Division of Research
School of Business Administration

December 1987

STRATEGIC GROUPS AND PERFORMANCE: THE U.S. INSURANCE INDUSTRY, 1970–84

Working Paper #553

Avi Fiegenbaum
The University of Michigan
and
Howard Thomas
Sloan School of Management, MIT and
University of Illinois at Urbana-Champaign

Original Version March 1987
Revised November 1987
Revised December 1987

FOR DISCUSSION PURPOSES ONLY

STRATEGIC GROUPS AND PERFORMANCE: THE U.S. INSURANCE INDUSTRY, 1970-84

ABSTRACT

The concept of strategic groups has been accepted as an important unit of analysis in understanding competitive strategy (Porter, 1980; McGee and Thomas, 1986; Hatten and Hatten, 1987). This study builds upon previous research (Hatten, Schendel and Cooper, 1978; McGee and Thomas, 1986; Harrigan, 1985; Cool, 1985; Cool and Schendel, 1987) and attempts to provide a general framework for the formation of strategic groups based upon important aspects of firm strategy. This is applied to the insurance industry over the 1970-1984 time period and strategic implications are drawn. The empirical findings demonstrate that some performance differences exist across strategic groups and also indicate that the structure of strategic groups, (both in terms of the number, and the membership, of strategic groups) changes over time. The use of this framework for understanding competitive positioning and developing dynamic theories of strategic group movement is also discussed.

INTRODUCTION

Since Hunt (1972) coined the term "strategic groups" in his study on the home appliance industry, a growing body of literature, both theoretical and empirical, has adopted this concept. It is argued that the concept of strategic groups allows firms to analyze the structure of complex industries (McGee and Thomas, 1986); to better define their competitors (Porter, 1980), and to examine the range of competitive positions available within an industry (Cool, 1985; Harrigan, 1981; Hayes et al., 1983; Hawes and Crittenden 1984; Hatten, 1974; Dess and Davis, 1984). Based on the concept of strategic groups, Caves and Porter (1977) generalized the theory of entry barriers (Bain, 1956; Vernon, 1972; Caves 1977; Scherer, 1980) and devised the term "mobility barriers." Mobility barriers not only protect firms in a strategic group from entry by firms outside the industry but also provide barriers to firms within the industry in attempting to move from one strategic group to another.

Porter (1979) used the concepts of strategic groups and mobility barriers to develop a theory that explains interfirm performance differences. According to this theory, the structure of strategic groups (the height of mobility barriers, number of groups, distance among groups, etc.) affects the process of rivalry within the industry and enables certain strategic groups to maintain persistent performance advantages over other strategic groups.

Yet, in existing research studies there is still much debate about how strategic groups should be identified and about the performance consequences of strategic groups membership (Cool and Schendel, 1987). One of the main problems is that firm strategy has been defined at different levels (e.g., corporate, business and functional (Hofer and Schendel, 1978)) without always clear specification of the reasons for choosing a given strategy level. For example, Newman (1973, 1978) and Oster (1982) focus primarily on corporate level strategy, whereas Hatten, Schendel, and Cooper (1978) and Cool (1985) correctly

examine business level strategy in their studies of brewing and pharmaceuticals. In the marketing literature Frazier and Howell (1983) have also formed groups based on functional (marketing) strategies. Further, many existing studies differ in their choice of components of strategic decisions by which to describe a firm's strategy. Harrigan (1985) used resource deployment decisions while Newman (1973, 1978) used scope decisions to describe a firm's strategy. On the other hand, Cool and Schendel (1987) provided a richer specification in their recent pharmaceutical industry study by linking both scope and resource deployment decisions to describe firm strategy. And, finaly, few studies examine the dynamic nature of the strategy process (Mintzberg, 1978: 934) and explore how strategic positions and strategic group patterns change over time.

Therefore, given the potential importance of strategic groups analysis for theory building in the strategic management area, this study attempts to develop a theoretical framework for the identification of strategic groups and then uses this framework to test whether the hypothesis that performance differences exist across groups can be verified. The study analyses strategic groups in the context of the insurance industry over the 1970-1984 time period. A discussion and interpretation of the empirical findings concludes the paper.

METHODOLOGY FOR IDENTIFYING STRATEGIC GROUPS

Figure 1 describes the process of strategic groups formulation in terms of a flow diagram. The main features of the formulation process are emphasized below.

Insert Figure 1 about here

At the first step it is necessary to map the characteristics of the competitive environment which we call the Strategic Space. Three dimensions,

namely, the levels of organizational strategy (e.g., corporate, business and functional), the components of strategic decisions (e.g., scope, resource deployment, etc. (Hofer and Schendel 1978)), and the time period define the broad characteristics of the Strategic Space. An important initial issue concerns the choice of the time period for the research study, which normally depends upon the industry under investigation and the purposes of the study.

Then (at step 2), the researcher must determine whether corporate, business or functional level strategies should be examined and assess which dimensions (components) best describe those strategies. Clearly 'strategic groups' may change with levels and components giving rise to the concept of 'overlapping' strategic groups (Fombrun and Zajac, 1987). Following Cool & Schendel (1987) and Porter (1985) we argue that scope and resource deployment decisions reflect major strategic decisions, whereas competitive advantage and synergy represent the resultant of scope and resource deployment decisions taken by the firm (Hofer and Schendel, 1978: 25).

The third step involves identifying the variables which best capture the firm's scope and resource deployment decisions in the competitive context under study. This requires a clear and thorough understanding of industry economics and the range of competitive strategies adopted by competing firms.

Particular emphasis must then be focused upon identifying periods of homogeneity and similarity in competitive strategic behavior when defining meaningful competitive strategic groups. Therefore, at step 4, time periods of homogeneity with regard to competitive strategic behavior, namely, stable strategic time periods (SSTP's) are identified. Once these stable time periods are found then analysis of strategically similar groups becomes much more meaningful. However, the assessment of SSTP's is made complex both by temporal changes in competitive behavior along the strategic dimensions and by changes

in the interrelationships among the strategic dimensions. A number of studies, including those of Cool (1985), Cool and Schendel (1987) and Fiegenbaum, Sudharshan, and Thomas (1985, 1987), have examined the concept of stable strategic time periods. They have generally defined a stable strategic time period as one in which the relationships among the strategic variables are stable within the considered period. However, the methodological procedures developed in each study are slightly different. Cool (1985), in his study of the pharmaceutical industry argued that it is essential to test the stability of the variance-covariance matrix of the strategy variables in adjacent time periods in order to determine whether a strategic change has occurred in the industry. The rationale for his argument is that when firms alter their commitments along the strategic variables, the covariances between these variables should reflect this strategic repositioning. Therefore, a stable strategic time period (SSTP) can be identified (according to Cool, 1985) as a period in which the variance-covariance matrix formed from the strategic variables within the considered time period is much more stable than that which exists across periods.

Fiegenbaum, Sudharshan, and Thomas (1985, 1987) proposed a somewhat different procedure. They argue that stable strategic time periods should be identified in terms of two criteria, namely:

(i) that the variance-covariance matrix formed from the strategic variables should remain relatively unchanged.

and

(ii) that the average (mean) behavior of the firms in terms of the strategic variables should remain relatively unchanged over the time period examined.

While the first of these criteria is exactly the same as Cool's, these authors added a criterion to examine the stability of the vector of means[1] of the key strategic variables. Their rationale for examining the mean vector is

that it is possible that the mean values of the strategic variables may change without necessarily altering the values in the variance-covariance matrix formed from the strategic variables. In such a case, the relative relationship (and hence, the variance-covariance matrix) amongst the strategic variables remains the same. However, the entire industry would have shifted to a set of different mean values in terms of key strategic decision variables. Therefore, in this study, a modified method of operationalizing stable strategic time periods incorporating changes in both mean vectors and variance-covariance matrices will be used. For the interested reader, the methodological procedures developed in Cool (1985) and Fiegenbaum et al. (1985, 1987) are briefly reviewed in Appendix 1.

Two statistical tests are applied for the two criteria of change. For the first criterion, Bartlett's test (Green, 1978: 169-71) is used to test the equivalence of two sets of variance/covariance matrices. Hotelling's T^2 test (Green, 1978: 166-7) is then used to test the second criterion of change--namely, the equivalence of the sets of mean vectors.

Once stable strategic time periods (SSTP's) have been identified firms can then be clustered into strategic groups (step 5). The determination of the appropriate number of clusters is an important issue in grouping studies. Otherwise, the clusters may simply be statistical artifacts rather than meaningful group clusters within the environmental studied.

Unfortunately, there are no satisfactory, clear-cut methods for determining the appropriate number of clusters for any type of cluster analysis (Everitt, 1979; 1980; Milligan and Cooper, 1985). However, a commonly used rule of thumb in selecting the number of clusters involves the examination of the "tightness" of the clusters as the algorithm progressively combines groups (e.g., Harrigan, 1985; Cool, 1985).

Previous studies (e.g., Harrigan, 1985; Cool, 1985) have looked at the tightness of the group structure in terms of the contribution that an additional group would make to the overall fit of the clusters (measured in terms of the R^2 coefficient). Then, an arbitrary rule of thumb (stopping rule), such as R^2 increases by less than 5 percent provides a basis for stopping the clustering algorithm at that point. However, Fiegenbaum, Sudharshan and Thomas (1987) have argued that the change in R^2 criterion may be misleading since the R^2 function might be different for different SSTP's. Therefore, they have proposed that two criteria should be used for each one of the SSTP's and these criteria, which are adopted in the following study, are as follows:

(i) An additional cluster increases the overall fit by less than 5 percent ($\Delta R^2 \leq 5\%$), (where ΔR^2 represents the change in R^2)

and

(ii) The clusters obtained explain at least X percent of the overall variance ($R^2 \geq X\%$).

It should be noted that the level of X can be determined empirically in terms of each data set.

The procedure will be examined in the context of the insurance industry over the 1970-84 time period and the extent of performance differences across strategic groups will also be assessed. A brief discussion of the insurance sector sample used in the research study is first presented.

