

**Workshop Paper for the 35<sup>th</sup> EIBA Annual Conference,  
Valencia, Spain, December, 13<sup>th</sup> -15<sup>th</sup>, 2009**

**INTANGIBLE ASSETS, ECONOMIES OF SCALE AND  
ORGANIZATIONAL LEARNING:**

**A TEST OF DIFFERENT THEORIES REGARDING THE  
IMPACT OF CORPORATE MULTINATIONALITY ON  
PERFORMANCE**

**Prof. Dr. Stefan Eckert**

Chair of International Management

Markt 23

02763 Zittau

Phone: ++49/(0)3583/612776

E-Mail: eckert@ihi-zittau.de

**M.A. Marcus Dittfeld**

Chair of International Management

Markt 23

02763 Zittau

Phone: ++49/(0)3583/612773

E-Mail: dittfeld@ihi-zittau.de

## ABSTRACT

We analyze the impact of multinationality on performance for a sample of listed firms stemming from Continental European countries, namely France, Germany, and Italy for the period from 1990 to 2006 (sample size ranging from 1061 to 2435 firm-year-observations). In accordance with recent research we were able to show that there is a non-linear effect of multinationality on performance. Yet, unlike Lu and Beamish (2004) but in accordance with Ruigrok et al. (2007) we found that in the case of our sample, the S-shaped curve between multinationality and performance was inverted in a way that a first stage of multinationality is accompanied by increasing performance, while in a second stage multinationality implies a performance decline and in a third stage increasing multinationality is again accompanied by increasing performance. Furthermore, in line with previous studies, our findings support arguments from the intangible asset theory and theories of industrial organization: the effect multinationality exerts on performance obviously depends to a large extent on the existence of firm specific intangible assets (especially related to R&D) and/or the potential to reap economies of scale through internationalization.

**Key Words:** Tobin's Q, geographical diversification, industrial diversification, shareholder value, foreign assets, foreign sales, U-curve, S-curve, France, Germany, Italy, MNCs

## INTRODUCTION

The relationship between multinationality and firm performance is one of the fundamental and most fascinating questions in international business research (Peng, 2004; Verbeke & Brugman, 2009). Despite the substantial number of studies regarding this topic, the findings are quite inconclusive and contradictory up to now. Whereas some authors argue that multinationality increases performance, others come to the opposite conclusion, i.e. that multinationality has a negative effect and still others find that multinationality leads to an increase in performance if certain conditions are fulfilled and does not lead to an improvement in performance or even reduces performance in the absence of these conditions.

Whereas early models of the relationship between multinationality and performance assume a linear relationship between multinationality and performance, more sophisticated recent approaches argue that the relationship between multinationality and performance is non-linear. These kinds of models highlight the importance of organizational learning and the costs of multinationality like the liabilities of foreignness and newness and the costs of coordinating and controlling the geographically dispersed activities of multinational corporations (MNCs). The most recent approach is the 3-stage S-shaped curve introduced by Contractor (2007) and Lu and Beamish (2004). Starting at low levels of multinationality with a U-shaped relationship between multinationality and performance, followed by a positive linear relationship in the case of advanced levels of multinationality, the S-curve comes to its end with an inverted U-shaped or decreasing performance in case of high levels of multinationality.

This paper aims to analyze the impact of multinationality on performance testing different theories regarding this relationship, more specifically the theory of intangible assets (sometimes referred to as “internalization theory”, e.g. Morck and Yeung (1991, 1992), the industrial organization argument of economies of scale and the S-shaped approach. It is based on a sample of stock-listed companies from three Continental European countries, namely France, Germany and Italy. These three countries are the largest economies of the Continental European countries in the European Union. In terms of GDP, in 2008 they made up nearly half of the GDP of all countries of the European Union<sup>1</sup>.

For different samples ranging between 1061 to 2663 firm-year-observations, we use an accounting based measure (return on assets) as well as a market value-based variable (Tobin’s Q) as indicators for performance for the period from 1990 to 2006. Contrary, to previous research we find an inverted S-shaped relationship between multinationality and performance, which nevertheless supports the idea of a non-linear relationship between multinationality and performance based on costs of internationalization and organizational learning. However, the S-shaped effect is attenuated by the performance effects that intangible assets and potentials for economies of scale unfold in the course of internationalization.

