The Relationship Between Corporate Board Linkages, Industry Environment, Firm Condition and Organizational Survival[1]

Jerry Paul Sheppard

Linkages between one firm and another firm can be critical to the very survival of the organization. Are interorganizational linkages really that important? This study will address that question by looking at the effect on firm survival of one particular type of interorganizational linkage: the board of directors. The study also goes beyond simply looking at board attributes and investigates some of the other factors which may affect firm survival.

Survival is defined here as non-failure. While failure can be defined in a number of ways (Chaganti, Mahajan & Sharma, 1985; Sharma & Mahajan, 1980), bankruptcy is the definition used in this paper. The rationale for this is that corporate boards have a legal obligation to direct and manage the operations of a business in accordance with shareholder wishes (Caldwell, 1985; Zahra & Pearce, 1989). In the long run, the bankruptcy of the firm is not in accordance with shareholder wishes and thus bankruptcy would represent a failure at the shareholder level. The short run exception is when bankruptcy can be employed to turn around a deteriorating situation (Flynn & Farid, 1991; Sirower, 1991). Even in the case of this exception, stockholders are probably better off if firm deterioration could have been prevented (Sheppard, 1992). In theory, directors sit in the position to aid in the prevention of such deterioration. When firms do succumb, the directorship of the company can be seen as having failed to act in the best interests of shareholders by not preventing the corporation's decline and subsequent need to file for bankruptcy.

The law holds directors highly accountable when a corporation files for bankruptcy. Take for example the case of Penn-Central. In the class action and derivative suits which followed the company's failure, a total of $12.6 million was assessed against its 23 directors for failing to ask discerning questions, detect the declining condition, and take appropriate action (Chaganti, et al., 1985; Vance, 1983).

Does the law reflect the reality of the situation? One may argue that many of the forces that drive a firm to its demise are beyond the control of management and the board. An organization may be so bound by past institutional arrangements or restricted by historical antecedents that it has little discretion in decisions affecting its fate (Hannan & Freeman, 1984). Thus, factors such as market conditions, market share, firm size and financial health may so severely restrict the firm's ability to chart its own destiny that at some point it is bound to fail.

On the other hand, there are those who argue that "uncontrollable" factors play a minor role in organizational demise. For example, Tamari (1990) argues, "Empirical research has shown clearly that bankruptcy is not the result of unforeseen circumstances or unavoidable actions but rather it is the consequence of poor management or incorrect economic decisions." Thus, organizations have substantial discretion with regard to the extent to which they allow environmental forces to impact them. D'Aveni (1987) argues that, "strategists believe that organizations have relatively unconstrained free will. That is,

Dr. Jerry Paul Sheppard is Associate Professor, Faculty of Business Administration, Simon Fraser University Burnaby, British Columbia. His research is focussed on questions of why business efforts fail to work as intended and what lessons can be learned from such failures.

organizations have discretion to choose their conduct, and that their choices reflect the preferences of top management." Thus, if the organization fails, the fault lies with those who manage and direct the firm. D'Aveni (1989a) found that directors can influence a creditor's decision to extend funds. His study found that prestigious directors lend credibility to the board and thus help maintain critical financing arrangements between a corporation and its creditors. By having such directors on the board a corporation can thus manipulate its relationship with its bankers. Sheppard (1989) found a relationship between the number of board interlocks and the likelihood of failure. According to Sheppard, fewer board interlocks indicated the firm lacked the ability to coopt resource providers. This lack translated into a significant increase in the chance of firm failure. Similarly, Schlueter (1985) tells us that, "In studies of corporate failure, defects are often found at the board level and just below." Additionally, the size and composition of the board may play a role in organizational survival or failure.

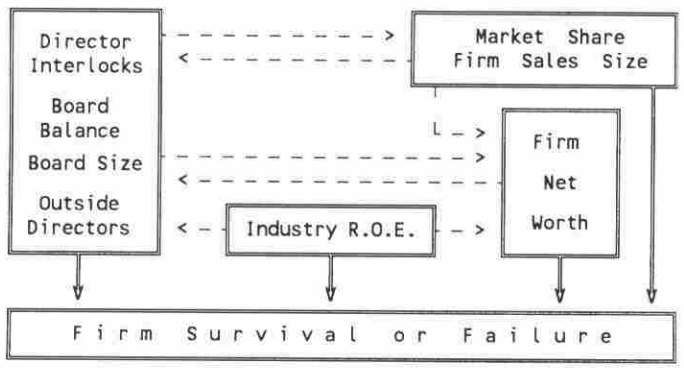
A 1985 study by Chaganti, Mahajan & Sharma looked at corporate board size and composition in relation to failures in the retailing industry. Their study found that non-failing companies tended to have larger boards. However, their study did not find any significant differences between failing and nonfailing firms with regard to the number of offices board chairs held or the percentage of outside (i.e., non-management) directors on the board. Since Chaganti, et al. (1985) only looked at retail organizations, the generalizability of their results to other types of organizations is questionable. In addition, they did not study other variables that may impact a firm's likelihood of failure. Such variables could include the number of board interlocks (Sheppard, 1989) or the distance from a board's optimal balance (Pfeffer, 1972). Such "balanced" boards are discussed in greater detail below.

A Model

While one may argue that environmental factors, firm attributes or board linkages are most important in determining if an organization survives or fails, all are likely to play some role. Both environmental and organizational factors can combine in several ways to affect the firm's existence. One possible set of relationships is graphically shown in Figure I. The model in Figure I shows that board factors can affect firm market share, size and net worth. Board members may smooth the way for mergers to take place and thus help increase the size and market share of the firm. Directors may also be able to provide advice which should assist in promoting the worth of the firm (Caldwell, 1985). Board factors may also be affected *by* firm market share, size and worth. Additionally, external factors like industry profitability may serve to attract or repel certain types of board members. The present research, however, is concerned with the direct relationships in Figure I. In other words, what is the direct impact of a firm's board, its industry conditions, its financial health, and its size on its survival likelihood?

Figure I

Factors Relating to Organizational Survival



The Board

The discussion up to this point leads to a rather straightforward conclusion. The conclusion is that boards are not only held legally accountable for the failure of the firm but are often seen as being able to influence the firm's likelihood of survival (D'Aveni, 1989a; Sheppard, 1989). This study seeks to test that relationship by comparing failed and non-failed firms on several critical board attributes.

Board Interlocks

Board interlocks provide a method by which a firm may coopt elements into the leadership of an organization (Burt, 1983; Kotter, 1979; Pennings, 1980; Pfeffer & Salancik, 1978; Selznick, 1949; Thompson, 1967). For example, the company's banker may be brought on to the board in order to make him or her less resistant to extending funds to the firm. Interlocks may also provide the organization with legitimacy or prestige (Pfeffer & Salancik, 1978), which can prove helpful in securing resources during troubled times (D'Aveni, 1989a).