THE INSURANCE INDUSTRY: SAMPLE AND DATA SOURCES

The insurance industry contains two major sectors of activity, namely, property/liability and life insurance. The property/liability sector includes the insurance of lines such as, automobile, homeowners, workers' compensation, commercial multiple peril and liability. The life insurance sector includes both life and health insurance. (For a comprehensive discussion on the

insurance industry see Fiegenbaum, 1987: chapter 4; Mehr and Cammack, 1976; and Tobias, 1982).

The question of how many corporations to include in our sample was resolved by deciding to study the largest corporations in depth. It should be noted that while the insurance industry contains about 5,000 corporations (in 1986), a relatively small number capture the greater proportion of market share. Indeed, by examining the distribution of accumulated market share it is clear that the top 30 corporations cover around 75 percent of the total activity in the industry. Therefore, it was decided that this study should focus mainly on the top 30 firms (defined across all areas of insurance activity) in the industry. This sample is clearly biased in the sense that it ignores smaller corporations. That fact cannot be ignored and should be kept in mind when interpreting the results.

Another important issue is the basis on which the top 30 firms were selected for this study. Since the study covers 15 years of data (1970-1984), it might be that the top 30 corporations in 1970 are not the same as those in 1984. By examining the top 30 corporations in 1970 and 1984 it is clear that there are a few changes on this list. For example, while Prudential Corporation was ranked number 87 in 1970 it was number 22 in 1984. Therefore, it was decided that the study should include all the top 30 corporations in both 1970 and 1984. Following this procedure, the final sample includes 33 corporations (see Table 6 for a listing).

Best's Corporation specializes in collecting data for the insurance industry. Data are available either on computer tapes or hard copy documents. In this study, data has been collected from the hard copy documents. Best's reports its data annually in several source books. The major sources for this study are Best's Insurance Reports Property-Casualty (annual) and Best's Aggregates and Averages (annual).

STRATEGIC GROUPS IN THE INSURANCE INDUSTRY: 1970-84

The general framework developed in the methodology section (see figure 1) has been applied here. As noted above, the researchers decided to explore the 1970-1984 time period which was a period of broad environmental and regulatory change in the insurance industry. In addition, it was decided to focus upon forming strategic groups at the corporate strategy level using the scope and resource deployment components of strategy suggested by Cool and Schendel (1987) and Hofer and Schendel (1978). Then a further set of performance variables were defined to test whether performance differences exist across strategic groups. We discuss the reasons for the choice of particular strategy and performance variables below (for a comprehensive discussion see Fiegenbaum, 1987; chapter 4).

Strategic Variables

The key strategic dimensions which define competitive strategy in the industry were carefully identified. Eight strategic variables reflecting scope and resource commitments were identified from a thorough literature survey and discussions with insurance academics and executives. The measures chosen are summarized in Table 1.

Insert Table 1 about here

Strategic Scope Variables

Scope committments in the U.S. insurance industry can be examined in terms of product scope, product diversification and size dimensions. Two variables describe product scope in terms of the focus on a) personal vs. commercial lines of insurance and b) property/liability vs. life insurance.

PERSONAL LINES VS. COMMERCIAL LINES (PPER):

Personal lines of insurance include policies that are sold to individuals while those sold to businesses are called commercial lines. The firm's decision about how to deploy their underwriting efforts between these two insurance types can have an important impact on the firm's strategy. For example, with commercial lines underwriting there is less reliance on advertising and marketing promotion and more emphasis on client relations. And, commercial policies are often more complex and expensive, thus, requiring more focussed underwriting skills.

A measure PPER was constructed to capture the proportionate distribution of business between personal and commercial lines, and is defined as:

$$\text{PPER} = \frac{\text{PERSONAL SALES}}{\text{PERSONAL SALES} + \text{COMMERCIAL SALES}}$$

PROPERTY/LIABILITY PROPORTION (PPROP):

The development of all lines (property liability (P/L) and life insurance) insurers is interesting from a competitive strategy viewpoint since it reflects the resultant of the actions and reactions involved in competitive positioning by various insurers. In the early years of the insurance industry, life insurers were unable to own property and liability insurer affiliates because of legal restrictions and, consequently, the life insurance and P/L insurance activities were often regarded as distinct industries. However, in 1972 the laws of New York and New Jersey were changed to permit life insurers to merge with property and liability affiliates. That was the springboard for many life insurers to enter to the (P/L) segment. Property/liability insurers reacted almost immediately to this change leading more and more P/L companies to acquire life insurance companies.

Different insurance groups choose to vary the extent of their involvement in the P/L and life segments and this can have an impact on the overall performance since Johnson (1981) notes that the proportion of P/L activities (relative to Life) can have a significant impact on returns to scale. Therefore, a variable PPROP which measures the extent of activity in the P/L segment relative to P/L and life insurance combined was constructed to describe the product mix aspect of firm strategy and it is defined as

$$\text{PPROP} = \frac{\text{PROPERTY + LIABILITY}}{\text{PROPERTY + LIABILITY + LIFE INSURANCE}} .$$

DIVERSIFICATION (DIVER):

The diversification variable (DIVER) more particularly examines the broad extent of an insurance firm's diversification across lines of businesses. The aims of greater line of business diversification typically include income improvement, risk reduction and the exploitation of economies of scope. Best's Aggregates and Averages (the most comprehensive industry reference source), indicates that there are almost 30 different lines of insurance business that insurance companies are routinely willing to cover. Each firm has to make a strategic decision about the number of lines of insurance business it wishes to underwrite, as well as the size of these lines. Kahane and Nye (1975) note that proper diversification among different insurance lines has the advantage of reducing portfolio risk (Markowitz, 1959; Sharpe, 1964).

Therefore, a Herfindal index (see Pitts and Hopkins for a review) was constructed to measure the extent of a firm's diversification and it is defined as

$$H = 1 - \sum_{i=1}^{n} P_i^2$$

where P_i = the relative size of the i^{th} line in the entire portfolio.

Therefore, if H = 0, the index implies that the firm has only one line of business and is undiversified. On the other hand, H = 1 means that many small lines of business exist in the portfolio, i.e., the firm is then widely diversified.

SIZE (LSIZE):

The absolute size of insurance firms (as well as non-insurance firms) has an important impact on firm performance. Industrial organization economists including Bain (1968) and Scherer (1980) have argued that large firms possess monopoly power which enables them to set prices above the economic costs involved in the production of the product, resulting, inter alia, in additional profit for the largest firms. Another common argument is that the largest firms enjoy economies of scale which typically lower their average cost relative to smaller firms (e.g., Scherer, 1980).

While there is debate about whether economies of scale exist in the insurance industry (Joskow, 1973; Greehan, 1977; Johnson et al., 1981), size (in terms of premium volume) is regarded as a key strategic decision for insurance companies. The variable LSIZE defined as

LSIZE = log(Net Premium Written)

was, therefore, used to describe firm size in this study.

Resource Commitment Variables

Measures of resource commitments were developed in order to reflect the bases for establishing competitive advantage in the insurance industry. We argue that the functional areas from which competitive advantage may particularly accrue are operations and finance. Indeed, control of expenses reflects operational efficiency whereas the character of leverage, reinsurance and investment decisions indicates differences in strategic financial skills.

EXPENSE RATIO (EXRATIO):

In order to evaluate the cost efficiency of each insurance company an expense ratio was calculated. Basically, this measure describes the overall efficiency of the insurance production process. The expense ratio is defined as:

$$\text{EXRATIO} = \frac{\text{Underwriting Expenses}}{\text{Net Premiums Written}}$$

Best's insurance reports argues that the net premiums written is preferred to earned premiums as a measure of output since a major portion of underwriting expenses are incurred at the time of writing new and renewal policies and should logically be deducted from the earned premiums figure. While this measure does not break the expense ratio into the different cost elements expected during the "production" of insurance products, it nevertheless enables us to broadly compare the efficiency of different insurance organizations.

REINSURANCE (PREINS):

Most firms in the insurance industry buy reinsurance and some companies specialize in selling reinsurance. Reinsurance is "a contractual arrangement under which one insurer, known as the ceding company, buys insurance from another insurer, called the reinsurer" (Webb et al., 1978: 329). Several reasons have been suggested in the literature to justify the purchase of reinsurance by insurance companies including risk sharing, catastrophe protection and increased underwriting capactity (Doherty and Korkie, 1980).

Careful use of reinsurance may, therefore, improve underwriting performance (particularly in spreading risk.) The proportion of reinsurance activity is measured in this study as:

$$\text{REINS} = \frac{\text{DPW} - \text{NPW}}{\text{NPW}}$$

where DPW = direct premiums written

and NPW = net premiums written.

FINANCIAL LEVERAGE (LEVER):

Haugen (1971) looked at the impact of financing strategies on insurer risk and found that leverage has an important impact on insurance risk. Therefore, leverage is considered as an important strategic variable for the study and it is defined as:

LEVER = net premium earned/policy holders surplus

It should be noted that policy holders surplus, defined as the sum of paid in capital and net surplus, including voluntary contingency reserves (Best's Insurance Reports, 1984:X), is used as a surrogate for equity. The reason is that mutual companies do not have equity, and, therefore, policy holders surplus (a measure common to both stock and mutual companies), which is reported by Best's Insurance Reports, and used in previous studies (e.g., Eck, 1982) is adopted for this study.

INVESTMENT STRATEGY (PSTOCK):

An insurance company's investment strategy is an important element in its strategic decision-making. It is well known, among insurance practitioners as well as public policy makers, that while underwriting gains were negative (losses) for 15 out of 25 years between 1958-1982 (Best's Aggregates and Averages, 1983), investment income was always positive for the same time period. When both sources of income are combined (underwriting and investment), insurance companies enjoyed positive gains for each year of the 1958-1982 time period. Therefore, investment gains are crucially important for the profitability of insurance companies.

