Focusing the Corporate Product: Securities Analysts and De-diversification

Ezra W. Zuckerman
Stanford University

The issue of corporate control is examined through an analysis of the de-diversification activity of publicly held American firms from 1985 to 1994. Prominent accounts of such behavior depict newly powerful shareholders as having demanded a dismantling of the inefficient, highly diversified corporate strategies that arose in the late 1950s and the 1960s. This paper highlights an additional factor that spurred such divestiture: the need to present a coherent product identity in the stock market. It is argued that because they straddle the industry categories that investors—and securities analysts, who specialize by industry—use to compare like assets, diversified firms hinder efforts at valuing their shares. As a result, managers of such firms face pressure from analysts to de-diversify so that their stock is more easily understood. Results indicate that, in addition to such factors as weak economic performance, de-diversification is more likely when a firm's stock price is low and there is a significant mismatch between its corporate strategy and the identity attributed to the firm by analysts.●

" . . . I realized that analysts are like the rest of us. Give them something easy to understand, and they will go with it. [Before the spin-off,] we had made it tough for them to figure us out."
—A.H. Stromberg, chief executive officer of URS Corporation (Brown, 1983: 72).

The issue of corporate control has traditionally been pursued by ascertaining who holds power over the public corporation and what their interests are. Accordingly, scholars have debated the degree of control exerted by managers (Berle and Means, 1933), banks (e.g., Kotz, 1978; Mintz and Schwartz, 1985), and founding families (Zeitlin, 1974) as well as the implications of a firm's position in the board interlock structure (e.g., Burt, 1983; Palmer et al., 1995) and its relationship to the capitalist class (e.g., Domhoff, 1967; Useem, 1984). Each of these stakeholders is presumed to direct the firm to act according to its interests, which may not be consistent with those of its shareholders. That shareholders themselves have not been viewed as agents of corporate control reflects the original framing of the issue by Berle and Means (1933), who worried that the diffusion of ownership would empower managers to divert the firm from the pursuit of profits for its shareholders. Thus, if corporate control is defined as "the power to determine the broad policies" or strategies of the firm (Fligstein and Brantley, 1992: 82; cf. Herman, 1981), such control would seem to be irrelevant when placed in the hands of investors. Such firms presumably occupy a pure state in which profitable return is the sole driver of corporate behavior, unblemished by other stakeholders' attempts to redirect strategy to suit their interests.

The period under study, the years 1985 to 1994, is commonly understood as one marked by the reemergence of such a state. Trends such as the rise of the "market for corporate control" (Marris, 1964; Jensen and Ruback, 1983), the increased concentration of shareholdings, and the movement to tie executive compensation to stock prices are often regarded as having brought about an alignment of managerial and shareholder interests (Davis and Stout, 1992; Useem,

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1993, 1996; Davis and Thompson, 1994; Donaldson, 1994; Dial and Murphy, 1995). In the view of agency theory, a prime example of such alignment is the movement to dismantle the conglomerate. Agency theorists regard the highly diversified firms that emerged in the late 1950s and early 1960s as being inefficient (e.g., Rumelt, 1974; Ravenscraft and Scherer, 1987), as reflected in the "conglomerate discount" that reduced the share prices of such firms by the 1980s (LeBaron and Speidell, 1987; Porter, 1987; Lang and Stulz, 1994; Comment and Jarrell, 1995; Berger and Ofek, 1995; Kose and Ofek, 1995). These theorists believe that the conglomerate did not start to unravel until that time because managers in the previous period were largely unconstrained by shareholders. The earlier trend toward unrelated diversification thus reflected managers' penchant for empire-building and exaggerated self-confidence in their abilities (Roll, 1986), coupled with their desire for increased job security and compensation, which are more attainable in large firms (Amihud and Lev, 1981; Murphy, 1985, 1986; Jensen, 1993; Donaldson, 1994; Dial and Murphy, 1995). By contrast, the push toward de-diversification represented a needed correction whereby newly powerful investors directed firms to engage only in those activities that increase shareholder returns and to refrain from those geared to executive interests. Thus, according to agency theory, the de-diversification wave of the 1980s and 1990s represents a return to a condition in which corporate control is not a salient issue.

Sociologists influenced by neoinstitutional theory have presented an understanding of the fall of the conglomerate that shares much with the agency-theoretic view but points to a more nuanced understanding of the processes involved and what they reflect about the nature of corporate control. Fligstein (1990; cf. Espeland and Hirsch, 1990) characterizes the rise of unrelated diversification in the 1950s and 1960s as a product of a financial conception of control, which replaced a focus on business unit strategy with a portfolio model of the corporation (Haspeslagh, 1982). The very acts of buying and selling corporate components, however, changed the dominant model of the corporation from that of a bounded actor to that of a profile of distinct investments (Davis, Diekmann, and Tinsley, 1994; cf. Espeland and Hirsch, 1990; Fligstein and Markowitz, 1993). Rather than regard corporate units as parts of a coherent whole, investors began to demand the divestiture of poorly performing assets (Davis, Diekmann, and Tinsley, 1994). Neoinstitutional theorists thus assert that understanding the issue of corporate control not only involves ascertaining which parties hold power but also requires an analysis of the models of corporate structure and behavior that dominate their thinking. Moreover, the fact that investors' interests dominate those of other stakeholders does not make the issue of corporate control moot. Rather, it implies that managers experience control in the form of pressure to structure their firms in ways that investors deem legitimate. Thus, while they do not dispute the agency theorists' claim that renewed investor control was necessary for de-diversification to occur, neoinstitutionalists maintain that the collapse of the conglomerate would not have occurred without the emergence of a new model of the corporation.

The empirical predictions made by neoinstitutionalists do not differ substantially from those made by agency theorists, however. Each of these theories, in common with other accounts of the fall of the conglomerate, seeks to explain which historical changes induced de-conglomeration as a general phenomenon, and there appears to be widespread agreement regarding the factors that determined which firms engaged in de-diversification and which divisions were likely to be divested.[1] In particular, with the removal of the factors that had previously supported the conglomerate, it is generally assumed that traditional bases for merger and growth reasserted themselves in the 1980s. Accordingly, de-diversification is understood to involve a return to a core set of related business lines because such focused strategies promote economic performance (e.g., Jensen, 1986, 1993; Prahalad and Hamel, 1990). But such an account of the de-diversification process ignores the pressure to de-diversify that is implicit in the quotation from A. H. Stromberg that opens this article. It is this pressure to adjust the corporation to fit stock market categories and its role in de-diversification that I examine here. I build on the neoinstitutional view that conceiving of the corporation as a bundle of assets facilitated the emergence of an environment in which the rearrangement of such assets is generally encouraged and show that the dominance of investor models entails specific constraints on how corporate assets may be combined.

Like most product markets, the stock market contains relatively distinct categories, which correspond to industries or broad sectors. Investors evaluate a firm by comparing it to its industry peers. Furthermore, securities analysts, who play the role of critics in the stock market, specialize by industry. An analyst's coverage of a firm reflects a belief that the firm is a member of the industry in which he or she specializes. By contrast, the neglect of a firm by industry specialists indicates that its participation in that industry has not been validated. Importantly, such illegitimacy carries significant costs. As Zuckerman's (1999) analysis showed, a firm's equity shares trade at a discount in situations of "coverage mismatch"—when it is not covered by the analysts who specialize in its industry. Such mismatch, furthermore, is particularly problematic for the multi-industry firm or conglomerate. By their very nature, diversified firms defy the industry-based system of classification that orders stock market valuation. Like brand images that are stretched across disparate product categories (DeGraba and Sullivan, 1995; Curtis, 1996), such firms promote confusion among investors because they hinder cross-product comparison. As Zuckerman (1999: 1420) suggested, conglomerates elicit the basic questions of identity that represent the first steps in the valuation process: to which industry does such a firm belong, which analyst should cover it, and with what should it be compared? Accordingly, he proposed that the condition of coverage mismatch experienced by diversified firms is at least partly responsible for the fact that their equity traded at a discount during the 1980s and 1990s.

