ISSN 1748-7595 (Online)

Kent Business School

*Working Paper Series*

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***Working Paper No.125***
*May 2006*

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**SUMMARY**

While both internationalization and product diversification are associated with firm growth, the choice between these two growth strategies has remained obscured. In this paper we argue that the development of specific capabilities leads to dominancy of one growth strategy over the other. Resources that are scarce, specific and indivisible create capabilities that lead to learning, scale and scope economies when either strategy takes dominancy. Hence, we expect firms to choose either internationalization or product diversification as their dominant growth path rather than pursuing both strategies. Moreover, such choice is expected to lead to superior performance. Analysis of the extent and process of internationalization and product diversification of leading food & beverage MNEs in the period 1996-2000 mostly supports these expectations.



Key words: Internationalization, Product diversification, Resource based view, firm growth.


**Short Running Title**: Internationalization, product diversification and capabilities

## INTRODUCTION

As noted nearly fifty years ago by Ansoff (1957), firms may grow by enlarging their market share in an existing market, by adding new markets to their market portfolio, by offering new products to their existing markets or by penetrating new markets with new products. Ansoff proposes four strategic growth options but it is not clear which path of growth will become dominant and for what reasons. Yet, it is quite unlikely that a firm would sustain growth over time solely by increasing the market share of its existing products (Chandler, 1990), thus we would expect sustainable growth to be associated with entering into new markets, expanding into new product areas or with combining both strategies (Davies, et al., 2001; Grant et al., 1988). In this study we examine firms' strategic choice between alternative growth paths by focusing on a special case of Ansoff's (1957) growth matrix: internationalization into new countries and diversification into new product areas.

While Ansoff's growth matrix is included in almost every Strategic Management course text book, it seems that both academics and practitioners still lack insight regarding the strategic choice of a growth strategy over time. More specifically, it is not clear whether it is more advantageous to focus on a dominant path of growth or to spread risk by engaging simultaneously in different strategic growth paths.

One of the explanations to the lack of clear answers regarding these questions is that the study of product diversification and internationalization patterns was split into different scholarly streams. Strategic Management literature was mainly interested in the phenomenon of product diversification (e.g. Amit & Livnat, 1988; Bettis & Hall, 1982; Chanon, 1973; Rumelt, 1974, 1982; Simmonds, 1990; Varadarajan & Ramanujam, 1987; Wrigley, 1970). International Business literature,

on the other hand, was mainly concerned with the internationalization process (e.g. Aharoni, 1966; Cavusgil, 1984; Czinkota, 1982; Johanson & Vahlne 1977, 1990; Reid, 1981; Welch & Luostarinen, 1988). By and large (with a few notable exceptions) research on internationalization was not concerned with product diversification moves, while research on product diversification did not address concurrent patterns of internationalization.

The current study fills this gap by offering an integrative perspective on product diversification and internationalization moves firms take[1]. We assert that the development of specific capabilities leads to firm specific learning, scale and scope economies that result in the choice of either product diversification or internationalization as a dominant path of growth.

The paper is organized as follows. First we present a literature review on product diversification, internationalization and their interaction in the context of the current study. Next, we introduce a conceptual framework that creates a linkage between firm's capabilities and their internationalization and product diversification patterns. The hypotheses derived from our conceptual framework are then tested by analyzing the extent and process of internationalization and product diversification of leading food & beverage multinational enterprises (MNEs) in the period 1996-2000. We follow by presenting our results and finally, we conclude by outlining the theoretical and practical insights derived from this study.

## LITERATURE REVIEW

While it seems natural to relate to internationalization and product diversification as two complementary growth phenomena, most of business research

[1] Many of the ideas presented in this paper are based on Hashai & Meshulach, 2004.

literature (with the exception of several studies) is mainly focused on either of the two.

*Studies on product diversification*

Early studies on product diversification include Wrigley (1970), Channon (1973) and Rumelt (1974) among others. The most influential publication on product diversification is probably by Rumelt (1974) who presented a typology of diversification strategies, which included *'single product'* firms, *'dominant product'* firms, *'related products'* firms, and *'unrelated products'* firms. Rumelt showed that firms became increasingly more diversified over time; typically a 'single product' firm became a 'dominant product' firm, which later developed into a 'related products' firm and finally (in some of the cases) into an 'unrelated diversifier' (Helfat & Raubitschek, 2000; Robins & Wiersema, 1995; Whittington et al., 1999).

A central question raised by this strand of the literature was whether a relationship existed between diversification patterns and performance. Rumelt (1982) showed that more-related diversifiers performed better than less-related and unrelated diversifiers, mainly because of the potential for synergy formation between businesses. This view was supported by a number of additional studies (e.g. Amit and Livnat, 1988; Delios & Beamish, 1999; Geringer et al., 1989, 2000; Grant et al., 1988; Hitt et al., 1994, 1997; Nachum, 2004; Palich et al., 2000a; Simmonds, 1990; Tallman & Li, 1996; Varadarajan & Ramanujam, 1987), essentially implying a curvilinear relationship (an inverted U-shape) between the degree of product diversification and a firm's performance (Grant et al., 1988). On the other hand, Montgomery (1985) concluded that the degree of product diversification does *not* explain differences in firms' profitability and other scholars identified difficulties in realizing synergy in practice since administrative "costs" involved in related diversification offset the

economic benefits of this strategy (Hitt et al., 1994; Ilinitch & Zeithaml, 1995). Hence, empirical results on performance and levels of diversification have been quite inconclusive (Hoskisson & Hitt, 1990).

*Studies on internationalization*

Studies on the internationalization process of firms have long occupied the domain of International Business (e.g. Aharoni, 1966; Johanson & Wiedersheim-Paul, 1975; Johanson & Vahlne 1977, 1990; Welch & Luostarinen, 1988). These studies view internationalization as an ongoing evolutionary process. Often referred to as the Uppsala model, it is argued that firms start to internationalize by arm's length transactions in 'psychically' close markets. Firms are expected to increase foreign market commitment and knowledge over time, which will subsequently lead to further commitments in more and more foreign markets. This view is supported by scholars such as Reid (1981), Czinkota (1982) and Cavusgil (1984), who claim that managers, who have little or no experience in international markets, will initially expand their businesses into psychically close markets. Once successful, firms will pursue active expansion into more challenging and unknown markets and become increasingly committed to international growth. This view which emphasizes the role of prior experience in shaping internationalization patterns has also received more recent confirmations (Chang & Rosenzweig, 2002; Shaver et al., 1997; Song, 2002).

Three conflicting models were offered regarding the linkage between internationalization and performance; one claimed a linear relationship between internationalization and performance (e.g. Delios & Beamish, 1999; Grant, 1987; Grant et al., 1988); the second proposed a U-shape relationship between internationalization and performance (Lu & Beamish, 2001; Qian, 1997; Ruigrok &

Wagner, 2003) implying that initially internationalization decreases performance due to lack of foreign market experience but that performance is enhanced over time; the third, posed an inverted U-shape linkage between internationalization and performance (Geringer et al., 1989; Geringer et al. 2000; Grant et al., 1988; Hitt et al., 1997; Tallman & Li, 1996), implying that initially internationalization increases performance since it enables accelerated growth but that administrative costs of control reduce performance when a firm becomes too internationalized. These three approaches have been recently reconciled by the S-shape hypothesis (Contractor et al., 2003; Lu & Beamish, 2004) combining all three approaches and proposing that the U shape curve is followed by a linear curve which is followed by an inverted U curve shape over time.

