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Corporate Diversification, Value Maximization, and Organizational Capabilities*

This article develops a dynamic model of a firm in which diversification can be a value-maximizing strategy even if specialization is generally efficient. The central idea is that firms are composed of organizational capabilities that can be profitable in multiple businesses and that diversification is a search process by which firms seek businesses that are good matches for their capabilities. The theory can account for diversified firms trading at discounts compared to single-segment firms, as well as some empirical regularities that are challenging to the agency theory of diversification, such as positive returns to diversification announcements.

I. Introduction

Corporate diversification is widely believed to be inefficient. It runs against one of the oldest ideas in economics, that specialization is productive. A popular explanation for its prevalence is that firms are plagued with agency problems that allow managers to enter new businesses (from which they privately benefit) at the expense of shareholders. However, the empirical evidence suggests that diversification is not entirely an agency phenomenon; although diversified firms trade at a discount relative to single-business firms, investors often bid up stock prices when firms announce diversification programs.[1] While the agency view describes some cases well, it does not appear to provide a complete understanding of diversification.

The goal of this article is to investigate the idea that in some cases diversification can be understood instead as a dynamic value-maximizing strategy revolving around the notion of organizational capabil-

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1. Sec. II contains a review of the empirical literature.

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ities. According to this view, firms consist of organizational capabilities—in particular, the skills and abilities of top and middle management—that are to some degree transferable across products and industries.[2] Because these capabilities are valuable, it may not be optimal for a firm to go slowly out of business as sales of its products decline. Rather it may be better to try to find a new product or industry. The process of searching for a business that is a good match for organizational capabilities is fraught with uncertainty, and in some cases the uncertainty can only be resolved by experimentation—entering an industry and observing the outcome—that is, by diversifying.

I develop a model to explore the view of diversification as a matching/search process. Organizational capabilities are formalized as a firm-specific asset/resource that is productive in many different industries. The productivity in any given industry is uncertain ex ante. The model shows how diversification can be a value-maximizing dynamic strategy even if there are specialization efficiencies, as the empirical literature suggests. Intuitively, if a firm's existing businesses are down but not yet out, it is safer to maintain the old businesses while searching for a better opportunity instead of liquidating and throwing all resources into a new venture with uncertain prospects.

The model is consistent with the seemingly contradictory evidence of discounts for diversified company stocks and positive returns from diversification announcements. Diversified firms trade at discounts because they do not have a good match for their organizational capabilities. Thus, it is poor performance (the lack of good uses of organizational capabilities in existing businesses) that causes diversification, not the other way around. The explanation for positive event returns is more subtle. The model shows that firms with the worst matches for their organizational capabilities will liquidate; only firms whose matches are not too bad will hold on to their existing businesses and diversify. Therefore, a diversification announcement can be good news by signaling that existing businesses are profitable enough to avoid the liquidation option. More generally, the model suggests that the market reaction to a diversification announcement can be positive or negative depending on the characteristics of the announcing company and further identifies some testable hypotheses.

The model is fundamentally dynamic and suggests that time-series information on corporate evolution might be useful in understanding corporate diversification. By way of example, I report some new statistical facts on the 1960s conglomerates. If diversification is a matching/search process, then diversifiers should eventually exit their original home businesses when they find a good match. Business histories suggest that matching/search motives might have been important for the 1960s conglomerates, and it is possible to follow their evolution over a long period of time. I track the businesses of

2. The idea of organizational capabilities plays a central role in Chandler's (1990) history of the modern corporation, and it closely parallels the "resource-based" view of the firm in the strategy literature.

TABLE 1 Empirical Findings on Corporate Diversification

Finding	Source
1. Diversified firms trade at discounts relative to single-business firms	Montgomery and Wernerfelt (1988), Lang and Stulz (1994), Berger and Ofek (1995), Servaes (1996)
2. Many unrelated acquisitions are later divested	Ravenscraft and Scherer (1987), Kaplan and Weisbach (1992)
3. Announcement returns for conglomerate acquisition programs are positive	Schipper and Thompson (1983)
4. Bidder announcement returns for diversifying acquisitions are positive in the 1960s	Matsusaka (1993), Hubbard and Palia (1998)
5. Bidder announcement returns for diversifying acquisitions are mixed in the 1980s	Morck, Shleifer, and Vishny (1990), Kaplan and Weisbach (1992), Hyland (1999)

63 conglomerates from 1958 to 1988, and I show that it is not unusual for these firms to exit their core businesses.

The next section of this article summarizes the empirical literature on corporate diversification. The intention is to highlight the empirical limitations of the agency view and thereby to identify what needs to be explained and to bring the stylized facts into sharper focus. Section III motivates the subsequent theory by presenting the acquisition and divestiture history of five conglomerate corporations and then develops the model. Section IV characterizes the firm's optimal dynamic strategy and offers an interpretation of the evidence in light of the model. Section V sketches an extension. Section VI reports evidence on the evolution of the 1960s conglomerate corporations, and Section VII concludes.

II. Difficulties Reconciling the Evidence with the Agency View

The agency view of diversification is based on the idea that because of diffuse stock ownership, individual shareholders have neither the incentive nor the ability to monitor and discipline managers. Managers are left with leeway to pursue their personal objectives, which might include empire building (Baumol 1967), protecting their specific human capital from firm risk (Amihud and Lev 1981), and entrenchment (Shleifer and Vishny 1989). Diversification is seen as a way for managers to advance these personal goals instead of to maximize shareholder value.

While the agency view helps to understand particular cases, such as oil companies in the 1970s (Jensen 1986), it is difficult to reconcile with some of the evidence in the literature. Table 1 summarizes several regularities and provides a partial list of references. Much of the appeal of the agency view derives from the well-known diversification discount and the high sell-off rate of diversifying acquisitions, regularities 1 and 2. Neither of these regularities is conclusive. Regarding regularity 1, it remains an open question whether

diversification causes discounts or whether firms diversify *because* they trade at discounts.[3] Regularity 2 suggests that unrelated acquisitions do not work out. However, firms make money on sell-offs: Kaplan and Weisbach (1992) report that roughly one-half of the divestitures were successful acquisitions in the sense that their sale price exceeded their purchase price by more than the increase in the Standard and Poor (S&P) 500 Index.