The present paper extends this perspective by showing that such illegitimacy costs have important effects on firm behav-

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Agency theory and neoinstitutional theory are by no means the only approaches to the rise and fall of the conglomerate. Observers have pointed to trends in federal antitrust policy, which erected and then dismantled barriers to traditional forms of merger (Fligstein, 1990; Espeland and Hirsch, 1990; Davis, Diekmann, and Tinsley, 1994; Davis and Robbins, 1997; but see Matsusaka, 1996); changes in tax policy, which rewarded mergers in the 1960s but ceased to do so in the 1980s (Steiner, 1975; Markides, 1995); the disappearance of gains available by exporting modern management skills, which were thought to be scarce in the earlier period (Markides, 1995; cf. Jacoby, 1969); and the heightened competition of recent years, which has made complex enterprises more difficult to manage (Markides, 1995). In addition, some have argued that the original impetus for the conglomerate lay in an effort to reduce the risks associated with participation in a single product market (Fligstein, 1990; cf. Espeland and Hirsch, 1990) but that such diversification is now more effectively accomplished in public capital markets (e.g., Bhide, 1990). The present focus on agency theory and neoinstitutional theory is thus not due to the fact that these are the only explanations for conglomeration or de-conglomeration but because they are most relevant for introducing the novel approach to corporate control introduced here.

ior. As suggested by neoinstitutional theory, corporate control does not cease to be an issue simply because it is maintained by investors. Rather, the very logic of stock market investment represents an important source of control over public firms. In the analysis that follows, I examine how the stock market limits the range of legitimate organizational identity and thereby plays a significant part in shaping the pattern of de-diversification. I focus on mismatch with the network of coverage given a firm by its audience of analysts and the effect of such mismatch on rates of divestiture and, hence, on corporate strategy. In examining the process by which de-diversification occurred in the 1980s and 1990s, I focus on two questions. First, which firms were more apt to de-diversify than others? Second, which divisions were these firms most likely to divest?

DE-DIVERSIFICATION MOVES

Role of Coverage Mismatch

Valuation is difficult. Just as consumers often cannot assess an item until after they have purchased and experienced it (Nelson, 1974), investors are greatly hampered in anticipating the returns they will derive. Moreover, such uncertainty is compounded because financial assets are "social goods" (Zuckerman, 1999): for an investor who cares about capital gains and losses, the value of a security depends crucially on how the financial community will value that asset within his or her time horizon. As suggested by Merton (1968) in his discussion of the self-fulfilling prophecy, the stability of a bank hinges on various acts of faith concerning the actions of other depositors. Similarly, the value of a financial asset reflects the set of beliefs held by investors about one another's beliefs (cf. Keynes, 1960).

Two structural features of the stock market emerge to facilitate valuation (Zuckerman, 1999). First, as in many product markets, the desire to ascertain prevailing opinion fosters the emergence of a field of critics or "surrogate consumers" (Hirsch, 1972) who review product offerings and shape demand through public recommendations (e.g., Rao, 1998; Zuckerman and Kim, 2000). Where such intermediaries command significant influence, sellers concentrate on courting their opinion (Hirsch, 1975), such that the market's key interface links sellers and intermediaries, rather than sellers and buyers. In the stock market, "sell-side" securities analysts play this intermediary role (Burk, 1988; Zuckerman, 1997). Just as do influential critics in other industries (e.g., Hirsch, 1972, 1975), analysts' recommendations and forecasts of firms' future profits influence demand (Stickel, 1985, 1992; Womack, 1996). Further, this position of influence renders analysts, along with large institutional investors, the principal target for investor-relations campaigns—the efforts by firms to manage their ties with owners and cultivate the interest of potential investors (Useem, 1993, 1996; Rao and Sivakumar, 1999).

A second characteristic that distinguishes markets in which valuation is difficult is the heightened salience of product category boundaries. In the stock market, the dominant mode of classification groups firms by industry (King, 1963; Boudoukh,

Richardson, and Whitelaw, 1994; Firth, 1996). This classification system is crucial in helping investors make sense of the market. As White (1981) argued, product markets sustain themselves on the basis of the continuing ability of sellers and buyers to engage in cross-product comparison. More generally, the availability of a ready comparison set greatly reduces uncertainty as to the value of any member of that category. Conversely, products that do not lend themselves to such comparisons encounter difficulty because they hinder valuation. As marketing theorists stress, a product that is not recognized by consumers as a member of its intended category is likely to be screened out of competition and ignored (e.g., Urban, Weinberg, and Hauser, 1996). Similarly, Zuckerman (1999) found that a firm that is not validated as a member of its declared industry suffers an "illegitimacy discount" in the stock market.

Securities analysts are the key agents in this process. Like intermediaries in other markets (e.g., Zuckerman and Kim, 2000), analysts divide their labor according to the market's dominant product categories. An analyst is typically responsible for following a set of firms from a single industry or a few industries that are thought to be related in some way (Zuckerman, 1999). Thus, gaining recognition as a member of an industry effectively means obtaining validation by the analysts who specialize in that industry. The set of reports published—and those not published—by such industry specialists represents a set of implicit judgments about which firms should and should not be classified as industry participants. A firm that participates in a given industry but does not draw attention from industry specialists can be described as suffering from coverage mismatch (Zuckerman, 1999).

In many cases, the reasons for coverage mismatch are idiosyncratic. For a typical firm, it is unclear why it should fail to gain recognition for its proposed identity, but diversified firms inherently experience a heightened state of mismatch. The reasons are twofold. First, by participating in multiple industries, such corporations contradict the logic of the accepted structure of valuation. Rather than residing in a single category, diversified firms present themselves as multi-category products, thereby invoking multiple frames of reference. As such, a diversified firm runs the risks akin to those involved in brand extension: stretching a brand image to include many dissimilar products threatens to make the brand incoherent in the eyes of consumers (DeGraba and Sullivan, 1995; Curtis, 1996). It is unclear with what the diversified firm should be compared.

The organization of work by securities analysts compounds this definitional issue. The process by which analysts initiate or cease coverage of a firm is influenced by numerous factors, including the firm's size, its stock performance, and its coverage by other analysts (Bhushan, 1989; O'Brien and Bhushan, 1990; McNichols and O'Brien, 1997; Mavrinac, 1999). Though such firm characteristics vary, what conditions the allocation of coverage across all firms is the fact that any individual analyst confines his or her attention to one and sometimes two industrial sectors. The division of labor among analysts may thus be said to be premised on a map-

ping of each firm into a single industry. A natural solution to the problem of allocating coverage to a conglomerate would be to assign a team of analysts from different specialties to cover the firm. But the rarity of this practice (see e.g., *Nelson's Directory of Research Analysts*) attests to the inherent tension that conglomerates pose to the division of labor among analysts. Moreover, while some analysts are sometimes identified as multi-industry or conglomerate analysts, this represents a residual category rather than a true solution to the problem. Firms that are designated in this fashion—e.g., ITT, Textron, and Rockwell International—tend to display very different profiles of industrial participation, such that they cannot be compared with one another. Designation as a conglomerate exacerbates the problem rather than solves it.

Accordingly, corporate executives frequently explain proposed or actual divestitures and spin-offs by citing such difficulties. One such manager is Arthur Stromberg of the URS Corp., who explained the 1983 spin-off of its computer training subsidiary from its engineering consulting operations in the quotation that opens this article. According to Stromberg, URS was forced to change its corporate strategy because it could not answer the question that it repeatedly fielded from brokerage houses: "What kind of analyst should we assign to cover you?" (Brown, 1983). Another such case is the 1994 spin-off of WilTel by the Williams Co., which chief executive officer Keith Bailey described as motivated by a desire to make the company "easier for [stock] researchers to follow" (Stancavage, 1994). Similarly, in explaining the planned spin-off of its prescription management business from its discount retailing operations, Dale Kramer of ShopKo explained that "The retail analysts don't want to understand this [its participation in the two industries]" (Hajewski, 1996). These are just a few of the many instances in which executives ascribed an announced divestiture to the mismatch between their firms' industrial activity and the analysts' division of labor—and not to any operational or strategic factors. For such firms, de-diversification promises to ease the valuation difficulties incurred by their participation in multiple industries.

Thus, lack of endorsement by industry specialists of a firm's industrial identity is likely to be a significant factor leading to de-diversification. Following Zuckerman (1999), the coverage mismatch of a firm is greater to the extent to which the analysts who specialize in the industries in which a firm participates fail to cover the firm. Firms that have a high degree of coverage mismatch present a corporate identity that stands in tension with the set of identities that are accepted by analysts. As such, they should face greater pressure to realign their industrial participation with analyst specialties. Furthermore, business lines with high levels of coverage mismatch detract from a straightforward valuation of the firm. They are peripheral to the firm's identity, as defined by analysts' reception, and are thus ripe for divestiture. The above reasoning leads to two hypotheses, the first at the firm level and the second at the division level:

Hypothesis 1a: The greater is a firm's aggregate coverage mismatch at time t–1, the more likely is it to divest any of its divisions by time t.