*The linkage between product diversification and internationalization*

While quite a few studies examine the interactive impact of product diversification and internationalization on firms' performance (e.g. Delios & Beamish, 1999; Geringer et al., 1989; Geringer et al. 2000; Grant et al., 1988; Hitt et al., 1994, 1997; Palich et al., 2000a), only a few studies are concerned with the direct relationship between the two. As detailed below, the findings of these studies are mixed and somewhat contradictory.

Kim et al. (1993) essentially argue that increased internationalization reduces the risk and increases the returns of product-diversified firms, since additional opportunities are created for such firms. This implies that firms will aim to be both internationalized and product diversified. Davies et al. (2001) support this view, claiming that, in general, internationalization and business diversification are complementary strategies. A different view is presented by Tallman & Li (1996) who

argue that internationalization improves performance of low product diversified firms, by providing risk diversification and enhancing the ability to exploit economies of scope, implying that firms are expected to combine low levels of product diversification with internationalization. This view is supported by the findings of Pearce (1993) who found a significant negative relationship between product diversification and internationalisation as well as by Davies et al. (2001) who identify substitutability between the two strategies in homogenous-product industries (i.e. non-differentiated product industries).

Yet another view is presented by Nachum (2004) whose findings imply for an inverted "U shape" linkage between internationalization and product diversification levels of firms, implying that these strategies are initially complementary but then become substitutes. Dass (2000), on the other hand, reports a "U shape" linkage between internationalization and product diversification, indicating that non-internationalized firms as well as highly internationalized ones are expected to be the most product-diversified firms. A similar pattern is also predicted by Palich et al., (2000b) who claim that internationalization decreases the advantages of related product diversification due to international impediments to synergy formation in marketing, production, and technology.

Interestingly the rationales of product diversification and internationalization schools are quite similar. Both notions reflect gradual increased commitment to more risky operations, be it foreign markets or new product areas. Nevertheless, as noted from our literature review, this similarity has not led to a build up of a coherent picture regarding the relationship between internationalization and product diversification levels of firms. Moreover, the dynamic linkage between both concepts has remained virtually unexplored. In the next section we develop a conceptual

framework which presents how internal factors lead firms to choose either product diversification or internationalization as their growth paths by linking these decisions to the development of capabilities over time.

## CONCEPTUAL FRAMEWORK

The resource based view (RBV) of the firm views firms as sets of tangible, intangible and human resources that create capabilities. These capabilities are unique provided that a given firm's resources are durable and inimitable hence enabling firms to compete successfully against their rivals (Barney, 1991; Collis, 1991; Peteraf, 1993; Wernerfelt, 1984).

However, the same resource characteristics that enable firms to compete successfully in a given context make it hard to utilize these resources in different contexts. Resources are often specific to certain applications, therefore the ability to transfer resources to different applications is highly constrained (Montgomery & Wernerfelt, 1988, Silverman, 1999). Moreover, according to the RBV, resource scarcity makes it is less costly stretching existing capabilities than building new ones. A firm is constrained in the amount of expansion activities it can pursue in a given time period, due to limitations of physical and intangible assets such as management time (Penrose, 1959) and will therefore select the expansion route that matches its resources best (Montgomery & Wernerfelt, 1988). In addition to resource specificity and scarcity, resource indivisibility (Barney, 1991; Wernerfelt, 1984) is a third characteristic which complicates expansion in alternate directions. Resource indivisibility implies that slack resources (Cyert & March, 1963; Penrose, 1959; Teece, 1982) are likely to emerge and promote expansion into other related areas

(rather than to non-related ones) with zero or close to zero marginal cost (Penrose, 1959).

These three attributes of resources: specificity, scarcity and indivisibility lead us to assert that once a firm decides to either start internationalizing or diversifying its products, path dependency dynamics will lead this firm to continue along its chosen path of growth. A firm that initially chooses to internationalize is expected to specialize over time in duplicating and managing a specific product set in multiple countries, whereas a firm that initially chooses to diversify its products will specialize over time in managing multiple products in a few countries. Thus firms are expected to create either "internationalization-" or "product diversification-" capabilities. For instance, a firm may use an existing underutilized marketing and servicing infrastructure in a given country together with its previous familiarity with customers in this country to market and serve additional related products without increasing its fixed costs. Alternatively, a firm that gains experience in marketing its products in a given market may use this experience to continue expanding in neighboring markets with similar characteristics, in terms of psychic or cultural distance (Hofstede, 1980; Johanson & Vahlne, 1977). The point of view that firms are expected to stick to a dominant growth path of either internationalization or product diversification is portrayed in Chart 1.

***Insert chart 1 about here***

In fact, learning, scale and scope economies are expected to strengthen path dependency dynamics in an initially chosen growth direction. Learning economies as a result of learning in specific related areas (Autio et al., 2000; Diericks & Cool, 1989; Forsgren, 2002) are likely to increase the efficiency of firms in performing either internationalization or product diversification moves. Scale economies are

expected to enable better exploitation of existing resources as a result of decreasing fixed costs per unit. Scope economies will lead to specialization in either international or product diversification activities due to the synergies that may arise from expansion into countries or products related to existing capabilities (Teece, 1982).

Essentially we posit that firms are more likely to develop superior capabilities (Almor & Hashai, 2004) by sticking to a specific dominant growth path than by switching between alternative paths. These capabilities will, in turn, become part of the specific core competences firms develop over time (Prahalad & Hamel, 1990). The perceived risk of further foreign market commitment is expected to decrease over time for firms that initially chose to expand through internationalization; therefore further investments in foreign operations are expected. An initial choice of product diversification, on the other hand, is expected to result in experience and knowledge of managing multiple products. We expect firms to leverage this experience when adding additional products to their product portfolio. These arguments lead us to hypothesize that firms become either "internationalized" or "product diversified":

> *Hypothesis 1 - The percentage of firms that are either highly internationalized or highly product diversified is greater than the percentage of firms pursuing both strategies or neither.*

Following the argument that firms which focus on a dominant growth strategy are expected to benefit from learning, scale and scope cost economies as discussed above, we also expect these economies to lead to superior performance.

> *Hypothesis 2: The performance of firms that are either highly internationalized or highly product diversified is better than that of firms pursuing both strategies or neither.*

Adding a dynamic perspective to our analysis, we have noted that specificity, scarcity and indivisibility of resources encourage firms to stretch their existing capabilities, rather than creating new capabilities. Since changing a dominant growth path is most likely to result with the need to create new capabilities, we expect that firms will continue to internationalize or to diversify their products based on their previous choices of one of these growth paths (King & Tucci, 2002; Shaver et al., 1997).

*Hypothesis 3: The pace of internationalization (product diversification) of highly internationalized (product diversified) firms is greater than their pace of product diversification (internationalization).*

We further expect a positive relationship to exist between continuation along a dominant path and performance. Hence,

*Hypothesis 4: Highly internationalized (product diversified) firms that continue internationalizing (diversifying) outperform those diversifying (internationalizing).*

## DATA AND SAMPLE DESCRIPTION

This study is based on the AGRODATA data base (I.A.M.M., 1990; Padilla et al., 1983; Rastoin et al., 1998). The database contains information regarding the one hundred largest food & beverage MNEs in the world since the 1970s. The data base is produced by the Institut Mediterraneen de Montpellier (IAMM) and includes world renowned firms such as: ANHEUSER BUSCH, ARCHER DANIELS, COCA COLA COMPANY, DANONE, GENERAL MILLS, HEINZ, MARS, NESTLE, PEPSICO, PHILIP MORRIS, SARA LEE and UNILEVER.