Positive announcement returns to diversification programs and individual diversifying acquisitions in the 1950s and 1960s, regularities 3 and 4, are significantly at odds with the view that agency problems are the primary reason for diversification. If managers diversify against the wishes of shareholders, why are investors willing to pay more for a company when it makes a diversifying acquisition or when a conglomerate announces an acquisition program? The mixed evidence on announcement period returns, regularity 5, is not helpful either insofar as agency theory clearly predicts negative returns.[4]

Regularities 1–5 are benchmarks against which theories of corporate diversification can be compared. Taken together, they suggest that diversification is not driven entirely by agency problems. To be clear, this is not to say that agency problems play no role in diversification. Indeed, there is ample evidence that managers stay diversified for too long and that they sometimes require external pressure to refocus.[5] But diversification is ubiquitous; it seems premature to declare that so widespread a phenomenon is solely the result of poor managerial incentives.[6]

III. A Matching/Search Model with Organizational Capabilities

A. Restructuring as an Ongoing Process: Illustrations

The model incorporates a view of diversification that is fundamentally dynamic. Firms repeatedly enter new businesses and exit old ones in search of good matches for their organizational capabilities. To give a sense of the behavior envisioned, figure 1 presents 30-year acquisition and divestiture histories of five companies, Gulf & Western, International Telephone & Telegraph, Ling-Temco-Vought, Litton, and Textron. I chose these companies

3. Lang and Stulz (1994), Servaes (1996), Campa and Kedia (1999), Hyland (1999), and Villalonga (1999) all report that diversified firms were trading at discounts prior to diversifying, although significance levels vary. Weston and Mansinghka (1971) and Gort, Grabowski, and McGuckin (1985) find lower accounting profits for conglomerates prior to diversifying.

4. Using different samples and methodologies, Morck, Shleifer, and Vishny (1990) find marginally significant negative returns, Kaplan and Weisbach (1992) find insignificant mixed returns, and Hyland (1999) finds significant positive returns.

5. For examples, see Bhagat, Shleifer, and Vishny (1990), Weisbach (1995), Berger and Ofek (1996), and Denis, Denis, and Sarin (1997).

6. Montgomery (1994) reports that the 500 largest U.S. companies operated in an average of 11 different industries in 1985, 1989, and 1992. Gort (1962) finds that 111 large firms were selling products in an average of 20 different industries in 1954. The often-noted decline in aggregate diversification beginning in the 1970s (Gollop and Monahan 1991) should not be exaggerated: the magnitude of the change is small, and there is evidence that the largest 500 corporations have been increasing their diversification (Montgomery 1994).

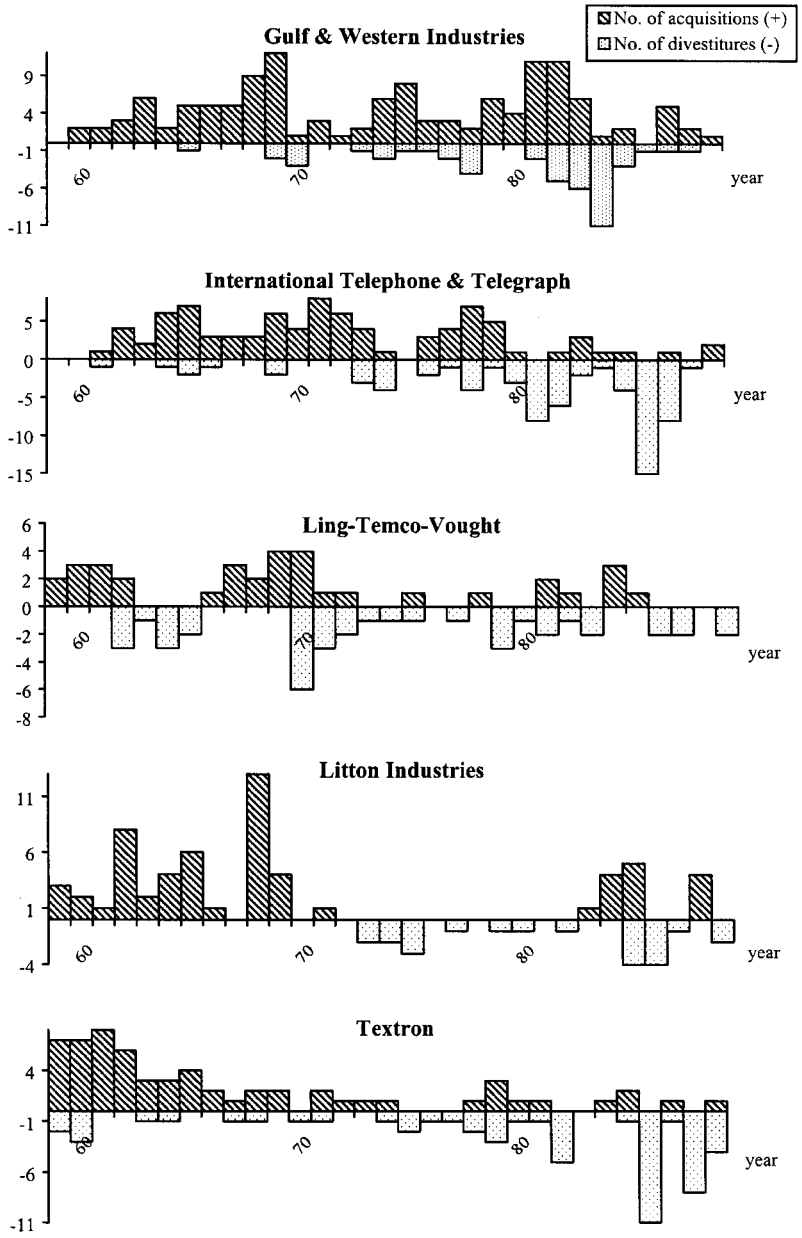

FIG. 1.—Acquisition and divestiture history of five conglomerate corporations: 1958–88.

because they were the so-called conglomerate kings chronicled in Sobel (1984). Each panel in figure 1 plots by year (1958–88) the number of acquisitions as a positive number and the number of divestitures as a negative number.[7] For example, Textron announced seven acquisitions and two divestitures in 1958.

The histories do not give the impression that the structure of these firms is ever "at rest" in the sense of attaining some sort of static organizational equilibrium. Rather, we see intermittent cycles of acquisitions and divestitures—sometimes concurrently and sometimes alternating—that continue throughout the entire 30-year period. Overall, for these firms, acquisition and divestiture were not singular corporate events but appear to have been an ongoing way of life. The rest of this article develops the idea that it is fruitful to think of ongoing diversification as a search process by which these firms try to find good matches for their organizational capabilities.

B. The Model

The theory is developed in the framework of a neoclassical model of the firm.[8] At the heart of the model is the idea of organizational capabilities. Chandler (1990) describes a firm's organizational capabilities as the collective physical facilities and skills of employees, especially the abilities of the top and middle management. More specifically, organizational capabilities can be thought of as marketing skills, distribution skills, product development skills, organization skills, and so on. They are general capabilities that potentially are applicable to different industries.

For the purposes of this article, organizational capabilities can be modeled as firm-specific inputs to a firm's production function. They must be firm-specific (owned by the firm/shareholders), or the revenue they generate will be distributed as factor payments and not accrue to the shareholders.[9] In addition, they must be transferable across businesses, at least to some degree.

