,0) = F + V = V_m$, the sum of the value of the stand-alone divisions.

The gains from merging, Δ , are found by comparing equations (10) and (7), obtaining

$$\Delta \equiv V_m(i_{HR}^*, i_{MR}^*, i_{LR}^*, R) - V_s(0, I, 0) \equiv \Delta A_H(i_{HR}^*, 0) + \Delta A_M(i_{MR}^*, I) + \Delta A_L(i_{LR}^*, 0) + S(i_{HR}^*, i_{MR}^*, i_{LR}^*, R), \quad (13)$$

where

$$\Delta A_T(i_{TR}^*, i_T^*) \equiv -A_T(i_{TR}^*) + A_T(i_T^*). \quad (14)$$

Equation (13) reveals the two factors which determine the gains from merging and hence the optimal organizational form chosen for the nascent firm. The first determinant is the impact of merging on the internal agency conflict, as captured by the terms $\Delta A_T(i_{TR}^*, i_T^*)$, $T = H, M, L$. As derived in Proposition 2, these terms are of ambiguous sign, since merging may cause divisional managers to increase or reduce their entrenchment activities. These terms depend both on the nature of divisional assets and on the expected synergies. The second factor affecting the optimality of merging is the incremental (positive or negative) value generated by the (positive or negative) expected synergies, R, as captured by the synergy term. In a pure transaction merger with no expected synergy, such that $R = 0$, equation (13) provides the anticipated result that a merger fails to have any substantive impact, either on divestiture decisions, on internal agency

conflicts, or on the firm's value relative to two single-division firms, $F + V_s(0, I, 0)$.

Proposition 3. If (13) is positive, then in equilibrium the board of directors chooses to merge the divisions, with entrenchment levels i_{HR}^* , i_{MR}^* and i_{LR}^* . If (13) is negative, then in equilibrium the board of directors chooses to maintain single-division firms, with entrenchment levels $i_M^* = I$ and $i_H^* = i_L^* = 0$. The desirability of merging depends on the level of expected synergies, R , relative to the extent of specificity of the divisional assets, $T - O$, as follows:

Region 1, Sufficiently negative expected synergies: Divisions are optimally organized as stand-alone firms, unless a sufficiently positive internal agency effect dominates, in which case divisions are optimally merged at time 0 and then division T is divested at time 2.

Region 2, Small negative expected synergies: Divisions are optimally organized as stand-alone firms.

Region 3, Small to moderately positive synergies and high asset specificity: Divisions are optimally merged.

Region 4, Small to moderately positive expected synergies and low asset specificity: Divisions are optimally merged, unless a sufficiently negative internal agency effect dominates, in which case they are organized as stand-alone firms.

Region 5, Large positive expected synergies: Divisions are optimally merged.

This proposition provides the third key insight of the paper, highlighting how asset specificity affects the choice of organizational form through its effect on both the size and the sign of the trade-off between synergies and internal agency conflicts.

For sufficiently large synergies, the synergy effect dominates the choice of organizational form. In Region 5, synergies are sufficiently large and positive that divisions are never optimally divested. Mergers have the dual advantage of generating positive synergies and improving internal incentives. In Region 1, sufficiently large negative synergies imply that typically divisions will be organized as stand-alone firms. In this region, however, it is also possible that internal incentives in a merged firm may be improved enough

to make a merger desirable despite negative synergies. In such a case, the two divisions are optimally merged at time zero, followed by a divestiture of division T at time 2. For small negative synergies (Region 2), including the neighborhood around $R = 0$, the internal incentives in the merged firm are the same as for stand-alone divisions and the two divisions are organized as stand-alone entities.

For small to moderately positive synergies, the choice of organizational form depends on the impact of synergies on internal incentives and thus on the nature of divisional assets in place. Mergers of firms with a high degree of asset specificity have limited adverse internal incentive effects, allowing them to safely exploit expected synergies. This possibility arises in Region 3, where internal incentives are the same or better than in stand-alone firms and divisions are always optimally merged. In this region, mergers have the dual advantage of generating positive synergies and (in some cases) improving internal incentives. Mergers of firms with limited asset specificity, in contrast, may alter the divestiture decisions and induce an adverse effect on internal incentives. This possibility arises in Region 4, where internal incentives may be compromised enough to make a merger undesirable despite positive synergies. In the next subsection, we characterize the “double-edged sword of mergers” as those circumstances in which the synergy and agency effects are of opposite sign, and we identify those cases in which the agency effect actually dominates.