The firms in our sample are active in a number of different food & beverage industries such as: meat processing, diary products, confectionary, spirits, and so forth. The main sources for compiling the AGRODATA database are Moody's Industrial Manual, the Fortune 500 directory, the "Dossier 5000" published by Le Nouvel Economist and the annual reports of the firms. Two time points were available for this study: the year 1996 and the year 2000. Firms that were included in the database during both time periods were selected for this study, thereby creating a sample of 81 firms in total, which had over 7000 subsidiaries worldwide (2000 data). Basic comparisons with the 19 firms excluded from the analysis did not show evidence of any response bias.

Descriptive statistics of our sample are presented in table 1.

***Insert table 1 about here***

Table 1 shows that the sample is dominated by large firms (mean sales are nearly 10 billion $US and average number of employees exceeds 40,000). The firms are only marginally profitable (5% on average) and mostly concentrate on food and beverage sales (on average over 86% of sales). Over 45% of these firms' subsidiaries are located in their home country. Nevertheless the firms in the sample operate on average in 22 countries and 11 sectors. The Correlations between the variables are presented in Appendix Table 1. Major correlations are observed between the firm size measures (sales and number of employees), between firm size and performance (larger firms are more profitable), between the number of countries where firms operate and their size and profitability as well as between the number of sectors in which firms operate and their size. There is also a positive correlation between the number of countries and the number of sectors in which firms operate. On the other

hand there is a negative correlation between the percentage of food affiliates and firm size and between the percentage of home subsidiaries and firm size and performance.

*Measures of internationalization and product diversification*

Various measures of firms' degree of internationalisation and product diversification have been proposed in the literature. Size and sales of foreign subsidiaries as well as sales generated by subsidiaries in different business sectors of the firm are very common (Grant, 1987; Geringer et al., 2000; Capar & Kotabe, 2003). In the absence of actual sales data the absolute number of countries and sectors where the firm has presence or the absolute number of subsidiaries active in foreign countries or non-core sectors are often used as popular proxies for internationalization and product diversification (Habib & Victor, 1991; Delios & Beamish, 1999; Lu & Beamish, 2004). Nevertheless since the current study aims to investigate the dispersion of activities over foreign markets and business sectors, after careful consideration we decided to use country and sector entropy measures as proxies of internationalization and product diversification respectively rather than absolute number measures. Entropy measures enable to capture both the depth and breadth of operations (Allen & Pantzalis, 1996) and hence give a better indication of the dispersion of firm activities over countries and sectors. The use of entropy measures is not new in the international business and strategic management literature. Previous studies (e.g. Kim et al., 1993; Hitt, et al., 1997; Qian, 1997; Raghunathan, 1995; Sambharya, 2000) have extensively used entropy measures to capture the degree of internationalisation, product diversification or their combined effect.

The general formula for the entropy measure is:

$Entropy_Measure = \sum_{i=1}^{n} [P_i * \log(1/P_i)]$ such that $P_i \neq 0$, where $P_i$ is the proportion of

operations within segment *i*. Segment *i* can represent countries thereby constructing a 'Country Entropy' measure (*ce*) or sectors thereby constructing a 'Sector Entropy' measure (*se*). 'Country Entropy' measures the dispersion of a network of subsidiaries with respect to the number of countries whereas 'Sector Entropy' does the same with respect to the number of sectors. Appendix Table 1 indicates that *ce* is positively correlated with performance and size while *se* is positively correlated with firms size only. *ce* and *se* correlate strongly to their correspondent absolute number proxies (*ncount* and *nsec*) and there is no significant correlation between the two measures. Overall, Appendix Table 1 does not indicate any significant suspicious for multicollinearity bias.

*Firm Classification*

In order to test our hypotheses we used both firm and group level analyses. For the group level analysis we divided the firms in our sample into three groups: (1) highly internationalized firms with low product diversification (group 2 – chart 1); (2) highly diversified firms with a low level of internationalization (group 3 – chart 1); and (3) firms that pursued both or neither of the first two strategies (groups 1 & 4 – chart 1). The classification criteria were according to median and mean of number and entropy measures, as specified below.

## RESULTS

Hypothesis 1 was first tested by comparing the distribution of firms according to the 'Country Entropy' and 'Sector Entropy' measures. These comparisons, presented in Table 2, confirm the expectation that more firms pursue either internationalization or product diversification as their dominant strategy rather than pursuing both

strategies or neither (50 compared to 31 where the split was according to median and 49 compared to 32 when the split was according to mean). The significance of this pattern is confirmed by using the z-stat test, which is an equality test of the sampling distribution of the difference between two proportions.

***Insert Table 2 about here***

We have also tested Hypothesis 1 by using the following system of simultaneous equations, taking into account the reciprocal causal relationship between internationalization (proxied by *ce*) and product diversification (proxied by *se*):

*ce= f (se, control variables)*

*se= f (ce, control variables)*

We used a Two-stage Least Squares (2SLS) regression analysis in order to avoid a possible bias as a result of correlation between the error term in one equation and the dependent variable in the other (Jaccard & Wan, 1996; Kmenta, 1986). The specification of our regression system was as follows:

$$ce = a_0 + ß_0 se + ß_1 Sal + ß_2 rrdt + ß_3 rmarkt + ß_4 rbasic + ß_5 radapt + ß_6 rtrans + ß_7 Europe + ß_8 Japan + ß_9 USA + ß_{10} hafa + e_0$$

$$se = a_1 + ?_1 ce + ?_1 Sal + ?_2 rrdt + ?_3 rmarkt + ?_4 rbasic + ?_5 radapt + ?_6 rtrans + ?_7 Europe + ?_8 Japan + ?_9 USA + ?_{10} div + e_1$$

Where $a_i$ are the coefficients of the constants, $ß_i$ and $?_i$ are the coefficients of the explanatory variables and $e_i$ are the error terms. Hypotheses 1 implies that a

negative correlation is expected between *ce* and *se*. This relationship is controlled by the following variables: *Sal* – a positive relationship is expected between a firm's sales and its level of *ce* and *se*; Variables measuring the impact of firm specific resources on *I* and *PD* (Delios & Beamish, 1999): *rrdt* – measures the share of R&D subsidiaries of a given firm. This variable controls for possible effect of firm specific knowledge resources. *rmarkkt* - measures the percentage of marketing subsidiaries that a given firm has. This variable controls for possible effect of firm specific marketing resources. Higher values of R&D and marketing subsidiaries are expected to be positively correlated with both *ce* and *se*. R&D subsidiaries were further classified into three types: *rbasic* – measures the share of subsidiaries engaged in basic research, *radapt* – measures the share of subsidiaries engaged in adaptation of products and *rtrans* – measures the share of subsidiaries engaged in technology transfer. The first type of R&D subsidiary is expected to be positively correlated with *se* whereas the two latter types are expected to be positively correlated with *ce*. The *Europe*, *Japan* and *USA* variables are dummy variables aimed to control for specific region of origin effects[2]. Institutional differences between different regions, such as in domestic market size, regulatory regime and economic conditions (Delios & Henisz, 2003; Guillen, 2001; Henisz, 2005; Khanna & Palepu, 2000) may affect firms' *ce* and *se* levels. The two final variables in each equation are different in order to ensure adequate identification of our equation system[3]. The first variable in *hafa* – which measures the share of subsidiaries located in each firm's home country. As implied from Appendix Table 1 this variable is expected to be negatively correlated with *ce*.