The choice of investment strategy will affect the overall returns as well as the risk of the investment portfolio. Since the two major sources of investment categories are stocks and bonds, a measure PSTOCK, defined as

$$\text{PSTOCK} = \frac{\text{STOCKS}}{\text{STOCKS} + \text{BONDS}}$$

will be used to describe insurance investment strategies. A pure stock investment strategy would result in a PSTOCK value of one whereas a pure bond strategy would result in a PSTOCK value of zero. The decision concerning the proportion of the portfolio to be invested in stocks depends on the risk preferences of the investment managers. A higher value of PSTOCK is considered to be associated with a higher level of risk taking.

Performance Variables

Three different sets of performance measures were constructed, namely, a) the combined ratio (COM) a common measure used in the industry to indicate the overall economic performance of an insurance company, b) the firm's share (MS) of industry volume and c) weighted market share (WMS) which indicates the firm's dominance of particular lines of insurance.

Insert Table 2 about here

Table 2 summarizes and defines the performance measures used. It should be noted that risk measures were calculated for each performance measure using the standard deviation over the relevant period. Further, risk-adjusted measures were also calculated by dividing average firm performance by the standard deviation for each time period.

Identification of Stable Strategic Time Periods

Stable strategic time periods (SSTP's) were then determined using the two criteria specified earlier. First, by examining changes in the means of the strategic variables. Second, by examining changes in the variance/covariance matrix of the strategic variables. The empirical results are reported in Table 3. Basically nine transition periods were found in the patterns of strategic behavior over the 1970-84 period. The test results are discussed in the following paragraphs.

Insert Table 3 about here

Means Over Time:

Hotelling's T^2 test (Green, 1978: 166-7) is used to examine shifts in means between years. It can be seen from Table 3 that significant changes (at the 5% significance level or less) in the vector of means appeared in 1974, 1976, 1979, and 1983. The interpretation of these findings is that, in these years the population of firms (and hence the industry) had changed significantly in terms of the quantitative levels (adjusted for inflation) of the key strategic variables. Therefore, from these findings it appears that there were five SSTP's during the 1970-1984 time period, namely, 1970-1973, 1974-1975, 1976-1978, 1979-1982, and 1983-1984. However, changes in variance/covariance matrices should be examined in association with changes in mean vectors before general conclusions about SSTP's in the industry can be made.

Variance/Covariance Over Time:

Bartlett's test (Green, 1978: 169-171), using a chi-square approximation, is used for testing the equivalence of variance/covariance matrices across

years. It can be seen from Table 3 that significant changes (at the 5% significance level or less) in the covariance matrices occurred in 1972, 1973, 1974, 1976, 1977, and 1978. Based on these findings seven SSTP's can be identified, namely, 1970-1971, 1972, 1973, 1974-75, 1976, 1977, and 1978-1984.

In order to have an accurate determination of SSTP's it is necessary to examine the results from both changes in means and variance/covariances. It can be inferred based upon the intersection of the two criteria, that nine SSTP's are evident during the time period studied, namely:

I	1970-1971
II	1972
III	1973
IV	1974-1975
V	1976
VI	1977
VII	1978
VIII	1979-1982
IX	1983-1984

Identification of Strategic Groups

In each of these SSTP's, different structures of strategic groups, in terms of the number of strategic groups, the location, membership, etc., may occur. The procedure to identify strategic groups is based on the proposition that firms having a similar strategic posture (in terms of the eight key strategic variables), will be clustered in the same strategic group. Therefore, a clustering algorithm is used which both minimizes the distance (in terms of the key strategic variables) between members of the same group while at the same time maximizing the distance between different groups. Harrigan (1985)

has summarized the application of clustering techniques for strategic group analysis. In this study, Ward's hierarchical clustering technique was chosen as the basic clustering approach (for a comprehensive discussion see also Anderberg, 1973; Everitt, 1980; and Spath, 1980) and a two criterion stopping rule to determine the optimal number of clusters was applied as follows:

1) An additional cluster increases the overall fit by less than 5% ($\Delta R^2 \leq 5\%$).

and

2) The clusters obtained explain at least 65% of the overall variance ($R^2 \geq 65\%$).

Table 4 summarizes the number of strategic groups identified in each one of the nine SSTPs based upon the use of the above two criteria.

Insert Table 4 about here

It can be seen that for the first three SSTP's, the number of strategic groups is five, while for the next four SSTP's the number of strategic groups is seven. For the last two SSTP's the number of strategic groups is six. In addition, the number of new strategic groups (as well as those which disappeared) is reported in the table.

In addition, multi-variate analysis of variance is used to test for the adequacy of the clustering results. The procedure tests whether distinct groups exist by examining the between groups variability for each of the strategic variables separately (ANOVA), and for all of the strategic variables simultaneously (MANOVA). For each SSTP the (M)ANOVA tests were executed and are reported in table 5.

Insert Table 5 about here

It can be seen that for most strategic variables, as well as for all of them together, in each SSTP, the F values of the statistical tests were significant at the 1% level or less. This indicates that the "between-groups" variance was significantly higher relative to the "within-groups" variance and that, therefore, distinct strategic groups were found. After strategic groups were determined for each SSTP, the insurance firms in each strategic group in each SSTP are identified. It can be seen from Table 6 that some firms remained in the same strategic group while others moved across strategic groups over time.

Insert Table 6 about here

INTREPRETATION OF THE STRATEGIC GROUPS IN THE INSURANCE INDUSTRY

Different patterns of strategic groups, and hence competition, have emerged over time in the insurance industry. However, three basic groups which cover most of the firms in our sample appear to exist throughout the time period and can be identified from a thorough examination of table 6. The characteristics of these groups (summarized in Table 7) and their patterns in terms of the strategic variables over the nine SSTPs will be discussed in the following paragraphs. (A fuller description of the movement across strategic groups is reported in Appendix 2.)

Insert Table 7 about here

Strategic Group 1--Diversified Strategy

Firms following this pattern of competition had chosen to de-emphasize personal lines of insurance, and to emphasize the commercial segment of

insurance business. (Note that PPER was significantly below the industry average for eight out of nine SSTP's.) In addition, these firms had focussed upon P/L activities rather than life insurance activities. This trend was observed in all nine SSTP's (see PPROP). Further, the above average diversification activity (DIVER) (present for all nine SSTP's) indicates that firms in this strategic group had diversified into many commercial lines, such as, fire, commercial multi-peril and ocean-marine. Firms in this category include INA, Continental Insurance, Fireman's Fund and Crum and Forster. The broad diversification strategy was accompanied by complementary resource deployment decisions. For example, this group's reinsurance (PREINS) was below the industry average (for all nine SSTP's) as would be expected on theoretical grounds since their diversification strategy enables them to reduce operational risk. However, in terms of "production" expenses (EXRATIO) most of these firms were less efficient than the other firms in the industry. Indeed, in all nine SSTP's their production costs were above the industry average. Another important strategic decision was the preference of diversified firms to invest in stock. Indeed, stock purchases (PSTOCK) of diversified firms were significantly above the industry average. This behavior can be attributed to the fact that operational losses in the property/liability segment stimulated insurance firms to take more risk, and hence, to purchase stocks in order to achieve positive total gains.

In summary, most firms in our sample of companies from the insurance industry (around 17 out of 33) adopted the diversified strategy. This strategy (the SG1-strategy) was accompanied by relatively low reinsurance and relatively high proportions of stock in investment portfolios. This strategy also led those firms to be less efficient than the industry average. The diversified strategy maintained its "unique" position relative to the rest of the firms in the industry over the 1970-84 time period.

Strategic Group 2: Focused (life insurance) Strategy

Firms in strategic group 2 had chosen to concentrate their activities in the life insurance segment, rather than in the property/liability segment (PPROP is the inverse of life insurance). Indeed, for all nine SSTP's the life insurance activities were dominant for these firms since around 60% of their premiums came from life insurance. The significantly below industry average diversification index (DIVER) in eight out of the nine SSTP's also supports this observation. In addition, the average size (LSIZE) of firms in this group was significantly above the industry average in all nine SSTP's. This can be attributed to the fact that the life insurance market grew very rapidly in the last two decades (Best's Aggregates and Averages, 1984). This focus (in life insurance) strategy was accomplished by below average (industry) leverage. This can be explained by the fact that stronger requirements for solvency are required for insurance companies writing life insurance. Firms such as Aetna, Travelers, CNA, and Connecticut fall into this category.

Strategic Group 3: Focused (Personal Lines) Strategy

Firms in this group tend to focus on personal lines (rather than commercial) insurance, such as, homeowners multiple peril and automobile liability. More than 90% of the policy premiums for this group came from personal lines as indicated by the extent to which it was above the industry average (according to the PPER variable) for each one of the nine SSTP's. The low level of the diversification (DIVER) index, supports the argument that firms in this group focused on the personal segment rather than on other commercial segments. The focused (personal) strategy was accompanied by an efficient "production" strategy. Indeed, in eight out of nine SSTP's the average production costs (EXRATIO) for firms in this group were significantly below the industry average.

In addition, in five of the SSTP's, the proportion of stock in the investment portfolio (PSTOCK) was below the industry average. This can be explained by the fact that operational results of firms in this strategic group were much better than those of other strategic groups. Therefore, these firms tend to adopt a more conservative investment strategy, leading to the presence of more bonds in the investment portfolio. Further, life insurance companies can more easily match claims (death) with assets, and, therefore, buy a portfolio of bonds of appropriate maturities. The firms in this strategic group were about average in terms of their reinsurance and leverage decisions for the most of the nine SSTP's.

Overall, as seen from Table 4, the number of strategic groups during the 1970-1984 time period varied between 5 and 7 groups for each SSTP. But, two general observations can be made. First, three basic patterns of competition (strategic groups) existed during the time period under study, which covered most of the firms in our sample. Second, other patterns (strategic groups) have emerged and disappeared during the 1970-1984 time period. These groups usually had one or two firms that had a unique position in some SSTP's but which invariably held only for short time periods.

STRATEGIC GROUPS AND INTRA-INDUSTRY PERFORMANCE DIFFERENCES

Porter's (1979) theory of interfirm performance differences within an industry relates a firm's performance to the characteristics of strategic groups. Based on this theory and the work of Cool & Schendel (1987), Newman (1973, 1978), Harrigan (1985) the following hypotheses are developed.