7. The raw data were all of the companies' mergers, acquisitions, and divestitures that were reported in the *Wall Street Journal* Index. Acquisitions and divestitures of minority stakes are included; the message is essentially the same if they are excluded. The years were chosen to parallel the empirical analysis in Sec. VI below.

8. Two other recent papers take a neoclassical approach to diversification. Jovanovic (1993) develops a dynamic model that seeks to account for long-run trends in diversification, but does not incorporate uncertainty and the associated search dynamics. Maksimovic and Phillips (1998) develop and test a static model that focuses on divisional productivity. Both studies are complementary in many respects to the approach taken here.

9. At a more "micro" level, organizational capabilities might be modeled as cospecialized or firm-specialized investments by managers in coordinating mechanisms, communication channels, and information relevant for matching people to tasks and workers to teams. For example, Prescott and Visscher (1980) develop models in which a firm's managers accumulate information about each worker's abilities that is useful for matching workers to tasks or forming them into teams. (Gort, Grabowski, and McGuckin [1985] develop a similar theory.) This specific human capital benefits shareholders only if managers and workers cannot market their services as a group. Suppose, e.g., that the information pertains to tasks that are specific to assets or products owned by the firm. Another impediment to leaving as a team is that individuals might find it difficult to agree on a division of the group's rents (see Mailath and Postlewaite [1990] for a model).

Formally, denote the firm's organizational capabilities as a quantity T of a firm-specific productive resource that can be allocated across an infinite number of activities. Perhaps the most natural interpretation is that T is the time of the top managers whose skills are specific to their firm. The amount allocated to activity i is t_i and $\sum_i t_i = T$.

To incorporate the notion that a firm is better at some activities than others, I assume that the productivity of T varies across businesses. The index of productivity in activity i is $\theta_i \in [0,1]$, sometimes referred to as the quality of the "match" between the firm's capabilities and an activity. Revenue, y, is produced with t and a market input x (such as production workers) with a given price ω according to

$$y_i = \theta_i g(t_i, x_i).$$

The function g is convex in t, concave in x, and $g_{tx} \geq 0$. Convexity in t captures the idea that specialization is productive. One of the purposes of the model is to show how diversification might be adopted as a value-maximizing strategy even if it is subject to static inefficiencies of this sort.[10]

The indirect profit function for a given activity is

$$\pi(t, \theta) = \max_x [\theta g(t, x) - \omega x],$$

where the activity index is suppressed. A firm's total profit is $\max_{\{t_i\}} \Sigma_i \pi(t_i, \theta_i)$. Conventional production theory implies that π is increasing and convex in t. This means that holding constant the match quality θ, it is more profitable to allocate T to a single business than to divide it between two: $\pi(T, \theta) > \pi(t, \theta) + \pi(T - t, \theta)$. That is, specialization to a single activity is the optimal static form of organization.

To capture the idea that the firm faces uncertainty about which businesses are best suited to its organizational capabilities, θ_i is assumed to be a random variable for each i (with independent distribution and density F and f, respectively), and the only way to learn the realization is by allocating some T to activity i for one period. The interpretation is the following: the firm sets up business in industry i by investing t in that activity, hires a quantity of x to produce, and at the end of the period learns whether it is a good match

10. Concavity would make diversification the preferred static choice in some cases (see n. 26). A great deal of recent work investigates static inefficiencies in multidivision firms. For example, Williamson (1975), Gertner, Scharfstein, and Stein (1994), Stein (1997), Rajan, Servaes, and Zingales (2000), Scharfstein and Stein (2000, and Matsusaka and Nanda (forthcoming) develop models in which investment decisions can be inefficient in multidivision firms. Some evidence consistent with investment distortions in internal capital markets appears in Scharfstein (1997) and Rajan, Servaes, and Zingales (2000). Williamson (1985) and Rotemberg and Saloner (1994) suggest that integration can be costly because it leads to adoption of contracts with low-powered incentives.

for industry i.[11] The structure here is essentially a search model, where the firm is searching over revenue functions θg.

All of the results are driven by the idea that θ_i is unknown until the firm enters the business. In principle, this uncertainty can arise from a number of sources depending on the precise nature of the firm's organizational capabilities. To give a concrete example of a type of uncertainty that could be present, consider this description of the diversification strategy of Sara Lee Corporation, a diversified consumer products company: "The company zeroes in on a fragmented consumer market, typically dominated by sleepy private-label manufacturers. [CEO John] Bryan buys an existing player or two for quick economies of scale. Next, he works to improve manufacturing productivity. And Sara Lee pours on the advertising to develop a powerful brand image—but prices its offerings competitively."[12]

In terms of the model, Sara Lee's organizational capabilities appear to be in improving manufacturing productivity and developing brands. When the company enters a new market, then, there are two sources of uncertainty: whether top management's skills at reorganizing production facilities will apply in the new business and whether its marketing skills will be effective for the new product, which might be targeted at an unfamiliar set of customers. The model is rather stylized in assuming that firms draw blindly from the same distribution every time they enter a new business. In practice, they might have a good idea about their fit with the new business and might take steps to reduce uncertainty. The point is that there is a certain amount of irreducible uncertainty that comes along with any new venture.[13]

Two additional assumptions are made to ease the exposition: (i) the firm must divide T equally across all of its lines of business, and (ii) the firm can enter only one new industry per period. The first assumption prevents the firm from experimenting with a new business while allocating an arbitrarily

11. The assumption that some T is allocated to the new business means the model would not apply to pure holding companies, such as Berkshire Hathaway, where top managers do not participate in running the units. Such cases appear to be rare—in most multidivision firms, headquarters does play a role in managing the divisions. For example, even in the highly decentralized "financial conglomerates" like the old ITT, the top managers receive regular reports from the business units and are involved in the budgeting decisions (one of the organizational capabilities might be project evaluation). On the role of headquarters in diversified firms, see Berg (1969), Hall (1987), and Chandler (1991). The model also would not apply to situations where the synergy is believed to arise from extension of a brand name or reputation.

12. The quotation appears in an article entitled "This Marketing Effort Has L'Eggs," which appeared in *Business Week* on December 23, 1991 (p. 50).

13. The president of 3M Corporation, a well-known conglomerate, observed: "Our company has, indeed, *stumbled* onto some of its new products. But never forget that you can only stumble if you're moving" (as quoted on p. 5 of Collins and Porras [1996]). Weston (1989, p. 70) gives an example of ARA Service, another conglomerate, that divested a previously acquired management consulting firm "because it found that the business depended on key individuals while ARA was built on systems and controls." He quotes a company executive who says that management consulting was "not a business we belonged in, and it took us about four years to find out." For a vivid account of the conglomerate Houdaille's attempts to improve the performance of an acquired machine tool company, see Holland (1989).

small amount of T to its home industry, thereby pushing the diversification penalty arbitrarily close to zero.[14] The second assumption leads the firm to operate in no more than two industries at a time.