[2] Overall 93% of the firms in our sample originated from these three regions (30% from the US, 27% from Japan and 36% from the EU).

[3] A necessary (albeit not sufficient) condition for obtaining meaningful parameter estimates in a two equations system is that each equation includes at least one explanatory variable not included in the other (Kmenta, 1986).

The second variable is *div* which measures the ratio of food sales to total sales of each firm. We expect a negative correlation between this variable and *se* as indicated in Appendix Table 1.

The results of a 2SLS regression analysis of a pooled 1996 and 2000 sample are presented in Table 3.

***Insert table 3 about here***

Tables 3 shows support to a significant relationship between *ce* and *se*, when *se* is the dependent variable. This relationship is not significant when *ce* is the dependent variable. When *ce* is the dependent variable the relationship is with the correct sign, but not significant. The signs of all the control variables that came out significant are mostly according to our expectations. *sal*, *rrdt*, and *rmarkt* are positively correlated with both *ce* and *se*, whereas *hafa* and *div* are respectively negatively correlated with them. As expected *radapt* and *rtrans* are positively correlated with ce. However in contrast to our expectations, *radapt* is also positively correlated with se. Region effects were significant only in some equations where a European base is positively correlated with *ce* and a Japanese base is positively correlated with *se*, thus implying that there is a possible home region effect on *se* and *ce* levels. Overall, both group and firm level analyses indicate that Hypothesis 1 is mostly supported.

Hypothesis 2 was first tested at the group level. Table 4 presents performance, measured by the ratio of net income to total sales (*perf*) of MNEs pursuing different strategies.

***Insert table 4 about here***

The results presented in Table 4 only partially support the direction of our hypothesis where the ratio of net income to total sales is higher for groups 2 and 3

firms compared to firms in groups 1 & 4, however in both cases the wedge between the groups is not statistically significant.

Moving to a firm level analysis we used a quantile regression non parametric estimation to test the relationship between performance, internationalization and product diversification. The non parametric analysis was required since the ratio of net income to sales was not normally distributed. Quantile regression as developed by Koenker & Basset (1978) takes into consideration the skewness of the distribution and gives a more complete picture of the way performance is affected by the various independent variables. This technique was further developed by Koenker & Hallok (2001) and Koenker (2005). In our case we also accounted for heteroscedastic errors, applying a bootstrapping technique which enables to select the number of replications that obtains robust standard errors (Gould, 1992; Horowitz, 1998).

Quantile regression provides estimations of models for the conditional median function and the full range of other conditional quantile functions (Buchinsky, 1994; Dimelis & Louri, 2002; Koenker & Bassett, 1978). Departing from a standard linear model in the form: $y_i = x_i'b + e_i$ [4], the parameters of the above model are estimated in different quantiles and the quantile regression model takes the following form:

$y_i = x_i'b(q) + e_i = Q_q(y_i) + e_i$ where $0 < q < 1$, *ß(q)* is the vector of explanatory variables estimated in a given value for $q$ in (0,1) and $Q_q(y_i)$ represents the $qth$ quantile of the conditional distribution of $y_i$ given the vector of $x_i$. In simple words quantile regression is using the median or different quantiles of the distribution instead of the mean for estimation. This solves the problem of skewed distributions with respect to the dependent variable.

[4] Where $y_i$ is the dependent variable (in our case firm performance), $x_i$ is the vector of explanatory variables, ß is the vector of parameters to be estimated and $e_i$ is the vector of independently and identically distributed error terms with a symmetric distribution around zero.

The specification of our quantile regression was as follows:

$$Perf = a_2 + d_0 lnemp + d_1 ce + d_2 se + d_3 rrdt + d_4 rmarkt + d_5 ge + d_6 Europe + d_7 Japan + d_8 US + e2$$

Where $a_2$ is the constant coefficient, $d_i$ are the coefficients of the explanatory variables and $e_2$ is the error term. The explanatory variables are:

*ce* Country Entropy

*se* Sector Entropy

*ge* Global Entropy measure controlling for combined country and product diversification (Kim, 1989). This variable is computed as follows: $ge = \sum_{a=1}^{A} \sum_{i \in a} P_{ia} \log(1/P_{ia})$, where $a$ is the number of countries in which a firm operates and $P_{ia}$ is the proportion of the size of the $i$*th* product sector in the a*th* country to a firm's total size of operations in terms of number of subsidiaries.

Confirmation of Hypothesis 2 should result with a positive correlation of either internationalization or product diversification with performance, but a negative correlation of their combination with performance. We also used the following control variables:

*lnemp* Logarithm of number of employees, controlling for possible size effects on performance.

*rrdt* Percentage of R&D subsidiaries. Firm-specific knowledge resources effects are expected to be positively related with performance

*markt* Percentage of marketing subsidiaries. Firm-specific marketing resources

effects are expected to be positively related with performance

*Europe* Dummy taking the value 1 if the home country is European

*Japan* Dummy taking the value 1 if the home country is Japan

*USA* Dummy taking the value 1 if the home country is USA

The latter three variables control for possible regional effects on performance.

The results of the median quantile regression of a pooled 1996 and 2000 sample are presented in Table 5.

***Insert table 5 about here***

Table 5 implies that Hypothesis 2 is mostly supported since when all three entropy measures are analyzed simultaneously (model 6), there is a positive correlation between internationalization (*ce*) and performance, a positive correlation between product diversification (*se*) and performance (albeit not statistically significant) and a negative correlation between their combination (*ge*) and performance indicating that firms that are both internationalized and diversified perform worse than others (albeit significant only at the 10% level). If we remove *se* (model 7) we get slightly better regression results in terms of the coefficients significance. In some of the models *lnemp* and *rmarkt* also come out significant thus confirming our expectations. Overall Table 5 implies that internationalization is a better explanatory variable for performance than product diversification and that those firms pursuing both internationalization and product diversification perform worse than other firms. In order to choose between the non-nested models we used the Cox-Pesaran test for quantile regression (Cox, 1962; Pesaran, 1974). The test has identified model 4 as better than model 1 and models 6 and 7 as better than model 4 ($p<.000$)[5].

Since the significance of ge is only at the 10% level we also estimated the

[5] However there is no significance preference of model 6 over model 7 or vice versa.

inter-percentile differences between the high performers (firms in the 9th percentile), the median performers (firms in the 5th percentile) and the low performers (1st percentile), based on the regression specified in Table 5. The results, presented in Table 6, represent the differences in coefficients between regressions of the different percentiles.

***Insert table 6 about here***

Table 6 provides further support to Hypothesis 2 as indicated by the statistically significant sign of *ge* in the model 0.9-0.1 and 0.9-0.5 models, implying that firms in the 0.9 percentile of the performance distribution have statistically significant lower ge values than those in the 1st and 5th percentile, respectively. (firms that have very low or even negative performance). This result further supports our argument that higher levels of simultaneous internationalization negatively affect performance. Table 6 further indicates that *ce* is positive in these models (albeit at the 10% significant level) thus further support our earlier finding that higher levels of internationalization positively affect performance. This result repeats itself fro se but is not significant. Overall, our group and firm level analyses indicate that Hypothesis 2 is supported.

