

**A LONGITUDINAL EXAMINATION OF CORPORATE DIVERSIFICATION
AND RESTRUCTURING ACTIVITIES USING MULTIPLE MEASURES***

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ABSTRACT

Using popular/common measures of diversification employed by industrial organization scholars (Jacquemin-Berry entropy measure) and strategy scholars (size of the primary business segment), this study examines the corporate diversification and restructuring activities of American firms (sample from the *Fortune* 250 list) in the 1980s and 1990s. The results illustrate the consistencies and discrepancies between the above measures. Additionally, there is empirical support for the widespread notion that in the 1980's and 1990's, firms underwent major restructuring efforts by divesting unrelated (unprofitable) businesses and strengthening their core business units and related segments.

INTRODUCTION

The origins and more specifically the growth (and activities) of the business firm has always been an object of considerable interest to scholars from the social sciences, especially from disciplines such as economics, public policy, business policy/strategy, etc. Moreover, such academic interests have been further fueled by the visibility and dominance of the (large) business organization in the western, capitalistic societies. Though the issue of corporate diversification has been studied extensively for the past three decades by economists initially and strategy scholars of late, this research stream has been marked by considerable disagreement on several key issues.

One of the major controversies in the field concerns the very operationalization or measurement of corporate diversification. While economists were primarily concerned with the degree or extent of corporate diversification, strategy researchers were more interested in the nature of firm diversification. Hence the disagreement between the two groups, as each developed measures tailored to meet their own needs and or research agendas. The importance of, or necessity for a consensus on a fundamental issue like this cannot be emphasized enough, as different operationalizations could influence the results differently and thereby lead to erroneous generalizations based on such findings.

From a historical perspective, tremendous macroeconomic expansion in the United States, especially after World War II translated into meteoric growth opportunities for business firms and has led to the rise of the truly large organizations as we know them today. Such firm growth was accompanied by their entry into other products and or markets for a multitude of reasons such as hedging for seasonal or business cycle fluctuations, more efficient utilization of the firm's resources, exploiting new opportunities, etc. (Penrose, 1959). Entry into and participation in other lines of businesses was not only a logical option for these high growth, highly profitable firms, but it also became the norm as evidenced by the culmination of the conglomerate form of business organizations in the 1960s and the early 1970s (Chandler, 1977).

However, in the second half of the 1970s and continuing throughout the 1980s, American businesses corporations were faced with increasing and new (efficient) competition, market saturation, economic downturns, shrinking revenues/profits and market shares, etc. As a result, they began to realize that largeness and or participation in many businesses did not necessarily translate into higher profitability. Hence, there is a widespread notion that corporate America has responded to the changes in the environment through extensive restructuring and or divestitures of unprofitable business lines. Moreover, significant works in both academic (Rumelt, 1974) and practitioner circles (Peters and Waterman, 1982) are believed to have led firms to focus their attention and resources on some specialized (unique) skills or activities that constituted the core of their organization.

The purpose of this paper is to determine if multiple measures of diversification yield the same results, i.e. are there any consistencies between several measures as reported by some researchers (Christensen and Montgomery, 1980; Montgomery, 1982 and 1985; Palepu, 1985; Wernerfelt and Montgomery, 1986; Varadarajan, 1986; Varadarajan and Ramanujam, 1987). Further, the paper will empirically determine what strategies large business organizations are

pursuing in the 1980s and 1990s, particularly in terms of corporate restructuring through diversification. To achieve this purpose, the restructuring strategies of firms over time (1985-1993 time period), will be traced by examining changes in both the size of their primary business segment as well as in their patterns of diversification. Finally, how these measures change with respect to each other will also be investigated.

REVIEW OF PREVIOUS RESEARCH

Several researchers have pointed out the fact that the diversification literature is marked by a lack of consensus on a universally acceptable and or appropriate measure(s) of corporate diversification (Rumelt, 1974; Pitts and Hopkins, 1982; Ramanujam and Varadarajan, 1989). Though some scholars report consistencies between a few measures, Pitts and Hopkins (1982, p.620) aptly note that due to the existent disagreement in the field "...researchers have tended to develop their own individualized operationalizations of this concept. The result is considerable diversity in approaches to operationalizing the concept of corporate diversity." Needless to say, the research efforts using a variety of measures have yielded inconclusive and often conflicting results thereby further fueling the controversies over such (measurement) issues in the academic world. This literature review will be undertaken with the objective of examining some of the popular/common measures and operationalizations of diversification utilized by researchers. A summary of the measures employed in the studies reviewed here, in addition to their major findings is presented in Review Table A.

Insert Review Table A here

While there are numerous forms, measures of corporate diversification can be broken down into two major types or categories:

SIC-Based Measures - The IO Research: These measures are predominantly employed by scholars from the industrial organization economics. In its simplest form, this continuous measure is based on counting the number of businesses at the 2-, 3-, or 4-digit level of the Standard Industrial Classification (SIC) categorization schema (Gort, 1962). According to this method of calculating diversification, a firm operating in five 2-digit (or 3-, or 4-digit) SIC codes/industries was considered to be more diversified than a firm operating in four 2-digit (or 3-, or 4-digit correspondingly) SIC codes/industries. One obvious shortcoming of this simplistic measure was that it failed to account for the proportionality of the various businesses the firm was involved in, and thereby exaggerated the extent of actual firm diversification.

To overcome the limitations of this simple product count measure, indices (measures) were developed wherein weights were assigned to reflect the sizes of the various businesses. Of the two more popular or commonly used refined indices of diversification, the first is Berry's (1975) following modification of the *Herfindahl index of diversification*,

$$\text{Diversification } D = 1 - \sum_{i=1}^N P_i^2$$

where,

D = index of diversification,

N = number of 2-(or 3-, or 4-) digit SIC codes the firm was involved in, and

P_i = relative share of each SIC code's sales to overall corporate sales

In this measure, if a firm operates in a single industry then the Herfindahl index of diversification is zero, and becomes closer to unity if the firm's total sales were divided equally among any number of SIC codes.