The firm lives forever, discounts the future at δ, and maximizes value. At the start of any period, the value from following the optimal strategy is $v(\theta)$, where θ is the quality of the best match so far encountered. This θ can be thought of as the firm's best existing business.[15]

Each period the firm must choose one of three courses of action: specialization, diversification, or liquidation. If the firm chooses to specialize in θ during the current period and follows its optimal strategy thereafter, its value is

$$\alpha(\theta) = \pi(T, \theta) + \delta v(\theta).$$

The first term reflects the fact that all of T is allocated to the existing business.

If the firm continues to operate its θ business while simultaneously experimenting in a new industry, that is, diversifies, its value is

$$\beta(\theta) = \pi(T/2, \theta) + \pi(T/2, \bar{\theta}) + \delta v(\theta)F(\theta) + \delta \int_{\theta}^{1} v(\theta')f(\theta')\mathrm{d}\theta',$$

where $\bar{\theta} = \int_0^1 \theta' f(\theta')\mathrm{d}\theta'$. The first two terms represent current profit from the existing and new business, respectively. Note that the firm hires x in the new business before θ is known, based on its expected value, $\bar{\theta}$. The last two terms are the discounted expected value of the firm next period. The third term is where the new match is no better than the existing match; in this case, which occurs with probability $F(\theta)$, the state variable remains θ. The fourth term is where the new match is better than the existing match; in this case, the value tomorrow is the expected value of v over $[\theta, 1]$. Intuitively, the third term is the case where the firm exits the new business next period, and the fourth term is where it exits the existing business.

The final course of action is to liquidate, that is, to abandon θ and start fresh with a new draw. The firm's value in this case is

$$\gamma = \pi(T, \bar{\theta}) + \delta \int_{0}^{1} v(\theta')f(\theta')d\theta'.$$

Other strategies are possible, but they will never be chosen. At any point of time, the firm's value is then

$$v(\theta) = \max[\alpha(\theta), \beta(\theta), \gamma]. \tag{1}$$

14. A messier, but effectively equivalent approach would be to set a lower bound on the t that must be allocated to each business.

15. Given that F is known and constant across time, recall is irrelevant because the firm will never want to return to an abandoned business.

IV. Value-Maximizing Behavior

A. Main Result

The recursive statement of the firm's value (1) is an equation in the unknown v. The following proposition characterizes the solution and shows how the optimal strategy (α, β, or γ) depends on θ.

PROPOSITION 1. The solution to equation (1) is

$$v(\theta) = \begin{cases} \alpha(\theta) & \text{if } \theta \geq \theta_1; \\ \beta(\theta) & \text{if } \theta_1 > \theta \geq \theta_0; \\ \gamma & \text{if } \theta < \theta_0; \end{cases} \tag{2}$$

or

$$v(\theta) = \begin{cases} \alpha(\theta) & \text{if } \theta \geq \theta_*; \\ \gamma & \text{if } \theta < \theta_*. \end{cases} \tag{3}$$

Proof. (i) Standard contraction mapping arguments as in Stokey and Lucas (1989) show that equation (1) has a solution, it is unique, and v is continuous and nondecreasing. (ii) The next step is to show that the α, β, and γ curves are configured as indicated in figure 2. First, because $\pi(t, 0) = 0$ and v is nondecreasing, $\alpha(0) < \beta(0)$; $\beta(0) < \gamma$ because $\pi(T/2, \theta) > \pi(T, \theta)$. Then $\alpha(0) < \beta(0) < \gamma$. Second, $\alpha(1) > \beta(1)$ because $\pi(T, 1) > [\pi(T/2, 1) + \pi(T/2, 1)] > [\pi(T/2, 1) + \pi(T/2, \theta)]$; and $\alpha(1) > \gamma$ because v is nondecreasing. Third, γ is a horizontal line in θ, while α and β are increasing continuous functions. Where the derivatives exist, $\alpha' = g[T, x^*(T, \theta)] + \delta v'$, and $\beta' = g[T/2, x^*(T/2, \theta)] + \delta F(\theta)v'$, using the envelope theorem (x^* is the optimal x). The fact that g and x^* are increasing in T establishes that $\alpha' > \beta'$. Taken together, these facts imply that the α, β, and γ curves cross each other at most once. Therefore, the three curves must be configured as in panel *a* or panel *b*.[16] (iii) The function v in either case is the upper envelope of the curves, which is indicated with a dark line. The important difference between the cases is that in panel *a*, the β curve lies above the α and γ curves for some θ, while in panel *b*, β is always below α and γ. In panel *a*, the solution takes the form of equation (2); in panel *b*, it takes the form of equation (3).

Both configurations (2) and (3) (which correspond to panels *a* and *b* of fig. 2, respectively) are possible, depending on parameter values and functional forms. In configuration (3), diversification never occurs. A firm with a bad match simply liquidates. This configuration attains when specialization efficiencies are large. The more interesting case is configuration (2). Here, a value-maximizing firm follows the α strategy when θ is high, the β strategy for intermediate values of θ, and the γ strategy for low values of θ. It is