1: Performance differences (measured in terms of economic, risk and risk-adjusted dimensions) should exist across strategic groups in a given stable strategic time period.

2: Performance differences should exist across groups with the evolution of time (i.e., for different stable strategic time periods).

In order to test these hypotheses, three dimensions of firms' performance that have been used by previous strategic management researchers (e.g., Cool, 1985) have been examined here (see Table 2). These involve economic, risk, and adjusted risk dimensions. Each one of these dimensions was broken into several measures. The economic dimension includes measures such as the combined ratio (COM), market share (MS), and weighted market share (WMS). The risk dimension used the standard deviation of each one of the three measures, while the risk adjusted measures used the ratio of the economic measures over their relevant risk measures.

Insert Table 8 about here

Table 8 indicates that performance differences exist for each one of the 9 stable strategic time periods when the economic and risk dimensions are examined. However, no differences across strategic groups were found (except for the period 1979-1982) for the risk adjusted dimension.

Insert Table 9 about here

In the second step an ANOVA test was performed separately for each one of the nine performance measures in order to deepen our understanding about the strategy-performance linkage. Table 9 summarizes the results of this procedure and it was found that the combined ratio (COM), market share (MS), weighted market share (WMS) (for the economic dimensions) and the risk of the combined ratio (RCOM) and the risk of market share (RMS) were almost always significantly different across strategic groups for each one of the 9 SSTP's.

The results of the ANOVA and MANOVA tests (summarized in Table 8 and 9) partially support the two hypotheses 1 and 2 concerning the strategy-performance linkage. When each performance dimension was considered separately, the results indicate that consistent performance differences across groups existed over time for the combined ratio (COM), market share (MS), weighted market share (WMS), and the risk measures of return (RCOM) and market share (RMS). Even though the risk adjusted performance dimension did not differ across strategic groups, the risk adjusted measure associated with the combined ratio (RACOM) was found to differ across strategic groups. This finding is attributed to the fact that in testing differences on all three risk adjusted measures (MANOVA test), the behavior of each one of the measures is underestimated. Therefore, the ANOVA test can indicate important differences for individual risk measures separately.

In order to infer whether specific patterns of competition (strategic groups) convey performance advantages, an ANOVA test was performed to test whether there were significant differences between the mean performance measures for each of the strategic groups and the industry average. Table 10 summarizes the results of this procedure for the three basic strategic groups.

Insert Table 10 about here

It can be seen that strategic group 1 has enjoyed superior returns over the entire period in terms of the COM ratio relative to the industry average. In three out of nine SSTP's SG1 firms performed significantly better than the industry average in terms of the COM ratio. It should also be noted that in the remaining 6 out of 9 periods superior COM ratio returns (although not statistically significant) were observed. However, the relative size of firms

in strategic group 1, in terms of market share (MS) and weighted market share (WMS) was significantly below the industry average for all nine SSTP's. The risk measures RCOM and RMS were also significantly below the industry average. The risk adjusted measure RACOM indicates that return per unit of risk for firms in strategic group 1 was significantly above the industry average in seven SSTP's. In summary, the diversified pattern of competition of strategic group 1 was associated with higher returns and lower risk than the industry average.

Strategic group 2 (focus in life insurance) had average returns that were significantly below the industry average in six SSTP's. However, the relative size of the firms (in terms of MS and WMS) was significantly above the industry average in most SSTP's. But the risk associated with the three measures (RCOM, RMS, RWMS) indicates that SG2 was significantly above the industry average risk in most SSTP's. Hence, the risk adjusted measure for returns (RACOM) indicates that in eight SSTP's, firm performance was significantly below the industry average.

Strategic group 3 appears for most measures, as well as for most SSTP's, to have a performance level roughly equivalent to the industry average. For example, the average measure of returns (COM) was different from the industry average in only 1 SSTP, while market share (MS) and weighted market share (WMS) were above the industry average in just a few SSTP's.

To summarize, the empirical results generally support the two hypotheses (1 and 2). More specifically, differences across both strategic groups (1) and time (2) were found for the three measures of economic performance (COM, MS, and WMS), the risk measures for returns (RCOM) and market share (RMS), and the risk adjusted measure associated with economic performance (RACOM). When exploration was carried out to relate patterns of competition (strategic

groups) and performance, it was found that strategic group 1 (diversified firms) performed better than the industry average in terms of returns and returns per unit of risk (COM, and RACOM respectively). However, the market share (MS) and weighted market share (WMS) were below the industry average for firms in strategic group 1. On the other hand, the two focus strategies (SG2 in life insurance and SG3 in personal lines) show returns below or close to the industry average respectively, although firms in these groups were larger than the industry average in terms of MS and WMS.

DISCUSSION AND FURTHER DIRECTIONS

A crucial issue in the study of strategic groups is the manner in which strategic groups are formulated. In order to overcome the conceptual confusion in previous studies, careful definitions of the Strategic Space (SSP) and Stable Strategic Time Periods (SSTP) concepts were developed and used as the framework for formulating strategic groups (see Figure 1). It was argued that the SSP should be the starting point for identifying strategic groups, as groups can be formulated relative to different levels of organizational strategy, different components of strategic decisions, and different time periods.

Based on the empirical findings several points can be made. First, the methodological procedure identified relatively short time horizons for stable strategic time periods (between one to four years) in the insurance industry. Unlike Cool and Schendel's (1987) study in which few stable time-periods were found over a twenty-year period in the pharmaceutical industry, the nine found in the fifteen year period of this insurance industry study indicate considerable strategic change. Thus, it appears that insurance firms changed their strategic position frequently in terms of key strategic decision variables. Since the methodology developed in this study (as well as in Cool, 1985 and

Fiegenbaum et al., 1985, 1987) is statistical in nature, we cannot directly explain why these changes occur. However, the frequent regulatory changes in this industry, particularly within individual states, and the size of liability/malpractice claims have tended to create a turbulent, more crisis-oriented competitive environment in which frequent competitive changes have necessarily been made.

Second, the study found that the number of strategic groups changed from 5 to 7 over different SSTPs; yet three dominant groups (diversified, focussed life, focussed personal lines) existed over the entire fifteen year period with the transient-groups (see Appendix 2) oscillating around the three dominant positions. It should be noted that few current studies on strategic groups have examined the reasons for group movement and change (such as those outlined in more detail in Appendix 2). In order to explore this question further, we believe that it is necessary to build a grounded theory of strategic group change incorporating rich descriptions of environmental change as well as relevant firm-specific characteristics. Such theories as incremental change (e.g., Quinn, 1980) or Quantum change (e.g., Miller and Friesen, 1984) are appropriate theoretical frameworks from which hypotheses about strategic group change may be formulated.

Third, dynamic analysis of the strategic group structure can enable the theory of strategic groups and mobility barriers (Caves and Porter, 1977) to be tested. If the theory is right then we should expect that the probability of firm movement among strategic groups will be low, because strategic barriers should protect successful groups from invasion by firms from less successful groups. The data on strategic group membership over time (reported in the Table in Appendix 2) can be used to calculate the level of firm movement across strategic groups. Firm movement can then be associated with changes in key

strategic variables, hence allowing inferences about the value of mobility barriers to be made. On the evidence of this study we would speculate there are long-term structural equilibria in terms of strategic group positions (i.e., three main groups), but that in the short-term environmental discontinuities, disturbances and strategic re-positionings create the need to search for new, more sustainable competitive positions.

Fourth, we find consistent evidence of performance differences across strategic groups and that these differences appear to persist over time. The link to performance is important for strategic groups research since the results support the theory of performance variations attributable to strategy. Thus, strategic groups have "predictive validity" since group structures can predict performance--a central anchor in strategic management research. Given that performance is not an unitary concept, we used multiple measures of performance as well as risk-adjusted measures and found strong support for the predictive validity of strategic groups across those multiple measures.

While existing theory (Porter, 1979) ignores the effects of group changes over time on performance we speculate that the relationship between strategic group membership and economic performance will change over time because key success factors driving industry competition may alter as a result of such issues as technology, regulation, and different patterns of industry rivalry. In addition, firms in stable group positions may adjust more slowly to change because of inertia about the quality of their current strategic decisions and their relationships to performance.

Finally, the authors believe that strategic groups research is at a crossroads. To continue with interesting empirical studies without theoretical insight will no longer be productive. What is needed is well designed, theoretically informed and precise research, preferably research that is placed

within a comprehensive framework that covers initially the stable aspects of group behavior, then moves progressively to theory development and testing of dynamic behavior. (As an example, notions of population ecology (McKelvey, 1983) may indicate why groups form and point to correlates of stability across time.) When this occurs proper attention can then be given to issues of modelling competitive rivalry (perhaps using game theory models) which are absent from most existing treatments of competitive strategy and competitive advantage.

Notes

1. The focus on changes in means reflects a concern for absolute change (adjusted for inflation) as well as the relative change captured by the changes in variances/covariances. For example, a large absolute quantum change in a particular strategic variable may not reflect relative change, but may indicate that this variable has now become a key strategic driver for the industry. If this is true then a clear strategic change has occurred in the industry indicating a new period of strategic rivalry. This information might be useful both to potential entrants and existing industry members.

APPENDIX 1

Methodology to identify stable strategic time periods.

Given the different criteria to identify stable strategic time periods (SSTP's), offered by Cool (1985) and Fiegenbaum et al. (1985, 1987), it is not surprising that those researchers used different approaches to identify those SSTP's. In Cool's (1985) study, the procedure to evaluate SSTP's over t periods, starts with testing the hypothesis of equality of the covariance matrices for the first two periods. Using Cool's notation the test is specified as:

H_0: $\Sigma_1 = \Sigma_2$

against $H1$: $\Sigma_1 \neq \Sigma_2$

where Σ represents the variance/covariance matrix between the strategic variables for a specific period.