The second more sophisticated/refined product count measure used is the *Jacquemin-Berry* (Berry, 1979) *entropy measure of diversification*, which is calculated as follows:

$$\text{Total Diversification } TTD = \sum_{i=1}^N P_i * \ln(1/P_i)$$

$$\text{Related Diversification } RTD = \sum_{j=1}^M RTD_j P^j$$

$$\text{with } RTD_j = \sum_{i \& j} P_i^j * \ln(1/P_i^j)$$

$$\text{Unrelated Diversification } UTD = \sum_{j=1}^M P^j * \ln(1/P^j)$$

where,

M = Number of industry groups (number of 2 digit SIC codes the firm is involved in)

N = Number of industry segments (4 digit SIC codes the firm is involved in within each 2 digit SIC code)

P_i = Share of segment i 's sales of total corporate sales

P^j = Share of group j 's sales in total corporate sales

P_i^j = Share of segment i 's sales of total sales for group j , and

\ln = natural log

(see Palepu, 1985 for a discussion and example of the calculations of this measure).

Like the modified (Berry's) Herfindahl index of diversification, the Jacquemin-Berry entropy measure of diversification also yields a score of zero for single industry firms, and becomes greater with increasing levels of diversification. The main difference between these two measures is that the Herfindahl index allocates smaller weight to smaller businesses (product lines) than the Jacquemin-Berry entropy measure.

However, the Jacquemin-Berry entropy measure is superior to the Herfindahl index of diversification in that unlike the latter, it is not influenced by the largeness of the dominant or primary businesses of a firm while calculating diversification (Carter, 1977; Palepu, 1985; Varadarajan, 1986). Moreover, the entropy measure (in addition to capturing total firm diversity), enables the researcher to decompose that total diversity into 'related' and 'unrelated' diversity - a concept introduced by Rumelt (1974, - see discussion in the next section).

Some additional but less well-known measures of diversification based on SIC codes are: number of multi-plant firms in the industry (Miller, 1969), industry price-cost margins, specialization ratios (Rhoades, 1973a and 1973b), capital employed outside the firm's leading product (Carter, 1977), 4-digit FTC industry categories (Ravenscraft, 1982), etc.

In sum, as the primary concern of the industrial organization economists was the extent or degree of firm diversification, studies in this research stream employ SIC based measures to capture diversification. Additionally, the employment of the SIC based measures that capture the extent of corporate diversification was a logical choice for the industrial organization economists, as their basic premise was that the more a firm diversified into other markets through internal development or acquisition of existing firms (in conjunction with higher industry concentration ratios), the greater the market power and hence the higher the profitability of that firm. However, as their investigations of the diversification-performance relationship were marked by various forms of the product or business count indices, the research efforts of the industrial organization economists have yielded inconclusive and contradictory findings and hence, unable to prove the hypothetical links between corporate diversification and firm performance (profitability) through the presence or intervention of various barriers to entry.

Further, the validity of the results from the studies that have found support for the above hypothetical linkages have been questioned by researchers because of the inherent biases or flaws in the samples and or methodologies employed by the same (Bass et al, 1978). The key features/advantages of such SIC based measures are that they are easy to operationalize and use, in addition to requiring less effort and time. Moreover, the availability of SIC data enhance the convenience of and the replicability of calculations using such measures and thus is a contributory factor to their increased usage and popularity in the industrial organization economics (Palepu, 1985). But, perhaps the biggest drawback of such measures is that they fail to capture the nature of firm diversification (Pitts and Hopkins, 1982; Palepu, 1985).

Typology Based Measures - The Strategy Research: Ansoff (1965) in his seminal work on corporate strategy coined the term "synergy" (which he defined as "...the firm seeks a product-market posture with a combined performance that is greater than the sum of its parts," p.75) as an explanation or rationale for firm entry and participation into certain other businesses or product lines. Building on Wrigley's (1970) four categories of diversification, Rumelt (1974)

in what is considered to be a pioneering research effort, developed nine categories of diversification. Further, Rumelt operationalized Ansoff's "synergy" by developing and refining the following measures:

Specialization ratio - Fraction of revenues accounted for by the largest single business unit.

Vertical ratio - Fraction of revenues attributable to the largest group of products, joint products, and by-products associated with the processing of the same raw material(s) through a set of stages.

Related ratio - Fraction of revenues attributable to the largest group of businesses that draw on some common core skill or resource.

Rumelt (1974) also delineated the distinction between 'constrained' diversification ("each business was related to each other business and all could be seen as radiating from a common core," p.18), and 'linked' diversification (which was defined as "...adding new businesses in such a way that each was related to at least one - but often no more than one - of its current activities, the firm gradually became involved in a linked network of widely disparate businesses," p.19).

Rumelt's caution that his method was (i) not completely devoid of subjective bias, and (ii) very time-consuming, added to the skepticism about the reliability of his measures that existed in the field (Pitts and Hopkins, 1982). However, several researchers were able to replicate Rumelt's categorization to a high degree of interrater reliability as well as establish the validity of the same (Christensen and Montgomery 1980; Bettis, 1981; Montgomery, 1982, and 1985; Bettis and Hall, 1982; Bettis and Mahajan, 1985; Wernerfelt and Montgomery, 1986). In fact, Christensen and Montgomery (1980, p.333) emphatically state that:

Commonly voiced fears that the system was unreliable owing to its degree of dependence on qualitative judgements were not borne out. Indeed, the availability of line-of-business data reduces the extent to which making Rumelt-type strategy classification is a judgmental process. Furthermore, the line-of-business data reduced the amount of time needed to make the classification decisions. In this capacity, they are a most useful facilitator of strategic management research. The fact that their high level of aggregation makes them unsuitable for some research questions (eg. competitive strategy in a narrowly-defined market) does not necessarily reduce their usefulness for making categorical strategy classifications.

Additionally, Christensen and Montgomery (1980), and Wernerfelt and Montgomery (1986) found a high degree of consistency between Rumelt's categorical measures and Berry's modification of the Herfindahl index of diversification.

Refinements of Rumelt's diversification typology into "broad spectrum" (across 2-digit SIC codes) and "mean narrow spectrum" (across 4-digit but within 2-digit SIC codes) diversity (Varadarajan, 1986; Varadarajan and Ramanujam, 1987); "product diversity" and "market diversity" (Nathanson and Cassano, 1982); "product diversity" and "multinational diversity" (Grant et al, 1988); and a market based typology of "category ratio" and "product ratio" (Capon et al, 1988), represent some of the recent refinements of Rumelt's categorization used by strategy

researchers to measure diversification. Additionally, Palepu (1985) using the Jacquemin-Berry entropy measure, demonstrates the relevance and validity of this continuous measure to strategy researchers because of its ability to decompose total firm diversity into related and unrelated diversity.