16. A third possibility, subsumed in panel *b* of fig. 2, is that the β curve never crosses the γ curve.

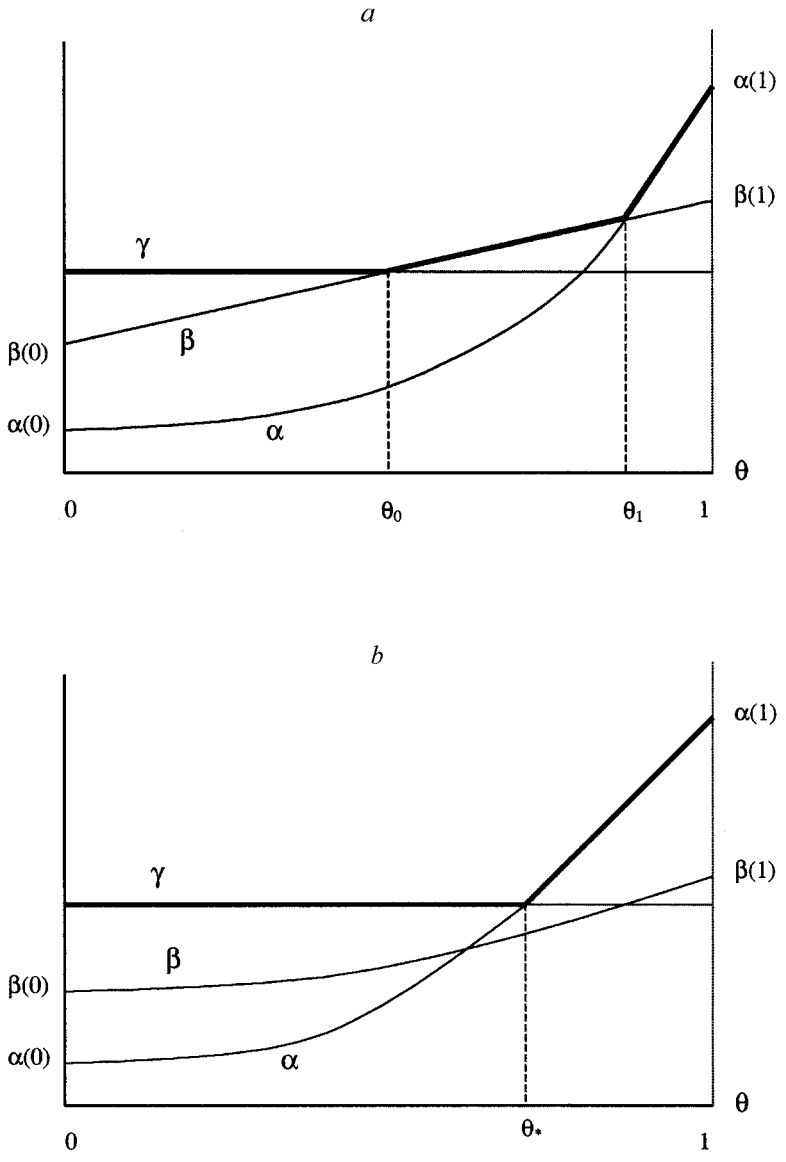

FIG. 2.—Solution of the firm's value-maximization problem

immediately clear that diversification can be an optimal strategy, even when there is a specialization premium.

The behavior can be stated more intuitively. A firm with an extremely bad match, $\theta < \theta_0$, abandons its original business and takes a new draw. The γ strategy is essentially one of liquidating the current business and moving on to something new.[17] A firm with a value of θ between θ_0 and θ_1 follows the diversification strategy, β. It seeks a better match in another industry while keeping one foot in its current business. The firm searches because its current match is not too good, but it maintains the old business to insure against the possibility of a particularly bad outcome in the new industry. Finally, a firm with a good match, $\theta \geq \theta_1$, pursues the α strategy and specializes.

The picture of diversification here is that firms enter businesses on an experimental basis. Those that do not work are divested; those that succeed are improved and become core activities. A case in point is General Electric, whose 1989 annual report described its policy as follows: "Each business was to be number one or number two in its particular market. For those that were not, we had a very specific prescription—they were to be fixed, sold, or closed" (Chandler 1991). The strategy of 3M Corporation noted above seems to fit the picture as well.

B. Remarks

1. Some observers argue that high divestiture rates indicate the failure of diversification strategies, for example, Porter (1987). The model points out, however, that a large number of divestitures may not be evidence of a failed strategy so much as of failed experiments. As long as the firm faces some uncertainty about the applicability of its organizational capabilities in a new business, there is no way to avoid the possibility of a bad draw.[18] As an analogy, the fact that many holes come up dry when exploring for oil does not mean that drilling for oil is a bad strategy.

2. An interesting feature of the model is that, even though diversification is a value-maximizing strategy, diversified firms may trade at discounts relative to specialized firms. A popular measure of discounts is Tobin's q, which can be expressed as $q(\theta) = v(\theta)/k$, where k is the replacement cost of the firm's assets (k is outside the model). Thus, q is increasing in θ, and it rises as a firm moves from γ to β to α strategies. Diversified β-strategy firms trade at discounts relative to specialized α-strategy firms for two reasons—they must

17. This is a somewhat unnatural way to think about liquidation since the firm's organizational capital remains intact. A more intuitive approach would be to include a breakup value for the resources generating the organizational capabilities. The breakup value would be composed of an opportunity cost that is subtracted from π each period. This would vertically shift down v. If the opportunity cost is large enough, γ would be negative, and the firm would disband entirely and sell off piece by piece the components of the organizational capital when it falls in the γ region instead of taking a new draw. The model's implications would otherwise be the same.

18. It is interesting to note that Weston (1989) studied the same conglomerates criticized by Porter (1987) for their high divestiture rates and found that in 21 of the 33 firms, shareholder returns outperformed the market over the period in question.

pay the efficiency cost of operating in multiple industries for an unknown number of periods, and they do not have good matches. Specialized firms have good matches, are done experimenting, and reap the benefits of focus. Diversified firms trade at premiums relative to specialized γ-strategy firms, but there is some reason to expect that such firms are underrepresented in most empirical studies—until a business finds a good match for its organization capabilities, it is unlikely to offer publicly traded securities, to be listed on a major stock exchange, and to meet the minimum size threshholds of most studies.[19] To the extent that most studies focus on α- and β-strategy companies, they would find lower q's for diversified firms.

3. The model suggests that a firm diversifies when it has organizational capabilities that are poorly matched to its businesses. One implication is that diversification is more valuable among firms with significant amounts of organization capital. Morck and Yeung (1998) report some supportive evidence under the view that investment in R&D and advertising leads to creation of organizational capabilities. Another implication with empirical support is that firms perform poorly before they start to diversify.[20] Weston and Mansinghka (1971) labeled this pattern "defensive diversification." Defensive diversification has been criticized as benefiting managers who have personal interests in extending the life of the enterprise. The criticism assumes that shareholders would be better off if the company was liquidated and the proceeds were paid out. In contrast, the organizational capabilities view suggests that defensive diversification can be good for shareholders. This is because liquidation is not always the most valuable course of action; as long as the preexisting match is not too bad, holding on to current business while searching is more profitable than liquidating and starting from scratch. The key insight, seen from a different perspective, is that even liquidated assets must be directed to a good use—liquidation itself does not solve the matching problem.

4. Another implication of the model concerns the evolution of corporate businesses. Taken literally, the model predicts that diversified firms start in one industry but may end up exclusively in another. The firm diversifies because its current match is poor; when it finds a good enough match, it refocuses in that industry, discarding its original industry.[21] There are plenty of anecdotes that fit this pattern. For example, Textron began in textiles and ended up in defense, shedding its textile operations along the way; Gulf & Western began as an automobile parts distributor, became a major cigar manufacturer, and ended up as Paramount, a communications company. Some statistical evidence relating to this implication appears in Section VI below.[22]

19. For example, Lang and Stulz (1994) exclude firms with less than $100 million of assets.

20. See n. 3 above.

21. This implication would take a more conditional form in a more complicated model. For example, if the model were extended so that the distribution of matches, F, is unknown, some firms might refocus into their home industry.

22. Some instances of diversification do not fit this pattern, notably the oil companies studied by Jensen (1986), which reinforces the point that there are many reasons for diversification.