A. The Double-Edged Sword of Mergers

The relation between the gains from merging, Δ , as defined in equation (13), and the level of the expected synergies, R , is represented in Figure 1. In the absence of either synergies or internal agency conflicts, merging would be irrelevant and the gains from merging, Δ , would be zero. This is represented by the origin in Figure 1. Standard intuition and the results in section I then suggest that, all else equal, the gains from merging should be monotonically increasing with the expected synergies. In the simplest case, Δ equals the synergy level, as represented by line A in Figure 1.¹²

¹² In the notation of our model, $S(R) = R$ in the simplest case.

Once internal agency conflicts are included, the relation between Δ and the synergy level is less obvious. Both McAfee and McMillan (1995) and Meyer, Milgrom and Roberts (1992) assume that merging two divisions into one firm increases the internal agency costs, uniformly reducing the gains from mergers. This possibility is represented by line B in Figure 1, a downward shift of line A. In contrast, Proposition 2 reveals a significant interaction between synergies and internal agency conflicts. For example, the extent of entrenchment activities may actually decline following an increase in organizational complexity in the presence of expected synergies. We find that the change in the extent of the internal agency conflict which is spawned by synergistic merging may completely offset the synergies themselves, such that the very monotonicity between Δ and the expected synergy level can be violated. The "double-edged sword of mergers" is represented by line C in Figure 1. Equation (13) reveals that this non-monotonicity occurs whenever the impact of merging on the internal agency conflict, captured with the terms $A_T(i_{TR}^*, i_T^*)$, $T = H, M, L$, dominates in both size and sign the expected synergy effect, captured with the synergy term. As shown in Proposition 3, while the synergy effect clearly dominates for extreme (positive or negative) synergy values, the agency effect may dominate at more moderate synergy levels. As a result, merging may be dominated despite positive expected synergies due to a deterioration in incentives, as shown in Figure 1 for synergy levels in the interval (R_2, R_3) , or merging divisions may be optimal despite negative expected synergies due to an improvement in incentives, as shown in Figure 1 for synergy levels in the interval (R_0, R_1) .¹³

V. Empirical Implications

The analysis of the interaction between synergies and internal agency conflicts yields several novel empirical implications concerning observed merger and divestiture activity and the cross-sectional variation in firm valuation.

¹³ In the Appendix, we develop specific examples for illustration. In the first, parameterized within Region 4 and therefore characterized as having limited asset specificity, merging is dominated despite positive expected synergies due to a deterioration in incentives. In the second, parameterized within Region 1, merging is optimal despite negative expected synergies due to an improvement in incentives.

Implication 1: An absence of diversifying mergers in industries characterized by limited asset specificity. Proposition 3 states that for moderate synergy levels, the choice of organizational complexity may depend on the nature of the assets in place. In particular, when divisions have limited asset specificity, the expectation of moderate synergies, such as gained through diversifying mergers, may have a significant impact on the divestiture decisions, and, therefore, a significant effect on managerial incentives. If this effect is detrimental and of sufficient magnitude, positive synergy mergers will not be optimal. Hence, our model predicts an absence of diversifying mergers in industries characterized by limited asset specificity such as supermarkets (see, for example, Chevalier, 1995). This is a novel and testable implication.

Implication 2: Organization complexity may arise from the nature of assets and hence, indirectly, from the nature of product market competition. The observation at the root of Implication 1 predicts further that if asset specificity is negatively correlated with market competitiveness,¹⁴ then divisions which operate in competitive output markets will tend to belong to single-division firms, while divisions operating in oligopolistic markets will tend to be part of multi-unit firms. This is a novel and testable implication.

Implication 3: For diversifying mergers, post-merger valuations are increasing in the degree of asset specificity, all else equal. Proposition 2 implies that, for moderately positive synergies such as in diversifying mergers, equilibria with significant entrenchment activities occur only when assets have limited specificity, as in Region 4, while merged firms with a high degree of asset specificity fear only a limited effect on internal incentives, as in Region 3. This observation suggests higher valuations for diversifying mergers of firms with high asset specificity than for diversifying mergers of firms with limited asset specificity, all else equal. This is a novel and testable implication.