As strategy researchers were relatively more interested in the nature of firm diversification than the extent of firm diversification per se, they adopted typology based measures (while rejecting the SIC based measures that the industrial organization economists used). Further, as typology based measures enable researchers to determine the profitability/performance levels associated with the various categories or paths of diversification, such measures have become the primary tools for corporate diversification measurement in the business policy research stream. Strategy researchers have been able to corroborate Rumelt's categorization schema to a high degree or level of confidence, thus establishing to some extent, both the reliability and the validity of his diversification typology (Christensen and Montgomery, 1980; Montgomery, 1982, 1985; Wernerfelt and Montgomery, 1986). However, as such measures are very time consuming and do require subjective decisions, some skepticism about them still do exist in the field (Pitts and Hopkins, 1982; Palepu, 1985). The various modifications or refinements of Rumelt's typology employed by strategy researchers have generally yielded differing degrees of support for Rumelt's findings - in that on average, firms pursuing strategies of related diversification had higher levels of profitability than firms pursuing other (unrelated) strategies of diversification.

For an extensive review of the diversification literature please see Ramanujam and Varadarajan (1989), and for an excellent discussion of the relative strengths and weaknesses of various measures employed in the diversification research stream, please refer to Pitts and Hopkins (1982).

RESEARCH OBJECTIVES OF THE PRESENT STUDY

Though considerable effort and time have been spent by researchers in developing measures of diversity, Ramanujam and Varadarajan (1989, pp.539-540) note that "...despite various refinements in the approach to measuring diversity, the findings of studies attempting to demonstrate the effects of diversification on performance remain inconclusive." Moreover, since the conceptualization and measurement of diversification presents a difficult task, the above authors' call to the field that "...it would be desirable for researchers to employ multiple measures in order to establish the robustness of their findings to the choice of measure," is a point well taken. Given the constraints that most measures of diversification are subjective and research-orientation specific, multiple measures of diversification are utilized in this study to determine if they yield consistent results as reported by several researchers (Christensen and Montgomery, 1980; Montgomery, 1982 and 1985; Palepu, 1985; Wernerfelt and Montgomery, 1986; Varadarajan, 1986; and Varadarajan and Ramanujam, 1987).

Additionally, while the growth and diversification strategies of (large) American corporations during the 1960s and 1970s are well documented, there are very few empirical investigations of the strategies of corporate America in the 1980s and 1990s (Ramanujam and

Varadarajan, 1989). This study examines the popular beliefs that the 1980s and 1990s were marked by an increasing trend of restructuring and or divesting of unprofitable businesses by American firms.

METHODS

The data used for this study - a multi-industry random sample of 30 firms from the Fortune 250 list, were drawn from the COMPUSTAT database. As the primary objective is to determine the consistencies between multiple measures, the following two measures of corporate diversification were employed in this study: (Please see Appendix A for a list of the firms).

The initial (1985) relative size of the largest/primary business segment was established by utilizing the "specialization ratio" - the fraction of revenues accounted for by the largest single business unit (the primary business segment) at the 4-digit SIC code (Rumelt, 1974). The size of that (primary) business segment was then followed over time to determine the changes and the nature of changes in this regard.

The Jacquemin-Berry entropy measure (see prior discussion) was used to calculate both the extent and nature of firm diversification over the 1985-1993 time period.

As the secondary purpose of this paper is to undertake a longitudinal examination of strategies of corporate America during the 1980s and 1990s, information for the sample was drawn for three points of time - 1985, 1989, and 1993.

RESULTS

Primary Business Segment: The descriptives for the primary business segment measure are shown in Table 1, while results from statistical (T-tests) of significance are reported in Table 2.

Insert Tables 1 & 2 here

An analysis of the primary business segment measure calculations for all 30 firms in the sample indicate a trend of decreases in the overall mean of the relative size of the primary business segment over time. While the primary business segment accounted for more than a half (0.528) of the total corporate sales in 1985, it's share dropped to 0.479 in 1989 and to 0.478 in 1993. Results of statistical tests (T-tests) of significance on the sample mean of the primary business segment confirmed that the relatively large reduction in its size (the primary business segment) for all 30 firms between 1985 and 1989 was significant.

Moreover, with regard to the identity of the primary business segment, exactly two-thirds of the sample (20 firms) reported the same primary business segment identified at the four digit

SIC code, while the remainder (10 firms) shifted their primary focus from one business segment to another at least once (4 firms did so twice!) during the 1985-93 time period.

Though several studies have been conducted in the past, where researchers have forcibly entered and or classified firms into Rumelt's categories on the basis of the median scores (which were treated as cutoff points) on the product or business count indices such as the Herfindahl index (Montgomery, 1982, and 1985; Wernerfelt and Montgomery, 1986), the Jacquemin-Berry entropy measure (Palepu, 1985), and SIC based measures (Varadarajan, 1986; Varadarajan and Ramanujam, 1987), the researchers were of the opinion that categorization of continuous measures would (a) lead to further researcher introduced bias, and (b) that the tradeoff between the validity and the explanatory powers of the model would be too high to warrant such a move.

Hence, on the basis of the result that the sample was divided into two groups in terms of changes in the primary business segment activities, the researchers decided to extend their analyses along these lines. In other words, given these two opposing strategies/trends, the sample was subdivided into two groups; namely, firms that reported the same primary business segment (hereafter referred to as Type 1 firms), and those that changed their primary business segment (hereafter, Type 2 firms) over time. An investigation was conducted to determine if there were any major differences between these two types of firms in their diversification strategies over time.

As evident from Table 1, though the relative size of the primary business segment for Type 1 firms decreased minimally (0.76%) in the 1985-1989 time period, it showed an overall increase of about 10% from 1985 to 1993. This greater dependence on the primary business segment was due to the statistically significant increases in the relative size of the same during the 1989-1993 time period (Table 2). However, Type 2 firms exhibited reductions in the average relative sizes of their primary business segments' during all three points of observation as the relative share of the primary business segment decreased from 0.408 (1985) to 0.270 (1989), and to 0.146 in 1993. Observing these statistically significant reductions in the relative size of the primary business segment for these firms shown in Table 2, it is apparent that not only did Type 2 firms undergo changes in, but that they were also becoming less reliant or focused on their primary business segments', no matter what industry or product line it was involved in.