Hypothesis 1b: The greater is the coverage mismatch of a division relative to others at time t–1, the higher the risk that it will be divested by time t.

Thus far, I have argued that a state of structural tension, which is indicated when a critical audience attributes to an organization an identity that contradicts its self-attribution, induces actions to relieve that tension, i.e., changes in a firm's degree of diversification. But the response need not be that extreme. For example, as the cultivation of a public image reflects continuous negotiation between an organization and its audiences (Ginzel, Kramer, and Sutton, 1992), managers may respond to this tension by redoubling their investor relations activity. Alternatively, they may respond to the pressure directly but through more cosmetic changes such as a partial spin-off or the creation of "tracking" or "letter" stock. The latter represent classes of stock that are shares in a parent company but track the earnings of a specific division (Neish, 1995; Hamilton, 1996; Gilson et al., 1997). Finally, managers may make changes in the firm's operations which, though they do not directly relieve the tension, improve the firm's standing in other ways (cf. Steele, 1988). To the extent that these strategems are available, the hypothesized effects of coverage mismatch should not be in evidence. Relief from the pressure to de-diversify is not always at hand, however. In general, I expect coverage mismatch to raise the rate of de-diversification.

A related issue concerns the causal ordering of coverage mismatch and de-diversification. It could be argued that a state of mismatch simply reflects the fact that the firm has announced its intention to de-diversify and that analysts have responded by ignoring the business lines that are slated for divestiture. That is, analyst coverage patterns could reflect the impression management practiced by managers rather than the independent attributions of analysts. But the basic source of the problem faced by conglomerates is not subject to such impression management; the difficulty stems from the tendency among brokerage houses to assign a single analyst to cover each firm. This practice is necessarily problematic for conglomerates. Moreover, coverage mismatch does have a causal impact on a firm's stock price (Zuckerman, 1999). Thus, it would seem that firms, and highly diversified firms in particular, are limited in their ability to dictate their coverage. Nevertheless, the analyses reported below examine the effect of coverage mismatch and all other variables at lags of one and two years before the time of potential divestiture. If the association between the two variables reflects the effect of a pre-announced restructuring, then the association should weaken sharply from the first to the second lag.

Finally, it is important to consider how stock market prices relate to the hypothesized effects. In particular, it might be argued that managers will take steps to redress a state of coverage mismatch only if it has engendered a discount in

the firm's stock price. If the conglomerate discount reflects the presence of an illegitimacy discount (Zuckerman, 1999), then it follows that firms will de-diversify in response to a depressed stock price, and the relative discount or premium attached to a firm's stock price should predict the rate of de-diversification. Defining a firm's excess value as the extent to which its market value exceeds the imputed value of its divisions (see Berger and Ofek, 1995; cf. LeBaron and Speidell, 1987; Zuckerman, 1999), I propose the following:

Hypothesis 2: The greater is a firm's excess value at time t–1, the less likely is it to divest any of its divisions by time t.

Although pressure from stock market participants should manifest itself in the relationship between a firm's excess value and its rate of de-diversification, this does not imply that coverage mismatch should not also have such an effect. For example, a firm's stock price may lag behind analysts' current attitudes toward the stock. As such, a firm may respond to analyst pressure even before it has resulted in a price discount. In addition, since managers typically find it difficult to discern why a stock trades at a given price, they may respond to analysts' pressure to de-diversify because they believe that analyst opinion has depressed the firm's shares even if the discount is due to other factors. Finally, although a firm's stock price cannot specify which divisions should be divested to remove a perceived discount, the pattern of coverage by securities analysts indicates which divisions are regarded as more central and which are more peripheral to a firm's market identity. Thus, even if firm-level coverage mismatch operates through a firm's stock price, division-level mismatch is important for explaining why some divisions but not others are divested.

Additional Factors Explaining De-diversification

Performance, relatedness, core/periphery. A complete model of the de-diversification process should also include the factors highlighted by historical accounts of the rise and fall of the conglomerate. In particular, three types of factors, which also figure prominently in Ravenscraft and Scherer's (1987) study of corporate divestiture, seem important: the performance of a firm or division, the relatedness among the firm's divisions, and the extent to which a given division constitutes the corporate core.

To the extent that managers seek to maximize their firm's profitability, it stands to reason that lower profitability will spur divestiture. Thus, less profitable firms should be more likely to engage in de-diversification, and less profitable divisions are at greater risk of divestiture than are divisions that earn a higher rate of return. In addition, to the extent that corporate executives have some glimpse of the future—or at least believe that they do—expectations of future profitability should drive divestiture decisions as well. Finally, prospects of profitability should matter especially when managers have backed up these expectations with specific investments (Ravenscraft and Scherer, 1987). Thus, I hypothesize:

Hypothesis 3a: The more profitable the firm at time t–1, the less likely is it to divest any of its divisions by time t.

Hypothesis 3b: The more profitable is a particular division relative to others at time t–1, the lower the risk that it will be divested by time t.

Hypothesis 4: The greater the expected profitability of a division relative to others in a firm at time t–1, the lower the risk that it will be divested by time t.

Hypothesis 5: The greater the firm's investment in a division relative to others at t–1, the lower is the risk that it will be divested by time t.

Relatedness among divisions reflects economic performance as well, though more indirectly. Standard economic reasoning suggests that a pair of businesses should be under the same corporate roof when there is something complementary about their resources, capabilities, or market positions such that they are more valuable when combined in the same firm than as separate entities (e.g., Chandler, 1990). By contrast, the absence of such synergies should prompt divestiture. A firm is more likely to de-diversify when its existing profile of businesses does not possess economies of scope:

Hypothesis 6a: The more complementary are a firm's divisions at time t–1, the less likely it is to divest any of its divisions by time t.

Hypothesis 6b: The more complementary is a particular division to the rest of a firm's operations at time t–1, the lower the risk that it will be divested by time t.

Finally, accounts of the de-diversification wave suggest that firms retain their "core" operations but divest peripheral businesses. Thus, firms are likely to hesitate before divesting those divisions that organizational members believe represent the heart of the organization's identity; such operations may also constitute the organization's basic "competencies" (Prahalad and Hamel, 1990). The core elements of the corporation are sometimes subject to significant change (see, e.g., Zald, 1970; Burgelman, 1994), but to the extent that organizational identity tends to be preserved, it seems reasonable to expect that firms will be least willing to part with their largest and oldest operations:

Hypothesis 7a: The larger is a division relative to others at t–1, the lower the risk that it will be divested by time t.

Hypothesis 7b: The older is a division relative to others at t–1, the lower the risk that it will be divested by time t.

METHOD

Sample and Data Sources

The sample consists of all American operating companies that appear both in Standard & Poor's Compustat Industry Segment File and the Center for the Study of Security Prices (CRSP) database during the years 1984–1994. I chose this time period for three reasons. First, it begins after the various changes thought to have spurred the de-diversification—the rise of the market for corporate control, changes in the tax code, and the inception of the Reagan antitrust regime—had already occurred. The aim of this study is not to engage in historical analysis but to understand the processes that occurred within a relatively self-contained historical period.

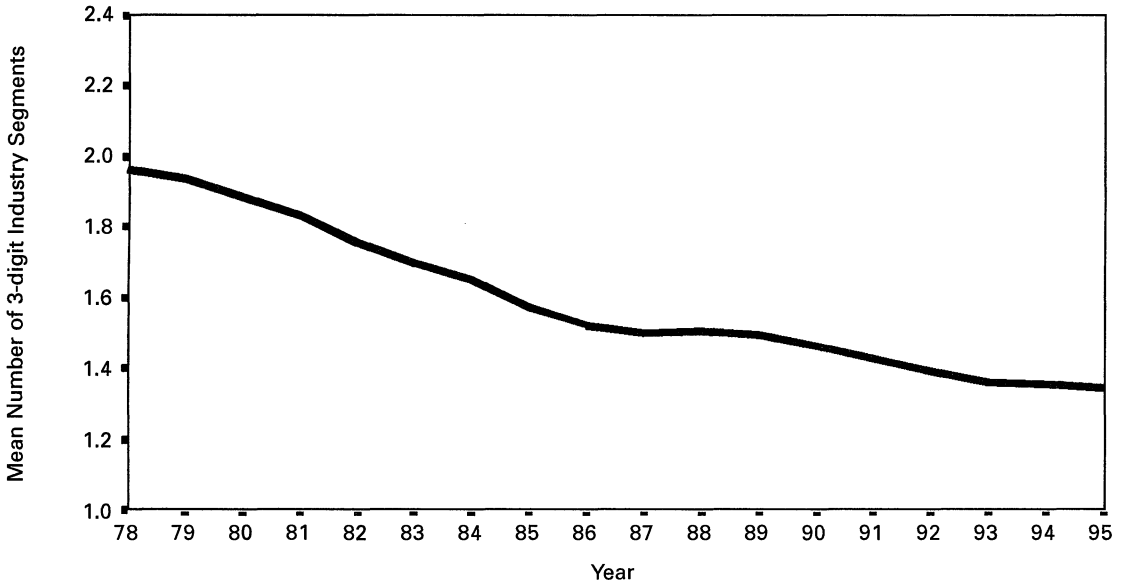
Second, while the data available on securities-analyst coverage firms are quite comprehensive, they are less reliable before the mid-1980s. Thus, I chose the most recent ten-year period for which data are available. Third, as discussed below, because industry segment data were not reported before 1978, these data are "left-censored." Beginning the study with 1984 allows a test for the robustness of the results across three subsamples: including all cases, excluding left-censored cases, and including only cases with full histories.