The paper is organized as follows. In the following section we will present a review on theory and extant research findings. Afterwards, we describe the methodology employed and the sample on which our analysis is based. In the following section our empirical findings are presented and discussed. In the final section we summarize our findings and present a short outlook on future research.

## LITERATURE REVIEW

With regard to explaining the relationship between multinationality and performance, different theoretical arguments are proposed in the literature, which should be differentiated according to the main target of theoretical explanation, namely accounting-based profitability and firm value.

The plurality of theoretical arguments notwithstanding, many theorists base their line of argumentation on the assumption that corporate multinationality implies certain costs that a firm restraining itself to its domestic market might not incur. Such additional costs of multinationality may on the one hand arise from the liabilities of foreignness and newness (Hymer, 1976; Zaheer, 1995). On the other hand, even if liabilities of foreignness and newness may decline with increasing international experience, international expansion may imply increasing costs of coordinating and controlling a geographically dispersed value chain which more than offset the reduction in costs regarding the liabilities of foreignness and newness (Lu & Beamish, 2004). These difficulties given, it seems rather plausible to assume that multinationality might lead to decreases in profitability which might be accompanied to decreases in value, or at least does not automatically imply increases in profitability and value.

The fact that companies pursue internationalization despite the costs of going abroad, is explained by agency theory though the separation of ownership and control and the divergence of interests between shareholders and managers. Internationalization decisions may be driven more by the personal interests of managers than sound economic motives (Aharoni, 1966). Multinationality might often be more in the interests of management and bondholders than in the interest of shareholders. Growth, diversification, prestige or simply higher remuneration are the primary motives for internationalization according to this theory. And given the impact of multinationality on firm risk, it is not in the interest of shareholders.

On the other hand it is argued, that firms may be able to reduce the fluctuation of revenues (and hence the variance of profitability) by geographical diversification (Rugman 1976). The corresponding effects of a reduction in the variability of profitability on value are however unclear. Following the theory of uncomplete capital markets multinational firms can be considered as a diversification vehicle for their investors. Investing in different countries might be difficult and costly for investors due to lack of information on foreign firms, certain regulations restricting transfer of capital across borders etc. By investing in a multinational firm investors reap the benefits of international diversification without having to diversify their capital across several countries. In this case multinational firms are in charge of a diversification advantage compared to their investors and hence, multinationality is viewed by investors as something valuable (Errunza & Senbet, 1981, 1984). However, if capital markets are sufficiently integrated, investors may be able to realize the benefits of international diversification by themselves. Under these conditions, firm diversification bears no value for investors. In a similar way, proponents of the contingent claims hypothesis argue, that the risk reduction effect of international diversification leads to a wealth transfer from stockholders to bondholders (Doukas & Kan, 2006).

According to location theory, multinational firms are able to combine and exploit the advantages of different locations leading to an increase in profitability. These firms should therefore possess an advantage compared to their national competitors (Kogut, 1985), which should also imply an increase in value.

The proponents of the theory of intangible assets (sometimes referred to as “internalization theory”) argue, that multinationality increases performance, if the multinational firm is in charge of certain firm-specific intangible assets, which should be internally exploited and capitalized on foreign markets. These firm-specific intangible assets enable these MNCs to compete successfully against national competitors, who are not burdened with liabilities of foreignness (Caves, 1971; Hymer, 1976; Morck & Yeung, 1991). Even if these intangible assets may not be a sufficient condition for guaranteeing superior rents (Hennart, 2007), according to the intangible asset theory they are a necessary one. Therefore, following this theory, without intangible assets multinationality does not lead to an improvement of profitability and a corresponding increase in value.