The Jacquemin-Berry entropy measure: The descriptives for the entropy measure are shown in Table 3, while results from statistical (T-tests) of significance are reported in Table 4.

Insert Tables 3 & 4 here

With the exception of a marginal increase (1.46%) in its unrelated diversification posture between 1985 and 1989, the entropy measure reveals an overall reduction in the diversification portfolios for all 30 firms over time . However, as evident from Table 4, the statistically significant reductions in the unrelated (from 0.792 to 0.651), and in the total diversification activities (at the 1% level of significance for the latter) between 1989 and 1993 seem to indicate that much of firm restructuring through a reduction of unrelated businesses especially, took place

during the second half of the time frame of this study.

An analysis of the Jacquemin-Berry entropy measure was undertaken for Type 1 and Type 2 firms. Given the opposing trends with regards to the primary business segment measure, the entropy measure calculations were expected to reveal differences between Type 1 and Type 2 firms in their diversification strategies. While there were some variations in the diversification strategies between the two groups in the intermediate periods (1985-1989 and 1989-1993), the entropy measures revealed a long-run (1985-1993) reduction or decrease in all three, namely, related, unrelated, and total diversification activities for both types of firms.

In the intermediate time periods, Type 1 and Type 2 firms adopted opposing strategies in that the while the former increased their average related diversification activities by about 3.25% and divested their unrelated businesses between 1985 and 1989. On the other hand, Type 2 firms decreased their related diversification on average, by 20.21% while increasing their unrelated diversification by 8.48%. In the 1989-1993 time period, Type 1 firms exhibited significant reductions (Table 4) in their related, unrelated, and total diversification activities, whereas Type 2 firms increased their related diversification activities by about 20% while cutting back almost a fourth of their unrelated businesses.

The statistically significant decreases in the related, unrelated, and total diversification portfolio of Type 1 firms for the 1985-1993 time period as shown in Table 4, seem to indicate a pattern of restructuring by these firms, and taking into consideration their increased reliance on the primary business segments leads one to speculate if Type 1 firms are revealing a trend of moving towards a single business or product line.

Type 2 firms revealed significant reductions (at the 10% level) in their total diversification profiles between the 1985-1993 time period. This presents a conflicting picture as not only did these Type 2 firms change their primary business segment identity and or reduce its relative size over time (logically, this would imply an increase in their diversification activities) but they also exhibited decreases in their related, unrelated, and total diversification activities. Hence, inconsistent strategies/trends emerge for Type 2 firms when their diversification activities are measured using multiple measures!

Comparison of the Two Measures:

A comparison of the descriptive statistics of the two measures (Tables 1 and 3) reveals major inconsistencies and some consistencies between the primary business segment measure and the Jacquemin-Berry entropy measure of diversification. Though there were similar discrepancies and consistencies between these measures for the intermediate time periods of interest (i.e. 1985-1989, and 1989-1993) as well, due to space constraints only those pertaining to the overall period of 1985-1993 are shown in Figure 1 below:

Insert Figure 1 here

There were reductions in relative size of the primary business segment, as well as in all three categories of the entropy measure for the entire sample (and for the subgroup of Type 2 firms also) over time. Decreases in the relative size of the primary business segment imply that the sample was (and Type 2 firms were) becoming more diversified as they relied less on a "core" set of skills and activities. However, reductions in the related, unrelated, and total diversification activities indicate that these firms were becoming single business firms. Hence, while the primary business segment measure shows the sample (and Type 2 firms) becoming increasingly diversified, the entropy measure reveals a trend of greater focus/dependence on a particular line of business by these firms.

However, for Type 1 firms, the two measures reveal a pattern that may be considered as consistent. Increases in the size of the primary business segment, and decreases in all three areas (entropy measure scores) of diversification both indicate that these firms were increasing their reliance or focus on a set of specialized (unique) skills or activities that constituted the core of their organization.

Sub-sample Comparisons:

While Type 1 firms were in general, increasing their reliance on the primary business segment over time, Type 2 firms pursued opposing strategies. Comparisons of group mean differences between the diversification postures of Type 1 and Type 2 firms shown in Table 5 revealed as expected, highly significant differences (at the 1% level) between the two groups in the relative size of primary business segment measure for all three points of observation. In the Jacquemin-Berry entropy measure of diversification, there were no significant differences in the related diversification postures of Type 1 and Type 2 firms. This is surprising, considering the fact that while Type 1 firms increased their related diversification activities, Type 2 firms decreased their related diversification portfolios in the first half of the time frame of this study. And then for the 1989-1993 time period, both groups reversed their roles and pursued vice-versa strategies! However, Type 1 and Type 2 firms exhibited statistically significant differences in their strategies of reducing their unrelated and total diversification activities for all three periods of observation.

Insert Table 5 here

Performance Measures:

On a cursory analysis, it appears that Type 1 firms on the average, reported greater returns on all four performance measures (ROA, ROE, ROI, and ROS) than Type 2 firms in all three time points of observation. This is consistent with Rumelt's (1974) findings that related diversifiers tended to outperform unrelated diversifiers on key financial measures. However, results of statistical tests of group mean comparisons between Type 1 and Type 2 firms were not significant. Perhaps the sample size or the number of observations has to be increased in order to yield statistically significant differences between the sub-samples. Hence, we will not discuss

this issue any further. Group means on the performance measures and results of T-tests on the differences between the means are shown in Table 6.

Insert Table 6 here

DISCUSSION

The statistically significant decreases in the related, unrelated and total diversification portfolio of Type 1 firms for the 1985-1993 period as shown in Table 4 are consistent with the pattern of an increased reliance on their primary business segment as shown in Table 2.

However, a conflicting picture is presented for Type 2 firms. Changes in the identity as well as reductions in the relative size of their primary business segments over time (logically, this would imply an increase in their diversification activities), were accompanied by decreases in the related, unrelated and total diversification activities of these firms (see Tables 3 and 4).