Like Compustat's Industrial Annual File, from which I obtained firm-level data, data in the Industry Segment File derive largely from quarterly and annual reports filed with the Securities and Exchange Commission (SEC). Starting in 1978, FASB No. 14 and SEC Regulation S-K required public corporations to report their assets, net sales, earnings before interest and taxes (EBIT), depreciation, and capital expenditures in up to ten business segments. Segments represent a higher level of aggregation than individual business lines. Although in most cases they correspond to a recognized corporate division, they may include multiple operations. Nevertheless, the Industry Segment data are unique in that they cover the relevant time period, allow for a linkage with firm-level information on performance and analyst coverage, and include extensive financial data on segments or business lines. Further, as they originate in the various statements and reports presented by corporations to the investment community, these data reflect the presentations of corporate self under study.

In addition, these data have been shown to represent accurately variation in scope among firms (Palepu, 1985) as well as change in aggregate levels of diversification in recent years (Lichtenberg, 1992; Davis, Diekmann, and Tinsley, 1994; Comment and Jarrell, 1995; Zuckerman, 1997). Figure 1, which shows the decrease from 1978 to 1995 in the mean number of primary 3-digit Standard Industrial Classification (SIC) industries in which firms participated, illustrates such change. The number of firms over this period increased from 3,763 in 1978 to 4,727 in 1986 and 5,428 in 1995, as the mean number of 3-digit segments declined. This reduction is accounted for both by the smaller number of corporate deaths relative to births over this period as well as by a reduction in the number of segments in which existing firms operated (Lichtenberg, 1992; Davis, Diekmann, and Tinsley, 1994; Zuckerman, 1997).

Certain scholars have questioned whether the de-diversification trend, which is evident in these data, reflects an actual decrease in corporate diversification or the fact that managers have become increasingly skilled at hiding divisional performance in aggregate firm data (Lichtenberg, 1991). Two considerations discount these concerns. First, given investors' and analysts' intensified scrutiny of corporate action and their particular concern with the publication of segment data (e.g., Practer, 1996), it seems unlikely that managers could easily manipulate such data, especially those in a firm that had already been providing segment-level data. In addition, the reliability of segment reporting seems to have been stable over time. Figure 2 charts the proportion of firms

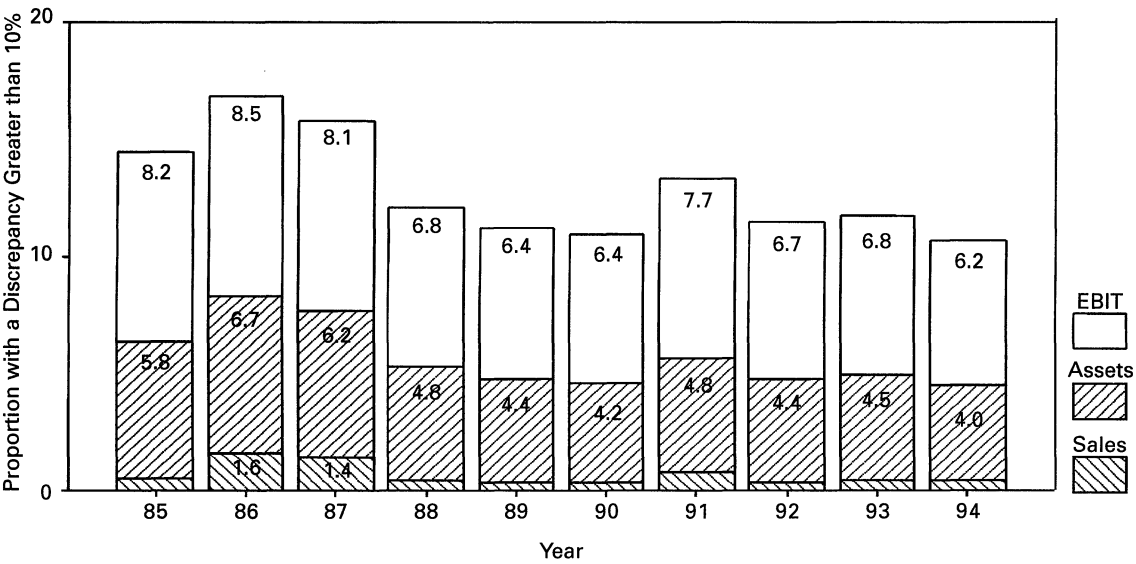
Figure 1. Public firms' mean number of 3-digit industry segments, 1978–1995.



for which aggregate and summed segment data for three critical accounting variables—sales, assets, and EBIT—differed by more than 10 percent. This figure shows that, over the time period in question, the relationship between segment and aggregate data has remained largely unchanged, with a slight trend toward smaller discrepancies.

Zacks Historical Database provides data on analyst coverage of industries and firms. Since the 1970s, several firms, including Zacks, have been collecting analysts' forecasts of corporate earnings. These data are useful for this study because every published earnings forecast indicates a relationship between an analyst and a firm. Thus, one can use these data to measure the degree to which a firm that is

Figure 2. Discrepancy between sum of segment numbers and aggregate firm numbers: EBIT, assets, and sales, 1985–1994.



active in a given industry is followed by the analysts who specialize in that industry—that is, a business line's degree of coverage match or mismatch. Although Zacks data do not contain the full set of analyst forecasts, treating these data as approximating a complete network involves minimal bias (Zuckerman, 1999: 1420-1421).

Unit of Analysis

For the purposes of the current analysis, I construct life histories of firms' participation in a given 3-digit SIC code. Thus, for the rare occasions in which firms report multiple segments with the same 3-digit code, I have combined those segments and treat them as one. The main motivation for this approach lies in the fact that Compustat maintains the Industry Segment Files in 7-year data sets such that segments cannot be easily linked across these periods. Linking segments that have the same 3-digit code therefore facilitates the construction of life histories. Moreover, as shown elsewhere, combining segments in this fashion does not substantially change aggregate patterns of corporate scope (Zuckerman, 1997: 84–91). In the discussion that follows, I use the term segment or division to refer to actual segments as well as combined segments in a 3-digit SIC code; divestiture refers to instances in which a firm has exited a 3-digit industry.

The Industry Segment Files also produce difficulties in coding the timing of divestiture because breaks of one or two years sometimes occur in the publication of segment data for a particular firm. I coded these cases as missing rather than as divestitures. A related problem concerns corporate restructurings in which divisionalization and, consequently, segment reporting changes from one year to the next. In such cases, a segment may appear to be divested when in fact it has merely been continued under a different label. To correct for this, I examined every case in which a 3-digit SIC code disappeared from a firm's profile of segments. Whenever a segment with the same 2-digit SIC code emerged to replace the missing segment, I coded the new segment as a continuation of the previous segment. Such a segment was not coded as having been divested but as retained under a slightly different identity.

Variables

Table 1 lists the variables used to predict de-diversification and the hypothesized direction of their effects. The measurement of several of these variables is straightforward. To tap economic performance, I followed common practice and used the division's and the firm's return on assets (ROA), the ratio of its earnings before interest and taxes (EBIT) to its assets (e.g., Ravenscraft and Scherer, 1987; Brush, Bromiley, and Hendrickx, 1999).[2] As a measure of a firm's investment in a segment, I used its expenditure on research and development (R&D) (Ravenscraft and Scherer, 1987). As measures of the centrality of a segment to a firm, I took the segment's age, its percentage of the firm's total sales, and its market share (sales divided by the sales of all public firms in that 3-digit industry). Following common practice in nested models

2
In addition, one may hypothesize that change in profitability from year to year affects the likelihood of divestiture. As this variable produced no association with divestiture and because it involves significant measurement difficulties (see Zuckerman, 1997: 150, fn. 3), I excluded it here.