If for a chosen significance level, the null hypothesis is accepted (meaning that no change had occurred between the two periods) and the two periods are pooled together to form a new covariance matrix $\sum_{12}$, then, the third period is introduced and the null hypothesis is re-formulated as

H_0: $\Sigma_{12} = \Sigma_3$

H_0: $\Sigma_1 = \Sigma_{23}$

against H_1: not all Σ are equal (for both H_0)

where Σ_{12} and Σ_{23} denote the variance-covariance matrices of the data pooled over the first two periods and the last two periods respectively.

The rationale for adopting this procedure is that even if the variance-covariance matrix for the first two periods is not significantly different to the last period, it might impede the detection of change occurring over the last two periods. Therefore, the hypothesis $\Sigma_1 = \Sigma_{23}$ must also be tested. When both null hypotheses are accepted, the three periods are considered as an SSTP and are pooled. The procedure is then continued. The general procedure to identify whether the period t can be considered with the previous t-1 period (SSTP) or whether the period t is the beginning of a new SSTP is specified as:

H_0: $\Sigma_{12 \ldots\ldots t-1} = \Sigma_t$

H_0: $\Sigma_{12 \ldots\ldots t-2} = \Sigma_{t(t-1)}$

H_0: $\Sigma_{12 \ldots\ldots t-3} = \Sigma_{t(t-1)(t-2)}$

.

.

.

H_0: $\Sigma_1 = \Sigma_{t(t-1)(t-2)\ldots.(3)(2)}$.

against H_1: not all Σ are equal (for each H_0).

If one of the null hypotheses cannot be accepted, then it indicates that the last period (t) represents the beginning of a new SSTP and the same procedure is then repeated.

The algorithm developed by Fiegenbaum, Sudharshan, and Thomas (1985, 1987) is different from the one used by Cool. Using Cool's notation, when t-1 periods represent a stable strategic time period and the period t is tested, the procedure performs the following tests:

H_0: $\Sigma_1 = \Sigma_t$

H_0: $\Sigma_2 = \Sigma_t$

.

.

.

H_0: $\Sigma_{t-2} = \Sigma_t$

H_0: $\Sigma_{t-1} = \Sigma_t$

against H_1: not all Σ are equal (for each H_0).

In comparing these two algorithms (Cool's against Fiegenbaum et al.) it is unclear which one is a superior since each examines different combinations of time periods. Therefore, in this study the features of both algorithms will be combined and used to identify stable strategic time periods. However, it should be noted that both two procedures will be used also to test for the average (mean) behavior of the strategic variables stated as (according to Cool procedure):

H_0: $\mu_{12 \ldots\ldots t-1} = \mu_t$

H_0: $\mu_{12 \ldots\ldots t-2} = \mu_{t(t-1)}$

H_0: $\mu_{12 \ldots\ldots t-3} = \mu_{t(t-1)(t-2)}$

.

.

.

H_0: $\mu_1 = \mu_{t(t-1)(t-2)\ldots.(3)(2)}$

against H_1: not all μ are equal (for each H_0)

where μ is the mean vector of the strategic decision variables. In addition, based on the Fiegenbaum, Sudharshan, and Thomas (1985, 1987) procedure the following hypotheses will be tested:

H_0: $\mu_1 = \mu_t$

H_0: $\mu_2 = \mu_t$

.

.

.

H_0: $\mu_{t-1} = \mu_t$

against H_1: not all μ are equal (for each H).

APPENDIX 2: Transient Strategic Groups

In each SSTP new strategic groups have emerged as well as failed (see Table to Appendix 2). In the second SSTP, American General established a new position on the strategic space (SG6 in the second SSTP). While in the previous SSTP American General was located in SG1, in the following SSTP the firm behaved differently from the other firms in its group. The firm had decreased its property/liability activities by 6.8%. In addition, American General made some strategic changes, such as, a decrease in PPROP (property/liability), and lever age (LEVER) by 6.8% and 7.3% respectively, and an increase in reinsurance (PREINS) activities and stocks (PSTOCK) purchases by 16.2% and 12.08% respectively.

In the third SSTP, strategic groups 4 and 6 disappeared. Liberty Mutual and Wausau, which were in SG4 in the second SSTP, "merged" with firms in SG3. Changes in their strategic decisions along PPER (personal lines), PREINS (reinsurance activities), and PPROP (property/liability) moved them into the space of strategic group 3. American General, which established a unique position (SG6) in the previous SSTP, "merged" with firms in strategic group 2 in the third SSTP. Changes in American General strategic decisions along PPROP (-14.2%) and LEVER (+37.01%) moved it to the space of strategic group 2. In addition, USAA and American International established a new group (SG7 and SG8 respectively) in the third SSTP. USAA increased its reinsurance level by 22% and reduced its stocks (PSTOCK) proportion in the investment portfolio by 22% from the previous (second) SSTP. American International dramatically increased its reinsurance level from 10% in the second SSTP to 73% in the third SSTP. This was accompanied by a decrease of 42% in the leverage of American Internaional between the second and the third SSTP.

In the fourth SSTP three new strategic groups emerged. Wausau and Geico, that were located in strategic group 3 in the previous SSTP, changed their stra tegy and created the new groups (9 and 11 respectively). Wausau had a decrease of 71.5% in their personal lines (PPER) followed by a decrease of 17% in the stock (PSTOCK) proportion of the investment portfolio. Meanwhile, Geico increased its leverage (LEVER) by 106% and reduced its stock (PSTOCK) investment by 35%. General Accident, which created the third new strategic group (SG10), decreased its leverage by 12% and increased its investment in stocks by 14.8%.

In the fifth SSTP two old strategic groups disappeared and two new groups emerged. Strategic group 7 in the fourth SSTP, contains only USAA, but the group disappeared when USAA increased its stock purchases (PSTOCK) by 39%. In addition, a decrease of 5.48% in its production expenses (EXRATIO) and reinsurance (PREINS) activities by 6%, returned the overall strategy of USAA to that of strategic group 3. Nationwide Insurance Company created a unique position on the strategic space SG12 by increasing its leverage from 1.81 to 7.39. In the fifth SSTP Prudential entered into the top 30 companies in the insurance industry. Prudential had a unique position in the strategic space (SG13) by having 100% of their activities in the personal lines (PPER), and low level (4.06%) of activities in property/liability lines (PPROP), indicating that most of their underwriting income came from life insurance activities.

In the sixth SSTP one firm group from the fifth SSTP (Nationwide in SG12) disappeared, and a new one firm group (American General in SG14) emerged changes

in Nationwide occurred in reinsurance activities (PREINS) production expenses, (EXRATIO), leverage LEVER) and stocks purchase (PSTOCK) by 4.5%, 6.9%, 72.5% and 8.8% respectively. These strategic changes resulted in Nationwide having a strategy similar to that of strategic group 1. American General which was located in strategic group 2 in the fifth SSTP, changed its strategy and became a one firm group (SG14) in the sixth SSTP. This was caused by decreases in PPER (-3.07%), PPROP (-5.9%), IVER D(-3.7%) and EXRATIO (-6.8%), and increases in LSIZE (1.25%), PREINS 5.2%), (LEVER (14.4%) and PSTOCK (9.09%).

During the seventh SSTP no new strategic groups emerged, and no old strategic groups disappeared. However, some firms moved between existing groups.

In the eighth SSTP, the one group firm (American General in SG14) in the seventh SSTP disappeared. An increase in PPER (+5.02%), PREINS (11.97%), and EXRATIO (1.26%), together with a decrease in PPROP (-8.08%), DIVER (-6.1%), and LEVER (-37.14%) put American General in strategic group 2.

In the last SSTP, one old firm group disappeared, and a new one firm group emerged. Also, Liberty Mutual company (SG9 in the eighth SSTP) changed its strategy and became a member of SG1. An increase in PPER (15.3%), DIVER (5.25%), PREINS (110.4%), and EXRATIO (17.04%), accompanied by decreased in PPROP (-2.6%), and LEVER (19.16%) put Liberty Mutual Companies in strategic group 1. In the same SSTP, Geico Company changed its strategic position (previously located in SG1) and created a new position (SG15). An increase in PPER (59.6%), and PSTOCK (30.4%), accompanied by a decrease in DIVER (-21.3%), PREINS (-78.2%) and LEVER (-16.03%) moved Geico into a unique position.

TABLE TO APPENDIX 2

STRATEGIC GROUP MEMBERSHIP

Time Period / Company	I 70-71	II 72	III 73	IV 74-75	V 76	VI 77	VII 78	VIII 79-82	IX 83-84
1. State Farm	3*	3	3	3	3	3	3	3	3
2. Allstate	5	3	3	3	3	3	3	3	3
3. Aetna	2	2	2	2	2	2	2	2	2
4. INA	1	1	1	1	1	1	1	1	N.E.
5. Travelers	2	2	2	2	2	2	2	2	2
6. Farmers Insurance	3	3	3	3	3	3	3	1	1
7. Continental Ins.	1	1	1	1	1	1	1	1	1
8. Liberty Mutual	4	4	3	9	9	9	9	9	1
9. Fireman's Fund	1	1	1	1	1	1	1	1	1
10. Hartford Fire	1	1	1	1	1	1	1	1	2
11. Nationwide	3	3	3	1	12	1	3	1	3
12. USF&G	1	1	1	1	1	1	1	1	1
13. Kemper	1	1	1	1	1	1	1	1	1
14. Crum & Forster	1	1	1	1	1	1	1	1	1
15. Home Insurance	1	1	1	1	1	1	1	1	1
16. St. Paul	1	1	1	1	1	1	1	1	1
17. American Inter.	1	1	8	1	1	1	1	1	1
18. CNA	2	2	2	2	2	2	14	2	2
19. Commercial Union	1	1	1	1	1	1	1	1	1
20. Royal Insurance	1	1	1	1	1	1	1	1	1
21. Chubb	1	1	1	1	1	1	1	1	1
22. USAA	4	3	7	7	3	3	3	1	15
23. American Finance	1	1	1	1	1	1	1	1	1
24. Reliance	1	1	1	1	1	1	1	1	1
25. Wausau Insurance	4	4	3	9	9	9	9	1	1
26. American General	1	6	2	2	2	14	14	2	2
27. Safeco	1	1	1	1	1	1	10	1	1
28. Ohio Casualty	1	1	1	1	1	1	1	1	1
29. Geico	4	3	3	11	3	3	3	1	15
30. General Accident	1	1	1	10	10	10	10	10	16
31. Connecticut General	2	2	2	2	2	2	2	2	N.E.
32. Cigna	N.E.**	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	2
33. Prudential	E***	E	E	E	13	13	13	13	13

*The numbers in the table indicate the code number of the strategic group.
**Not present in the sample in the given time period.
***Excluded from the sample for the given time period.