Two possible causes may explain the discrepancies between the primary business segment measure and the entropy measure of diversification. First, the primary business segment measure is not a good proxy for capturing (changes in) the related and unrelated diversification activities of firms. Since this measure reflects only the share of the largest business, Pitts and Hopkins (1982, p.621) point out the fact that it "...ignores an important dimension of diversification--namely, the extent to which the remainder of a firm's activities may be diversified."

A second possible explanation may be that the entropy measure, because it assigns smaller weights to the primary business segment (Carter, 1977; Varadarajan, 1987), either ignores and or trivializes major changes in the activities and or size of the core business. Conversely, the entropy measure may be highly sensitive to changes in the smaller (unrelated and related) business segments/activities.

While consistencies between multiple measures of a phenomenon are welcome indicators of the maturity of the discipline, the observed discrepancies between the primary business segment and the Jacquemin-Berry entropy measures of diversification highlight the fact that a researcher's findings may be driven by his/her choice of operationalization or measurement and thereby lead to erroneous generalizations and conclusions. Such inconsistencies between the two measures of diversification (in conjunction with other factors) may be one of the primary reasons for the inconclusive and often contradictory findings in the diversification-performance literature (Ramanujam and Varadarajan, 1989), especially between industrial organization economists and strategy researchers.

The popular belief that the 1980s and 1990s were an era of restructuring by corporate America is empirically supported to some extent. More specifically, Type 1 firms have exhibited strategies of increasing the relative size of their primary business segments, in addition to

reducing their related, unrelated, and total diversification activities. Such an observed trend leads one to speculate if these firms are becoming single business/industry firms, thereby further supporting the notion of corporate restructuring. For Type 2 firms however, the picture is not as clear. The fact that these firms changed their primary business identity (at least once) as well as reduce the relative size of the same seems to indicate a pattern of increasing diversification, thus refuting the widespread belief of restructuring. However, this finding is confounded by the fact that these firms reduced all of their diversification activities over time. Additionally, the fact that Type 2 firms increased their related diversification, while decreasing their unrelated and total diversification during the second half of the time frame of this study (a strategy that their counterparts in Type 1 pursued in the 1985-1989 time period!) does seem to provide partial evidence of their restructuring through divestiture of unrelated businesses. Therefore, the empirical support for the corporate restructuring notion from the perspective of the sub-sample of Type 2 firms is inconclusive at best (the same could be said for the entire sample also, as the findings for this unit of analysis were similarly contradictory).

CONCLUSIONS and RESEARCH IMPLICATIONS

Results of this study indicate that there are major inconsistencies between classifications based on the size of the primary business segment and the Jacquemin-Berry entropy measure of diversification. This finding is contrary to the conclusions of several other researchers that there were consistencies between multiple measures of diversification (especially between continuous measures and semi-subjective classification schemes), and one possible explanation for this contradiction is that the other researchers employed measures that were different from the ones employed in this study. Or perhaps, because the "share of largest business and comprehensive index (Jacquemin-Berry entropy measure) approaches represent opposing ends of the spectrum" (Pitts and Hopkins, 1982, p.622) - (researcher addition), such inconsistencies between the two measures shown here are not unusual nor unexpected.

However, the implication of this finding for scholars investigating corporate diversification and restructuring (especially, the diversification-performance linkages), cannot be stressed enough as it emphasizes the fact that a researcher's findings may very well be to the peculiar bias and influence of the measure chosen. Hence, caution and judgement will have to be exercised in the evaluation and acceptance of any findings (including those of the present study) in this research area. More importantly, scholars should heed to the advice of Ramanujam and Varadarajan (1989) and utilize multiple measures of diversification in their research studies to not only have a system of internal "checks and balances" that validates their results, but also to lay the foundations for consensus, integration, and significant advances in the diversification research stream.

This study has shown that, in general there exists a distinct bipolarization of large firms in terms of reliance or focus on a given set of skills, activities, or resources that may be considered as the nucleus of their existence. In other words, while one group of firms were found to be moving back towards their "core" by increasing the relative size of that primary segment, the other (group) not only changed their primary business segments (a few did so twice), but also became less reliant on that segment over time. The popular notion that corporate

America has responded to the changing environment of the 1980s and 1990s by restructuring is empirically supported to some extent.

Some possible avenues for future research that could arise from the present study are:

(1) Expanding the scope of this study to a larger sample and for longer time periods to determine if such divergence in corporate (restructuring) strategies is a common or prevalent pattern.

(2) A logical extension of the results of this study would be to investigate the performance-diversification linkages as suggested by some researchers (Grant *et al*, 1988). In other words, empirical investigations should be undertaken to determine if performance levels of previous years were the motivation or reason for the changes in the identity of the primary business segment by a sub-sample of firms from this study and hence test the validity of "offensive" versus "defensive" diversification concepts that are existent in the field.

(3) As the entropy measure enables researchers to capture the nature as well as the extent of diversification, a comparison of the Jacquemin-Berry entropy measure of diversification and Rumelt's nine (or seven, according to his recent work) categories of diversification to determine the extent of consistencies between them. This could be approached by equating the median scores to be the cutoff points of high and low levels of diversification, like some researchers have done in the past (Montgomery, 1982; Wernerfelt and Montgomery, 1985; Varadarajan, 1986; Varadarajan and Ramanujam, 1987; and Palepu, 1985, etc.), and then comparing it with Rumelt's categories of diversification.