5. Refocusing occurs when a firm finds a business that is a good match for its organizational capabilities; it then divests unrelated businesses that are inferior matches. If investors perceive refocusing in this way, we expect to see three patterns in the data concerning divestiture. First, a refocusing announcement will have a positive event return. Second, after divesting its unrelated operations, the remaining business will perform better because (i) it is a good match and (ii) the firm enjoys the specialization premium. Third, and in contrast, a divestiture that is not part of a refocusing program is less likely to result in improved performance for the remaining businesses. Evidence in John and Ofek (1995) and Daley, Mehrotra, and Sivakumar (1997) is consistent with these predictions.

C. Comparative Statics

This section focuses on two comparative static results.[23]

PROPOSITION 2. The probability that the firm is diversified in any period is increasing in the spread of F and increasing in δ. For the proof, see the appendix.

An increase in the spread of F leads to more diversification primarily because the uncertain new venture is a real option for the searching firm. If the venture turns out poorly, no matter how poorly, the firm simply leaves the business. However, if it turns out well, the firm's value depends on how well. Thus, the value of diversifying only depends on the potential upside of the new businesses. One implication is that diversification becomes more common in times or places with high volatility. This reasoning also suggests that, if given a choice, diversifiers prefer to enter risky businesses, or businesses with a significant upside potential, all else equal. This might help to to explain why diversifiers tend to enter new and growing industries.[24] The logic also implies that, when diversifying, firms may act as if they are risk lovers: given two prospective ventures with the same expected match quality, the diversifier will choose the riskier one. Such behavior has a number of interesting implications: a diversifier might enter an industry with a low expected success rate even if there are investment opportunities that look like better matches (if the low opportunity has significant uncertainty), diversifiers will pursue synergies that look like longshots to outsiders, and a great many of these tries will ultimately fail.

The second part of proposition 2 indicates that the probability of diversification is positively related to the discount rate. The main intuition is that as the future becomes more valuable, it is optimal to search more before specializing. We might expect an inverse relation between δ and the real interest

23. One could also investigate what parameter configurations cause panel *a* of fig. 2 to attain instead of panel *b*. This leads to comparative-static-like results in the same direction as indicated in proposition 2.

24. See, e.g., Gort (1962, p. 4): "Companies have diversified largely into industries characterized by rapid technological change." He interprets such industries as being characterized by significant amounts of uncertainty.

rate, in which case the model predicts that diversifying mergers are more common when real interest rates are low. The same intuition suggests what would happen in a model where the firm's organizational capabilities depreciate over time. As the depreciation rate rises, the future payoff from finding a good match would fall relative to the current opportunity cost of not specializing, making diversification less attractive. This could lead to some interesting implications about the timing of focus changes if coupled with a theory of the sources of organizational capabilities. For example, if organizational capabilities reside primarily in the CEO, then the relevant discount rate would rise as he or she nears retirement. We should then observe significant amounts of diversification early in a CEO's term and refocusing as retirement approaches.

V. An Extension

An unsatisfying aspect of the basic model is that all firms end up specialized. From a modeling point of view, what is missing is a force that degrades the match quality over time. One reason to expect such an effect is competition; other firms will eventually discover better products, production processes, and so on, eroding the profit from existing businesses.

To sketch a specific case, suppose that each period with probability p, the quality of the home industry match erodes from θ to $z\theta$, where $z < 1$. The expression for γ is the same as above, but α and β must be modified. Specifically,

$$\alpha\theta = \pi(T, \theta) + (1 - p)\delta v(\theta) + pv(z\theta),$$

and

$$\begin{aligned}\beta(\theta) = {} & \pi(T/2, \theta) + \pi(T/2, \bar{\theta}) + (1 - p)\delta v(\theta)F(\theta) \\ & + (1 - p)\delta \int_0^1 v(\theta')f(\theta')d\theta' + p\delta v(z\theta)F(z\theta) \\ & + p\delta \int_{z\theta}^1 v(\theta')f(\theta')d\theta'.\end{aligned}$$

As before, v is defined by equation (1).

The first thing to observe is that the model so extended can still achieve the configurations in figure 2. The same contraction mapping argument shows that v is continuous and nondecreasing. In addition, $\gamma > \beta(0) > \alpha(0)$ because $\alpha(0) = \delta v(0)$ and $\beta(0) = \pi(T/2, \theta) + \delta \int_0^1 v(\theta')f(\theta')d\theta'$; α and β are continuous; and $\alpha' > \beta'$ where the derivatives exist. The only difference in the model is the comparison of $\alpha(1)$ and $\beta(1)$. It is not hard to show that $\gamma > \alpha(1)$ and $\gamma > \beta(1)$ cannot both hold, but now $\beta(1) > \alpha(1)$ for large enough p and small enough z. When this is the case, the α strategy is never optimal. Intuitively,

if a firm's best match is likely to be eroded, it pays to keep seeking new matches, even if the existing match is good. Because large values of p and small values of z are characteristic of a highly competitive environment, one implication is that competition may breed diversification. This may be one way to think about corporations such as 3M and General Electric that view diversification as a permanent rather than transitory strategy.[25]

This extension also gives some insight into the event-study evidence, which tells us that investors approve of diversification in some cases and disapprove of it in others. Suppose managers observe θ before investors, so that diversification announcements are signals of θ. Then a diversification announcement by an α-strategy firm is bad news—it means that the firm's existing business has deteriorated—while a diversification announcement by a γ-strategy firm is good news—it has found a good enough match to move into the β region. Similarly, a diversification announcement by a β-strategy firm could mean that its last experiment turned out to be no better than the existing business (neutral news), the last experiment was an improvement but not enough to enter the α region (good news), or the firm suffered an erosion shock (bad news). The significant point is that the model can generate both positive and negative market reactions to diversification announcements.

Furthermore, these announcement-return implications are testable to the extent that it is possible to identify whether a company was following an α, β, or γ strategy prior to its diversification announcement. Procedures for identifying β-strategy firms are well developed in the literature, for example, counting the number of business segments. The α- and γ- strategy firms might be distinguished in several ways. The age of the firm or number of years in its current business might work—α-strategy firms are likely to be well established, while γ-strategy firms are relatively new. Since α- and γ-strategy firms differ in their θ's, another way to identify them is by prior performance: in the period somewhat before the announcement, the α-strategy firms had good matches and should have had better performance in terms of accounting returns than the γ-strategy firms. This reasoning suggests one candidate explanation for the time pattern in diversification announcement returns (positive in the 1960s and negative in the 1980s): perhaps the 1960s diversifiers were relatively young γ-strategy firms, while the 1980s diversifiers were older α-strategy firms.

As mentioned above, the model also has implications for announcements of other structural changes, in particular, divestitures and refocusing programs.

25. Another extension of the model generates diversification as a stable strategy. Suppose that g is a concave function of t. Then diminishing returns to organizational capital in one business can cause a firm to seek a second business that can use its "excess" resources. One can think of the firm as "searching for synergies." In such a model, a firm with two good matches will choose to stay in both industries and stop searching. A firm with one good match and one bad match will specialize. And a firm with two average-quality matches will engage in search-motivated diversification. In most other respects, the implications of this model are similar to those of the basic model. The exposition is more complicated because there are two state variables corresponding to the match quality in both businesses.