A more recent contribution to the relationship between multinationality and performance is offered by the organizational learning perspective (Barkema & Vermeulen, 1998; Vermeulen & Barkema, 2002). According to this theory, in a first stage of the internationalization process MNCs are challenged by new cultural and institutional settings. Confronted with the new environment of a foreign market, the company has to adapt its structures, strategies, systems as well as its corporate culture to a certain extent to compete successfully against established competitors in the foreign market and to simultaneously reap the benefits of integrating its geographically dispersed activities. The MNC that has already accumulated experience regarding operating on foreign markets and managing a multinational network can easier meet with similar challenges. In a second stage of internationalization, the experienced MNC should therefore be able to reap these benefits of being a multinational. Nevertheless, from a certain threshold of internationalization on, increasing multinationality might imply too much complexity so that the costs of operating in many countries exceed the benefits. Taken together, these arguments propose a S-shaped relationship between multinationality and profitability (Contractor, 2007; Lu & Beamish, 2004): Starting at low levels of multinationality with a U-shaped relationship between multinationality and profitability, followed by a positive linear relationship in the case of advanced levels of multinationality, the S-curve comes to its end with an inverted U-shape or decreasing profitability in the case of high levels of multinationality. With regard to firm value a corresponding development is expected.

Although, in the meantime researchers have presented comprehensive overviews on the state of art regarding the relationship between multinationality and performance (Annavarjula & Beldona, 2000; Bausch & Krist, 2007; Ramaswamy, 1992), we will briefly sketch the main findings of extant research.

Unfortunately, the empirical evidence regarding the impact of multinationality appears to be rather inconclusive. A number of studies supports the liabilities of foreignness and newness argument. Geringer et al. (2000) find that multinationality has a negative impact on return on sales. Click and Harrison (2000) find a negative valuation impact of multinationality on Tobin’s Q in the range of 8.6 to 17.1 percent. This finding is supported by the results of Denis et al. (2002). Following Mishra and

Gobeli (1998), Click and Harrison (2000) or Doukas and Kan (2006) the negative impact of multinationality on performance might be due to agency problems.

Regarding the risk reducing effect of corporate multinationality different empirical studies were undertaken generating inconsistent results. E.g. Kim et al. (1993) showed that multinationality leads to decreases in the variability of ROA. Agmon and Lessard (1977) claim to have found evidence that MNCs are appropriate vehicles for realizing the benefits of international diversification. Their argumentation was, however, heavily criticized by Adler (1981). Jacquillat and Solnik (1978) showed that international portfolio diversification was more efficient than international corporate diversification by foreign direct investment. Errunza and Senbet (1981, 1984) compare the impact of multinationality on value during two different periods: one characterized by severe restrictions concerning international capital transfers, the other characterized by more liberal regulations, thus testing the incomplete capital markets theory. The authors find that multinationality increases value, albeit the effect on value weakens due to the increasing liberalization of international capital markets. Hence, the authors appear to have found empirical evidence on the validity of the incomplete capital market theory. This theory is again tested by Morck and Yeung (1991), who interpret their findings as a proof that capital markets are sufficiently integrated, so that corporate multinationality is not a value in itself. A number of researchers such as Markides and Ittner (1994), Markides and Oyon (1998), Christophe (1997), Mishra and Gobeli (1998) claim to have found supporting evidence. However, a closer look at these studies reveals that their ability to test the validity of the incomplete capital markets theory must be considered as dubious due to methodological problems (Eckert & Engelhard, 2008).

Furthermore, researchers have analyzed whether the valuation impact of multinationality depends on the existence of firm-specific intangible assets. In the relevant studies concerning this question research and development spending is usually employed as a measure of firm specific intangible assets related to research and development capabilities and advertising expenditures are used as a proxy for firm-specific intangible assets related to marketing skills and consumer goodwill (Kotabe, Srinivasan & Aulakh, 2002). Already in 1974 Severn and Laurence (1974) claim to have found supporting evidence that firm specific resources with regard to R&D have a positive impact on the relationship between multinationality and profitability. The findings of Delios and Beamish (1999) also support this view. Morck and Yeung (1991) can be seen as the pioneering contribution regarding the question whether intangible assets are a prerequisite for a positive effect of multinationality on firm value. The essence of their empirical results is, that the existence of firm-specific intangible assets is crucial if internationalization is expected to create value. Markides and Ittner (1994), Markides and Oyon (1998), Christophe (1997) and Mishra and Gobeli (1998), who adopt the research design of Morck and Yeung to some extent, find supporting evidence.