REFERENCES

- Ansoff, H.I. 1965. *Corporate Strategy: An Analytic Approach to Business Policy for Growth and Expansion*. New York: McGraw-Hill Book Company.
- Bain, J.S. 1956. *Barriers to New Competition*. Cambridge: Harvard University Press.
- Bass, F.M., Cattin, P., and Wittink, D.R. 1977. Market structure and industry influence on profitability, in H. Thorelli (ed.), *Strategy + Structure = Performance*. Bloomington: Indiana University Press.
- Berry, C.H. 1967. Corporate Bigness and Diversification in Manufacturing. *Ohio State Law Journal*, 28: 402-426.
- Berry, C.H. 1971. Corporate growth and industrial diversification. *Journal of Law and Economics*, 14: 371-383.
- Berry, C.H. 1975. *Corporate Growth and Diversification*. Princeton: Princeton University Press.
- Berry, C.H. Corporate diversification and market structure. *The Bell Journal of Economics and Management Science*, 196-204.
- Bettis, R.A. 1981. Performance differences in related and unrelated diversified firms. *Strategic Management Journal*, 2: 379-393.
- Bettis, R.A., & Hall, W.K. 1982. Diversification strategy, accounting determined risk, and accounting determined return. *Academy of Management Journal*, 25: 254-264.
- Bettis, R.A., & Mahajan, V. 1985. Risk/Return Performance of Diversified Firms. *Management Science*, 31 [7]: 785-799.
- Capon, N., Hulbert, J.M., Farley, J.U., & Martin, L.E. 1988. Corporate Diversity and Economic Performance: The Impact of Market Specialization. *Strategic Management Journal*, 9: 61-74.
- Carter, J.R. 1977. In Search of Synergy: A Structure-Performance Test. *The Review of Economics and Statistics*, 59: 279-289.
- Caves, R.E. 1981. Diversification and Seller Concentration: Evidence From Changes 1963-72. *The Review of Economics and Statistics*, 63: 289-293.
- Christensen, H.K., & Montgomery, C.A. 1981. Corporate economic performance: Diversification strategy versus market share. *Strategic Management Journal*, 2: 327-343.
- Dubofsky, P., & Varadarajan, P. 1987. Diversification and Measures of Performance: Additional Empirical Evidence. *Academy of Management Journal*, 30 [3]: 597-608.

- Galbraith, C., Samuleson, B., Stiles, C., & Merrill, G. 1986. Diversification, industry research and development, and market performance. *Academy of Management Proceedings*, 17-20.
- Gort, M. 1962. *Diversification and integration in American industry*. Princeton: Princeton University Press.
- Grant, R.M., Jammine, A.P., & Thomas, H. 1988. Diversity, Diversification, and Profitability among the British Manufacturing Companies, 1972-84. *Academy of Management Journal*, 31: 771-801.
- Jacquemin, A.P., & Berry, C.H. 1979. Entropy measure of diversification and corporate growth. *Journal of Industrial Economics*, 27: 359-369.
- Michel A., & Shaked, I. 1984. Does Business Diversification Affect Performance?. *Financial Management*, 18-25.
- Miller, R.A. 1969. Market Structure and Industrial Performance: Relation of Profit Rates to Concentration, Advertising Intensity, and Diversity. *Journal of Industrial Economics*, 17: 104-118.
- Miller, R.A. 1973. Concentration and marginal concentration, advertising and diversity: Three issues in structure-performance tests. *Industrial Organization Review*, 1: 15-24.
- Montgomery, C. A. 1979. *Diversification, Market Structure and Firm Performance: An Extension of Rumelt's Model*. Unpublished doctoral dissertation, Purdue University.
- Montgomery, C.A. 1982. The measurement of firm diversification: Some new empirical evidence. *Academy of Management Journal*, 25: 299-307.
- Montgomery, C.A. 1985. Product-Market Diversification and Market Power. *Academy of Management Journal*, 28: 789-798.
- Montgomery, C.A., & Singh, H. 1984. Diversification Strategy and Systematic Risk. *Strategic Management Journal*, 5: 181-191.
- Nathanson, D.A., & Cassano, J.S. 1982. Organization, diversity and performance. *The Wharton Magazine*, 6: 19-26.
- Palepu, K. 1985. Diversification Strategy, Profit Performance and the Entropy Measure. *Strategic Management Journal*, 6: 239-255.
- Penrose, E.T. 1959. *The Theory of The Growth Of The Firm*. New York: John Wiley and Sons.
- Pitts, R.A., & Hopkins, H.D. 1982 Firm diversity: conceptualization and measurement. *Academy of Management Review*, 7: 620-629.

- Prahalad, C.K., & Bettis, R.A. 1986. The Dominant Logic: a New Linkage Between Diversity and Performance. *Strategic Management Journal*, 7: 485-501.
- Ramanujam, V., & Varadarajan, P. 1989. Research on Corporate Diversification: A Synthesis. *Strategic Management Journal*, 10: 523-551.
- Ravenscraft, D.J. 1980. Price-Raising and Cost-Reducing Effects in Profit-Concentration Studies: A Monte Carlo Simulation Analysis. Unpublished doctoral dissertation, Northwestern University.
- Ravenscraft, D.J. 1982. Structure-Profit Relationship at the Line of Business and Industry Level. Working Paper No.47, Federal Trade Commission.
- Rhoades, S. A. 1973. The Effect of Diversification on Industry Profit Performance in 241 Manufacturing Industries: 1963. *The Review of Economics and Statistics*, 55: 146-155.
- Rhoades, S. A. 1974. A Further Evaluation of the Effect of Diversification in Industry Profit Performance. *The Review of Economics and Statistics*, 56: 557-559.
- Rumelt, R.P. 1974. Strategy, structure, and economic performance. Boston: Harvard Business School, Division of Research.
- Rumelt, R.P. 1982. Diversification Strategy and Profitability. *Strategic Management Journal*, 3: 359-369.
- Scherer, F.M. 1970. Industrial market structure and economic performance. Chicago: Rand McNally & Co.
- Shepherd, W.G. 1970. Market power and economic welfare. New York: Random House.
- Shepherd, W.G. 1972. The elements of Market Structure. *The Review of Economics and Statistics*, 54: 25-37.
- Varadarajan, P. 1982. Product diversity and firm performance: An empirical investigation. *Journal of Marketing*, 50 [3]: 43-57.
- Varadarajan, P., & Ramanujam, V. 1987. Diversification and Performance: A Reexamination using a new two-dimensional conceptualization of diversity in firms. *Academy of Management Journal*, 30 [2]: 380-393.
- Wernerfelt, B., & Montgomery, C.A. 1986. What is an Attractive Industry? *Management Science*, 32 [10]: 1223-1230.
- Wrigley, L. 1970. Divisional autonomy and diversification. Unpublished doctoral dissertation, Harvard Business School.