Table 1

Factors Predicted to Affect Divestiture Decisions

Hypothesis	Issue	Variable	Hypothesized effect
Firm-level			
1a	Mismatch	Weighted coverage mismatch	+
2	Price discount	Excess value	–
3a	Economic performance	Return on assets	–
6a	Relatedness	Prevalence score	–
	Control for opportunity to divest	No. of segments	+
	Control for size	Logged assets	Unclear
	Control for analyst coverage	No. of analysts covering firm	Unclear
Segment-level			
1b	Mismatch	Coverage mismatch	+
3b	Economic performance	Return on assets	–
4	Industry prospects	Median sales multiple	–
5	Investment in industry	R&D expenditure	–
6b	Relatedness	Prevalence score	–
7	Core/periphery	Sales percent	–
7	Core/periphery	Market share	–
7	Core/periphery	Years in segment	–

(Iversen, 1991), each of the segment-level variables described here and below is expressed as a deviation from the firm's mean level.

I controlled for three firm-level variables: a firm's size, measured by its logged assets, the number of segments in which the firm participates, and the number of analysts who cover the firm. The rationale for the latter two variables is clear. Firms that have many segments are more likely to divest one of them in a given year. In addition, it is important to distinguish the effects of coverage mismatch from the sheer amount of analyst coverage (Zuckerman, 1999).

Coverage mismatch, expected profitability, excess value, and interdivisional relatedness were somewhat more challenging to measure. To clarify my discussion I therefore provide greater detail on the construction of these variables.

Coverage mismatch. Coverage mismatch was measured following the approach introduced in Zuckerman (1999: 1417–1418). First, an analyst is identified as covering a firm if he or she publishes at least one earnings forecast for that firm and is then designated as an industry specialist based on the number and proportion of the firms in that industry that he or she covers. Once analysts have been assigned to industries, coverage mismatch for a firm f that participates in industry i is:

$$Cm_{fi} = 1 - [c_{fi}/\max(c_{gi})],$$

where c_{fi} is the number of analysts following f who are also specialists in i, c_{gi} is the number of specialists in i that follow firm g, and $\max(c_{gi})$ is the maximum taken over all firms that participate in i. Thus, coverage mismatch varies from a score of zero, which indicates that the firm has succeeded in attracting the maximum number of industry specialists to cover the firm, to a score of 1, which means that it has failed to attract any of these analysts. A firm-level measure represents a weighted average of the segment-level scores:

$$cm_f = \sum_{i=1}^{I} w_{fi} \times cm_{fi},$$

where I refers to the number of industry segments reported by firm f and w_{fi} refers to the proportion of total sales—or assets, if sales data are unavailable—that the segment represents. Finally, the segment-level measure is again computed by expressing the coverage mismatch of a segment in terms of its deviation from the firm-level measure.

To illustrate the measurement of coverage mismatch, table 2 gives the segment-level data on mismatch and several other key variables for General Mills in 1985. At that time, General Mills reported segments in three different 3-digit SIC industries: 204, grain mills products; 581, restaurants; and 562, women's clothing stores. As the table shows, General Mills' primary market identity lies in the grain mills products industry. The six grain mills products specialists who follow General Mills form the largest group of specialists to follow any firm in this industry. Further, given the other industries listed at the bottom, it is clear that General Mills' broad identity is that of a marketer of retail food products. By contrast, none of the specialists from either the restaurant or women's clothing store industries covers General Mills. These industries appear to be peripheral to its identity. Thus, of its segments, General Mills should face pressure to divest itself of its divisions that participate in restaurants and women's clothing stores. By 1994, General Mills had indeed exited both of these industries.

Expected profitability. As an indicator of expected profitability of a segment, I employ the median ratio, taken over all single-segment firms in the corresponding industry, of a firm's total value or capitalization (the market value of a firm's common stock plus the book value of its debt) to its sales. A value on this measure indicates that the stock market sees the industry as having superior prospects; investors are willing to pay more for the same amount of current sales. For both this variable and excess value, I used sales rather than another performance measure because the sales-based measure has produced the most robust results in previous research (see Berger and Ofek, 1995; Denis, Denis, and Sarin, 1997; Zuckerman, 1999). Finally, to increase the reliability of the variable, I used the median ratio for the corresponding 2-digit industry when there were fewer than four single-segment firms in a 3-digit industry (Berger and Ofek, 1995; Zuckerman, 1999).

Table 2

General Mills' Segment-level Data and Coverage Mismatch in 1985*

	3-Digit SIC code	Industry name	C_{fi}	max(c_{gi})	Coverage mismatch	Prevalence score	Sales in segment†	Market share	ROA	Years in segment	Year divested
Industries in which	204	Grain mills products	6	6	0	2.33	3061.30	.17	.282	7+	–
General Mills does	581	Restaurants	0	10	1	1.59	1051.00	.05	.189	7+	1994
business	562	Women's clothing stores	0	2	1	1.04	474.30	.07	.136	0	1987
Other industries	206	Sugar & confectionery	4	5	0.2						
followed by	514	Producers	3	4	0.25						
3 or more of	213	Groceries	3	19	0.84						
General Mills' analysts		Chewing, smoking tobacco									

* For greater clarity, covariates of divestiture are expressed in their original metrics. In the statistical analyses, they are expressed as deviations from the firm-level variables.
† In millions.

Excess value. In measuring the presence of a discount on a firm's shares, I calculated its excess value by deriving an imputed value for a firm, I(V), and comparing it to the firm's actual value, V, through a log-ratio: ln [V/I(V)] (Berger and Ofek, 1995; Denis, Denis, and Sarin, 1997; Zuckerman, 1999; cf. LeBaron and Speidell, 1987). V is measured as its total capitalization. I(V) is calculated by taking the median V-to-sales ratio, applying it to each of the segments of a multi-industry firm and then summing to generate an imputed value for that corporation:

$$I(V) = \sum_{i=1}^{I} AI_i \times [Ind_i(V/AI_{mf})],$$

where I(V) is the estimated value of the firm, AI_i is segment i's sales, $Ind_i(V/AI)_{mf}$ is the median ratio of total firm capital to sales for the single-segment firms in industry i (i.e., expected profitability), and I is the number of segments reported by the firm. Thus, the excess value variable compares this imputed value of the firm with its total capitalization through a log-ratio to indicate the extent to which a firm is worth more, rather than less, than the sum of its parts. Additional coding decisions in the calculation of excess value follow Zuckerman (1999). First, discrepancies between summed segment-level sales and total sales are corrected by eliminating the 5 percent of firms for which the discrepancy is greater than 1 percent (cf. Berger and Ofek, 1995). Second, unlike Berger and Ofek (1995), I included the firms for which the imputed value was more than four times greater or smaller than its actual market value.

Intersegment relatedness. Scholars have long wrestled with the task of properly measuring interindustry relatedness, with little resolution. Approaches have included impressionistic coding (Rumelt, 1974), use of the SIC system (e.g., Caves, 1981; Berger and Ofek, 1995), and measurements based on patterns of exchange between industries (Lemelin, 1982; Burt, 1988; Burt and Carlton, 1989; Gollop and Monahan, 1991). I adopted the approach of Teece et al. (1994), who proposed an indirect measure based on the prevalence of various industry pairs under the same corporate roof. The Appendix shows how the interindustry prevalence structure **T** was derived. The main rationale for using this matrix as the basis for calculating intersegment relatedness is that the observed tendency for certain industry pairs to be combined indirectly incorporates all measurable and immeasurable synergies that pertain to such industries. To the extent that a pair of business lines shares economies of scope, standard economic theory suggests that they will be combined. If they do not enjoy such economies, they will not be owned in common. Thus, this approach should indirectly capture all effects of interindustry relatedness.[3]

In addition, the prevalence-based method captures two effects beyond scope economies. First, the prevalence of a phenomenon is often regarded as evidence of its legitimacy (e.g., Hannan and Carroll, 1992; Reagans and Burt, 1998). To the extent that institutional forces beyond those reflected in analyst-coverage patterns privilege certain industry pairs but

3
In results not presented here, a comparison with alternative approaches to interindustry relatedness based on the input-output accounts data (cf. Burt, 1988; Burt and Carlton, 1989) and the difference in SIC codes showed that Teece et al.'s measure relates to these alternatives in predictable ways.

not others, prevalence-based measures should capture such effects. Finally, the prevalence-based measure also speaks to the possibility that short-term diversification and de-diversification activity partly reflects a regression toward long-run patterns of diversification, so that, beyond the efficiency or legitimacy of various industry combinations, random deviations from the general pattern of diversification would disappear from one period to the next. Thus, firm and division-level measures based on the interindustry prevalence structure **T** should display a strong association with patterns of divestiture, following hypotheses 6a and 6b.