Implication 4: A diversification discount for conglomerates with limited asset specificity. Recent research has documented a “diversification discount,” whereby conglomerates sell on average at a 13%-15%

¹⁴ A negative correlation between market competitiveness and asset specificity be motivated as follows. More competitive industries typically produce more standardized products. Therefore, assets acquired from one firm in such an industry will be less costly to adapt to a second firm’s specific needs.

discount to the imputed combined value of their segments. This discount is found to have significant cross-sectional variation in both its sign and size.¹⁵ Specifically, Morck and Yeung find that diversifying mergers increase share value only in the presence of intangible assets, such as R&D expenditures. While our paper provides no insight into why mergers that generate a diversification discount would be executed, because our paper is predicated on market efficiency, it does suggest that a diversification discount would be more likely to emerge for diversifying mergers of firms with limited asset specificity, such as tangible assets, rather than for diversifying mergers of firms with highly specific assets, such as intangibles.

Implication 5: Mergers may be valuable ex ante while leading to successful divestitures, ex post.

Shleifer and Vishny (1991) argue that the most puzzling, and troublesome, feature of the conglomerate mergers of the late 1960s is that the stock market price responses to the announcements of mergers and their subsequent divestitures suggest both an approval of the mergers ex ante as well as an approval of their break up, through divestitures, ex post.¹⁶ This seemingly contradictory pattern, which is interpreted by Shleifer and Vishny as evidence of market inefficiency, can emerge naturally from our model of rational agents and markets. Proposition 3 suggests that conglomerate mergers may correct internal agency conflicts sufficiently for the conglomerate to be ex ante value-enhancing. When managerial entrenchment is reduced, eventual divestiture is more, not less, likely. Hence, mergers driven by the benefit of reduced internal agency conflict rather than by the large positive synergies of overlapping or related businesses, as in Region 1, are predicted

¹⁵ The conglomerate discount has been documented using various methodologies including the “multiples valuation” approach (such as in Berger and Ofek, 1995) and the Tobin’s q approach (such as in Lang and Stulz, 1994). The discount has been shown to depend on the relatedness of segments (Berger and Ofek, 1995), differences in corporate governance systems (Lins and Servaes, 1999), and the presence of intangibles (Morck and Yeung, 2002). Others have argued that the diversification discount instead reflects pre-merger valuation (Campa and Kedia, 2002, Graham, Lemmon and Wolf, 2002, and Villalonga, 2000),

¹⁶ This pattern is also observed for the 1980s acquisitions documented in Mitchell and Lehn (1990). Matsusaka (1993) finds that buyers earned significantly positive announcement-period returns during this conglomerate merger wave, even though many firms joined by these mergers subsequently broke up. Ravenscraft and Scherer (1987), for example, estimate that 33% of the acquisitions in the 1960s and 1970s were later divested. Porter (1987) finds that over 50% of the unrelated acquisitions made by conglomerates were later divested. Similarly, Kaplan and Weisbach (1992) document that for a sample of large acquisitions between 1971 and 1982, almost 44% of the acquirers had divested the target company by 1989.

to display the pattern that they are ex ante value enhancing and they result in successful divestiture ex post.¹⁷

VI. Extensions

In this section we show how our main results are robust to the inclusion of both debt financing and optimal incentive contracts.

A. The Choice of Capital Structure

Bagwell and Zechner (1993) have suggested that debt financing may serve to mitigate internal agency conflicts. In this section we show that our main intuitions are robust to the inclusion of debt as an instrument for controlling internal agency conflicts, and we relate the optimal financing choice to the nature of the assets in place.

For illustration, we modify the basic model as follows. Assume now that at time 2 a division realizes its first cash flow, a random variable independently distributed with mean $C > 0$. For simplicity, C is independent of division type and organizational form. At time 0, in addition to choosing the organizational form, the board of directors chooses the face value of short term debt maturing at time 2 to maximize ex ante firm value. Equity (zero debt) remains a choice. Once the firm is levered, financial distress is possible at time 2, since the cash flow realization may not be sufficient to repay the debt liability.