TABLE 1**Descriptive Statistics For the Primary Business Segment Measure**

| | <u>Primary Group Size</u> | | |
|--------------------------------|---------------------------|-------------|-------------|
| | <u>1985</u> | <u>1989</u> | <u>1993</u> |
| TOTAL SAMPLE MEAN | 0.528 | 0.479 | 0.478 |
| STD. DEVIATION | 0.208 | 0.229 | 0.291 |
| TYPE 1 GROUP ^a MEAN | 0.588 | 0.583 | 0.644 |
| STD. DEVIATION | 0.220 | 0.191 | 0.173 |
| TYPE 2 GROUP ^b MEAN | 0.408 | 0.270 | 0.146 |
| STD. DEVIATION | 0.109 | 0.137 | 0.169 |

^aType 1 Group - Firms that have not changed their primary business segment over time

^bType 2 Group - Firms that have changed their primary business segment over time

TABLE 2**Paired Comparisons of Sample Means of the Primary Business Segment Measure**

| <u>All 30 Firms Combined</u> | | | | |
|------------------------------|--------------------|-------------------|----------------|---------------------|
| <u>Time-Period</u> | <u>Group Means</u> | <u>Difference</u> | <u>t-Value</u> | <u>Significance</u> |
| 1985-1989 | 0.5280-0.4791 | -0.0489 | -1.87 | 0.072 ⁺ |
| 1989-1993 | 0.4791-0.4785 | -0.0006 | -0.02 | 0.985 |
| 1985-1993 | 0.5280-0.4785 | -0.0495 | -1.16 | 0.255 |
| <u>Type 1 Firms</u> | | | | |
| <u>Time-Period</u> | <u>Group Means</u> | <u>Difference</u> | <u>t-Value</u> | <u>Significance</u> |
| 1985-1989 | 0.5880-0.5836 | -0.0045 | -0.18 | 0.859 |
| 1989-1993 | 0.5836-0.6445 | 0.0610 | 1.92 | 0.070 ⁺ |
| 1985-1993 | 0.5880-0.6445 | 0.0565 | 1.44 | 0.167 |
| <u>Type 2 Firms</u> | | | | |
| <u>Time-Period</u> | <u>Group Means</u> | <u>Difference</u> | <u>t-Value</u> | <u>Significance</u> |
| 1985-1989 | 0.4080-0.2702 | -0.1378 | -2.64 | 0.027 [*] |
| 1989-1993 | 0.2702-0.1464 | -0.1238 | -2.02 | 0.075 ⁺ |
| 1985-1993 | 0.4080-0.1464 | -0.2616 | -4.35 | 0.002 ^{**} |

+ p < .10

* p < .05

** p < .01

TABLE 3**Descriptive Statistics For Jacquemin-Berry Entropy Measure of Diversification**

| | <u>Related Diversification</u> | | | <u>Unrelated Diversification</u> | | | <u>Total Diversification</u> | | |
|-------------------|--------------------------------|-------------|-------------|----------------------------------|-------------|-------------|------------------------------|-------------|-------------|
| | <u>1985</u> | <u>1989</u> | <u>1993</u> | <u>1985</u> | <u>1989</u> | <u>1993</u> | <u>1985</u> | <u>1989</u> | <u>1993</u> |
| TOTAL SAMPLE MEAN | 0.283 | 0.259 | 0.243 | 0.783 | 0.792 | 0.651 | 1.065 | 1.051 | 0.893 |
| STD. DEVIATION | 0.274 | 0.269 | 0.330 | 0.441 | 0.425 | 0.389 | 0.522 | 0.514 | 0.468 |
| TYPE 1 GROUP MEAN | 0.234 | 0.241 | 0.178 | 0.664 | 0.661 | 0.569 | 0.897 | 0.902 | 0.747 |
| STD. DEVIATION | 0.266 | 0.254 | 0.230 | 0.454 | 0.434 | 0.385 | 0.529 | 0.488 | 0.421 |
| TYPE 2 GROUP MEAN | 0.381 | 0.294 | 0.372 | 1.020 | 1.056 | 0.814 | 1.401 | 1.349 | 1.186 |
| STD. DEVIATION | 0.265 | 0.294 | 0.441 | 0.296 | 0.248 | 0.418 | 0.298 | 0.427 | 0.418 |

TABLE 4**Paired Comparisons of Sample Means of the Jacquemin-Berry Entropy Measure of Diversification**

All 30 Firms Combined

| <u>Variables</u> | <u>Group Means</u> | <u>Difference</u> | <u>t-value</u> | <u>Significance</u> |
|----------------------------------|--------------------|-------------------|----------------|---------------------|
| <u>Related Diversification</u> | | | | |
| 1985-1989 | 0.2825-0.2587 | -0.0238 | 0.81 | 0.426 |
| 1989-1993 | 0.2587-0.2426 | -0.0161 | 0.38 | 0.704 |
| 1985-1993 | 0.2825-0.2426 | -0.0399 | 0.87 | 0.390 |
| <u>Unrelated Diversification</u> | | | | |
| 1985-1989 | 0.7829-0.7922 | 0.0094 | -0.24 | 0.812 |
| 1989-1993 | 0.7922-0.6508 | -0.1415 | 2.66 | 0.013** |
| 1985-1993 | 0.7829-0.6508 | -0.1321 | 2.06 | 0.049* |
| <u>Total Diversification</u> | | | | |
| 1985-1989 | 1.0654-1.0510 | -0.0144 | 0.42 | 0.680 |
| 1989-1993 | 1.0510-0.8934 | -0.1576 | 3.22 | 0.003** |
| 1985-1993 | 1.0654-0.8934 | -0.1720 | 2.97 | 0.006** |

TABLE 4 (contd.)

Type 1 Firms

| <u>Variables</u> | <u>Group Means</u> | <u>Difference</u> | <u>t-value</u> | <u>Significance</u> |
|----------------------------------|--------------------|-------------------|----------------|---------------------|
| <u>Related Diversification</u> | | | | |
| 1985-1989 | 0.2336-0.2411 | 0.0076 | 0.29 | 0.777 |
| 1989-1993 | 0.2411-0.1781 | -0.0630 | -1.95 | 0.066 ⁺ |
| 1985-1993 | 0.2336-0.1781 | -0.0554 | -1.74 | 0.099 ⁺ |
| <u>Unrelated Diversification</u> | | | | |
| 1985-1989 | 0.6640-0.6607 | -0.0033 | -0.09 | 0.929 |
| 1989-1993 | 0.6607-0.5692 | -0.0915 | -2.56 | 0.019 [*] |
| 1985-1993 | 0.6640-0.5692 | -0.0948 | -1.77 | 0.092 ⁺ |
| <u>Total Diversification</u> | | | | |
| 1985-1989 | 0.8975-0.9017 | 0.0042 | 0.11 | 0.916 |
| 1989-1993 | 0.9017-0.7474 | -0.1543 | -2.81 | 0.011 ^{**} |
| 1985-1993 | 0.8975-0.7474 | -0.1502 | -2.08 | 0.051 [*] |

TABLE 4 (contd.)