Additionally, arguments from industrial organization theory are used in order to explain the relationship between multinationality and value. Economies of scale may provide a theoretical reason why expanding abroad may improve firm performance. Eckert et al. (2008) claim to have found empirical support, that multinationality leads to value increases if the MNC has the potential to reap economies of scale.

Moreover, Morck and Yeung (1991) analyze whether the potential to combine the location advantages of different locations adds value. The authors test, whether subsidiaries located in low cost countries or subsidiaries located in tax havens lead to an enhancement of value. Based on their empirical findings, they come to the following conclusion:

„Our results do not support ... theories of the advantages of multinationality based either on tax avoidance using transfer pricing, tax havens, and so on, or on the use of cheaper labor or other production inputs in low cost countries.“ (Morck & Yeung, 1991, p. 185).

Markides and Ittner (1994) resp. Markides and Oyon (1998) who concentrate on impact of the announcement of foreign acquisitions on the stock price of the acquiring firm, examine the moderating effect of location advantages, however without being able to deliver significant results. On the other hand, a number of other event studies, which analyze the effect of a foreign acquisition on the share price of the acquirer, find that acquisitions from developing countries lead to significantly higher share price reactions (Doukas & Travlos, 1988; Doukas, 1995; Kiyimaz, 2004; Doukas & Kan, 2006): a finding that is perfectly in line with the assumption that multinationality increases value due to the fact that multinational firms are able to combine the location advantages of different locations. This assumption is further supported by Pantzalis (2001) and Berry (2006), who come to the conclusion that having the ability to combine the advantages of different locations increases value, albeit only under certain conditions.

The idea that the relationship between multinationality and performance is non-linear has a rather long-tradition in the research field where the focus is on the effect of multinationality on accounting-based profitability (M-ABP-research). Haar (1989), Geringer et al. (1989), Hitt et al. (1997) find evidence that the positive effect of multinationality on profitability is thwarted by increasing costs of complexity when the degree of corporate multinationality exceeds a certain threshold. More recent studies claim to have found empirical evidence supporting an S-shaped relationship between multinationality and performance (Contractor, Kundu & Hsu, 2003; Lu & Beamish, 2004; Ruigrok, Amann & Wagner, 2007).

Yet, despite the ongoing discussion on the nature of the relationship between multinationality and accounting-based profitability, in the research field where the focus was on the impact of multinationality on value (M-V-research) linear approaches dominate. Up to now, studies analyzing a non-linear effect of multinationality on firm value are hard to find. One of the very few exceptions is Lu and Beamish (2004), who find evidence that the S-curve also holds with regard to Tobin's Q. [Needless to say, that Lu and Beamish actually do belong to the group of researchers whose focus is on the M-ABP-research].

A further difference between the two research traditions is that while the studies from the M-V-research domain almost always rely on samples consisting exclusively or almost exclusively of US-firms, research from other countries is rather rare. One of the few exceptions is again the contribution of Lu and Beamish (2004). On the contrary, concerning the studies, which focus on the relationship between multinationality and accounting-based profitability, the country of origin of the firms analyzed is more mixed (for an overview see Bausch & Krist, 2007).

Although oversimplified to a certain degree, summarizing extant research it might be justified to state that one of the main contributions of M-V-research has been to highlight the role of intangible assets, while the main contribution of M-ABP-research has been to prove the impact organizational learning exerts on the relationship between multinationality and performance. Following Lu and Beamish (2004) we try to synthesize these contributions by simultaneously analyzing the effect of organizational learning and intangible assets on the impact of multinationality on performance and replicate their study of Japanese firms by analyzing a sample of firms from Continental Europe. By concentrating on a sample of companies from European countries, not only the transferability of the findings from Lu and Beamish (2004) is tested, but furthermore the generalizability of knowledge on the relationship between multinationality and value generated from US-samples is examined. We may therefore be able to enrich extant knowledge concerning the relationship between multinationality and value, as this stream of research has been relying heavily on US-samples up to now.