Figure 1

A Flow Diagram of Formulating Strategic Groups

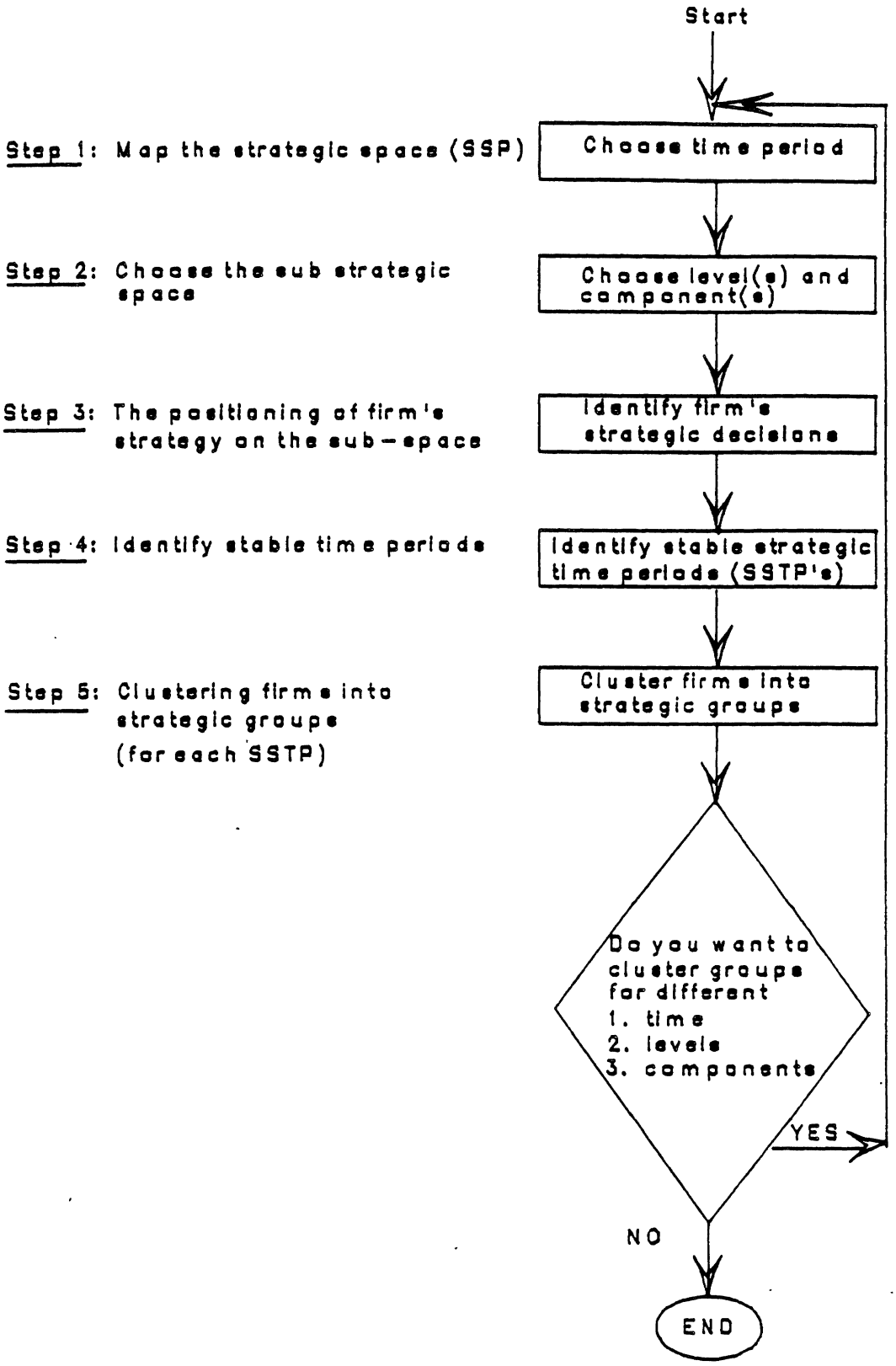

TABLE 1

Corporate Strategy Variables and Their Definition in the Insurance Industry

Strategic Component	Strategic Function	Strategic Variable	Definition
A. Scope	A1: Product Scope	1. PPER	$\frac{\text{Personal Net Premium Written (NPW)}}{\text{Personal NPW + Commercial NPW}}$
	A2: Product Scope	2. PPROP	$\frac{\text{Property NPW + Liability NPW}}{\text{Property NPW + Liability NPW + Life Insurance}}$
	A3: Product Diversity	3. DIVER	$H = 1 - \sum_{i=1}^{n} P_i^2$ where: P_i is the relative size of the ith line in the firm portfolio; i=1...n is the number of lines
	A4: Firm Size	4. LSIZE	LOG (NPW)
B. Resource Deployment	B1: Production	5. EXRATIO	$\frac{\text{Underwriting Expenses}}{\text{NPW}}$
		6. PREINS	$\frac{\text{Direct Premium Written (DPW)-NPW}}{\text{NPW}}$
	B2: Finance	7. LEVER	$\frac{\text{New Premium Earned}}{\text{Policy Holders Surplus}}$
	B3: Investment t	8. PSTOCK	$\frac{\text{Stocks}}{\text{Stocks + Bonds}}$

TABLE 2

SUMMARY AND DEFINITIONS OF PERFORMANCE MEASURES

PERFORMANCE DIMENSION	PERFORMANCE MEASURE	NOTATION	DEFINITION
1) ECONOMIC	1) COMBINED RATIO	COM	$\frac{\text{incurred losses + loss adjustment expenses + underwriting expenses + dividend}}{\text{net premium written}}$
	2) MARKET SHARE	MS	$\frac{\text{firm's net premium written}}{\text{industry net premium written}}$
	3) WEIGHTED MARKET SHARE	WMS	$\sum_{i=1}^{n} P_i LB_i$ where: i=1...n indicates the line of insurance P_i = the relative share of the line in the total portfolio LB_i = the market share of the line in the segment
2) RISK	4) RISK OF COMBINED RATIO	RCOM	Standard deviation of COM
	5) RISK OF MARKET SHARE	RMS	Standard deviation of MS
	6) RISK OF WEIGHTED MARKET SHARE	RWMS	Standard deviation of WMS
3) RISK ADJUSTED	7) RISK ADJUSTED FOR COMBINED RATIO	RACOM	The ratio COM/RCOM
	8) RISK ADJUSTED FOR MARKET SHARE	RAMS	The ratio MS/RMS
	9) RISK ADJUSTED FOR WEIGHTED MARKET SHARE	RAWMS	The ratio WMS/RWMS

TABLE 3

IDENTIFICATION OF STABLE STRATEGIC TIME PERIODS[c] (1970-1984)

Added Year	Contrasted Period	Contrasted Years	Stability Criteria				Change in Contrasted Years?	Conclusions
			VAR/COVAR		MEANS			
			Bartlett X^2	P	Hotelling T^2	P		
71	70	71 vs. 70	9.09	1.00	.25	.97	No	1. 70 and 71 are in the same SSTP
72	70-71	72 vs. 70	126.8	.0001***	.98	.46	Yes[a]	1. 70 and 71 is the FIRST SSTP
		72 vs. 71	123.6	.0001***	.76	.66	Yes[a]	2. 72 is the starting of a new SSTP
		72 vs. 70-71	139.26	.0001***	.90	.52	Yes[a]	
		72-71 vs. 70	20.5	.98	.54	.82	No	
73	72	73 vs. 72	111.8	.0001***	1.03	.42	Yes[a]	1. 72 is the SECOND SSTP 2. 73 is the starting of a new SSTP
74	73	74 vs. 73	94.7	.0001***	2.78	.002***	Yes[a,b]	1. 73 is the THIRD SSTP 2. 74 is the starting of a new SSTP
75	74	75 vs. 74	34.9	.51	.42	.90	No	1. 74 and 75 are in the same SSTP
76	74-75	76 vs. 75	60.9	.005***	.40	.91	Yes[a]	1. 74 and 75 is the FOURTH SSTP
		76 vs. 74	24.03	.93	.97	.46	No	2. 76 is the starting of a new SSTP
		76 vs. 74-75	33.50	.68	60.5	.006***	Yes[b]	
		76-75 vs. 74	32.3	.64	.72	.67	No	

TABLE 3 (Cont'd.)

IDENTIFICATION OF STABLE STRATEGIC TIME PERIODS (1970-1984)

Added Year	Contrasted Period	Contrasted Years	Stability Criteria				Change in Contrasted Years?	Conclusions
			VAR/COVAR		MEANS			
			Bartlett X^2	P	Hotelling T^2	P		
77	76	77 vs. 76	71.1	.0004***	.61	.76	Yes[a]	1. 76 is the FIFTH STEP 2. 77 is the starting of a new SSTP
78	77	78 vs. 77	83.5	.0001***	.64	.73	Yes[a]	1. 77 is the SIXTH STEP 2. 78 is the starting of a new SSTP
79	78	79 vs. 78	10.0	1.0	3.3	.003***	Yes[b]	1. 78 is the SEVENTH SSTP 2. 79 is the starting of a new SSTP
80	79	80 vs. 79	6.97	1.0	.29	.96	No	1. 79 and 80 are in the same SSTP
81	79-80	81 vs. 80	20.13	.98	1.78	.12	No	1. 79, 80, and 81 are in the same SSTP
		81 vs. 79	29.04	.78	1.34	.24	No	
		81 vs. 79-80	42.2	.22	1.62	.12	No	
		81-80 vs. 79	22.7	.95	.18	.99	No	
82	79-80-81	82 vs. 79	13.7	.99	1.06	.40	No	1. 79, 80, 81 and 82 are in the same SSTP
		82 vs. 80	10.7	1.00	1.85	.12	No	
		82 vs. 81	13.3	.99	.33	.94	No	
		82-81 vs. 79-80	32.6	.62	1.21	.44	No	
		82-81 vs. 79	11.5	1.00	.87	.54	No	

TABLE 3 (Cont'd.)