In order to test Hypothesis 3 we first examined firms that were either highly internationalized or highly diversified (but not both) in 1996 and 2000, thus representing a specific stable growth path over time[6]. These firms were referred to as "Group A". Firms that were both highly internationalized and highly diversified in either period or firms that changed strategies between 1996 and 2000 formed the comparison group (labeled as Group B). Table 7 clearly indicates that the number of

[6] Following Caves & Mehra (1986) and Chaterjee & Wernerfelt (1991) we assume that a 4 year period is a suitable time frame to test changes in internationalization and product diversification.

firms belonging to Group A is significantly higher than the number of firms belonging to Group B, thus supporting the hypothesis that firms are expected stick to a specific growth path. This is statistically confirmed by the z-stat equality test.

***Insert table 7 about here***

A further test of Hypothesis 3 employed an OLS regression estimation in which the dependent variables were *?ce/ce* and *?se/se* for the period 1996 and 2000 and the explanatory variables are those indicated in Table 5. An additional explanatory variable was LAN of sales (*lnsal*) which aimed to control for positive size effects on the pace of either *ce* or *se*. The regression contained only observations referring to 1996. Our expectation was to find a significant positive relationship between the pace of *ce* and *se* and their 1996 levels as well as a negative relationship between these variables and the alternate path of growth. The results of the OLS regression are presented in Table 8.

***Insert table 8 about here***

Table 8 only partially supports Hypothesis 3, as the only significant relationship we get is between *?ce* and *se*. There is also a negative relationship between *?se/se* and *ce* (albeit not significant) and the relationships between *?ce/ce* and *?se/se* and *ce* and *se*, respectively, are opposite to our expectation (but yet again not in the required level of significance). Overall, our group level analysis supports hypothesis 3 strongly and the firm level analysis only partially.

Hypothesis 4 was first tested at the group level. We compared the net income to sales ratios of Group A and Group B mentioned above. Table  shows that as expected Group A firms had on average better performance than Group B firms. While the difference in performance was not significant, it is noteworthy that in 1996

the net income to sales ratio of Group B exceeded that of Group A. Thus, firms that continued to diversify along their original route outperformed other firms.

***Insert table about here***

We have further analyzed the differences in performance of firms pursuing different growth paths by referring to firms belonging to Group A (either highly internationalized or highly diversifying firms) in comparison to three classes of firms belonging to Group B: firms pursing "concentrated" strategy (i.e. low levels of both internationalization and diversification), firms pursing "diversified" strategies (i.e. simultaneous internationalization and diversification) and firms pursuing "inconsistent" strategies (i.e. changing the dominant growth path between 1996 and 2000).

We have then regressed the performance in 2000 with the variables detailed in Table 8 and added three dummy variables indicating that a firm belongs either to the concentrated, diversified or inconsistent group. In addition we also added the changes in LAN of employees and sales between 1996 and 2000 (*?lnem*p and *?lnsal*) as controls of changes in performance due to scale changes. Results presented in Table 10 show that "concentrated" and "inconsistent" strategies are negatively correlated to the change in performance. We did not get a statistically significant between "diversified" strategy and performance though. Change is sales is shown to be negatively correlated with change in performance, however change in number of employees has the opposite effect. In addition USA based MNEs outperformed MNEs from other origins.

***Insert table 10 about here***

We have further regressed the change in performance between 1996 and 2000 with the variables detailed in Table 11. Results presented in Table 12 show that all

three dummy variables are negatively correlated to the change in performance (albeit not statistically significant). Change is sales is shown to be negatively correlated with change in performance. Overall, we conclude that the group and firm level analyses mostly support Hypothesis 4.

***Insert table 11 about here***

## CONCLUSION

The main argument of this study is that since resources are scarce, specific and indivisible, firms would prefer to stick to a dominant growth path which would enable them to exploit leaning, scale and scope economies and hence outperform firms that either do not diversify at all or diversify in multiple paths. Since most resources are context and task specific, it is easier and more efficient to stretch existing capabilities than develop new ones. Our basic premise is that unique path dependent valuable and rare strategic resources (Chi, 1994) will be created as long as firms progress along a specific path of growth.

This line of reasoning was tested by examining the internationalization and product diversification strategies of a sample of the largest MNEs in the food and beverage industry world wide. We were mostly able to confirm our hypotheses on a sample of MNEs which represents a significant portion of the food & beverage MNEs population as the eighty one MNEs in our study are leaders in the food & beverage industry and have over 7000 subsidiaries world wide. We found that a dominant path of growth is preferred to a mix of growth strategies or to pursuing no growth strategy and that highly internationalized firms outperform other firms. Firms that chose to diversify their product did not outperform others whereas the performance of firms choosing to combine both growth paths was significantly reduced. This result was strongly supported at the group level but only partially at the firm level. Results

further showed that firms tend to stick to their original growth path and that firms which continued diversifying along a single dominant path outperformed firms that either not diversified at all or changed their path of growth over time.

Overall, our findings support the notion of choosing a dominant growth path and imply that internationalization is a better growth strategy than product diversification and that combining internationalization and product diversification or the switching between the two worsen the performance of firms. The major contribution of this study lies therefore in the identification of a dominant growth path (rather than multiple growth paths) as means for improving performance.

It should be noted that we base our analysis on large multinational firms (rather than domestic ones) from a single industry. In fact, one explanation for the superiority of internationalization over product diversification may be the fact that our sample includes MNEs which are mostly operating in a single industry and therefore this result should not be generalized, but rather serve to demonstrate the advantages of sticking to a dominant growth path whether it is internationalization or product diversification. Hence, further studies examining different industries as well as smaller firms are yet required in order to confirm the external validity of our results. Moreover, while our static and dynamic analyses are rooted in RBV logic, the data available to us did not enable us to test directly the impact of the nature of firm specific resources on the chosen growth path. Such a test requires a more micro level analysis that identifies "internationalization generating resources" as well as "product diversification generating resources" and see how accumulation of such resources affect firms' growth paths.

Finally, it is noteworthy that we tested our dynamic hypotheses on a relatively short time span. Over longer periods of time firms may also choose to expand their

business activities into alternate growth paths. This may happen when a firm's original growth path reaches a certain level of saturation when this firm becomes highly internationalized or highly diversified. Partial evidence to this is the negative (albeit no statistically significant) relationship that was identified between firms' level of internationalization or diversification and their continued expansion in the respective path. Therefore further empirical investigations of product diversification and internationalization patterns over longer periods of time are required in order to further establish the long term external validity of our results.