## SAMPLE AND METHODOLOGY

The objective of our study was to analyze the effect corporate multinationality exerts on performance. Referring to Click and Harrison (2000), Christophe (1997), Mishra and Gobeli (1998), Morck and Yeung (1991) we use Tobin's Q as a value-based indicator of corporate performance. Tobin's Q is defined as the market value of the firm divided by the replacement costs of its tangible assets (Tobin, 1969). We obtain estimates for a firm's Tobin's Q by the following formula:

$$Q = \frac{\text{Market Value of Equity} + \text{Market Value of Preferred Stock} + \text{Book Value of Debt}}{\text{Book Value of Equity} + \text{Book Value of Preferred Stock} + \text{Book Value of Debt}}$$

However, in contrast to Morck and Yeung (1991), Mishra and Gobeli (1998) and others we argue, that due to its operationalization Q can not be interpreted as a proxy for firm value, but has to be interpreted as a proxy for shareholder value (Eckert et al., 2008). Furthermore, as a second indicator of corporate performance, return on assets (ROA) was used as an accounting based performance measure.

Multinationality was measured using the ratio of foreign sales to total sales (FSTS) and the ratio of foreign assets to total assets (FATA).

As control variables we considered leverage, profitability, size, industry, industrial diversification, capital intensity, and firm-specific intangible assets. Leverage was measured by the ratio of total debt to total assets (TDTA). Leverage has been employed as a control variable by Christophe (1997), Click and Harrison (2000), Denis et al. (2002), Lu and Beamish (2004) Mishra and Gobeli (1998), Morck and Yeung (1991) among others. In most of these studies a significant negative relationship between leverage and performance was found. As a proxy for size we used total assets (TA). Concerning the effect of firm size extant research reports contradictory results (Bodnar et al., 2003; Click & Harrison, 2000; Christophe, 1997; Kotabe, Srinivasan & Aulakh, 2002; Lu and Beamish, 2004).

We took account of a firm's industry by employing industry dummies (Click & Harrison, 2000; Morck & Yeung, 1991). Furthermore, we control for the degree of industrial diversification by classifying firm activities according to the Standard Industrial Classification-Code (SIC). Firms were considered as industrially diversified if they had more than one business segment at the 2-digit standard industrial classification (SIC) code level. Besides a few exceptions (e.g. Kim, Hwang & Burgers, 1993) most studies find a negative effect of industrial diversification on performance (Bodnar et al., 2003; Lu and Beamish, 2004).

Additionally, Bodnar et al. (1997) and Denis et al. (2002) take account of a firm's capital intensity. We interpret capital intensity as a proxy for economies of scale (George et al., 1992). This control variable is measured by capital expenditures per sales (CETS). Bodnar et al. (1997) as well as Denis et al. (2002) find a significant positive relationship between capital expenditures per sales and shareholder value.

Furthermore, several control variables were included in order to proxy for a firm's intangible assets. To measure firm-specific intangible assets that refer to technology and research abilities we use the variable research and development per sales (RDS). A significant positive effect of this variable on performance has been confirmed by the studies of Bausch and Krist (2007), Bodnar et al. (1997), Christophe (1997), Denis et al. (2002), Markides and Oyon (1998), Mishra and Gobeli (1998). Firm-specific intangible assets concerning marketing capabilities and consumer goodwill were considered by Bodnar et al. (1997), Christophe (1997), Denis et al. (2002), Kotabe et al. (2002), Markides and Ittner (1994), Markides and Oyon (1998) among others. Due to lack of data, we could not use advertising expenses as a control variable in our model. Instead, we employed the variable selling, general and administrative expenses per sales (SAS) in order to measure firm-specific intangible assets related to marketing capabilities and consumer goodwill as well as specific organizational and managerial skills.

Moreover, in some studies, where the impact of multinationality on value was analyzed profitability was introduced as a control variable. Referring to Bodnar et al. (1997) and Denis et al. (2002) who discovered a significant positive relationship between profitability and value, we included profitability as a control variable in our value-based regression model measuring profitability by the ratio of EBIT per sales.