When in financial distress, control of corporate decisions is transferred to (or at least greatly influenced by) the creditors of the firm, who typically have less information than do the firm's insiders (see, for example, Giammarino, 1989). To formalize this notion, we assume that while the board of directors learns the value of the type parameter T for a division at time 2, the bondholders do not. Given this information structure, the bondholders' divestiture decisions must be made conditional on the more limited information set which is available to them: the observed time 2 cash flows and the observed divestiture opportunities. Thus, the choice of capital structure at time 0 credibly commits a firm to a specific information set on which

¹⁷An alternative explanation of this pattern is offered in Fluck and Lynch (1999).

it will base time 2 divestiture decisions. The board of directors would themselves be unable to credibly commit to ignore their knowledge of the division's type once it has been obtained, when the consideration of such information would enhance their decision-making ability.

The difference between the divestiture decisions of bondholders and the board of directors has the important implication of changing the divisional managers' incentives to entrench at time 1. Specifically, debt financing may allow the board of director to dissuade divisional managers from engaging in entrenchment, and thus may ameliorate internal agency conflicts. This possible benefit provided by debt financing, however, has the disadvantage of inducing inefficient divestiture decisions in the event of financial distress. These inefficiencies, arising from bondholders' blindness to divisional type when making divestiture decisions, represent the costs of controlling internal agency conflicts with debt. Therefore, the choice of optimal capital structure in a firm trades off the possible beneficial effect on the internal incentives against the cost of the bondholders' inefficient liquidations. Further, merging may reduce the amount of debt that is necessary to manage incentives and, thus, may reduce the cost of controlling internal agency conflicts with capital structure.

The optimal form of financing for the merged firm depends on the nature of divisional assets and on the level of expected synergies. For extreme synergy levels, debt is not necessary to control internal incentives and thus mergers will be equity-financed. For moderate synergy levels, however, debt may be an instrument which enables mergers to be value-enhancing. This strategic role of debt is most significant when assets are not firm-specific, as in Region 4, since only under these conditions do moderate synergies alter divisional incentives and create the need for debt beyond that for comparable single-division firms. For firms with high asset specificity, as in Region 3, in contrast, moderate synergies have little effect on incentives, limiting the need for debt beyond that for comparable single-division firms.¹⁸

¹⁸ For a complete analysis, see Bagwell and Fulghieri (1995).

B. Optimal Incentive Contracts

Our model hinges on the effects of internal agency conflicts in the absence of complete contracts. While in our basic model managers are paid a constant (zero) wage, an incentive contract provides the board of directors with an additional instrument for controlling internal agency conflicts. In fact, it may be possible that by the careful design of incentive contracts, the board of directors may reduce or even completely eliminate enrichment activities. In this section, we outline a modified version of our model which suggests that the main intuitions continue to hold in this richer contractual setting.

Assume now that divisional managers are risk averse, and that the personal cost suffered by a divisional manager upon divestiture depends on divisional type T . The cost may be interpreted as the "cash equivalent" of pecuniary and non-pecuniary costs, such as reputation losses. The board of directors of a single-division firm may attempt to control internal agency conflicts by offering a compensation schedule, ω , consisting of a fixed wage plus a state-dependent payment that is contingent on contractible events, such as the ex-post divestiture decisions and the realized value of the outside opportunity.¹⁹ If so, total compensation W can be denoted as $W = \omega[O, \phi(T, O)]$. Specifically, in our model the board of directors can deter a type M manager from engaging in entrenchment by paying managers a flat wage plus an appropriate payment in the case of a divestiture. These payments, which can be interpreted as severance, may lead firms to pay managers an expected compensation which is higher than the one paid under a fixed wage contract (that is, the contract we consider in main body of this paper).

At time 0, the board of directors chooses the compensation schedule ω that maximizes ex-ante firm value, net of expected compensation costs, subject to appropriate incentive compatibility and individual rationality constraints. The optimal managerial contracts, determined by the board of directors, trade off the benefits of reducing entrenchment activities against the possible additional compensation that is necessary to eliminate such activities. These additional wages represents the cost of resolving internal agency conflicts

¹⁹ Such state-dependent payments may include "golden parachutes" or similar severance payments.

by the use of incentive contracts. As such, they are comparable to the costs of financial distress which are incurred by firms who instead reduce agency by the use of debt discussed in the previous section.