Director interlocks come in two basic forms — direct and indirect. Pennings (1980) explains that: "A direct interlock exists when one individual is a director of two organizations... an indirect interlock exists when two organizations are linked by a path through one or more third organizations..." Indirect interlocks are of questionable value since information transmitted through them is likely to become distorted. This is because "the indirectly linked director's attention is much more diffused than that of a directly linked director" (Pennings, 1980). For the above reasons — as well as the practical difficulties involved in uncovering indirect interlocks — this study looks only at the number of *direct* interlocks possessed by a firm. Since indirect interlocks are of such questionable value (Pennings, 1980) restricting the study to direct interlocks should greatly alter the validity of the interlock measure. It is expected that failing firms would have significantly fewer board interlocks than non-failing firms.

The number of direct interlocks, though useful, is not sufficient to describe adequately the extent of the linkages between organizations (Pennings, 1980). Thus, we will turn our attention to some additional factors.

Percentage of Outside Directors

The percentage of outside directors would, in addition to the board interlock measure, provide an indicator of board orientation toward its external environment and possible connections to others in that environment (Sheppard, 1989). Outside directors are classified as directors who are not: employed by the organization, officers or directors of subsidiaries or parent organizations, or retired officers of the corporation (Pennings, 1980). In general, directors are charged with looking over management's shoulder to ensure the company is being run properly. Inside directors are thus seen as having a conflict of interest between management and shareholder views (West, 1985). Outside directors are seen as being better able to objectively oversee the company (Spencer, 1983; Zahra & Pearce, 1989). Since one of the perceived functions of outside directors is to ensure the long run survival of the organization (West, 1985), one would expect failing companies to have significantly fewer outsiders on their boards. There is little evidence to support the idea that a larger percentage of outsiders helps the firm to survive (Chaganti, et al., 1985). A better approach than the study of outsiders on the board is the study of what could be called "the optimally balanced board."

The Optimally Balanced Board

The optimally balanced board is an idea advanced by Pfeffer (1972). The contention is that organizations which develop an optimal balance between inside and outside directors have better political effectiveness (Pfeffer, 1972). Firms with small differences between their optimal board balance and actual board balance will be the highest financial performers. According to Pfeffer (1972) optimally balanced boards are a function of firm sales size, its debt to equity ratio and the degree of national and local regulation. A small firm with a low debt to equity ratio would be expected to have about 40% outside directors. Larger firms with high debt to equity ratios in highly regulated industries would have boards almost entirely composed of outside directors. Conversely, firms with a great difference between their optimal board balance and actual board balance will be poorer financial performers.

While Pfeffer's theory about the relationship between board optimal balance and firm economic performance is useful, there are reasons for not applying his formula to a failure study. To begin with, when using Pfeffer's formula for optimal board composition one must take into account the firm's debt to equity ratio. Since failing firms may be highly leveraged (Argenti, 1976), the formula Pfeffer suggests may result in boards that are more than 100% outsiders. This "optimal" board is clearly an impossibility. (Estimates the author arrived at for "optimal" boards of some highly leveraged failing firms suggested the board should be made-up of over 500% outsiders.) Since Pfeffer's 1972 study there are likely to have been changes in what one would consider an "optimal" board. For example, since the time of Pfeffer's study, interest rates have increased. For firms with high debt to equity ratios, higher interest rates could spell trouble. By extending Pfeffer's logic, such high debt firms would need to increase their percentage of outsiders during high interest rate periods. Pfeffer, however, does not really address the issue of changing interest rates and how they affect the debt to equity / optimal board relationship.

Instead of using Pfeffer's "optimal board" formula this study will make the seemingly arbitrary assumption that boards which are half insiders and half outsiders are "optimally balanced" (or a 50/50 board). However, the assumption is not as arbitrary as it seems. It may well be that the board requires a true balance between insiders and outsiders rather than letting either one dominate. (Some of the more important advantages and disadvantages of insider or outsider dominated boards are summarized in Zahra & Pearce, 1989.) The logic behind this runs as follows. On the one hand, inside directors — though knowledgeable about the firm's affairs — may be more concerned with their own interests than the welfare of the shareholders (Eisenhardt, 1989). This is in spite of the fact that, as directors, insiders are still responsible for promoting the interests of the shareholders. On the other hand, outside directors are seen as more likely to defend the shareholders' interests and are less likely to be knowledgeable about the firms they direct (West, 1985). Therefore, a balance of insiders and outsiders may be the best way to achieve both knowledgeable and responsible direction on the board (West, 1985).

For the purpose of this study, failing firms were expected to have less balanced boards than non-failing firms, i.e. failing firms would have boards that were more distant from an even balance between outside and inside directors. To operationalize this, one would take the absolute value of the difference between the percentage of insiders and 50%. An example may better clarify what this means. Two firms, Maxon Industries and United Industrial, had six member boards in 1980. Maxon's board was 100% insiders while United Industrial's board was 50% insiders. Thus, Maxon's distance from an optimal board balance would be 50% (absolute value of 100%-50%) and United Industrial's distance 0% (absolute value of 50%-50%). The balanced board assumption would lead one to the hypothesis that the firm most likely to fail would be the one farthest away from a 50/50 insider/outsider split. Therefore, one would assume that Maxon — being 50% away from an optimal board — would be most likely to go bankrupt (which it did in 1981).

Although the balanced board calculation is useful, there is, however, one other board dimension we have not looked at — board size.

Board Size

Board size is also important to consider when looking at the board's effectiveness in altering the firm's likelihood of failure. According to Chaganti, et al. (1985):

> *"Board size has a number of implications for the board functioning. From the stand point of the C.E.O., a smaller board is 'manageable'. More often than not, a smaller board plays a controlling function,*

whereas a larger board may not be able to function effectively as a controlling body leaving the management relatively free. Though a larger board is unmanageable, it may be valuable for the breadth of its 'services'. Board size, therefore, is a significant attribute and affects board functioning and eventually corporate performance."

Thus, smaller, more "manageable" boards tend to allow the strong C.E.O. to dominate the organization. Such domination can increase the likelihood of mistakes that may lead a firm to failure (Argenti, 1976). The "breadth of its 'services'" in the above paragraph can be taken to mean that a large board may have greater diversity of business backgrounds or greater likelihood of extensive interlocks. Both effects would serve to lessen the corporation's chance of failure. Therefore, one would expect failing firms to have smaller boards.

Board Hypotheses

To summarize the above discussion with regard to boards of directors we can hypothesize that, as compared with non-failing firms:

h_1 Failing firms have significantly fewer board interlocks, and the number of board interlocks serves as a significant predictor of failure;

h_2 Failing firms have significantly fewer board outsiders, and the percentage of outsiders serves as a significant predictor of failure;

h_3 Failing firms have significantly less even balance between outside and inside directors and, board balance serves as a significant predictor of failure;

h_4 Failing firms have significantly smaller boards, and the number of board members serves as a significant predictor of failure.

Upon initial inspection, hypotheses two and three may seem incompatible — this is not necessarily the case. If one looks at the two hypotheses jointly, what is really being said is that non-failing firms would have a more even mix of insiders and outsiders (h_3) and that failing firms are more likely to be dominated by insiders (h_2). The above hypotheses reflect not only individual factors previously discussed but their importance for predicting failure. The importance of predicting failure has also been a central concern of previous researchers (D'Aveni, 1987) and has led to development of several failure prediction models. Models were developed in this study in order to provide a better picture of how the factors discussed above were (or were not) significant as predictors of failure.