In Table 1 an overview on the variables employed in this study is given.

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Insert Table 1 about here

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Our sample consists of listed corporations from France, Germany and Italy from all industrial sectors except financials. As the period of analysis we select the time interval stretching from 1990 to 2006. Capital market data were obtained from Thomson Financial Datastream, accounting data were retrieved from Worldscope. We included all corporations from these countries which were listed at least for one year for our period of analysis and provide all necessary informations for the variables employed in our models. Thus, we reached a minimum total number of firm-year-observations of 1061 (Models 7-12) and a maximum of 2633 firm-year-observations (Models 13-28). Models operating multinationality with foreign sales to

total sales have in general a better coverage due to improved data availability for this proxy.

## EMPIRICAL RESULTS AND DISCUSSION

### Descriptive statistics

Table 2, 3, 4, 5 and 6 offers summary statistics and bivariate correlation matrixes for all four groups of samples.

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Insert Table 2, 3, 4, 5 and 6 about here

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The samples are clearly dominated by German firm-year-observations, especially when foreign assets to total assets are used as a proxy for multinationality. Although firm-year-observations from Italy only amount to a relatively small percentage of the respective samples, their share increases when foreign sales to total sales are used as a proxy for multinationality. With regard to the distribution of firm-year observations across industries the sample is dominated by firm year observations of the sectors industrials, consumer goods and technology, which constitute together approximately two thirds of all observations in the different samples.

Depending on the respective sample group an average firm has a return on assets of between 1,2 to 1,9 percent or respectively an average  $\ln TQ$  of 0,38 to 0,39. The average ratio of foreign sales to total sales ranges between 53,5 to 53,8 percent and the average of foreign assets to total assets ranges between 34,2 to 34,5 percent. Furthermore, companies spend on average 5,9 to 8,2 percent of their sales for investments, 24,5 to 25,8 percent of their sales for selling and general administrative expenditures and 7,8 to 9,7 percent of their sales for research and development. The average ratio of debt to total assets amounts to between 19,2 and 20,5 percent. Between 58,8 to 62,1 percent of the firm-year-observations are industrially diversified.

### Multivariate Analysis

In order to gain insight on the impact of multinationality on performance, we tested several different regression models. Our baseline models were:

$$ROA = Const. + \beta_1 \times MN + \beta_2 \times RDS + \beta_3 \times SAS + \beta_4 \times CETS + \beta_5 \times TDTA + \beta_6 \times LnTA + \beta_7 \times DummyISeg + \varepsilon$$

$$LnQ = Const. + \beta_1 \times MN + \beta_2 \times RDS + \beta_3 \times SAS + \beta_4 \times CETS + \beta_5 \times TDTA + \beta_6 \times LnTA + \beta_7 \times EBITs + \beta_8 \times DummyISeg + \varepsilon$$

Subsequently, we included a squared and a cubic component of multinationality in further regression models in order to test non-linear effects of multinationality on performance. The models with the squared component are specified as the following:

$$ROA = Const. + \beta_1 \times MN + \beta_2 \times MN^2 + \beta_3 \times RDS + \beta_4 \times SAS + \beta_5 \times CETS + \beta_6 \times TDTA + \beta_7 \times LnTA + \beta_8 \times DummyISeg + \varepsilon$$

$$\begin{aligned} \text{Ln}Q = & \text{Const.} + \beta_1 \times \text{MN} + \beta_2 \times \text{MN}^2 + \beta_3 \times \text{RDS} + \beta_4 \times \text{SAS} + \\ & \beta_5 \times \text{CETS} + \beta_6 \times \text{TDTA} + \beta_7 \times \text{LnTA} + \beta_8 \times \text{EBITS} + \beta_9 \times \text{DummyISeg} + \varepsilon \end{aligned}$$