The main insight of our paper is that synergies interact with internal incentives in ways that may magnify or reduce these costs. Upon merging two divisions, synergies may change the divestiture policy of the merged firm in a way that it increases the cost of reducing entrenchment activities by the use of incentive contracts. This implies that, even if internal agency conflicts could be (partially) resolved by the optimal design of incentive contracts, synergies may affect the cost of implementing such contracts. The double-edged sword of mergers may then manifest itself as a trade-off between positive (or negative) synergies and an increase (or decrease) in the cost of addressing internal agency conflicts with incentive contracts.

VII. Conclusion

This paper investigates the interaction between synergies and internal agency conflicts that emerges endogenously in multi-division firms. The analysis yields several empirical implications concerning observed merger and divestiture activity. For diversifying mergers, post-merger valuation should be increasing in the degree of asset specificity. This may justify both an absence of diversifying mergers in industries characterized by limited asset specificity and a diversification discount for conglomerates with limited asset specificity. Moreover, organization complexity, as it arises from the nature of assets, may arise indirectly from the nature of product market competition. We can also explain why, in a rational model, mergers may be valuable *ex ante* while leading to successful divestitures *ex post*.

The extent to which an explicit consideration of the interaction between synergies and firms' internal conflicts truly enhances our understanding of mergers and divestitures is ultimately an empirical question. In future research, we plan to test the empirical predictions derived from the model, focusing on the cross-sectional variation it predicts. Such work, of course, must recognize the importance of other factors, such as taxes, which are not modeled here and which may help explain observed regularities. It would be interesting to isolate that portion of acquisition activity which is truly because of expected synergies, the

"synergy fever," and that portion which is actually motivated by internal agency issues. The 1995 divestiture of AT&T, in seeming defiance of the synergistic merger trend of its time, reminds us that "synergy-seeking is hard work . . . persuading business units to sacrifice their own narrow interests to the interests of the firm as a whole" (*The Economist*, 8/20/94).

Table I - Sequence of Events

Time $t = 0$: Choice of Organizational Form

The board of directors chooses the organizational form f , with $f \in \{s, m\}$, deciding whether to merge the two divisions in a single multi-unit firm ($f = m$), or to organize them as independent, single-division firms ($f = s$).

Time $t = 1$: Entrenchment Activities

The divisional manager of division T receives a fixed wage, which is normalized to zero, and learns her type T to be high, medium, or low, $T \in \{H, M, L\}$. θ_T is the ex-ante probability that a division is of type T . She then chooses her level of entrenchment activities i , $i \in \{0, I\}$, where the activities are undertaken at personal cost z . Division F is known to be of fixed value F and its manager chooses not to entrench herself.

Time $t = 2$: Divestiture Decisions

The board of directors decides whether or not to divest division T , after observing its type, $T \in \{H, M, L\}$, and its realized outside opportunity, $O \in \{G, B\}$. The probability that the outside opportunity is good is $\pi(i)$, which depends on the level of entrenchment activities i chosen by the divisional manager at $t = 1$. The manager of a divested division incurs a personal cost which is normalized to 1. Division F is never divested.

Time $t = 3$: Cash Flow

If non-divested, division T produce a cash flow with expectation $T \in \{H, M, L\}$. Division F realizes a fixed cash flow F . If the two divisions still belong to one multi-unit firm, synergies of expectation R are realized.

Table II - Permutations of Division Types and Divestiture Opportunities

(T,O)	Expected payoff to time 2 divestiture decisions given expected R for the multi-division firm with division T facing outside opportunity O (division F is never divested).
(H,G)	F + G: if divest H F + H + R: if keep H
(H,B)	F + B: if divest H F + H + R: if keep H
(M,G)	F + G: if divest M F + M + R: if keep M
(M,B)	F + B: if divest M F + M + R: if keep M
(L,G)	F + G: if divest L F + L + R: if keep L
(L,B)	F + B: if divest L F + L + R: if keep L

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APPENDIX

Proof of Proposition 2. Given the realized outside divestiture opportunity O , the divestiture policy of a division of type T depends on the expected synergies R .

Region 1: $R \leq \max \{ G - H ; B - M \}$.

1. Division of type H : if $R < B - H$, this division is always divested and its manager does not entrench herself; if $B - H \leq R \leq G - H$, this division is divested only when facing outside opportunity G , and its manager optimally entrenches herself; if $G - H < R < B - M$, this division is never divested and its manager does not entrench herself.