The Organization and its Environment

While the above attributes of boards are important, they are not the only factors to be considered when comparing the failing and non-failing firms. As stated earlier, many other variables may be of great importance in determining the organization's fate. Attributes of the firm's environment, the firm's interaction with that environment and factors unique to the firm may have significant impact of the organization's likelihood of survival.

Industry Environment

For some time industry environmental factors have been seen as vital to the well being of the firm. Starting with studies by Bain (1956) and continuing to present various researchers (Scherer, 1980; Schmalensee, 1985) in industrial economy have confirmed the relationship between industry structure and firm performance. Schmalensee (1985) found that industry effects accounted for a better than 75% of the variance of company rates of return.

Industry conditions, like industry profitability, can provide a significant explanation of the firm's performance or lack thereof (Christensen & Montgomery, 1981; Lieberson & O'Conner, 1972). Such performance is critical to the firm's continued survival (Altman, 1968; Drucker, 1970). Industry profitability can also be used to summarize a number of industry effects (Hansen & Wernerfelt, 1989). Therefore, one would expect to find failing firms in less profitable industries than non-failing ones. Yet the simple presence of the firm in a profitable industry will not be sufficient to ensure its continued survival. Thus, there are several other factors that must be considered.

Market Share

Market share has been found to significantly affect a firm's profitability (Bass, Cattin & Wittink, 1978; Buzzell, Gale & Sultan, 1975; Dalton & Penn, 1976; Shoeffler, Buzzell & Heaney, 1974). As stated above, profitability is necessary for the long run survival of the firm (Altman, 1983; Drucker, 1970). Therefore, the firm that possesses sufficient market share should be able to earn adequate profits with which to stay afloat. However, market share should be viewed in relative terms, i.e. to what extent the firm can control the market relative to other firms in the industry (Hambrick, MacMillian & Day, 1982; Hedley, 1977).

One way to look at relative market share is to compare the firm's market share to the combined market shares of the four largest firms in the industry (Shepherd, 1972). This measure gives, "an indicator of the extent to which dominant firms can prey on their rivals" (Hansen & Wernerfelt, 1989). Additionally this type of measure takes into account the level of industry concentration. According to Bain (1951) industry concentration is an important industry structural variable. Therefore, we would expect firms with lower relative market shares to be more prone to failure due to decreased power in the market. However relative market share is not the only dimension of power that may be relevant here. Firm size may also influence the ability of the firm to survive.

Corporate Size

The size of the company may contribute significantly to its likelihood of failure. Population ecology literature speaks of "the liability of smallness" (Singh & Lumsden, 1990) — that is,

smaller firms are more likely to fail. When one speaks of firm size, a typical perception might be that we mean a firm's total assets or its annual sales (Burt, 1983). Size is seen as giving the firm power (Pfeffer & Salancik, 1978) and prestige (Monson & Downs, 1965). The firm can press this advantage over resource suppliers if the firm represents a substantial percentage of the supplier's sales (Pfeffer & Salancik, 1978; Porter, 1980). Thus, firm size may play a part in the firm's ability to "enforce" cooperation from its buyers, suppliers or competitors (Pfeffer & Salancik, 1978). Since most interactions occur via sales (and the associated purchases of goods or raw materials), sales size was the measure employed in this study.

On its own, size creates a prestigious image for the firm (Monson & Downs, 1965) which could also be used to ensure the availability of resources (D'Aveni, 1987; Perrow, 1961; Thompson, 1967). We would therefore expect that smaller firms would be more likely to fail. If smaller firms were truly very high risk ventures, it is less likely that they would ever receive funding. This is clearly not the case as small firms are often able to acquire capital. Thus, we need to look at one other important factor regarding firm failure, which we will refer to as "firm internal resources".

Firm Internal Resources

Firm internal resources can refer to anything the firm possesses that may be used to induce others to contribute to the organization (Sheppard, 1989). For instance, cash on hand is a resource that can convince workers to contribute their labor to the organization. Likewise, unencumbered assets are a resource that can convince creditors to contribute funds to the organization. It is important to possess resources that can add to the firm's competitive advantage. However, the evaluation as to the quality and appropriateness of the resources are not necessarily easily performed by external agents (e.g., banks) which may supply resources. Such resource providers would be more likely to look at broad indicators of firm financial health. In the broadest sense it is the unencumbered assets of the company that objectively equal the full extent of the firm's resources (Granof, 1980). Thus, the net worth or equity of the corporation becomes an objectively measured resource base for the firm to keep itself going. Several authors mention net worth over total assets as being a useful solvency indicator (Chen & Shimerda, 1981; Chudson, 1945; Mun & Garcia, 1983; Pinches & Mingo, 1973). So by using net worth to total assets we can get a standardized measure to evaluate the internal resources of failing and non-failing firms. One would thereby expect firms with lower net worth to asset ratios to stand less of a chance of surviving.

Other Considerations

As we have seen in the airline industry, the presence, absence, and radical change of regulation may affect a corporation's chance of survival. For this study, firms that involved themselves primarily in highly regulated or recently deregulated industries are not included. Such industries include utilities, telecommunications, banking, law, medical practice, insurance, and transportation.

Another potential consideration would be the age of the firm. Start-up firms are particularly susceptible to the possibility of failure (Moulton & Thomas, 1988). Thus, firms that had been in existence less than five years were eliminated from this study sample. Also, small employment and sales figures are indicative of start-up firms. Thus, firms with less than 100 employees or $25 million in sales (1982 dollars) were eliminated from the sample. Specific measures and methods employed are discussed in the Measurement and Research Methodology section below.

Non-Board Hypotheses

To summarize the above discussion with regard to non-board factors we can hypothesize that, as compared with non-failing firms:

h_5 Failing firms are in significantly less profitable industries, and industry profit serves as a significant predictor of failure;

h_6 Failing firms have significantly lower relative market shares, and relative market share serves as a significant predictor of failure;

h_7 Failing firms are significantly smaller in sales size, and sales size serves as a significant predictor of failure;

h_8 Failing firms have significantly less net worth relative to assets, and the net worth to asset ratio serves as a significant predictor of failure.

With this background stated, let us now turn our attention to the problems of measurement and testing.