TABLE 2 Predicted Abnormal Stock Returns Conditional on Type of Announcement and Strategy of the Announcing Firm

	Announcement in Period t			
Strategy in Period $t-1$	Diversifying Acquisition	Refocusing Divestiture	Nonrefocusing Divestiture	Liquidation
Specialized (α)	< 0*	N.A.	N.A.	< 0*
Diversified (β)	$> = < 0$†	> 0‡	$> = < 0$†	< 0*
Start-up (γ)	> 0‡	N.A.	N.A.	N.A.

NOTE.—The productivity of the firm's best existing business opportunity is denoted by θ. The cell entries indicate the predicted sign of the abnormal return. The predictions follow from a version of the model where managers observe θ before investors do, and, therefore, a change in the company's strategy signals the value of θ.

* Investors infer a decline in θ.

† Announcement is consistent with an increase, decline, or no change in θ.

‡ Investors infer an increase in θ.

Table 2 brings together the predicted market response to several different focus announcements conditional on the firm's preannouncement strategy (α, β, or γ). The implications follow from the observation that a change in strategy signals a change in θ. It is worth emphasizing that the implications in table 2 are predicated on diversification announcements signaling only θ. To the extent that announcements also convey other information, such as the severity of agency problems, studies would also need to control for the other factors.

VI. Some Evidence on the Evolution of the Conglomerates of the 1960s

Cross-sectional evidence on corporate diversification is abundant, but systematic evidence on how diversified firms evolve over time is scarce. The model developed in this article is fundamentally dynamic and suggests that longitudinal information might be useful in understanding diversification. In this section, I report some statistical facts about the evolution of the conglomerates of the 1960s, both as a motivation for future work and to suggest that matching/search motives might be important for this set of firms.

The model implies that diversified firms migrate across industries and eventually exit their original business when they find a good match for their organizational capabilities. In contrast, one version of the agency theory depicts diversifying firms as eventually returning to their core business when market discipline brings their diversification program to an end.[26]

To get a sense of the evolution of diversified firms, I collected data on the businesses of 63 conglomerate corporations and a matching sample of nonconglomerates.[27] I started with the list of conglomerate firms compiled by

26. See, e.g., Jensen's (1986) discussion of the diversifying acquisitions of the oil companies and Shleifer and Vishny's (1991, p. 51) characterization of the rise and fall of diversification programs as "a round trip for corporate America."

27. These data had to be collected by hand because detailed industry lists going back to 1958 do not exist in a machine-readable form.

Weston and Mansinghka (1971). They defined a firm as a "conglomerate" if (i) at least 20% of the firm's growth during the period 1960–68 came from acquisitions and (ii) in 1968 the firm was involved in 10 or more three-digit SIC industries or five or more two-digit SIC industries. The 63 firms that met these criteria make up the universe of conglomerates (so defined) in 1968. I then tracked each firm backward 10 years to find its preconglomerate businesses and forward 10 and 20 years to see how its diversification program played out over time. The primary business/industry, defined as a four-digit SIC code, was identified for 1958, 1968, 1978, and 1988, using Dun and Bradstreet's *Million Dollar Directory*.[28] The four-digit SIC codes were used to determine each firm's primary two-digit and three-digit industry. The matching sample was drawn by identifying each conglomerate's position in the Fortune 500 for 1968. If the conglomerate's position was N, then the firm ranked $N + 1$ was taken as the match.[29]

Table 3 reports how often these firms deleted their primary businesses. A firm's primary business was said to have been "deleted" if its SIC code did not appear among any of its SIC codes 10 years later (or 30 years later in the last column).[30] Panel A lists the fraction of conglomerate firms that deleted their primary business from period to period, panel B reports the numbers for nonconglomerates, and panel C gives the z-statistics for the hypothesis that the conglomerate and nonconglomerate numbers are the same.

It is apparent that deletion is not a rare event for conglomerates. Over 10-year intervals, about one-quarter of the conglomerates deleted their primary business when measured at the two-digit level, and about one-third did so when measured at the three-digit level. Given the inclusiveness of two-digit industries, it is remarkable to see so many deletions of core businesses.[31] It is interesting that the 30-year deletion percentages are similar to the 10-year deletion percentages, which means that many firms were making multiple deletions. Such a pattern is consistent with matching/search behavior: firms entered and then exited a series of businesses before they found a good match.[32]

A firm's reported SIC codes could change over time even though its activities stay the same if SIC definitions are revised by the Census Bureau or

28. The primary industry is the one that generated the largest fraction of sales. If the primary four-digit SIC code was 6711 (holding company), the second-listed SIC code was used instead.

29. If the $(N + 1)$st firm was also a conglomerate, the $(N + 2)$d firm was checked, etc., until a nonconglomerate was found. Six conglomerates were not listed in the Fortune 500, usually because they were not industrials, and matches were not selected for them.

30. Dun and Bradstreet's *Million Dollar Directory* lists up to six four-digit SIC codes. A business must account for at least 10% of sales to be included.

31. A few examples illustrate the broadness: SIC 37 (Transportation) includes manufacturers of planes, ships, and automobiles; SIC 20 is Food; SIC 28 is Chemicals; SIC 35 is Fabricated Metal Products; and SIC 36 is Electrical Machinery.

32. I also calculated the rate of change in primary businesses across time (as distinct from deletions). The pattern was the same, but, of course, the overall rates of change were higher. For example, 61.4% of conglomerates changed their main two-digit line of business at least once in the sample period as compared with 34.1% of nonconglomerates.

TABLE 3 Percentage of Firms Deleting Their Primary Industry during Various Periods: Conglomerates and Nonconglomerates

Industry Definition	1958–68	1968–78	1978–88	1958–88
A. Conglomerates:				
Two-digit SIC	21.8	28.8	25.0	29.5
Three-digit SIC	34.5	39.0	31.3	47.7
Four-digit SIC	52.7	55.9	35.4	75.0
No. of firms	55	59	48	44
B. Nonconglomerates:				
Two-digit SIC	15.1	9.3	2.2	18.2
Three-digit SIC	28.3	20.4	13.3	31.8
Four-digit SIC	45.3	29.6	20.0	63.6
No. of firms	53	54	45	44
C. *Z*-statistics for the null hypothesis that the conglomerate and nonconglomerate percentages are equal:				
Two-digit SIC	.91	2.69***	3.65***	1.34
Three-digit SIC	.70	2.17**	2.23**	1.64*
Four-digit SIC	.78	2.88***	1.76*	1.22

NOTE.—The main cell entries in panels A and B indicate the fraction of sample firms that deleted their primary SIC code from the first to the second listed year. The full sample of 63 conglomerate firms was taken from Weston and Mansinghka (1971). The full nonconglomerate sample contains 57 firms. The SIC codes were taken from Dun and Bradstreet's *Million Dollar Directory* for the years 1959, 1969, 1979, and 1989.