Using this matrix, I computed a prevalence score, which reflects the mean relatedness of one segment to all other segments of the firm:[4]

$$p_{fi} = \frac{\sum_{j \neq i}^{I} (t_{ij} + t_{ij'})/2}{I_f - 1},$$

where I_f is the number of industries in which firm f participates and t_{ij} is the relatedness of industry segments I and j from matrix T. For the firm-level measure, I took the weighted average of the prevalence scores across its segments:

$$wp_f = \sum_{i=1}^{I_f} w_{fi} \times p_{fi},$$

where w_{fi} is measured as the ratio of the segment's reported sales or, when available, its assets to total firm sales or assets. For the segment-level measure, I subtract the firm-level measure from a segment's prevalence score.

Analysis

As the data are given by year rather than in continuous time, I analyzed the event histories as a discrete-time logit. For a segment of a firm in a particular fiscal year, I assessed the effect of a series of covariates on the log-odds that the segment would be divested by the subsequent fiscal year. Divested segments were removed from the analysis in all years subsequent to divestiture. Such analyses were then interpretable in the manner of standard logistic regression analyses (Allison, 1982; Yamaguchi, 1991). The coefficients on firm-level variables characterize differential rates across firms; the effects of segment-level variables represent variation across segments of the same firm. In addition, the standard errors of the presented models are robust to clustering of variance within the same firm.

Six models were used to test the hypotheses. The first model considers all firms that had more than one segment in a given year, all covariates are measured at a lag of one year before the time of potential divestiture, and all segments are considered, the former referring to cases for which earlier data are unavailable but whose start year is known (Yamaguchi, 1991). Subsequent models vary each of these conditions. As table 3 shows, many of the segment histories are

4
A limitation of this measure is that it ignores the possibility that a firm may contain multiple sets of segments, characterized by high relatedness within sets and low proximity between sets. Given the relatively small average number of segments, this does not appear to be a common condition.

Table 3

Frequency of Start Year of 3-Digit Industry Segments, 1978–1993

Start year	Number	Frequency
1978*	1728	22.53
1979	86	1.12
1980	126	1.64
1981	126	1.64
1982	506	6.60
1983	212	2.76
1984	216	2.82
1985	272	3.55
1986	372	4.85
1987	318	4.15
1988	373	4.86
1989	353	4.60
1990	528	6.88
1991	604	7.87
1992	866	11.29
1993	985	12.84

* Includes segments that may have started before 1978 but whose start year is unknown.

left-censored because the SEC first began mandating the publication of segment information for fiscal year 1978. The construction of the time window helps alleviate this problem by allowing me to compare the results from the first set of models with those that exclude left-censored and left-truncated cases. In particular, by opening the time window for the analysis in 1984, I can distinguish segments that are neither left-truncated nor left-censored (beginning in 1984 or later) from those that are left-censored (beginning in 1978 or sooner) and those that are left-truncated (beginning between 1979 and 1983). The second and third sets of models, respectively, follow the latter two selection criteria. To the extent that results are robust across these selection criteria, we may have greater confidence in the strength of coefficients and in the confirmation or disconfirmation of the hypotheses.

The fourth model repeats the first set but with the covariates measured at a lag of two years preceding the time of potential divestiture. As discussed above, this analysis is particularly important because there is an alternative explanation for the positive association between coverage mismatch and divestiture: firms may announce their impending divestitures, thus spurring a decrease in coverage from the analysts who specialize in the industries that will be exited. If this is so, however, the association between mismatch and divestiture should be insignificant the earlier in time mismatch is measured. Thus, finding an effect for coverage mismatch two years before the potential divestiture would provide strong evidence that the direction of the effect runs from the former variable to the latter, rather than vice versa.

The fifth model again repeats the first set but uses a slightly different model specification. Here the event histories are estimated as a conditional or fixed-effects logit, which entails a logistic regression analysis on the same set of covariates with a set of dummy variables for every firm. The motivation for estimating these models is that the data set constitutes a nesting of divisions within firms. Fixed-effects analyses are a

useful check on the possibility that there is unobserved heterogeneity that is due to firm-level differences.

Finally, the sixth model considers the impact of relevant covariates on single-segment firms. Such firms are clearly not at risk of de-diversification and are thus not subject to the hypothesized effects. It might thus be argued that there should be no effect of coverage mismatch on the likelihood that a single-segment firm expires, but this may not be the case. Since high coverage mismatch in a single-segment firm lowers a firm's market value (Zuckerman, 1999), the firm may be more likely to fail for lack of necessary capital. Such firms may also be more likely to become takeover candidates. While results concerning single-segment firms do not have clear implications for my thesis, I present them so as to facilitate comparison with diversified corporations.

RESULTS

Table 4 presents summary statistics and correlation matrices for the covariates in the models performed on multi-segment firms. Coverage mismatch correlates with several variables, displaying predictable patterns. Firms that suffer from high mismatch tend to be smaller firms that are not followed by many analysts and show a low level of intersegment relatedness. Further, as shown by Zuckerman (1999), low coverage mismatch is associated with higher excess value. At the segment level, segments that are highest in mismatch are generally small relative to other segments and to the size of their industry and were added to the firm more recently than other segments.

The first set of models, which are presented in table 5, represent the basic test of the hypotheses. Model 1a is a baseline model that includes all independent variables except coverage mismatch and excess value. With the exception of market share, results from this model provide considerable support for the three factors discussed by historical accounts of the de-diversification process: economic performance, scope economies, and whether a division represents the corporate

Table 4

Descriptives and Correlation Matrices

Firm-level variable	N	Mean	S.D.	1	2	3	4	5	6	
1. Number of segments	26,315	3.19	1.26	–						
2. Logged (assets)	26,315	6.24	1.94	.39	–					
3. Number of analysts	26,315	8.82	9.86	.21	.75	–				
4. Return on assets	26,250	.10	.54	–.00	.01	.03	–			
5. Prevalence score	26,306	1.91	2.68	–.28	.13	.11	–.00	–		
6. Excess value	26,315	–.33	1.10	–.04	.22	.29	.05	.09	–	
7. Coverage mismatch	26,310	.72	.31	–.02	–.56	–.65	–.02	–.22	–.26	
Segment-level variable	**N**	**Mean**	**S.D.**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
8. ROA	26,117	.00	.76	–						
9. Median sales multiple ($ millions)	25,503	.00	552.91	.00	–					
10. R&D expenditure ($ millions)	26,315	.01	18.35	.00	.05	–				
11. Prevalence score	26,306	2.92	3.91	.01	–.06	.00	–			
12. Percentage sales	26,295	.00	.26	.05	–.13	.06	.10	–		
13. Market share	26,315	.00	.08	.01	–.03	.00	.02	.15	–	
14. Years in segment*10	26,315	–.00	2.73	.03	–.04	.04	.11	.37	.07	–
15. Coverage mismatch	25,564	.09	.29	–.02	.07	–.09	–.08	–.43	–.20	–.27

Table 5

Discrete-Time Logit Analysis of Exit from 3-Digit Industries, 1985–1994*

Firm variable	Model 1a	Model 1b	Model 1c	Model 1d	Δp†
Number of segments	.15•••	.14•••	.14•••	.13•••	+.009
	(.03)	(.03)	(.03)	(.03)	
Logged (assets)	–.01	–.01	–.01	–.01	n.s.
	(.02)	(.02)	(.02)	(.02)	
Number of analysts/10	–.16•••	–.12••	–.12••	–.09•	–.008
	(.00)	(.05)	(.05)	(.05)	
Return on assets	–.25•••	–.25•••	–.23•••	–.24•••	–.004
	(.07)	(.07)	(.07)	(.07)	
Prevalence score	–.10•••	–.10•••	–.10•••	–.10•••	–.007
	(.02)	(.02)	(.02)	(.02)	
Coverage mismatch		.64•••		.60•••	+.010
		(.17)		(.17)	
Excess value			–.10•••	–.11•••	–.004
			(.03)	(.03)	
Segment variable					
ROA	–.14••	–.15•••	–.13••	–.14•••	+.004
	(.07)	(.07)	(.07)	(.07)	
Median sales multiple ($ thousands)	–.10••	–.09••	–.09••	–.09••	–.002
	(.04)	(.04)	(.04)	(.04)	
R&D expenditure ($ thousands)	–2.97•	–2.28	–2.82	–2.18	n.s.
	(1.65)	(1.66)	(1.63)	(1.64)	
Prevalence score	–.03••	–.02	–.03••	–.02	n.s.
	(.01)	(.01)	(.01)	(.01)	
Percentage sales	–2.70•••	–2.48•••	–2.71•••	–2.49•••	–.017
	(.14)	(.15)	(.14)	(.14)	
Market share	–.22	–.07	–.20	–.05	n.s.
	(.37)	(.39)	(.37)	(.38)	
Years in segment*10	–.25••	–.20••	–.25•••	–.20••	–.002
	(.09)	(.09)	(.09)	(.09)	
Coverage mismatch		.73•••		.73•••	+.008
		(.15)		(.15)	
Constant	–2.70•••	–3.28•••	–2.78•••	–3.31•••	
	(.13)	(.20)	(.12)	(.20)	
N (segment–years)	24,645	24,645	24,645	24,645	
–2 * Log likelihood	12,548.87	12,517.03	12,521.28	12,490.23	