Measurement and Research Methodology

The population firms chosen for study were those firms which failed between 1980 and 1987, plus an equal number of randomly selected non-failed firms. Both failed and non-failed firms met the restrictions discussed above. (A summary of the firms in the study listed by principle industry is shown in Appendix 2.) Failed firms are defined as all those corporations that have filed bankruptcy petitions from 1980 to 1987. Surviving firms were all those firms that did not file for bankruptcy during the period of study. Firm survival is simply the lack of a bankruptcy filing. The sample is actually a set of samples which compare firms at differing temporal distances from a possible failure date. In other words, sets of firms were compared one to five years prior to target year. For failed firms this target year was the year in which they failed. The appropriate method for comparing failed and non-failed companies on each individual measure would be a test of means (t- test). To test a predictive model in its entirety, appropriate methods include discriminant analysis or logit analysis (Cox, 1970). Logit analysis is the preferred method since it is a more robust statistical measure (Lo, 1986). Predictive accuracy was calculated using a 50% probability cutoff from the logit analysis and

a two-by-two accuracy matrix (Altman, 1968). The analysis not only gives us a way to predict which firms are likely to survive but it also indicates which variables are significant in differentiating survivors from failures. Survivors were coded as a "1", and failures were coded as a "0".

In order to control for non-board differences, industry profitability, relative market share, firm size and firm net worth to assets were formulated into the analysis. These 'non-board' attributes thus act as statistical controls for the purpose of analysis (Kerlinger, 1973), i.e. the 'non-board' attributes are controlled by including them in the tested model (Dillon, Madden & Firtle, 1987).

To ensure consistency over time, sales size was adjusted for inflation (using the G.N.P. deflator). As is common when measuring size (Christensen & Montgomery, 1981), the log of sales size (in millions) was employed to adjust for the wide range of possible firm sizes. Both Return on Assets (ROA) and Return on Equity (ROE) have been employed by several researchers as measures of profitability (Christensen & Montgomery, 1981; Rumelt, 1974). Since ROE affects investors' decisions to commit funds, and industries can not survive for long if such funds are not available, ROE is seen as the more critical profitability measure. Therefore, industry profitability for a firm was measured via use of Return on Equity (ROE) for each of the industries in which a company does business. Industries were defined by four digit Standard Industrial Classification codes (SIC codes). Industry profitability was calculated by using a weighted average (by revenues) of all the firm's businesses according to four-digit SIC codes. The weighted average ratio using the SIC code system has been employed previously in several studies (Dess, 1980; Dess & Beard, 1984; Montgomery, 1982). Industry ROE was adjusted (to reflect its premium above the three month T-bill rate) to account for variation in interest rates that occurred during the period of this study (a ten percent ROE is fine if interest rates are six percent, but poor if interest rates are fourteen percent).

The market share for the firm was measured as a weighted average relative market share for each of the industries in which the firm does business. The four-digit SIC code system was again employed to calculate the firm's relative market share. Relative market share is the firm's market share in a particular industry over the sum of the market shares of the largest four firms in the industry (i.e., the four firm concentration ratio). Relative market share has been used in previous studies by Shepherd (1972) and by Hansen & Wernerfelt (1989).

Data for each of the selected firms came from several sources. Annual reports and 10Ks were employed to calculate the number of interlocking directorships, outside directors, and board and firm size. The number of director interlocks and board size were adjusted for firm size due to high correlations between the variables. Firm market share data were obtained from the Trinet E.I.S. database. The four firm concentration ratios employed to calculate relative market share were obtained from the U.S. Department of Commerce Census figures. Lastly, the industry profitability figures were obtained from Dun & Bradstreet's *Key Business Ratios.*

Results and Discussion

Now let us look at the test results. First we will look at the results of the t-test, next the results of the logit models, and finally the results of the hypotheses tests. A brief discussion of the results accompanies each of these sections. Summary statistics are included in Appendix 1. It should be noted that logit analysis does not produce a complete set of results if there is significant intercorrelation among the variables (Wilkinson, 1988). As no incomplete results were produced, there is a reasonable assurance that significant intercorrelations were not present.

T-Test Results

Included in Table 1 below are the t-tests for board and non-board factors related to the samples of failing and non-failing firms. The years noted in the table indicate the number of years in advance of potential failure. For example, for failing firms the "Year 3 " column summarizes the measurements which were taken three years prior to the target year in which the firm failed; for non-failures the measures are three years prior to the same target year.

Table 1 shows several significant results. First, both the firm net worth and board interlocks measures are significantly (beyond the .05 level) and consistently (for all five years) lower for failing firms than for non-failing firms. Second, failing firms have significantly smaller market shares ($p<.1$) and sales size ($p<.05$) in a majority of years prior to failure. Yet, the sales size / failure relationship was fairly unstable over time. D'Aveni (1989a) was also unable to demonstrate consistent size effects. That the market share / failure relationship grew stronger as firms got closer to potential failure tends also to be in agreement with D'Aveni (1989a; 1989b) if we treat market share as a measure of firm prestige. High levels of firm prestige or reputational capital would cause creditors to keep funding the organization. This implies that market share may be a more reliable prestige indicator as a firm nears failure. Third, board balance is somewhat significant ($p<.1$) four to five years prior to potential failure.

The remaining Table 1 results are somewhat unexpected. Board size and industry profitability of failing firms are significantly different from nonfailing firms only in the fifth year prior to potential failure. The board size result in contrast to Chaganti, et al. (1985). The lack of results is likely due to the fact that the board size was adjusted for differences in sales size. Lack of results for other variables are discussed below.

Logit Analysis Results

As shown in Table 2, in four out of five years net worth to total assets was a significant predictor of failure ($p<.05$). Firms with higher net worth to asset ratios were more likely to survive (since failing firms were coded as 0, and non-failing firms coded as 1, the sign of the logit estimate indicates the variables' relationship with survival). In the two years prior to failure net worth to assets is the only variable significant beyond the .1 level. The importance of net worth as firms near failure is no great surprise. Argenti (1976) notes that such poor financial ratios are simply the outward and obvious signs that appear immediately prior to collapse.

TABLE 1: T-TEST RESULTS

	Year 1	Year 2	Year 3	Year 4	Year 5
Dir. Interlocks	2.19 **	2.99 ***	3.73 ****	3.54 ****	3.86 ****
Board Balance	-1.49	0.91	-1.31	-1.62 *	-1.76 *
Board Size	-0.08	1.21	1.27	1.26	3.21 ***
Outside Dirs.	0.12	-0.46	0.40	-0.98	1.06
Ind. R.O.E.	-0.85	0.20	-0.40	-0.74	1.98 **
Market Share	3.12 ***	1.68 *	2.23 **	1.13	0.80
Firm Sales Size	2.98 ***	1.21	3.88 ****	2.03 **	1.11
Net Worth	6.16 ****	5.28 ****	2.44 **	3.67 ****	3.70 ****
N	62	84	98	102	90

*p<.1 **p<.05 ***p<.005 ****p<.001

The more interesting results occur three to five years prior to potential failure. In all three years both director interlocks and board balance are significant predictors (p<.1 for year three and p<.05 for years four and five). The importance of interlocks seems to rise as the firm is further away from failure (firms with greater numbers of interlocks were less likely to fail). We can therefore consider the number of board interlocks as a significant predictor of failure prior to the time when the firm's financial condition becomes critical. Such results are consistent with studies like D'Aveni's (1989a; 1989b), that link top management prestige to survival. The board balance measure also performed as expected. Thus, the less even the balance between board insiders and outsiders, the less likely the firm was to survive. This result is consistent with Pfeffer's (1972) ideas regarding the need for a proper ratio between insiders and outsiders. Surviving firms can be seen as having boards that combine equal amounts of insider managerial knowledge and, as Chaganti, et al. (1985) calls it, outsider "breadth of experience."