2. Division of type M : if $R \leq B - M$, this division is always divested and its manager does not entrench herself; if $B - M < R \leq G - H$, this division is divested only when facing outside opportunity G , and its manager optimally entrenches herself.

3. Division of type L : this is always divested and its manager does not entrench herself.

Region 2: $\max \{ G - H ; B - M \} < R \leq 0$.

1. Division of type H : this division is never divested and its manager does not entrench herself.

2. Division of type M : this division is divested only when facing outside opportunity G , and its manager optimally entrenches herself.

3. Division of type L : this division is always divested and its manager does not entrench herself.

Region 3: $0 < R \leq B - L$.

1. Division of type H : this division is never divested and its manager does not entrench herself.

2. Division of type M : this division is divested when facing outside opportunity G only when $R < G - M$; thus its divisional manager optimally entrenches herself if $0 < R < G - M$, and does not entrench herself if $G - M \leq R \leq B - L$.

3. Division of type L : this division is always divested and its manager does not entrench herself.

Region 4: $B - L < R < G - L$.

1. Division of type H : this division is never divested and its manager does not entrench herself.

2. Division of type M: this division is divested when facing outside opportunity G only when $R < G - M$; thus its divisional manager optimally entrenches herself if $B - L < R < G - M$, and does not entrench herself if $G - M \leq R < G - L$.

3. Division of type L: this division is divested only when facing outside opportunity G , and its divisional manager optimally entrenches herself.

Region 5: $R \geq G - L$.

Divisions of all types are always kept and their divisional managers do not entrench themselves. QED

Proof of Proposition 3. Given expected synergies R , the optimal organization form for the two divisions is as follows.

Region 1: Given that in this region expected synergies are negative, the divisions should be organized as stand-alone firms unless a positive internal agency effect dominates the negative synergy effect, in which case $\Delta > 0$. From Proposition 2, this may happen only when $R \leq B - M$, in which case equilibria of type $(0, 0)$ exists.

Region 2: From Proposition 2, only equilibria of type $(I, 0)$ exist. Given that in this region expected synergies are negative, the divisions should be organized as stand-alone firms.

Region 3: From Proposition 2, only equilibria of types $(I, 0)$ or $(0, 0)$ exist. Given that in this region expected synergies are positive, the divisions are always optimally merged.

Region 4: From Proposition 2, on only equilibria of types (I, I) or $(0, I)$ exist. Given that in this region expected synergies are positive, a merger is optimal unless a negative internal agency effect dominates, in which case $\Delta < 0$.

Region 5: From Proposition 2, only equilibria of type $(0, 0)$ exist. Given that in this region expected synergies are sufficiently large, the divisions are never divested and are always optimally merged. QED

The Double-Edge Sword of Mergers. We provide here two examples of the double-edge sword of mergers. In Example 1, a merger is dominated despite positive expected synergies; in Example 2, a merger enhances value despite with negative expected synergies.

Example 1. Let $0 < B - L < R < G - M$ (Region 4). The divestiture policy for a multi-division firm differs from that of a stand-alone firm only when a division of type L is confronted with outside opportunity B and is kept. In this case, the manager of a type L division in a multi-division firm will optimally entrench herself, while she will not do so when her division is standing alone. The double-edged sword emerges when the deterioration in incentives overwhelms the positive synergy gains afforded by the joint production, such that Δ is negative:

$$\Delta = -\theta_L \Delta \pi (G - B) + \theta_H R + \theta_M \pi (I) R + (1 - \theta_H) [1 - \pi(I)] (R + L - B) < 0. \quad (\text{A1})$$

Example 2. Let $G - H < R \leq B - M < 0$ (Region 1). The divestiture policy for a multi-division firm differs from that of a stand-alone firm only when a division of type M is confronted with outside opportunity B and is divested. In this case, the manager of a type M division in a multi-division firm will not entrench herself, while she will optimally do so when her division is standing alone. The double-edged sword emerges when the improvement in incentives overwhelms the negative synergy gains afforded by the joint production, such that Δ is positive:

$$\Delta = \theta_M \Delta \pi (G - B) + \theta_H R + \theta_M (1 - \pi) (B - M) > 0. \quad (\text{A2})$$