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Chart 1 –Internationalization and product diversification growth paths

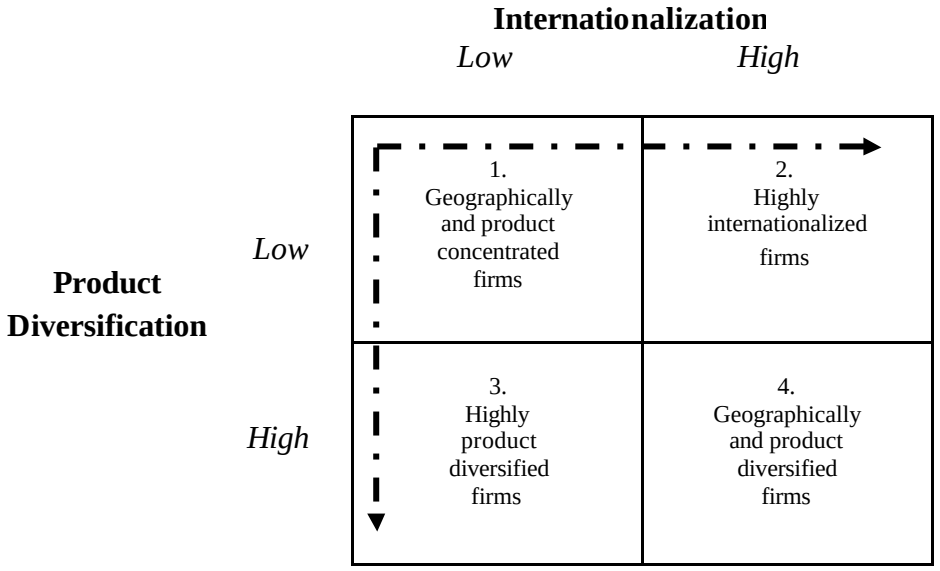


Table 1 – Basic descriptive statistics (2000 data, n=81)

| Variable | Variable abbreviation | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Sales (US$ Millions) | sal | 9,987 | 11,830 | 2,030 | 63,276 |
| Number of Employees | emp | 40,886 | 52,937 | 1,064 | 295,000 |
| Net income (US$ Millions) | ninc | 564 | 1,165 | -95 | 8,510 |
| Net Income over Total Sales | perf | 4.74% | 4.62% | -4.22% | 19.18% |
| Food Sales (US$ Millions) | fsales | 7,230 | 7,246 | 2,030 | 45,369 |
| Food sales over Total sales | div | 86.16% | 23.14% | 11.60% | 100.00% |
| Home affiliates over Total affiliates | hafa | 45.64% | 26.93% | 2.45% | 94.44% |
| Number of Countries with Presence | ncount | 22 | 21 | 2 | 93 |
| Number of Sectors With Presence | nsec | 11 | 6 | 2 | 32 |
| Country Entropy | ce | 0.876 | 0.451 | 0.106 | 1.728 |
| Sector Entropy | se | 0.756 | 0.252 | 0.078 | 1.406 |
| Global Entropy | ge | 0.736 | 0.231 | 0.000 | 1.243 |
| Percentage of R&D affiliates (over Total) | rrdt | 1.78% | 4.11% | 0.00% | 29.17% |
| Percentage of R&D affiliates in Basic Research (over Total) | rbasic | 1.24% | 3.44% | 0.00% | 25.00% |
| Percentage of R&D affiliates in Adaptation (over Total) | radapt | 0.14% | 0.57% | 0.00% | 3.57% |
| Percentage of R&D affiliates in Technology Transfer (over Total) | rtrans | 0.41% | 1.65% | 0.00% | 10.39% |
| Percentage of Marketing affiliates (over Total) | rmarkt | 0.94% | 1.86% | 0.00% | 8.33% |

Table 2 –Different internationalization and product diversification strategies (2000 data)

| | **Comparison of median company, using the Country Entropy and the Sector Entropy measures (No. of firms)** |
|---|---|
| Highly Internationalized, Low Product Diversified (Quadrant 2, Chart 1) | 24 |
| Highly Product Diversified, Low Internationalized (Quadrant 3, Chart 1) | 24 |
| Firms pursuing both or neither of the strategies (Quadrants 1 & 4, Chart 1) | 33 (16,17) |
| **Z-stat of equality of proportions** | **3.392*** ** |
| | **Comparison with the mean company, using the Country Entropy and the Sector Entropy measures (No. of firms)** |
| Highly Internationalized, Low Product Diversified (Quadrant 2, Chart 1) | 21 |
| Highly Product Diversified, Low Internationalized (Quadrant 3, Chart 1) | 27 |
| Firms pursuing both or neither of the strategies (Quadrants 1 & 4, Chart 1) | 33(15,18) |
| **Z-stat of equality of proportions** | **3.392*** ** |

Table 3 - Internationalisation and Product Diversification
Results of 2 Stage Least Squares System of Equations

| Dependent variable | Explanatory Variables | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|---|
| Equation 1: Country Entropy | se | -0.143 | -0.142 | -0.096 | -0.026 |
| | | (-0.43) | (-0.45) | (-0.32) | (-0.09) |
| | Sal | 0.073** | 0.072** | 0.070*** | 0.073*** |
| | | (2.47) | (2.32) | (2.64) | (2.76) |
| | rrdt | -0.031 | | 0.564* | |
| | | (-0.08) | | (1.63) | |
| | rmarkt | 0.317 | 0.275 | 0.024 | -0.026 |
| | | (0.49) | (0.42) | (0.04) | (-0.04) |
| | rbasic | | -0.296 | | 0.210 |
| | | | (-0.66) | | (0.53) |
| | radapt | | -0.362 | | 3.058** |
| | | | (-0.19) | | (1.92) |
| | rtrans | | 0.828 | | 1.195* |
| | | | (0.98) | | (1.62) |
| | Europe | | | 0.137** | 0.133** |
| | | | | (2.3) | (2.26) |
| | Japan | | | -0.039 | -0.055 |
| | | | | (-0.65) | (-0.92) |
| | USA | | | 0.079 | 0.076 |
| | | | | (1.32) | (1.29) |
| | hafa | -1.514*** | -1.517*** | -1.441*** | -1.425*** |
| | | (-20.56) | (-19.44) | (-24.05) | (-23.12) |
| | Constant | 0.834*** | 0.830*** | 0.777*** | 0.758*** |
| | | (4.67) | (4.42) | (4.53) | (4.43) |
| Equation 2: Sector Entropy | ce | -0.222*** | -0.230*** | -0.193*** | -0.202*** |
| | | (-4.99) | (-5.21) | (-4.05) | (-4.2) |
| | Sal | 0.116*** | 0.121*** | 0.109*** | 0.112*** |
| | | (5.12) | (5.38) | (4.49) | (4.61) |
| | rrdt | 0.932** | | 0.576944 | |
| | | (1.99) | | (1.17) | |
| | rmarkt | 1.392* | 1.312* | 1.408* | 1.306* |
| | | (1.76) | (1.68) | (1.77) | (1.65) |
| | rbasic | | 0.282 | | 0.087 |
| | | | (0.49) | | (0.15) |
| | radapt | | 5.251*** | | 3.606* |
| | | | (2.63) | | (1.67) |
| | rtrans | | 1.584 | | 1.501 |
| | | | (1.51) | | (1.42) |
| | Europe | | | 0.030 | 0.026 |
| | | | | (0.34) | (0.30) |
| | Japan | | | 0.148* | 0.124 |
| | | | | (1.67) | (1.39) |
| | USA | | | 0.088 | 0.084 |
| | | | | (1.00) | (0.95) |
| | div | -0.341*** | -0.331*** | -0.382*** | -0.374*** |
| | | (-4.09) | (-4.01) | (-4.47) | (-4.36) |
| | Constant | 0.207 | 0.157 | 0.205 | 0.187 |
| | | (0.89) | (0.68) | (0.83) | (0.76) |
| Equation 1 | N | 153 | 153 | 153 | 153 |
| | Adjusted R-square | 0.878 | 0.879 | 0.889 | 0.909 |
| | F-statistic | 151.07 | 214.83 | 148.09 | 171.35 |
| Equation 2 | N | 153 | 153 | 153 | 153 |
| | Adjusted R-square | 0.383 | 0.356 | 0.149 | 0.391 |
| | F-statistic | 11.99 | 15.25 | 2.69 | 11.42 |