Firm sales size is a significant predictive variable three to four years prior to potential firm demise. A likely explanation is that three or four years prior to failure, firms experience a large drop in sales due (as Argenti, 1976, would argue) to poor management decisions. (This would explain the importance of sales in the third and fourth years.) Having such a large decline the company may employ extraordinary measures in the following year to regain those lost sales. (In the course of doing this research the author noted a few occasions where the firm seemed to go through a last hurrah of sales growth.) Sales increase, but the bottom line does not. (This would explain why, two years before failure, net worth is so important and sales are less important as a predictor.) Near the end the firm is financially weakened and is unable to keep up its extraordinary measures to maintain sales. It quickly succumbs to its poor financial condition and goes into Chapter 11. Both the summary statistics, t-tests and logit analysis tend to confirm this theory of a downward trend, a slight upswing and a final collapse. D'Aveni (1989b) shows a similar pattern prior to a firm's collapse. Moulton (1988) also notes that firms go through an expansionary period prior to their failure.

The predictive accuracy of the models ranged from approximately seventy to eighty-four percent. This range is better than the naive (50/50) guess. The results are comparable to similar studies — particularly when we look at the results more than one year from failure (Altman, 1968).

Finally, let us look at whether variables within the models performed as expected.

Hypotheses Results

Board interlocks, board balance and net worth to assets (h_1, h_3, h_8) all proved to have significant discriminating to power with regard to corporate failure and survival. All three of these measures were related to failure in the hypothesized direction. In other words, surviving firms had significantly more board interlocks and larger net worth to asset ratios. Also, the boards which had a more even balance between inside and outside directors were less likely to fail. These three variables also served to be significant predictors of failure in a majority of years.

As shown in Table 3, hypothesis two and hypotheses four through seven were all rejected —or to be technically correct, we failed to reject the null hypotheses (that these variables were not significant predictors). Outside board members (h_2) were never significant in the t-tests or as predictors in the logit models. Board size (h_4) and industry profitability (h_5) of failing versus non-failing firms was significantly different only five years prior to potential collapse. Neither variable was a significant predictor in the logit analyses. The market share of failing versus non-failing firms (h_6) was significantly different one to three years from possible failure but did not serve as an important predictor in any of the models. The sales size (h_7) of failing versus non-failing firms was significantly different in three of the five years potential failure, but it served as an significant predictor in only one year.

That there was no significant difference regarding the number of outsiders on failing versus non-failing firms calls into question the demands for additional outsiders on the board. While such outsiders may help the board be more

TABLE 2: LOGIT ANALYSIS RESULTS

Year 1	Estimate
Dir. Interlocks	0.0046
Board Balance	0.0020
Board Size	-0.0858
Outside Dirs.	-0.0013
Ind. R.O.E.	-0.1355
Market Share	0.0793
Firm Sales Size	-0.0930
Net Worth	0.0809 ****

Actual	Predicted: Failed	Predicted: Surv.
Failed	26	5
	83.87%	16.13%
Surv.	5	26
	16.13%	83.87%
Overall		83.87%

Year 2	Estimate
Dir. Interlocks	0.1508
Board Balance	0.0402
Board Size	0.2166
Outside Dirs.	-0.0155
Ind. R.O.E.	0.0015
Market Share	0.0470
Firm Sales Size	0.5411
Net Worth	0.0708 ****

Actual	Predicted: Failed	Predicted: Surv.
Failed	33	9
	78.57%	21.43%
Surv.	12	30
	28.57%	71.43%
Overall		75.00%

Year 3	Estimate
Dir. Interlocks	0.1740 *
Board Balance	-0.1740 *
Board Size	0.3084
Outside Dirs.	0.0003
Ind. R.O.E.	0.0206
Market Share	0.0305
Firm Sales Size	1.4769 **
Net Worth	0.0181

Actual	Predicted: Failed	Predicted: Surv.
Failed	36	13
	73.47%	26.53%
Surv.	16	33
	32.65%	67.35%
Overall		70.41%

Year 4	Estimate
Dir. Interlocks	0.2153 **
Board Balance	-0.0494 **
Board Size	0.1244
Outside Dirs.	-0.0216
Ind. R.O.E.	-0.0068
Market Share	-0.0130
Firm Sales Size	0.7157 **
Net Worth	0.0414 ***

Actual	Predicted: Failed	Predicted: Surv.
Failed	39	12
	76.47%	26.53%
Surv.	12	39
	26.53%76.47%	
Overall		76.47%

Year 5	Estimate
Dir. Interlocks	0.2419 **
Board Balance	-0.0564 **
Board Size	0.0949
Outside Dirs.	0.0195
Ind. R.O.E.	0.0594
Market Share	0.0073
Firm Sales Size	-0.3488
Net Worth	0.0546 **

Actual	Predicted: Failed	Predicted: Surv.
Failed	33	12
	73.33%	26.67%
Surv.	11	34
	24.44%	75.56%
Overall		74.44%

* p<.1 ** p<.05 *** p<.005 **** p<.001

"socially responsible" (Jones & Goldberg, 1982), they may not necessarily aid in the firm's survival.

The changes noted in the board size of failing firms, by year, indicate that such firms may be enlarging as they decline. Such moves may serve to bring resource providers onto the board to ensure their continued support and delay the failure of the firm (Sheppard, 1989). New members of such expanded boards are also likely to serve as interlocks with other boards. This would explain why the number of board interlocks is less important as a discriminator of failure when the firm moves closer to Chapter 11. That is, as the firm declines it adds board interlocks. This would explain why, as the firm approaches potential failure, the number of board interlocks for failing firms does not differ significantly from those of non-failing firms. Therefore, the finding by Chaganti, et al. (1985) that board size does make a difference in discriminating failing from non-failing companies may be valid for firms five or more years away from failure. Analysis of the failure/board size relationship more than five years from firm demise, though recommended, is beyond the scope of this study.

TABLE 3: HYPOTHESIS SUMMARY

h_1	Failing firms have fewer direct board interlocks.	**Rejected Null**
h_2	Failing firms have a smaller % of outside directors.	Failed to Reject Null
h_3	Failing firms have less evenly balanced boards.	**Rejected Null**
h_4	Failing firms have smaller boards of directors.	Failed to Reject Null
h_5	Failing firms are in less profitable industries.	Failed to Reject Null
h_6	Failing firms have lower relative market shares.	Failed to Reject Null
h_7	Failing firms are smaller in sales size.	Failed to Reject Null
h_8	Failing firms have lower net worth to asset ratios.	**Rejected Null**

There could be several reasons why the industry ROE for failing firms was significantly different from the industry ROE for non-failing firms only in the fifth year prior to failure. Most likely failing firms were shifting into more profitable industries in which the firms lacked managerial expertise (Sheppard, 1989). Therefore, while the firm may have moved into an industry that is, on average profitable, the firm is unable to compete. Another possibility is that the profit picture in the industries in which failing firms compete may be unstable over time. Firms in such unstable industries fall by the way because they may not be able to adapt quickly enough to changing environmental conditions. Further research is needed to study these possible explanations for the industry ROE results. Such research is beyond the scope of the current study and was thus not undertaken.