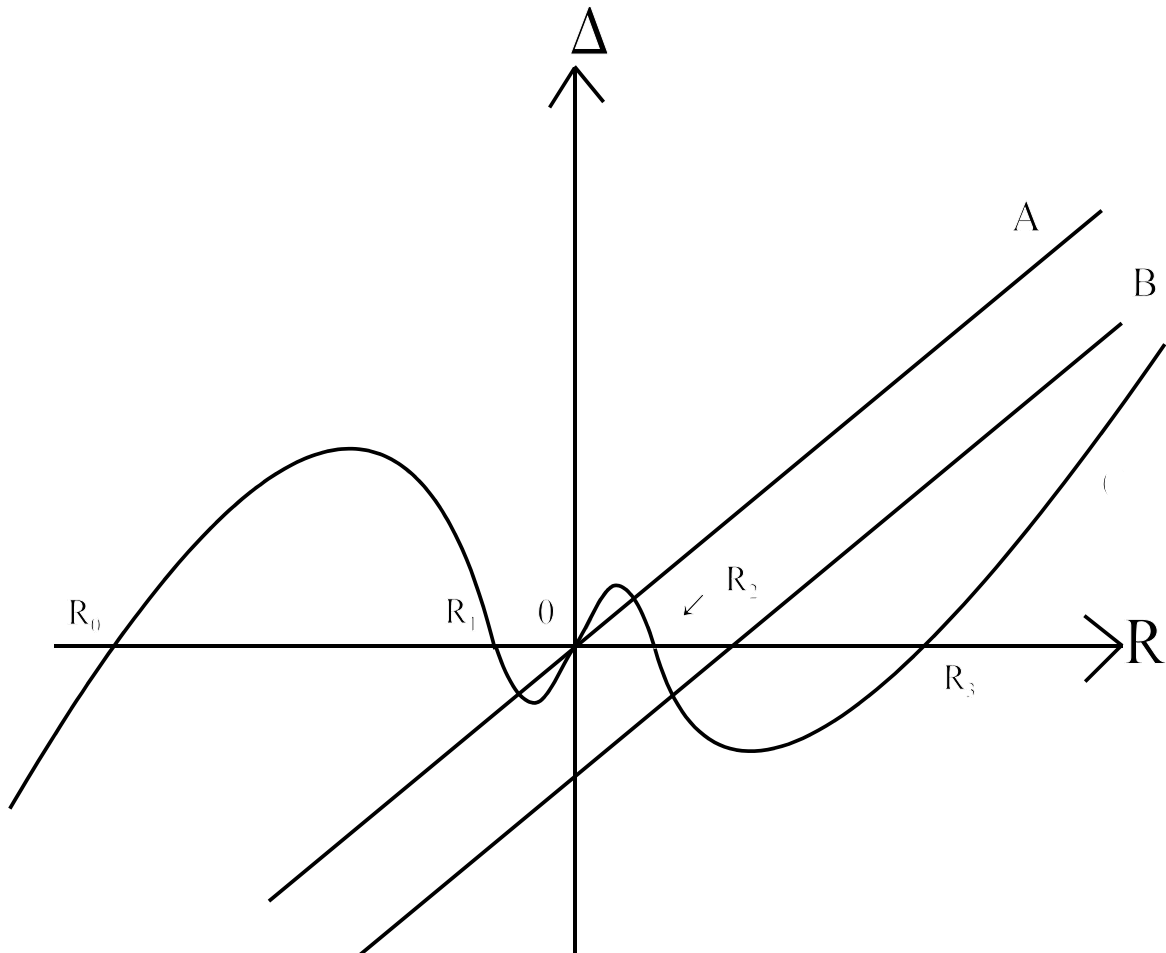


Figure 1. The double-edged sword of mergers. This figure represents the gains from merging, Δ , relative to the expected synergy, R , under three different scenarios. Under scenario A, there are no internal agency conflicts: the gains from merging, Δ , are a monotonically increasing function of the level of expected synergies, R , going through the origin. Under scenario B, a merger imposes a negative internal agency cost which is independent of the level of synergies, R , hence the gains from merging are decreased by an additive term. Finally, under scenario C, the impact of merging on internal agency conflicts is a non-monotonic function of the level of synergies, R . The figure represents the double-edged sword of mergers: for expected synergies in the interval (R_0, R_1) , negative synergy mergers are value-enhancing due to improved incentives, while for expected synergies in the interval (R_2, R_3) , positive synergy mergers are value-decreasing due to worsened incentives.