IDENTIFICATION OF STABLE STRATEGIC TIME PERIODS (1970-1984)

Added Year	Contrasted Period	Contrasted Years	Stability Criteria				Change in Contrasted Years?	Conclusions
			VAR/COVAR		MEANS			
			Bartlett X^2	P	Hotelling T^2	P		
83	79-80-81-82	83 vs. 79	30.71	.71	3.56	.003***	Yes[b]	1. 79, 80, 81 and 82 is the EIGHTH SSTP 2. 83 is the starting of a new SSTP
		83 vs. 80	27.03	.85	4.48	.0003***	Yes[b]	
		83 vs. 81	18.03	.99	2.41	.02**	Yes[b]	
		83 vs. 82	29.1	.78	6.60	.0001***	Yes[b]	
		83-82-81 vs. 79-80	43.2	.19	4.52	.0001***	Yes[b]	
		83-82-81-80 vs. 79	24.3	.92	.90	.52	No	
84	83	84 vs. 83	14.7	.99	1.96	.005	No	1. 83 and 84 is the NINTH SSTP

***$p \leq .01$
**$p \leq .05$

Notes: a: indicates a change in the var/covariance matrix.
b: indicates a change in the means vector.
c: the results follow the algorithm developed in appendix 1.

TABLE 4

STRATEGIC GROUPS (SG's) OVER TIME

Criteria	Stable Strategic Time Period (SSTP)								
	I	II	III	IV	V	VI	VII	VIII	IX
	70-71	72	73	74-75	76	77	78	79-82	83-84
Number of SG's	5	5	5	7	7	7	7	6	6
Number of New SG's		1	2	3	2	1	0	0	2
Number of SG's Disappeared		1	2	1	2	1	0	1	2
Net Change		0	0	2	0	0	0	-1	0

TABLE 5

STRATEGIC GROUPS AND (MULTI) ANALYSIS OF VARIANCE ((M)ANOVA)

Strategic Variable	Stable Strategic Time Period								
	70-71	72	73	74-75	76	77	78	79-82	83-84
1) PPER	5.62***	15.18***	8.37***	7.56***	13.34***	8.20***	14.18***	3.18**	9.71***
2) PPROP	38.27***	82.76***	69.64***	43.32***	73.63***	54.84***	65.99***	42.4***	27.17***
3) DIVER	28.86***	13.97***	28.85***	24.80***	46.40***	31.96***	86.61***	30.8***	26.86***
4) LSIZE	6.83***	3.57**	3.96**	5.03***	2.84**	3.12**	4.22***	7.94***	13.01***
5) PREINS	34.18***	82.81***	93.24***	33.43***	74.54***	64.02***	70.48***	42.9***	27.38***
6) EXRATIO	29.22***	23.04***	19.70***	36.47***	19.11***	22.19***	17.48***	2.12*	6.41***
7) LEVER	11.16***	11.20***	7.24***	14.93***	13.60***	7.18***	4.11***	5.73***	6.14***
8) PSTOCK	10.79***	10.83***	7.55***	5.63***	5.96***	9.89***	3.68***	1.73	4.41***
MANOVA (1-8)	18.57***	11.07***	11.30***	10.06***	10.93***	14.04***	9.63***	6.23***	6.49***
P(F)	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001

Note: F value is reported in ceils
*** P $\leq$ .01;
** P $\leq$ .05;
* P $\leq$ .10;

TABLE 6

STRATEGIC GROUP MEMBERSHIPS: 1970-1984[a]

STRATEGIC GROUP 1: DIVERSIFIED	STRATEGIC GROUP 2: FOCUS-Life Insurance	STRATEGIC GROUP 3: FOCUS-Personal Line	OTHERS[b]
1. INA	1. Aetna	1. State Farm	1. Liberty Mutual
2. Continental Ins.	2. Travelers	2. Allstate	2. Wausau Insurance
3. Fireman's Fund	3. CNA	3. Farmers Insurance	3. General Accident
4. Hartford Fire	4. American General	4. Nationwide	4. Cigna
5. USF&G	5. Connecticut General	5. USAA	5. Prudential
6. Kemper		6. GIECO	
7. Crum & Forster			
8. Home Insurance			
9. St. Paul			
10. American Inter.			
11. Commercial Union			
12. Royal Insurance			
13. Chubb			
14. American Finance			
15. Reliance			
16. Safeco			
17. Ohio Casualty			

Notes: a--the firms in strategic groups 1, 2 and 3 belonged to these groups for most of the nine stable strategic time periods (see also Table in Appendix 2).

b--firms in the "others" category were located in different groups (other than the basic groups) during most of the stable strategic time periods.

TABLE 7

SUMMARY: THE PATTERN OF THE THREE BASIC STRATEGIC GROUPS

Strategic Group / Strategic Variable	SG1 above/below[a]	SG1 proportion[b]	SG2 above/below	SG2 proportion	SG3 above/below	SG3 proportion
1. PPER	-	8/9	0	9/9	+	9/9
2. PPROP	+	9/9	-	9/9	0	9/9
3. DIVER	+	9/9	-	8/9	-	3/9
4. LSIZE	-	8/9	+	9/9	+	3/9
5. PREINS	-	9/9	+	9/9	+	1/9
6. EXRATIO	+	9/9	+	1/9	-	8/9
7. LEVER	+	4/9	-	8/9	0	9/9
8. PSTOCK	+	7/9	-	1/9	-	5/9
General Pattern	Diversified		Focus (Life Insurance)		Focus (Personal Lines)	

a - above (+) or below (-) the industry average at $P \leq 10\%$, 0 indicates industry average

b - the proportion of SSTP's (out of nine) that the mean average was above/below the industry average at $P \leq 10\%$

TABLE 8

STRATEGIC GROUPS AND PERFORMANCE DIMENSIONS DIFFERENCES--MANOVA RESULTS

Performance dimension	Stable Strategic Time Period								
	1	2	3	4	5	6	7	8	9
	70-71	72	73	74-75	76	77	78	79-82	83-84
1. Economic	5.70***	1.64*	4.37***	5.83***	10.98***	4.61***	5.07***	9.34***	16.81***
2. Risk		2.36**	2.33*	3.10**	4.52***	5.06***	4.68***	4.75***	3.73***
3. Risk adjusted		1.41	1.72	2.17	1.75	1.62	1.72	2.06*	1.85

Notes: F values and their significant levels are given in the table.

***; $p \leq .01$;

**; $p \leq .05$;

*; $p \leq .10$;

TABLE 9

STRATEGIC GROUPS AND PERFORMANCE DIFFERENCES--ANOVA RESULTS

Performance measure	Stable Strategic Time Period								
	1	2	3	4	5	6	7	8	9
	70-71	72	73	74-75	76	77	78	79-82	83-84
COM	6.75***	1.17	5.77***	9.40***	6.36***	4.50***	3.74***	5.57***	11.96***
MS	10.33***	5.00***	3.86**	3.85***	4.58***	5.19***	7.98***	12.04***	13.07***
WMS	12.16***	2.52	6.23***	5.87***	17.02***	17.58***	15.45***	31.31***	21.53***
RCOM		2.48*	3.84**	5.65***	5.53**	6.42***	5.78***	6.14***	1.86
RMS		1.29	1.62	1.91	5.68***	7.77***	7.45***	8.52***	11.26***
RWMS		.20	.18	.19	.74	1.26	1.43	2.04	2.93*
RACOM		2.44*	4.08**	2.68*	2.59*	2.73*	2.96*	4.59**	5.27**
RAMS		.32	.29	.06	1.05	1.06	.63	.53	.99
RAWMS		1.09	.49	.42	2.12	1.75	1.78	1.97	1.94

Notes: F values and their significant levels are given in the table.

***; $p \leq .01$;

**; $p \leq .05$;

*; $p \leq .10$;

TABLE 10

STRATEGIC GROUPS AND PERFORMANCE DIFFERENCES ANALYSIS OF VARIANCE (ANOVA)