Both the firm sales size and market share results may be evidence of the decline pattern noted in the above sections (i.e., decline, temporary expansion, then further decline). Such effects are not significant in the logit analysis due to the strength of other variables — director interlocks (in years four and five) and net worth to assets (in years one and two). Thus, firm market share and size effects are for the most part secondary to director interlock, balanced board and net worth effects.

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

As we have seen, linkages between one firm and another firm *are* critical to the survival of the organization. As has been investigated, one particular route for interorganizational linkages — the board of directors — has a significant effect on the survival likelihood of a corporation. We have gone beyond simply looking at board attributes and studied other factors that may affect firm survival. In doing so, several important aspects regarding the relationship between corporate board linkages, industry environment, firm condition and organizational survival have been noted. All these factors were expected to play some role in differentiating survivors from failures.

Some factors were more important than others. Firm financial condition played a consistent and significant role in the ability of a firm to survive. To some extent then, corporations are subject to their history. Financially healthy firms may be seen as having greater inertia (surprisingly independent of size) and so offer resource providers greater stability (Singh & Lumsden, 1990). However, failing firms are not necessarily victims of their environment; there was little evidence to support the contention that environment resulted in the demise on firms. Board attributes were found to significantly affect the firm's likelihood of survival. Firms which, early on, possessed well balanced and highly interlocked boards seemed to be better equipped to affect their fate. Results here tend to confirm that both organizational and financial attributes have roles to play in developing better models in firm failure research.

We have seen that there is a consistent and statistically significant difference between failing and non-failing firms regarding net worth to total asset ratios and the number of director interlocks. The former is always a significant predictor of failure, while the latter is significant when the firm is more than three years from collapse. Firm sales size, firm market share, and industry profitability appear to play a role in failure. However, it is the pattern of changes, rather than static indicators, that may be important in predicting which firms will fail. Study of such changes was beyond the scope of this study but is recommended for future researchers. Outsiders on the board seemed to make little difference as an indicator of

whether the firm would fail. Lastly, board size may play a role in failure prediction but only more than four years from failure. Since this study only looked at five years prior to failure, longer term studies may reveal a more significant role for board size as a failure indicator.

This study looked at only a few aspects of board composition — interlocks, percentage of outsiders, insider/outsider board balance and board size. The significant findings regarding interlocks and insider/outsider board balance call for more extensive investigation. Future studies need to look at what types of interlocks are important and under what conditions (e.g., interlocks with creditors before the company has any chance to run into cash flow problems). Additionally we need to look at the detailed composition of boards. Do the boards of non-failing firms contain professional knowledge that is not on the boards of failing firms (e.g., experienced financial planning and legal expertise). Lastly, we need to ask if the financial well being of the firm effects the ideal composition of the board (e.g., does a firm with greater debt require more board outsiders and more directors with high levels of financial expertise). If boards do not match the ideal are they then more likely to fail?

REFERENCES

Altman, E. I. "Financial Ratios, Discriminant Analysis & the Prediction of Corporate Bankruptcy," *Journal of Finance*, Sept. 1968: 589-609.

_____. *Corporate Financial Distress: A Complete Guide to Predicting, Avoiding, & Dealing with Bankruptcy*, New York: John Wiley & Sons, 1983.

Argenti, J. *Corporate Collapse: The Causes & Symptoms*, New York: John Wiley, 1976.

Bain J. S. "Relation to Profit Rate to Industry Concentration: American Manufacturing, 1936-1940," *Quarterly Journal of Economics* Aug. 1951: 293- 324.

_____. *Barriers to New Competition*, Cambridge: Harvard University Press, 1956.

Bass, F. M., P. Cattin & D. R. Wittink. "Firm Effects & Industry Effects in the Analysis of Market Structure & Profitability," *Journal of Marketing Research*, February 1978: 3-10.

Burt, R. S. *Corporate Profits & Cooptation*, New York: Academic Press, 1983.

Buzzell, R. D., B. T. Gale & R. G. M. Sultan. "Market Share: A Key to Profitability," *Harvard Business Review*, 1975 (1): 97-106.

Caldwell, D. R. "Generally Accepted Rules & Key Functions of the Board," in the *Handbook for Corporate Directors*, E.P. Mattar & M. Ball, Eds., New York: McGraw-Hill, 1985, 10.1-10.5.

Chaganti, R. S., V. Mahajan & S. Sharma. "Corporate Board Size, Composition & Corporate Failures in Retailing Industry," *Journal of Management Studies*, July, 1985, 400-17.

Chen, K. U. & T. A. Shimerda. "Empirical Analysis of Useful Ratios," *Financial Management*, Spring 1981: 51-60.

Christensen, H. K. & C. Montgomery. "Corporate Economic Performance: Diversified Strategy versus Market Strategy," *Strategic Management Journal*, October 1981: 327-43.

Cox, D. R. *The Analysis of Binary Data*, London: Methuen, 1970.

Chudson, W. A. *Pattern of Corporate Financial Structure*, New York: National Bureau of Economic Research, 1945.

D'Aveni, R. *Organizational Deterioration, Decline, & Death: The Role of Corporate Conflict*, Unpublished Doctoral Dissertation (Columbia University, 1987).

_____. "Dependability & Organizational Bankruptcy: An Application of Agency & Prospect Theory," *Management Science*, Sept., 1989(a), 1120-38.

_____. "The Aftermath of Organizational Decline: A Longitudinal Study of the Strategic & Managerial Characteristics of Declining Firms," *Journal of Management*, Sept., 1989(b), 577-605.

Dalton, J. & D. Penn. "The Concentration-Profitability Relationship: Is There a Critical Concentration Ratio?," *Journal of Industrial Economics*, Mar. 1976: 181-87.

Dess, G. G. *The Relationship Between Objective and Subjective Measures of Manufactures' Competitive Environments: Implications for Firm Economic Performance*, Unpublished Doctoral Disseration (University of Wash., 1980).

Dess, G. G. & D. W. Beard. "Dimensions of Organizational Task Environments," *Administrative Science Quarterly*, 1984: 52-73.

Dillon, W. R., T. J. Madden & N. H. Firtle. *Marketing Research in a Marketing Environment*, St. Louis: Times Mirror/Mosby College Publishing, 1987.