• $p \leq .05$; •• $p \leq .01$; ••• $p \leq .001$, two-tailed t-tests.
* This represents the date of potential divestiture. Covariates are measured from 1984 to 1993. Standard errors are in parentheses. Models include left-censored and left-truncated cases.
† Shows change in probability of divestiture in model 1d from increase in one s.d. from the mean value of the variable. In these calculations, all other variables are set to zero.

core or periphery all significantly affect divestiture rates. In particular, firms are less likely to divest their operations when they enjoy higher rates of return (H3a) and when their divisions are highly related to one another (H6a). In addition, a segment is less likely to be divested when it is more profitable than other segments in the firm (H3b), when its prospects of future earnings are greater than other segments (H4), when the segment is larger than other segments (H7), and when it is older than other segments (H6b). Further, there is somewhat weaker evidence that a segment is at a lower risk of divestiture when the firm has invested more in it relative to others (H3b) and when the segment is unrelated to other of the firm's segments (H6b). Finally, it appears that firms that are covered by many analysts display lower rates of divestiture. This confirms the importance of including this measure as a control for the coverage mismatch variables.

Model 1b introduces firm and segment-level coverage mismatch. Each of these variables has significant effects of

roughly comparable magnitude. The significant decrease in log-likelihood from model 1a to model 1b attests to the fact that coverage mismatch adds significant explanatory power to that captured by the other variables. In model 1c, the coverage mismatch variables are removed and the firm's excess value score is added. As predicted, firms that achieve a high valuation are less likely to engage in de-diversification. Finally, model 1d considers all independent variables in the analysis. The significant reduction in the log-likelihood statistic from both models 1b and 1c indicates that coverage mismatch and excess value have independent effects on de-diversification. This suggests that the pressure on corporate executives to participate in a constellation of industries that match the stock market's industry-based categories is expressed both through a reduced share price and through a mismatch in coverage by securities analysts.

The last column in table 5 shows the change in the probability of divestiture that accompanies a one-standard-deviation change in that covariate from its mean level. All other variables are set equal to zero for these calculations. For example, an increase in firm-level return on assets from 0.10 to 0.64 reduces the probability that a firm will divest one of its divisions from .034 to .030, or .004. Excess value has an effect on the likelihood of divestiture of roughly similar size while the effect of firm-level coverage mismatch is larger, almost at the level of the prevalence score. Also, coverage mismatch affects divestiture to a greater extent than does the number of analysts that cover the firm. That is, the particular pattern of coverage that a firm obtains is more important than the amount of coverage. Among segment-level variables, size and age both have quite substantial effects on the likelihood that a division will be divested. But the impact of coverage mismatch is quite evident and is stronger than all the other covariates, including those tapping the past and future probability of the segment.

Models 2 and 3 in table 6 test the robustness of the results by applying more restrictive selection criteria. Model 2 excludes all segments that are left-censored because the first year they appear in the Compustat Industry Segment file is 1978, the first year for which such data were published. Model 3 further excludes any segment that began before 1984. Results from these models bear strong resemblance to those from model 1d. Despite the loss of cases from model 1 to model 3, the coverage mismatch variables retain their statistical and substantive significance. Thus, we may conclude that left-censoring does not pose a problem for this analysis.

Models 4 and 5 represent additional tests of the robustness of the results of model 1d. Model 4 repeats the analysis presented in model 1d but with covariates lagged at two years before the time of potential divestiture. If it is announced plans for divestiture that lead to increases in coverage mismatch, then the estimated effect of mismatch should be greatly attenuated the earlier it is measured. The results of model 4 show no such attenuation. It appears that causality runs from coverage mismatch to divestiture rather than vice versa. Results from model 5 also affirm the basic findings

Table 6

Discrete-Time Logit Analysis of Exit from 3-Digit Industries, 1985–1994*

Firm variable	Model 2	Model 3	Model 4	Model 5	Model 6
Number of segments	.10•••	.07•	.14•••	.31•••	NA
	(.03)	(.04)	(.03)	(.05)	
Logged (assets)	–.02	–.02	–.03	.41•••	–.09•••
	(.03)	(.04)	(.03)	(.09)	(.03)
Number of analysts/10	–.04	–.03	–.07	–.09	–.30•••
	(.06)	(.08)	(.05)	(.11)	(.08)
Return on assets	–.24•••	–.25•••	–.50•••	–.16•••	–1.77•••
	(.08)	(.10)	(.12)	(.06)	(.25)
Prevalence score	–.09•••	–.07••	–.11•••	–.16•••	NA
	(.03)	(.03)	(.02)	(.04)	
Coverage mismatch	.40••	.54••	.43••	.70•••	.00
	(.19)	(.26)	(.18)	(.23)	(.12)
Excess value	–.10•••	–.14•••	–.12•••	–.16•••	–.12•••
	(.03)	(.04)	(.03)	(.04)	(.03)
Segment variable					
ROA	–.15•	–.19••	–.45•••	–.09•	NA
	(.09)	(.10)	(.12)	(.05)	
Median sales multiple ($ thousands)	–.11•••	–.07	–.13•••	–.09••	–.10••
	(.04)	(.06)	(.05)	(.05)	(.04)
R&D expenditure ($ thousands)	–2.93	–3.72•	–3.34•	–2.62	–.37
	(2.18)	(2.11)	(1.78)	(2.86)	(.54)
Prevalence score	–.01	–.02	–.02	–.03••	NA
	(.02)	(.02)	(.01)	(.01)	
Percentage sales	–1.98•••	–1.59•••	–2.22•••	–2.56•••	NA
	(.16)	(.19)	(.15)	(.15)	
Market share	–.11	–.26	–.16	.28	–.20
	(.41)	(.51)	(.47)	(.44)	(.35)
Years in segment*10	–.00	–.02	–.22••	–.03•••	–.04•••
	(.01)	(.02)	(.11)	(.01)	(.01)
Coverage mismatch	.52•••	.62•••	.66•••	.74•••	NA
	(.17)	(.23)	(.16)	(.15)	
Constant	–2.83•••	–2.79•••	–3.00•••	†	–1.72•••
	(.22)	(.31)	(.22)		(.17)
N (segment–years)	15,038	7,858	19,578	16,255	19,799
–2 * Log likelihood	9,269.82	5,145.33	9,656.84	7,374.62	8,930.40

• $p \leq .05$; •• $p \leq .01$; ••• $p \leq .001$, two-tailed t-tests.

* This represents the date of potential divestiture. Covariates are measured from 1984 to 1993. Standard errors are in parentheses. All models represent versions of model 1d with some aspect of the analysis changed. Model 2 and model 3 vary the sample; the former excludes left-censored cases and the latter excludes both left-censored and left-truncated cases. Model 4 repeats model 1d but with covariates measured at a two-year, rather than one-year, lag; model 5 repeats model 1d as a conditional logit analysis; model 6 analyzes single-segment firms.

† Varies by firm.

from model 1d. To test for the possibility that unobserved heterogeneity based on firm characteristics biases the previous findings, model 5 includes dummy variables for each firm to produce a conditional or fixed-effects logit analysis. This analysis repeats the analysis in model 1d except that, because conditional logit estimates within-firm effects, only firms that divested at least one division from 1985 to 1994 are included. Again, these analyses generate patterns that strongly resemble those found in the earlier analyses. In particular, the effects of firm and segment-level coverage mismatch remain strong.