Type 2 Firms

| <u>Variables</u> | <u>Group Means</u> | <u>Difference</u> | <u>t-value</u> | <u>Significance</u> |
|----------------------------------|--------------------|-------------------|----------------|---------------------|
| <u>Related Diversification</u> | | | | |
| 1985-1989 | 0.3805-0.2940 | -0.0865 | -1.25 | 0.244 |
| 1989-1993 | 0.2940-0.3717 | 0.0777 | 0.74 | 0.480 |
| 1985-1993 | 0.3805-0.3717 | -0.0088 | -0.07 | 0.946 |
| <u>Unrelated Diversification</u> | | | | |
| 1985-1989 | 1.0205-1.0555 | 0.0350 | 0.37 | 0.718 |
| 1989-1993 | 1.0555-0.8141 | -0.2414 | -1.70 | 0.124 |
| 1985-1993 | 1.0205-0.8141 | -0.2064 | -1.26 | 0.239 |
| <u>Total Diversification</u> | | | | |
| 1985-1989 | 1.4011-1.3495 | -0.0516 | -0.73 | 0.482 |
| 1985-1993 | 1.3495-1.1856 | -0.1639 | -1.61 | 0.142 |
| 1985-1993 | 1.4011-1.1856 | -0.2155 | -2.16 | 0.059 ⁺ |

+ p < .10

* p < .05

** p < .01

TABLE 5

Comparisons of Group Means of the Diversification Measures Between Type 1 and Type 2 Firms

| <u>Variables</u> | <u>Group Means</u> | <u>t-value</u> | <u>Significance</u> |
|--|--------------------|----------------|---------------------|
| <u>Size of Primary Business Segment</u> | | | |
| Type 1- Type 2 (1985) | 0.5880-0.4080 | 2.89 | 0.007** |
| Type 1- Type 2 (1989) | 0.5836-0.2702 | 4.94 | 0.000** |
| Type 1- Type 2 (1993) | 0.6445-0.1464 | 7.22 | 0.000** |
| <u>Entropy Measure - Related Diversification</u> | | | |
| Type 1- Type 2 (1985) | 0.2336-0.3805 | -1.37 | 0.188 |
| Type 1- Type 2 (1989) | 0.2411-0.2940 | -0.46 | 0.649 |
| Type 1- Type 2 (1999) | 0.1781-0.3717 | -1.24 | 0.240 |
| <u>Entropy Measure - Unrelated Diversification</u> | | | |
| Type 1- Type 2 (1985) | 0.6640-1.0205 | -2.48 | 0.020* |
| Type 1- Type 2 (1989) | 0.6607-1.0555 | -3.05 | 0.005** |
| Type 1- Type 2 (1993) | 0.5692-0.8141 | -1.70 | 0.103 ⁺ |
| <u>Entropy Measure - Total Diversification</u> | | | |
| Type 1- Type 2 (1985) | 0.8975-1.4011 | -3.21 | 0.003** |
| Type 1- Type 2 (1989) | 0.9017-1.3495 | -2.47 | 0.022* |
| Type 1- Type 2 (1993) | 0.7474-1.1856 | -2.59 | 0.019* |

+ p < .10

* p < .05

** p < .01

TABLE 6**Comparisons of Group Means on Performance Measures Between Type 1 and Type 2 Firms Over Time (1985-1993)**

| <u>Variables</u> | <u>Group Means</u> | <u>F-Statistic</u> | <u>Significance</u> |
|----------------------|--------------------|--------------------|---------------------|
| <u>ROA</u> | | | |
| Type 1-Type 2 (1985) | 8.2400-5.9800 | 1.33 | .204 |
| Type 1-Type 2 (1989) | 6.5575-4.8960 | 0.95 | .355 |
| Type 1-Type 2 (1993) | 5.1755-3.2160 | 0.93 | .364 |
| <u>ROE</u> | | | |
| Type 1-Type 2 (1985) | 16.0320-11.9280 | 1.62 | .129 |
| Type 1-Type 2 (1989) | 12.2755-8.2450 | 1.21 | .245 |
| Type 1-Type 2 (1993) | 10.6060-4.0790 | 1.36 | .197 |
| <u>ROI</u> | | | |
| Type 1-Type 2 (1985) | 12.0545-9.3820 | 1.13 | .273 |
| Type 1-Type 2 (1989) | 9.6065-7.3330 | 0.87 | .397 |
| Type 1-Type 2 (1993) | 9.4700-4.9980 | 1.62 | .122 |
| <u>ROS</u> | | | |
| Type 1-Type 2 (1985) | 6.1495-5.1650 | 0.68 | .508 |
| Type 1-Type 2 (1989) | 4.9325-3.9270 | 0.66 | .518 |
| Type 1-Type 2 (1993) | 4.2275-2.3300 | 0.86 | .402 |

Figure 1

Comparison of the Primary Business Segment and the Jacquemin-Berry Entropy Measures of Diversification (1985-1993 time period only)

| Sample | Primary Business Segment | Entropy Measure of Diversification | | | Consistency ^a |
|--------------|--------------------------|------------------------------------|-------------|------------------|--------------------------|
| | | Related | Unrelated | Total | |
| All 30 firms | Decreased | (Decreased) | (Decreased) | Decreased | - |
| Type 1 firms | Increased | (Decreased) | (Decreased) | Decreased | + |
| Type 2 firms | Decreased | (Decreased) | (Decreased) | Decreased | - |

^aA positive sign indicates consistency between the two measures, and a negative sign otherwise. In other words, if decreases in the primary business segment measure are accompanied by increases in the total diversification scores of the entropy measure, then the two measures are consistent and hence a plus sign.