Drucker, P. F. Chapter 9: "Business Objectives & Survival Needs," *Technology, Management, & Society,* New York: Harper & Row, 1970: 149-65.
Eisenhardt, K. M. "Agency Theory, An Assessment & Review," *Academy of Management Review*, Jan., 1989: 57-74.
Flynn, D. M. & M. Farid. "The Intentional Use of Chapter XI: Lingering versus Immediate Filing," *Strategic Management Journal*, Jan. 1991: 63-74.
Granof, M. H. *Financial Accounting: Principles and Issues* 2nd Ed. Englewood Cliffs, NJ: Prentice-Hall, 1980
Hambrick, D. C., I. C. MacMillian & D. L. Day. "Strategic Attributes & Performance in the BCG Matrix - A PIMS-Based Analysis of Industrial Product Businesses," *Academy of Management Journal*, Mar. 1982: 510-31.
Hannan, M. T. & J. Freeman. "Structural Inertia & Organizational Change," *American Sociological Review,* April 1984: 149-64.
Hansen, G. S. & B. Wernerfelt. "Determinants of Firm Performance: The Relative Importance of Economic & Organizational Factors," *Strategic Management Journal*, Sept./Oct. 1989: 399-411.
Hedley, B. D. "Strategy & the Business Portfolio," *Long Range Planning*, 1977 (1): 9-15.
Jones, T. M. & L. D. Goldberg. "Governing the Large Corporation: more Arguments for Public Directors," *Academy of Management Review*, October, 1982: 603-11.
Kerlinger, F. N. *Foundations of Behavioral Research: Second Edition*, New York: Holt, Rinehart, 1973.
Kotter, J. P. "Managing External Dependence," *Academy of Management Review*, Dec. 1979: 87-92.
Lieberson, S. & J. F. O'Conner. "Leadership & Organizational Performance: A Study of Large Corporations," *American Sociological Review*, April 1972: 117- 30.
Lo, A. W. "Logit Versus Discriminant Analysis, A Specification Test & Application to Corporate Bankruptcies," *Journal of Econometrics*, March, 1986: 151-78.
Monsen, J. & A. Downs. "A Theory of Large Managerial Firms," *Journal of Political Economy*, June 1965: 221-36.
Montgomery, C. "The Measurement of Firm Diversification: Some Empirical Evidence," *Academy of Management Journal*, June, 1982: 299-307.
Moulton, W. N., *Strategic & Financial factors in Business Failure, Bankruptcy & Reorganization*, Unpublished Doctoral Dissertation, University of Illinois at Urbana-Champaign, 1988.
Moulton, W. N. & H. Thomas. "Firm Growth, Industry Growth & Business Failure," *Academy of Management Best Papers Proceedings 1988*, 27-31.
Mun, Glenn G. & F. L. Garcia. *Encyclopedia of Banking & Finance*, 8th Ed., Boston: Bankers Book Co., 1983.
Pennings, J. M. *Interlocking Directorates*, San Francisco, CA: Jossey-Bass, 1980.
Perrow, C. "Organizational Prestige; Some Functions & Disfunctions," *American Journal of Sociology*, Jan. 1961 335-41.
Pfeffer, J. "Size & Composition of Corporate Boards of Directors: The Organization & its Environment," *Administrative Science Quarterly*, 1972: 218-28
Pfeffer, J. & G. R. Salancik. *The External Control of Organizations, A Resource Dependence Perspective* New York: Harper & Row, 1978.
Pinches, G. E, & K. A. Mingo. "Multivariate Analysis of Industrial Bond Ratings," *J. of Finance*, Mar. 1973: 1-18.
Porter, M. E. Competitive Strategy, Techniques for Analyzing Industries & Competitors. New York: Free Press, 1980.
Rumelt, R. P. *Strategy, Structure & Economic Performance* (Division of Research, Harvard Business School, 1974).
Scherer, F. M. *Industrial Market Structure & Economic Performance*, 2nd Ed., Boston: Houghton Mifflin, 1980.
Schlueter, J. F. "Officers of the Board: A Team Approach," in the *Handbook for Corporate Directors*, E.P. Mattar. & M. Ball, Eds., New York: McGraw-Hill, 1985, 3.3-3.7.
Schmalensee, R. "Do Markets Differ Much?," *American Economic Review,* 75 (3) 1985: 341-51.
Selznick, P. *TVA & the Grass Roots,* Berkeley: University of California Press, 1949.

Sharma, S. & V. Mahajan. "Early Warning Indicators of Business Failure," *Journal of Marketing*, Fall, 1980: 80-9.

Shepherd, W. G. "The Elements of Market Structure," *The Review of Economics & Statistics*, 1972 (1): 25-37.

Sheppard, J. P. *The Strategy of Corporate Survival: A Resource Dependence Approach*, Unpublished Doctoral Dissertation (University of Washington, 1989).

_____. "When the Going Gets Tough, The Tough go Bankrupt: The Questionable Use of Chapter 11 as a Strategy", *Journal of Management Inquiry*, 1992 (3): 183-92.

Shoeffler, S., R. D. Buzzell & D. F. Heaney. "Impact of Strategic Planning of Performance," *Harvard Business Review*, 1974 (2): 137-45.

Singh, J. V., C. J. Lumsden. "Theory & Research in Organizational Ecology," *Annual Review of Sociology*, 1990, W.R. Scott & J. Blake Eds.: 161-95.

Sirower, M. "Bankruptcy as a Strategic Planning Tool," *Academy of Management Best Papers Proceedings '91*, 46-50.

Spencer, A. *On the edge of the Organization: The Role of Outside Director.* New York: John Wiley, 1983.

Tamari, M. "Ethical Issues in Bankruptcy: A Jewish Perspective," *Journal of Business Ethics*, Oct. 1990: 785-89.

Thompson, J. D. *Organizations in Action*, New York: McGraw-Hill, 1967.

Vance, S. *Corporate Leadership: Boards, Directors & Strategy*, New York: McGraw-Hill, 1983.

West, R. R. "Inside Directors & Former Corporate Officers as Board Members," in the *Handbook for Corporate Directors*, E.P. Mattar & M. Ball, Eds., New York: McGraw-Hill, 1985, 25.3-25.10.

Wilkinson, L. *SYSTAT: The System for Statistics,* Evanston, IL: SYSTAT Inc., 1988.

Zahra, S. A. & J. A. Pearce II. "Boards of Directors & Corporate Financial Performance: A Review & Integrative Model," *Journal of Management*, 2, 1989, 291-334.

1 Special thanks are given to Sharon Sheppard, Tom Jones, Gary Hansen, Mark Wexler, Kelly Denholme, Jean Last, Mike Church, and several anonymous reviewers for their assistance in this research. Funding for this research was provided by grants from the Government of Canada SSHRC and Challenge Programs, and the University of Washington Dean's Social Sciences Fellowship Competition Grant. The author, however, assumes responsibility for all errors, omissions, etc.