Finally, model 6 analyzes single-segment firms. Rather than estimating the likelihood that a segment will be divested, this analysis looks at the probability that a firm will disappear altogether, either through bankruptcy or being acquired by another firm, outcomes that cannot be distinguished in the Compustat data. For this analysis, several of the covariates are now

undefined because, by definition, firms with only one segment do not vary on these variables. Results from these models are straightforward: firms are less likely to disappear when they are larger, get more attention from analysts, are more profitable, enjoy greater prospects of profitability, are older, and have a higher stock price. Most relevant here is the insignificance of the coverage mismatch variable. For single-segment firms, failure to attract coverage from the analysts who cover the firm's industry does not have an appreciable impact on the probability that the firm disappears. Thus, while helpful in charting which segments of diversified firms will be divested, coverage mismatch does not help explain the expiration of a stand-alone business. Coupled with findings on the illegitimacy discount suffered by such firms in the stock market (Zuckerman, 1999), this result speaks to the disjuncture between success or failure in financial markets and the productive economy. While coverage mismatch lowers the market value of single-segment firms, it does not influence the rate at which they cease to exist.

DISCUSSION

The foregoing analyses deepen our understanding of the corporate de-diversification wave of the 1980s and 1990s. Previous research tends to portray the aggregate decline in industrial scope during this period as an efficiency-driven movement aimed at refocusing on a core set of related activities. The results presented here confirm that such factors as economic performance, divisional relatedness, and whether a division constitutes the corporate core significantly affect the likelihood of divestiture. In addition, however, analysis of divestiture rates reveals a separate impetus for de-diversification: the pressure faced by firms to assume a legitimate product identity in the stock market. Diversified firms contradict the dominant logic of valuation, which classifies firms by industry, and the division of labor among analysts, which rests on that categorization. As a result, such a corporation faces pressure to align its corporate identity with one that more readily fits its position in the analyst-review network. It is through such pressure by analysts to match the stock market's industry-based product categories that investors exert control over the corporation.

The nature of such control is illuminated by recognizing that, for certain purposes, the public corporation may be likened to a product. Just as a seller in a product market aims to meet consumer demand, managers of a public firm must satisfy investors. Traditional approaches to the issue of corporate control have generally regarded such sensitivity to shareholder wishes as unproblematic: since investors want nothing more than a high return on their investment, adjusting a firm's strategy so that it increases such returns means merely that nothing will distract the firm from achieving maximum profitability. But such a perspective ignores the difficulty of ascertaining which actions in fact enhance shareholder value and which erode it. This challenge is particularly acute because corporate shares are social goods in that they are generally valuable to their owners only if others come to value them highly as well (Zuckerman, 1999). As a result, investors are highly sensitive to prevalent valuation methods

and their associated categories. Such categories typically become entrenched as they are embedded in structures such as the analysts' division of labor. It is the logic that underlies this structure that is the source of corporate control emphasized here, a powerful constraint that pushed public firms in the 1980s and 1990s to adhere to a given industry and thereby present a coherent image.

It is important to stress that the findings presented here are specific to the time and place studied. Although diversified firms suffer from problems that inhere in the structural context of valuation, it appears that they were in favor during much of the 1960s (Matsusaka, 1993; cf. Sobel, 1981, 1984; Malkiel, 1985; Espeland and Hirsch, 1990). Why then, if the industry categories that guide investment pose such powerful constraints in recent years, was that not the case in earlier periods?

To answer this question, one must recognize that pressure to abide by industry categories should be found only for markets that group stocks by industry. Such a structure has clearly been in place since the "pragmatic" revolution of the 1930s, which ushered in an era of valuation based on future earnings (Burk, 1988: 245–267; cf. Babson, 1967). The development in the previous period of indexes for railroad, manufacturing, and utilities stocks suggests that industry boundaries have long been salient to investors. Thus, the conglomerate firms that emerged in the 1960s presented a profound challenge to deep-seated principles of valuation. At first, market participants latched onto the theory that the conglomerateurs were selling them: that the violation of the product-category boundaries represented a new category, which merited a high valuation. But with the collapse of the general optimism associated with the 1960s bull market, the mounting evidence that conglomerates did not improve economic performance, and the opening of new avenues for traditional growth, the conglomerate category fell into disfavor and was de-institutionalized by the early 1980s (Espeland and Hirsch, 1990; Davis, Diekmann, and Tinsley, 1994; Davis and Robbins, 1997). The 1950s and 1960s may have been a temporary aberration, in which predominant theories of valuation encouraged a violation of the industry-based product structure, and the 1980s and 1990s may represent a backlash, in which strict adherence to this structure was demanded. Thus, while the described process of conformity with industry-based product categories has been in evidence for many years (see, e.g., Fisher, 1996: 111), it was clearly overshadowed during the conglomerate boom and may be especially salient in recent years.

The historical contingency of investor pressure to focus the firm helps illuminate what is distinct about investor control of the corporation: investors' demands for greater value are mediated by prevalent theories of valuation and their attendant structures. Such structures, which include intermediary relationships, currently enacted by securities analysts, as well as systems of classification, currently dominated by industry-based categories, are notable because they introduce a set of characteristic constraints to which the managers of public firms must adjust. That the salience of these structures

changes over time reinforces the thesis advanced here: that pressure from investors to change a firm's corporate strategy cannot be reduced to efficiency-based considerations. The effects on de-diversification of coverage mismatch and excess value represent changes in corporate strategy that would likely not have been undertaken were the shares of the firms under study not publicly traded. Accordingly, A. H. Stromberg of the URS Corp. summarized his feelings after having succumbed to analyst pressure to spin off its computer training subsidiary by saying, "In a perfect world, I don't know if we would be public right now" (Brown, 1983: 72). It is only because managers are dependent on investors—and more directly, analysts—for a high valuation of their firm that it matters whether the firm's pattern of diversification is at odds with the analysts' division of labor. It would seem, then, that control by public market investors is not a pristine state in which only issues related to a firm's income stream guide its actions but that such control introduces powerful constraints on corporate strategy.

The results presented here also have implications for research on organizational identity. Recent work on this topic has documented the processes by which organizational constituents strive to cultivate positive self-portraits. For instance, when an organization is of low rank on one measure of performance, its members often seek alternative measures (Elsbach and Kramer, 1996) or points of comparison (Porac, Wade, and Pollock, 1999) that afford a higher rating. Through such identity work (Snow and Anderson, 1987), organizations resolve tension between the identity they ascribe to themselves and the image others hold of them (Dutton and Dukerich, 1991). But a focus on the tactics of impression management threatens to ignore the heavy constraints that plague efforts to shape organizational identity, particularly when the relevant audience comprises external, rather than internal, constituents (Ginzel, Kramer, and Sutton, 1992). That institutional environments limit the range of organizational self-presentation constitutes the dominant theme of neoinstitutional theory (e.g., Meyer and Rowan, 1977; DiMaggio and Powell, 1983). The market also sets clear bounds on the public identities that economic organizations may adopt for themselves and their products. For instance, while every firm desires the great returns earned by those who achieve high status, the nature of status hierarchies is such that only a few can reach the top (Podolny, 1993). This article illustrated how the role or category system that orders a market constrains organizational impression management. Goods and services encounter difficulty when they do not lend themselves to the cross-product comparisons on which the market is premised. When such mismatch is great, organizational identity appears less a matter of choice than of necessity.

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APPENDIX: Measurement of Interindustry Relatedness

Following Teece et al. (1994), I assume that the number of business lines in industry i (n_i) and the number in industry j (n_j) is fixed. A sample without replacement of size n_i is drawn from a population of K corporations and assigned business lines in industry i. A second sample, independent of the first, is also drawn, with n_j business lines assigned to industry j. Then, the number of firms with business lines in both industries i and j is a hypergeometric random variable whose probability may be expressed as:

$$\Pr[X_{ij} = x_{ij}] = f_{hg}(x,N,n_i, n_j) = \frac{\left(\frac{n_i}{x}\right) \times \left(\frac{K - n_i}{n_j - x}\right)}{\left(\frac{K}{n_j}\right)}$$

The mean of X_{ij} is

$$\mu_{ij} = E(X_{ij}) = \frac{n_i n_j}{K}$$

and the variance of X_{ij} is

$$\sigma^2 = \mu_{ij} \times \left(1 - \frac{n_i}{K}\right).$$

Teece et al.'s (1994) measure of interindustry relatedness is the t-statistic:

$$t_{ij} = \frac{J_{ij} - \mu_{ij}}{\sigma_{ij}}$$

with the matrix T referring to the full set of interindustry proximity scores.