*** statistically significant at 1%,** statistically significant at 5%. In parentheses - T values.

Table 4 - Performance of firms pursuing different strategies

| | **Net income to sales ratio (2000)** |
|---|---|
| | **Comparison with the median company, using the Country Entropy and the Sector Entropy measures** |
| Highly Internationalized, Low Product Diversified (Group 2) | 5.19% |
| Highly Product Diversified, Low Internationalized (Group 3) | 6.89% |
| Firms pursuing both or neither strategies (Groups 1&4) | 4.80% |
| **T-tests** | |
| Group 2 vs. Group 1&4 | 1.10 |
| Group 3 vs. Group 1&4 | 0.40 |

Table 5 – Quantile regression results (Median), robust standard errors

| Variable | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| lnemp | 0.005 | 0.005* | 0.010** | 0.007 | 0.005 | 0.003 | 0.001 |
| | (1.21) | (1.89) | (2.40) | (1.10) | (0.93) | (0.40) | (0.20) |
| ce | 0.032*** | 0.034*** | | 0.018 | 0.034* | 0.028* | 0.039** |
| | (3.22) | (2.69) | | (0.98) | (1.80) | (1.84) | (1.98) |
| se | -0.005 | | | -0.018 | | 0.010 | |
| | (-0.29) | | | (-0.57) | | (0.29) | |
| rrdt | -0.120 | -0.152 | -0.224 | -0.085 | -0.151 | -0.072 | -0.129 |
| | (-0.76) | (-0.75) | (-1.14) | (-0.35) | (-0.71) | (-0.26) | (-0.49) |
| rmarkt | 0.354* | 0.327** | 0.177* | 0.258* | 0.326 | 0.092* | 0.130** |
| | (1.93) | (1.96) | (1.89) | (1.87) | (1.28) | (1.92) | (1.96) |
| ge | | | 0.041** | 0.031 | 0.001 | -0.002* | -0.023* |
| | | | (2.04) | (0.95) | (0.20) | (-1.86) | (-1.85) |
| Europe | | | | | | 0.012 | 0.017 |
| | | | | | | (0.38) | (0.54) |
| Japan | | | | | | -0.004 | 0.002 |
| | | | | | | (-0.11) | (0.06) |
| USA | | | | | | 0.025 | 0.026 |
| | | | | | | (0.79) | (0.83) |
| Constant | -0.034 | -0.041 | -0.091** | -0.054 | -0.041 | -0.030 | -0.022 |
| | (-0.94) | (-0.88) | (-2.14) | (-0.93) | (-0.82) | (-0.40) | (-0.30) |
| | | | | | | | |
| N | 135 | 135 | 135 | 135 | 135 | 135 | 135 |
| Pseudo R-Square | 0.129 | 0.132 | 0.110 | 0.134 | 0.132 | 0.153 | 0.158 |
| Number of replications | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 |

*** statistically significant at 1%,** st atistically significant at 5%, *statistically significant at 10%. In parentheses - T values.

Table 6 - Inter-percentile Regression (High, Median and Low Performers)

| Variable | 0.5-0.1 | 0.9-0.5 | 0.9-0.1 |
|---|---|---|---|
| | | | |
| lnemp | -0.002 | -0.019* | -0.021* |
| | (-0.25) | (-1.85) | (-1.86) |
| ce | 0.025 | 0.027* | 0.052* |
| | (1.37) | (1.82) | (1.76) |
| se | 0.002 | 0.044 | 0.047 |
| | (0.08) | (0.90) | (0.87) |
| ge | -0.039* | -0.073** | -0.111** |
| | (-1.82) | (-1.98) | (-1.95) |
| rrdt | -0.148 | 0.182 | 0.034 |
| | (-0.83) | (0.74) | (0.15) |
| rmarkt | -0.116 | 0.030 | -0.086 |
| | (-0.39) | (0.08) | (-0.22) |
| Europe | 0.002 | -0.049 | -0.047 |
| | (0.07) | (-1.13) | (-1.02) |
| Japan | -0.002 | -0.111** | -0.112** |
| | (-0.05) | (-2.37) | (-2.25) |
| USA | 0.038 | -0.019 | 0.019 |
| | (1.07) | (-0.38) | (0.38) |
| Constant | 0.046 | 0.285*** | 0.331*** |
| | (0.69) | (2.78) | (3.05) |
| | | | |
| N | 135 | 135 | 135 |
| 0.1 Pseudo R-Square | 0.145 | | 0.145 |
| 0.5 Pseudo R-Square | 0.152 | 0.152 | |
| 0.9 Pseudo R-Square | | 0.247 | 0.247 |
| Number of replications | 10000 | 10000 | 10000 |

*** statistically significant at 1%, ** statistically significant at 5%, *statistically significant at 10% In parentheses - T values.

Table 7 –Firms with different growth paths

| **Type of Comparison** | **GROUP A** | **GROUP B** | **GROUP A ( % of Total)** | **GROUP B (% of Total)** | **z-stat** |
|---|---|---|---|---|---|
| **Median, Country Entropy, Within Core Entropy** | 47 | 34 | 58.0% | 42.0% | 2.927* |
| **Mean, Country Entropy, Within Core Entropy** | 45 | 36 | 55.6% | 44.4% | 2.012* |

*-statistically significant at 1%

Table 8 - OLS estimation with robust standard errors

Dependent Variables: ? ce(1996-2000)/ce(1996) and ? te(1996-2000)/te(1996)

| | Dependent | | Dependent | |
|---|---|---|---|---|
| Variable | ? ce(1996-2000)/ce(1996) | | ? te(1996-2000)/te(1996) | |
| | | | | |
| ce(1996) | -1.041* | -1.033* | -0.174 | -0.116 |
| | (-1.73) | (-1.76) | (-1.52) | (-1.45) |
| se(1996) | -0.989** | -0.971** | -0.218 | -0.096 |
| | (-2.41) | (-2.58) | (-0.97) | (-0.57) |
| ge(1996) | | -0.035 | | -0.241 |
| | | (-0.10) | | (-1.21) |
| Lnsal (1996) | 0.482* | 0.482* | 0.104* | 0.102* |
| | (1.82) | (1.81) | (1.82) | (1.94) |
| rrdt (1996) | 1.295 | 1.294 | 0.155 | 0.150 |
| | (0.69) | (0.68) | (0.22) | (0.20) |
| rmarkt (1996) | -0.362 | -0.417 | -0.435 | -0.812 |
| | (-0.12) | (-0.13) | (-0.39) | (-0.67) |
| Europe | 0.256 | 0.255 | -0.035 | -0.040 |
| | (1.21) | (1.20) | (-0.36) | (-0.37) |
| Japan | -0.058 | -0.059 | 0.104 | 0.101 |
| | (-0.26) | (-0.26) | (1.14) | (1.00) |
| USA | 0.244 | 0.248 | 0.062 | 0.091 |
| | (1.14) | (1.12) | (0.70) | (0.88) |
| Constant | -2.580* | -2.574* | -0.655** | -0.613** |
| | (-1.64) | (-1.64) | (-2.21) | (-2.12) |
| | | | | |
| N | 81 | 81 | 81 | 81 |
| Adjusted R-square | 0.277 | 0.277 | 0.213 | 0.243 |
| F-stat | 1.97 | 2.01 | 2.48 | 2.26 |

*** statistically significant at 1%, ** statistically significant at 5% , *statistically significant at 10%.
In parentheses - T values.