* Significant at the 10% level.

** Significant at the 5% level.

*** Significant at the 1% level.

if the *Million Dollar Directory* makes classification errors. The nonconglomerate sample provides a benchmark for the amount of spurious change in the sample since these firms are less likely to delete their primary business.[33] For all time periods and all industry definitions, conglomerates deleted their primary business more often than did nonconglomerates, and the differences are statistically significant after 1968. Thus, the high rate of business deletions for conglomerates is probably more than a statistical illusion.[34]

Most of the conglomerate firms were specialized in 1958, diversified rapidly over the next 10 years (by construction of the sample), and thereafter began to refocus. Therefore, we expect to see industry deletions primarily after 1968 if matching/search motivations were important.

33. This is probably an upper bound on the true amount of spurious change because some of the nonconglomerates might have been engaged in matching/search behavior as well. In addition, the selection procedure looks for firms that were not conglomerates in 1968. It is possible that some of them diversified in later years.

34. Individual case histories tend to support this impression. For example, Singer evolved from a manufacturer of sewing machines to a defense electronics company, and Gulf & Western shifted from manufacturing and distributing car parts to producing motion pictures and publishing.

VII. Conclusion

The central idea of this article is that it might be fruitful to think of diversification as a process by which corporations search for productive new uses of their organizational capabilities. A neoclassical flavored model is developed to explore this idea. At the heart of the model is the concept of organizational capabilities—the combined marketing, distribution, and development skills of top and middle management—that Chandler (1990) suggests are the engines of corporate evolution. Because organizational capabilities are the source of a company's value, it is not always optimal to liquidate them when existing businesses begin to decline. Instead, it may be better to attempt to deploy them in a new business, a process that is fraught with uncertainty.

An important implication of the model is that diversified firms may trade at discounts even if diversification is a value-maximizing strategy. A poor match between organizational capabilities and businesses both generates a discount and causes the firm to diversify. This suggests that the diversification discount may cause diversification, not the other way around as is often argued.[35]

The view of diversification in this article has much in common with the "resource-based" view that is found in the strategy literature.[36] In that approach, routinization of decisions and downgrading of functions continually free up managerial resources and other productive factors for new uses, which allows the firm to seek opportunities in new businesses. The resource-based literature, starting with Penrose ([1959] 1995), has tended to employ verbal "disequilibrium" theorizing instead of neoclassical techniques. One view of my article is that it offers a way to express certain ideas in the resource-based literature in terms of a dynamic optimizing neoclassical model (and thereby to take advantage of production theory and dynamic programming tools). For example, the formalization of organizational capabilities in my article is consistent with the conceptualization of Teece (1982) and Gort, Grabowski, and McGuckin (1985). My article also differs from the resource-based literature by emphasizing the intrinsic uncertainty of entering a new business, something that has been recognized but not extensively explored, and by tracing the connections of a model with this feature to the burgeoning empirical literature.

The view of diversification as a matching/search process contrasts with the prevailing agency view by suggesting that diversification can be a value-maximizing strategy. But the two approaches are not mutually exclusive: managers may search for better matches to ensure the survival of the firm under their own control (Blanchard, Lopez-de-Silanes, and Shleifer 1994). What the model suggests is that, by doing so, managers are not necessarily acting against shareholder interests. In support of this, the article argues that

35. Two recent studies, Campa and Kedia (1999) and Villalonga (1999), provide evidence that tends to support the view that the discount causes diversification, not the other way around.

36. See Montgomery (1994) for a survey.

some of the evidence that is considered favorable to the agency view can also be understood in terms of value maximization. It seems premature to conclude that diversification is always at odds with the interests of shareholders. By the same token, searching for matches is only one of many factors that drive corporations to diversify. The matching/search view, like the agency view, can explain only some of the behavior we observe. Additional research that can help distinguish the various sources of corporate diversification would be valuable.

Appendix

Proof of Proposition 2

i) Let b_n be the probability that the firm is diversified in period n, and let a_0 and g_0 be the initial probabilities that θ is in the α and γ strategy regions, respectively. Then $b_n = (1 - a_0)[F(\theta_1)]^n - g_0[F(\theta_0)]^n$. Note that b_n is increasing in θ_1 and decreasing in θ_0.

ii) Observe that θ_0 is defined implicitly by $\beta(\theta_0) = \gamma$. This is the match quality for which the firm is indifferent between liquidation and diversification. When $\theta = \theta_0$, next period's value of the firm is the same whether it follows a β or γ strategy; in either case, it will draw a $\theta < \theta_0$ with probability $F(\theta_0)$ and discard the match, or it will draw a $\theta \geq \theta_0$ and proceed with the optimal α or β strategy. Thus, $\beta(\theta_0) = \gamma$ holds when the single-period profit between the two strategies is the same, which gives an alternative definition of θ_0:

$$\pi(T/2, \theta_0) + \pi(T/2, \bar{\theta}) = \pi(T, \bar{\theta}). \tag{A1}$$

Similarly, θ_1 is defined as the solution to $\alpha(\theta_1) = \beta(\theta_1)$. Note that for $\theta \geq \theta_1$, $v(\theta) = \alpha(\theta) = \pi(T, \theta)/(1 - \delta)$. With this, the definition of θ_1 can be restated as

$$\pi(T,\theta_1) - \pi(T/2,\theta_1) - \pi(T/2, \bar{\theta}) = \left(\frac{\delta}{1-\delta}\right) \int_{\theta_1}^{1} [\pi(T, \theta') - \pi(T, \theta_1)] f(\theta') \mathrm{d}\theta'. \tag{A2}$$

Intuitively, at this point the static advantage of specialization, represented on the left-hand side of equation (A2), exactly balances the dynamic advantage of diversification, given by the right-hand side. The left-hand side is increasing in θ_1, and the right-hand side is decreasing in θ_1.

iii) Consider an increase in the spread of F that does not affect its mean. Equation (A1) indicates that θ_0 does not change. If θ_1 is held constant, the left-hand side of equation (A2) does not change, but the right-hand side increases because $\theta_1 > E[\theta]$ and π is convex in θ. Therefore, θ_1 increases. A mean-preserving increase in spread leaves θ_0 unchanged and increases θ_1, which results in an increase in b_n.

iv) Equation (A1) indicates that θ_0 does not depend on the discount rate, δ. As for θ_1, an increase in δ has no effect on the left-hand side of equation (A2) (holding θ_1 constant) but causes an increase in the right-hand side. Thus, a higher value of θ_1 results. Together, this implies an increase in b_n.

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