Strategic Group	Performance Measure	Stable Strategic Time Period								
		70-71	72	73	74-75	76	77	78	79-82	83-84
SG1	COM	8.98+	12.67	9.43	2.86	6.65+	11.21	11.86	8.35+++	-3.58
	MS	2.14---	2.67--	2.30--	2.34--	2.09--	2.11--	2.06--	1.90---	1.77---
	WMS	3.28---	4.36-	3.32---	3.39---	3.34--	3.30--	3.39--	3.30---	3.15---
	RCOM		2.88--	2.68--	4.41---	4.17---	4.23---	4.11---	6.00	
	RMS		.23	.22	.24	.25	.26-	.27	.30--	.32---
	RWMS		1.02	.90	.81	.78	.77	.76	.73	.74
	RACOM		4.94+	4.47++	2.05++	2.15+++	2.24++	2.33++	2.20++	1.17
	RAMS		28.74	26.35	18.95	13.98	12.70	11.90	8.99	8.05
	RAWMS		24.29	21.90	17.92	16.16	14.97	13.82	10.06	9.04
SG2	COM	1.78--	8.30-	8.18	-2.08--	1.74	6.61-	7.52	.40--	-11.2--
	MS	8.05+++	7.3+++	6.24+++	6.33+++	5.31+	5.82++	7.54++	5.23+	5.09+
	WMS	14.07+++	13.53+++	11.31+++	11.29+++	8.05	9.05	11.65+	8.35	7.21
	RCOM		5.73+	6.02+	7.37+	6.88+	6.72+	6.48	6.40++	7.62+
	RMS		.45	.45+	.44+	.61+++	.73+++	.74+++	.83+++	.97+++
	RWMS		.56	.69	.77	1.54	1.84	1.89	1.96++	2.15++
	RACOM		1.13-	1.47--	.56-	.58-	.03-	.72-	.47---	.20---
	RAMS		21.20	18.57	17.32	9.85	8.19	8.06	6.92	5.46
	RAWMS		41.33	31.90	25.78	6.69--	5.52-	5.28-	4.82-	4.35-
SG3	COM	-.39---	15.04	10.08	2.92	5.45	13.66	14.02	7.15	4.78
	MS	4.32	3.75	3.92	6.10++	3.81	4.15	3.75	8.18++	6.90++
	WMS	7.49	6.85	7.12	10.61++	7.55	7.89	7.32	16.06++	12.01+
	RCOM		5.53	5.05	7.30+	6.84+	6.73++	6.64++	5.91	5.81
	RMS		.13	.13	.16	.20	.26	.30	.39	.47
	RWMS		.33	.30	.32	.38	.49	.59	.79	.85
	RACOM		2.91	3.32	1.13	1.14	1.27	1.37	1.62	1.66+
	RAMS		33.84	25.19	20.46	17.32	15.12	12.98	9.25	8.39
	AWMS		20.62	20.95	20.08	18.94	17.42	12.69	10.84	10.73
Industry	COM	7.62	12.57	10.05	2.43	4.77	10.669	11.60	6.25	-2.82
	MS	3.22	3.22	3.22	3.22	3.12	3.112	3.12	3.26	3.17
	WMS	5.49	6.06	5.38	5.42	5.89	5.882	5.83	5.94	5.67
	RCOM		3.81	3.62	5.38	5.08	5.116	5.12	4.87	6.40
	RMS		.23	.25	.26	.30	.334	.35	.40	.47
	RWMS		.74	.69	.66	.79	.889	.96	1.04	1.08
	RACOM		4.85	4.18	1.72	1.77	1.774	1.82	1.76	1.02
	RAMS		27.86	23.91	18.49	13.56	12.224	11.62	9.11	7.97
	RAWMS		25.78	23.18	19.00	15.07	13.994	12.03	9.33	8.66

--- or +++: below or above industry average; $p \leq .01$;
-- or ++: below or above industry average; $p \leq .05$;
- or +: below or above industry average; $p \leq .10$;

REFERENCES

Anderberg, M. R., Cluster Analysis for Applications, New York: Academic Press, 1973.

Bain, J. S., Barriers to New Competition. Cambridge, Mass.: Harvard University Press, 1956.

Bain, J. S., Industrial Organization, 2d ed. New York: John Wiley & Sons, 1968.

Best's, Aggregate and Averages. Reported annually.

Best's Insurance Reports Property-Casualty. Reported annually.

Caves, R., American Industry: Structure, Conduct, Performance, 4th edition. Prentice-Hall Inc., 1977.

Caves, R. E. and E. M. Porter, "From Entry Barriers to Mobility Barriers." Quarterly Journal of Economics, 91, May 1977, 241-261.

Cool, K., "Strategic Group Formation and Strategic Group Shifts: A Longitudinal Analysis of the U.S. Pharmaceutical Industry, 1963-1982." Unpublished Doctoral Dissertation, May 1985, Purdue University, West Lafayette, Indiana, 47907.

Cool, K. and D. Schendel, "Strategic Group Formation and Performance: The Case of the U.S. Pharmaceutical Industry, 1963-1982." Management Science, 33, 9, 1987, 1102-1124.

Dess, G. G. and S. P. Davis, "Porter's (1980) Generic Strategies as Determinants of Strategic Group Membership and Organizational Performance," Academy of Management Journal, 27, 1984, 467-488.

Doherty, N. A., and R. M. Korkie, "Portfolio Adjustment in a Reinsurance Market." The Geneva Papers on Risk and Insurance, 17, June 1980, 63-74.

Eck, J. E., "Detecting Financially Troubled Property-Liability Insurers." Journal of Business Research, Vol. 10, No. 4, 1982, 445-458.

Everitt, B. S., "Unresolved Problems in Cluster Analysis," Biometrics, 35, 1979 161-181.

Everitt, B. S., Cluster Analysis, 2nd ed., London: Heinessan Educational Books Ltd, 1980.

Fiegenbaum, A., "Dynamic Aspects of Strategic Groups and Competitive Strategy: Concepts and Empirical Examination in the Insurance Industry." Unpublished Doctoral Dissertation, 1987, University of Illinois at Urbana Champaign.

Fiegenbaum, A., D. Sudharshan, and H. Thomas, "On Stable Strategic Time Periods in Strategic Group Research." National Academy of Management Meetings, August, 1985.

Fiegenbaum, A., D. Sudharshan, and H. Thomas, "The Concept of Stable Strategic Time Periods in Strategic Groups Research." Managerial and Decision Economics, 8, 1987, 139-148.

Fombrun, C. J. and E. J. Zazac, "Structural and Perceptual Influences on Intraindustry Stratification." Academy of Management Journal, 30, 1987, 33-50.

Frazier, G. L. and R. D. Howell, "Business Definition and Performance." Journal of Marketing, 47, 1983, 59-67.

Greehan, R., "Return to Scale in the Life Insurance Industry." The Bell Journal of Economics, Autumn 1977, 497-516.

Green, P. E., Analyzing Multivariate Data. The Dryden Press, 1978.

Harrigan, K. R., Strategies for Declining Business. New York: Lexington Books, 1981.

Harrigan, K. R., "An Application of Clustering for Strategic Group Analysis." Strategic Management Journal, 6, 1985, 55-73.

Hatten, K. J., "Strategic Models in the Brewing Industry." Unpublished Doctoral Dissertation, Harvard University, 1974.

Hatten, K. J., D. E. Schendel, and A. Cooper, "A Strategic Model of the U.S. Brewing Industry: 1952-1971." Academy of Management Journal, 21, 1978, 592-610.

Hatten, K. J., and M. L. Hatten, "Strategic Groups, Asymmetrical Mobility Barriers and Contestability." Strategic Management Journal, 8, 1987, 329-342.

Haugen, R. A., "Insurer Risk Under Alternative Investment and Financing Strategies." The Jounral of Risk and Insurance, March 1971, 71-80.

Hawes, M. J., and F. W. Crittenden, "A Taxonomy of Competitive Retailing Strategies." Strategic Management Journal, 5, 1984, 275-287.

Hayes, A., M. Spence, and D. Marks, Competitive Structure in the Investment Banking, 1983.

Hergert, M., "The Incidence and Implications of Strategic Grouping in U.S. Manufacturing Industries." Unpublished Doctoral Dissertation, Harvard University, 1983.

Hofer, C. W. and D. Schendel, Strategy Formulation: Analytical Concepts. St. Paul: West Publishing Company, 1978.

Hunt, M. S., "Competition in the Major Home Applicance Industry, 1960-1970." Unpublished Ph.D. Dissertation, Harvard University, 1972.

Johnson, J. E., G. B. Flanigan, and S. W. Weisbart, "Returns to Scale in the Property and Liability Insurance Industry." The Journal of Risk and Insurance, March 1981, 18-45.

Joskow, P. L., "Caratels, Competition and Regulation in the Property-Liability Insurance." The Journal of Risk and Insurance, May 1972, 55-64.

Kahane, Y., and D. Nye, "A Portfolio Approach to the Property-Liability Insurance Industry." The Journal of Risk and Insurance, December 1975, 579-598.

Markowitz, H., Portfolio Selection, Cowles Foundation Monograph 16, Wiley, New York, 1959.

Mehr, R. I., and E. Cammack, Principles of Insurance, 6th. ed., Homewood, Ill: R. D. Irwin, 1976.

McGee, J. and H. Thomas, "Strategic Groups: A Useful Linkage Between Industry Structure and Strategic Management." Strategic Management Journal, Vol. 7, 1986, 141-160.

Miller, D., and D. Friesen, "Organization: A Quantum View." Englewood Cliffs, NJ: Prentice-Hall, 1984.

Milligan, G. W. and M. C. Cooper, "An Examination of Procedures for Determining the Number of Clusters in a Data Set." Psychometrika, 50 (2), 1985, 159-179.

Mintzberg, H., "Patterns in Strategy Formation." Management Science, 24, 1978, 934-948.

Newman, H. H., "Strategic Groups and the Structure Performance Relationships: A Study with Respect to the Chemical Process Industries." Unpublished Ph.D. Dissertation, Harvard University, 1973.

Newman, H. H., "Strategic Groups and the Structure Performance Relationship." Review of Economics and Statistics, 1978, 376-383.

Oster, S., "Intra-industry Structure and the Ease of Strategic Change." Review of Economics and Statistics, 64, 1982, 376-383.

Pitts, R. A., and D. H. Hopkins, "Firm Diversity, Conceptualization and Measurement." Academy of Management Review, 7, 4, 1982, 620-629.

Porter, M. E., "The Structure Within Industries and Companies' Performance." Review of Economics and Statistics, 61, 1979, 214-219.

Porter, M. E., Competitive Strategy. New York: The Free Press, 1980.

Porter, M. E., Competitive Advantage. New York: The Free Press, 1985.

Quinn, J. B., Strategy for Change. Homewood, Ill.: Richard D. Irwin, Inc., 1980.

Scherer, F. M., Industrial Market Structure and Economic Performance, 2nd ed., Chicago: Ran McNally College Publishing Company, 1980.

Sharp, W., "Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk." Journal of Finance, 19, 1964, 425-44.

Spath, H., Cluster Analysis Algorithms, Chichester, England: Ellis Horwood, 1981.

Tobias, A., The Invisible Bankers, the Linden Press, 1982.

Vernon, J. M., Market Structure and Industrial Performance: A Review of Statistical Findings. Boston: Allyn and Bacon, Inc. 1972.

Webb, B. L., J. J. Launie, W. P. Rokes, and N. A. Balini "The Framework for Insurance Marketing Changes." The Journal of Risk and Insurance, June 1974, 239-248.