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Table 9 – Performance of firms with different growth paths (net income to sales ratio)

| **Type of Comparison** | **Performance 1996** | **Performance 2000** |
|---|---|---|
| **Group classification by median of Entropy measures** | | |
| GROUP A | 3.67% | 6.29% |
| GROUP B | 4.25% | 5.07% |
| **T tests** | | |
| Difference between groups | - 1.29 | 0.78 |

Table 10 - Growth Path and Performance - Least Square estimation with robust standard errors (Dependent Variable: Change in performance (1996-2000)

| Variable | Model 1 | Model 2 | Model 3 |
|---|---|---|---|
| Lnemp (1996) | 0.022** | 0.011 | 0.032*** |
| | (2.01) | (0.79) | (7.36) |
| ? empl(1996-2000) | -0.001 | 0.016 | 0.011 |
| | (-0.04) | (0.97) | (1.04) |
| Lsales (1996) | -0.016 | -0.001 | -0.045 |
| | (-1.11) | (-0.05) | (-1.49) |
| ? sal(1996-2000) | -0.033 | -0.036 | -0.081*** |
| | (-1.07) | (-1.23) | (-3.57) |
| rrdt | 0.138 | 0.143 | 0.056 |
| | (1.07) | (0.88) | (0.30) |
| rmarkt | 0.144 | 0.160 | 0.210 |
| | (1.06) | (1.12) | (1.54) |
| Europe | | 0.038 | 0.009 |
| | | (1.18) | (0.83) |
| Japan | | 0.014 | 0.021 |
| | | (0.37) | (1.60) |
| USA | | 0.069** | 0.043*** |
| | | (2.19) | (3.95) |
| Concentrated | | | -0.039*** |
| | | | (-5.41) |
| Inconsistent | | | -0.026*** |
| | | | (-4.51) |
| Diversified | | | 0.035 |
| | | | (1.58) |
| Constant | -0.033 | -0.092 | 0.125 |
| | (-0.39) | (-0.99) | (1.63) |
| N | 63 | 63 | 63 |
| Pseudo-R square | 0.117 | 0.154 | 0.238 |

Table 11 - Dynamic Growth Path, Least Square estimation with robust standard errors
(Dependent Variable: Change in performance (1996-2000)

| Variable | Model 1 | Model 2 | Model 3 |
|---|---|---|---|
| Lnemp (1996) | 0.011* | 0.015* | 0.017* |
| | (1.99) | (1.78) | (1.93) |
| ? lnemp (1996-2000) | -0.016* | -0.013 | -0.014* |
| | (-1.84) | (-1.52) | (-1.78) |
| Lnsal (1996) | -0.016* | -0.021* | -0.018 |
| | (-1.92) | (-1.86) | (-1.52) |
| ? lnsal(1996-2000) | -0.039** | -0.040** | -0.035* |
| | (-2.21) | (-2.19) | (-1.82) |
| rrdt | 0.138 | 0.143 | 0.056 |
| | (1.07) | (0.88) | (0.30) |
| rmarkt | 0.144 | 0.160 | 0.210 |
| | (1.06) | (1.12) | (1.54) |
| Europe | | -0.013 | -0.002 |
| | | (-1.02) | (-0.17) |
| Japan | | 0.002 | 0.018 |
| | | (0.10) | (0.87) |
| USA | | -0.001 | 0.009 |
| | | (-0.08) | (0.61) |
| Concentrated | | | -0.001 |
| | | | (-0.06) |
| Inconsistent | | | -0.020* |
| | | | (-1.80) |
| Diversified | | | -0.017 |
| | | | (-1.32) |
| Constant | 0.047 | 0.052 | 0.002 |
| | (0.98) | (1.07) | (0.04) |
| | | | |
| N | 63 | 63 | 63 |
| Adjusted R-Square | 0.326 | 0.345 | 0.391 |
| F-statistic | 2.78 | 3.88 | 4.67 |

** statistically significant at 5% , *statistically significant at 10%

## Appendix Table 1 - Correlation table of variables

| | perf | emp | sal | ninc | fsales | ncount | nsec | ce | se | ge | rrdt | rbasic | radapt | rtrans | rmarkt | hafa |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| perf | 1.00 | | | | | | | | | | | | | | | |
| emp | 0.11 | 1.00 | | | | | | | | | | | | | | |
| sal | 0.17 | 0.72* | 1.00 | | | | | | | | | | | | | |
| ninc | 0.53* | 0.51* | 0.77* | 1.00 | | | | | | | | | | | | |
| fsales | 0.11 | 0.63* | 0.84* | 0.57* | 1.00 | | | | | | | | | | | |
| ncount | 0.36* | 0.52* | 0.57* | 0.53* | 0.41* | 1.00 | | | | | | | | | | |
| nsec | 0.08 | 0.33* | 0.49* | 0.32* | 0.38* | 0.32* | 1.00 | | | | | | | | | |
| ce | 0.36* | 0.31* | 0.35* | 0.37* | 0.22* | 0.85* | 0.11 | 1.00 | | | | | | | | |
| se | -0.05 | 0.25* | 0.39* | 0.25* | 0.29* | 0.01 | 0.81* | -0.16 | 1.00 | | | | | | | |
| ge | 0.21* | 0.21 | 0.38* | 0.33* | 0.46* | 0.36* | 0.41* | 0.38* | 0.42* | 1.00 | | | | | | |
| rrdt | -0.16 | -0.07 | 0.01 | -0.05 | 0.05 | 0.04 | 0.15 | 0.02 | 0.20 | 0.12 | 1.00 | | | | | |
| rbasic | -0.14 | 0.02 | 0.10 | 0.03 | 0.13 | 0.04 | 0.09 | -0.03 | 0.15 | 0.03 | 0.73* | 1.00 | | | | |
| radapt | -0.11 | -0.08 | -0.05 | -0.08 | -0.05 | -0.01 | 0.23 | 0.03 | 0.19 | 0.06 | 0.38* | 0.02 | 1.00 | | | |
| rtrans | -0.04 | -0.10 | -0.09 | -0.07 | -0.06 | 0.02 | 0.01 | 0.06 | 0.04 | 0.12 | 0.54* | -0.09 | 0.08 | 1.00 | | |
| rmarkt | 0.12 | -0.08 | -0.02 | 0.09 | -0.04 | -0.06 | 0.12 | -0.04 | 0.12 | -0.02 | -0.03 | -0.06 | 0.02 | 0.02 | 1.00 | |
| hafa | -0.27* | -0.20 | -0.23* | -0.25* | -0.12 | -0.71* | 0.01 | -0.93* | 0.21 | -0.33* | -0.02 | 0.02 | -0.03 | -0.05 | 0.06 | 1.00 |
| div | -0.18 | -0.34* | -0.43* | -0.37* | 0.01 | -0.45* | -0.46* | -0.29* | -0.37* | 0.05 | 0.03 | -0.02 | -0.03 | 0.09 | 0.01 | 0.23 |

* statistically significant at 1%

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