APPENDIX 1: SUMMARY STATISTICS

Year 1: N = 62		Means		Std.Dev.		Correlations (.01 Sig. > .42)							
		Surv.	Fail.	Surv.	Fail.	DIl	BBl	BSz	OsD	ROE	MkS	FSS	NtW
1. Dir. Interlocks	DIl	5.44	3.24	4.11	3.81		-.023	.636	.261	.148	-.002	-.105	.159
2. Board Balance	BBl	14.61	18.85	10.83	11.55	.014		.170	-.094	.153	.060	-.191	-.221
3. Board Size	BSz	4.33	4.36	1.48	1.64	.115	.156		.298	.333	-.191	-.386	.163
4. Outside Dirs.	OsD	58.09	57.54	17.18	20.42	.287	.340	.421		.294	.278	.044	-.149
5. Ind. R.O.E.	ROE	5.34	6.39	4.39	5.21	.037	.301	.209	.028		.173	-.316	.141
6. Market Share	MkS	11.15	3.76	11.92	5.60	.224	-.120	.084	.220	.119		.569	-.049
7. Firm Sales Size	FSS	2.41	1.89	0.83	0.52	.528	-.208	-.328	.016	-.182	.512		-.017
8. Net Worth	NtW	44.58	11.34	17.76	24.26	.325	.010	.110	.126	.303	.186	.170	

Year 2: N = 84		Means		Std.Dev.		Correlations (.01 Sig. > .37)							
		Surv.	Fail.	Surv.	Fail.	DIl	BBl	BSz	OsD	ROE	MkS	FSS	NtW
1. Dir. Interlocks	DIl	6.03	3.37	5.09	2.70		.410	-.205	.376	-.100	.117	.344	.072
2. Board Balance	BBl	17.17	14.90	11.39	11.39	.040		.113	.809	.189	-.168	.097	.022
3. Board Size	BSz	4.68	4.26	1.75	1.44	.183	-.237		.151	.320	-.330	-.560	.320
4. Outside Dirs.	OsD	59.22	60.94	18.56	15.31	.233	.458	.004		.083	-.167	.038	-.025
5. Ind. R.O.E.	ROE	6.61	6.42	3.67	5.14	-.060	-.126	.420	.002		-.252	-.392	.138
6. Market Share	MkS	9.54	6.08	11.17	7.29	.327	-.267	-.090	-.092	.083		.432	-.164
7. Firm Sale Size	FSS	2.32	2.14	0.71	0.63	.372	.213	-.549	.055	-.461	.511		-.167
8. Net Worth	NtW	50.54	29.28	16.30	20.38	-.109	-.324	.094	-.389	-.025	-.091	-.289	

Year 3: N = 98		Means		Std.Dev.		Correlations (.01 Sig. > .34)							
		Surv.	Fail.	Surv.	Fail.	DIl	BBl	BSz	OsD	ROE	MkS	FSS	NtW
1. Dir. Interlocks	DIl	5.31	2.57	4.50	2.45		.265	.249	.400	.062	-.170	.087	.013
2. Board Balance	BBl	15.75	19.04	10.34	14.16	.235		.275	.174	.130	-.272	-.110	.139
3. Board Size	BSz	4.33	3.89	1.80	1.60	.456	.069		-.049	.190	.085	-.251	-.012
4. Outside Dirs.	OsD	56.70	55.03	17.73	23.34	.389	.282	.194		.032	-.058	-.129	-.163
5. Ind. R.O.E.	ROE	9.25	9.71	5.56	5.84	-.325	-.016	-.146	-.187		.035	-.331	.104
6. Market Share	MkS	9.51	5.65	10.12	6.66	-.112	.081	-.163	.030	.145		.151	.056
7. Firm Sale Size	FSS	2.43	1.98	0.66	0.47	.160	.044	-.579	.185	-.126	.281		.134
8. Net Worth	NtW	45.25	34.92	20.30	21.67	.155	-.036	.029	-.342	.016	.123	.003	

Year 4: N = 102		Means		Std.Dev.		Correlations (.01 Sig. > .33)							
		Surv.	Fail.	Surv.	Fail.	DIl	BBl	BSz	OsD	ROE	MkS	FSS	NtW
1. Dir. Interlocks	DIl	4.84	2.36	4.41	2.35		.138	.262	.372	.006	.060	.474	.087
2. Board Balance	BBl	14.06	17.64	9.93	12.23	.336		.083	.343	-.017	-.009	.010	.322
3. Board Size	BSz	4.32	3.94	1.68	1.36	.199	-.229		.202	.097	.067	-.152	.095
4. Outside Dirs.	OsD	54.76	58.31	16.64	19.84	.366	.274	.111		-.018	.202	.255	.037
5. Ind. R.O.E.	ROE	8.60	9.48	6.25	5.82	-.247	-.225	.034	.069		.271	.039	.036
6. Market Share	MkS	7.75	5.84	8.59	8.51	.121	-.064	.059	-.178	-.163		.228	.200
7. Firm Sales Size	FSS	2.30	2.05	0.70	0.55	.352	.307	-.422	-.005	-.268	.502		.025
8. Net Worth	NtW	47.32	34.15	18.28	17.94	.242	-.027	.259	.055	-.120	.088	-.180	

Year 5: N = 90		Means		Std.Dev.		Correlations (.01 Sig. > .37)							
		Surv.	Fail.	Surv.	Fail.	DIl	BBl	BSz	OsD	ROE	MkS	FSS	NtW
1. Dir. Interlocks	DIl	6.02	3.08	4.14	3.01		.168	.238	.053	.045	.083	.472	.090
2. Board Balance	BBl	14.21	18.57	10.07	13.23	.280		-.076	.053	-.180	-.060	.023	.254
3. Board Size	BSz	4.33	3.59	1.16	1.02	.111	-.001		-.072	.096	-.065	-.191	-.063
4. Outside Dirs.	OsD	58.75	54.45	15.15	22.53	.442	.330	-.131		.120	.163	.140	-.142
5. Ind. R.O.E.	ROE	9.86	7.37	6.86	4.93	.132	.025	.365	-.273		.279	.139	-.188
6. Market Share	MkS	9.50	8.00	8.70	9.09	.421	.100	-.037	.180	.292		.384	.169
7. Firm Sales Size	FSS	2.50	2.34	0.68	0.64	.591	.388	-.270	.455	-.098	.568		.277
8. Net Worth	NtW	46.60	34.59	15.13	15.62	.103	-.125	.193	-.141	-.062	-.145	-.003	

Correlations above and to the right of the diagional are failures; below and left are survivors.

APPENDIX 2: FIRMS IN THE STUDY BY PRINCIPLE INDUSTRY

Industry Names	Ind. Group	Fail.	Surv.	Total
Mining & Construction	12 to 16	3.7%	1.8%	5.5%
Food & Tobacco Products	20 and 21	1.6%	2.3%	3.9%
Textiles & Apparel	22 to 23	4.6%	1.6%	6.2%
Wood, Paper & Print Prod.	24 to 27	3.2%	4.4%	7.6%
Chemicals & Refining	28 and 29	2.3%	5.1%	7.4%
Rubber & Leather Products	30 and 31	1.2%	2.5%	3.7%
Metal Industry & Fabrication	33 and 34	4.8%	3.9%	8.7%
Machinery & Equipment	36 and 37	8.9%	8.0%	16.9%
Miscellaneous Manufactures	32, 38 & 39	2.5%	3.9%	6.4%
Wholesalers	50 and 51	7.1%	6.2%	13.3%
Retailers	52 and 59	8.5%	5.7%	14.2%
Services & Holding Companies	67 to 73	1.6%	4.6%	6.2%
Total of all observations		50.0%	50.0%	100.0%