Furthermore, the models including a cubic component are specified as follows:

$$\begin{aligned} \text{ROA} = & \text{Const.} + \beta_1 \times \text{MN} + \beta_2 \times \text{MN}^2 + \beta_3 \times \text{MN}^3 + \beta_4 \times \text{RDS} + \beta_5 \times \text{SAS} + \\ & \beta_6 \times \text{CETS} + \beta_7 \times \text{TDTA} + \beta_8 \times \text{LnTA} + \beta_9 \times \text{DummyISeg} + \varepsilon \end{aligned}$$

$$\begin{aligned} \text{Ln}Q = & \text{Const.} + \beta_1 \times \text{MN} + \beta_2 \times \text{MN}^2 + \beta_3 \times \text{MN}^3 + \beta_4 \times \text{RDS} + \beta_5 \times \text{SAS} + \\ & \beta_6 \times \text{CETS} + \beta_7 \times \text{TDTA} + \beta_8 \times \text{LnTA} + \beta_9 \times \text{EBITS} + \beta_{10} \times \text{DummyISeg} + \varepsilon \end{aligned}$$

In each model we controlled for industry effects using industry dummies. Furthermore, year dummies were included in order to control for macroeconomic effects. We also checked country-specific effects by additionally including country-dummies. However, inclusion of these dummies did not substantially alter our results. Then, following Eckert et al. (2008), Kotabe et al. (2002), Morck and Yeung (1991), Mishra and Gobeli (1998), we introduced interaction terms measuring the moderating impact of intangible assets and economies of scale on the multinationality-performance relationship.

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Insert Table 7 and 8 about here

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We estimate ordinary least squares regressions. The results are presented in tables 7 and 8. In correspondence to previous studies leverage has a significant negative effect on ROA as well as on Tobin's Q. Size measured by the natural log of total assets has a significant positive effect on ROA, but a significant negative effect on Tobin's Q. Selling, general and administrative expenses per sales have a significant negative effect on ROA, but a positive effect on Tobin's Q. The effect of research and development per sales is the same for ROA and similar for Tobin's Q. This finding could be interpreted in a way that current spendings for R&D and marketing lead to a reduction in current return on assets (Lu & Beamish, 2004), but are interpreted by investors as an investment in the future and therefore lead to value increases as current value may be interpreted as investors' anticipation of the firm's future profitability. Capital expenditures per sales exert a significant positive effect on ROA in the model where FSTS is used as indicator of multinationality, but have no effect on ROA in the model where FATA is used. Their effect on Tobin's Q is positive and in some models weakly significant. The regression coefficient of industrial diversification is negative, but not significant for Tobin's Q. However, when ROA is used as performance indicator, we (mostly) find a significantly negative impact of industrial diversification.

Overall, the adjusted R-squares of our models seem to be quite satisfactory, ranging from 0.112 to 0.345. Consistent with the findings of Christophe and Lee (2005) and Eckert et al. (2008) we find that FATA leads to more efficient performance explanations than FSTS. Substituting FSTS by FATA increases adjusted R-squared in the worst case by more than 8 percentage points and in most cases by more than 11 percentage points. With the exception of the linear model with ROA as dependent

variable FSTS never comes out significant. In contrast to this, FATA is significant positive in the linear models explaining ROA and Tobin's Q.

The introduction of a squared component of multinationality of FATA wipes out the significance of the regression coefficients of multinationality. However, introducing a third, cubic component of multinationality changes the results remarkably. All components of multinationality are significant, in the case of ROA even at the 0.001 level. While the linear component of FATA and the cubic component both have a positive sign, the squared comes out negative. Thus, our findings support the S-shaped relationship between multinationality and performance. However, contrary to the findings of Lu and Beamish (2004), who support the conventional S-shaped argumentation for a sample of Japanese companies, we find that in a first stage multinationality leads to increases in profitability and value. Then, afterwards in a second stage, with increasing multinationality, profitability and value decline until after a certain threshold of internationalization has passed, profitability and value rise again. These findings are perfect in line with the results of Ruigrok et al. (2007) who find a "sinus curve (or Swiss landscape form)" (p. 361) explains the effect of multinationality on performance best in the case of MNCs from Switzerland. These empirical contradictions notwithstanding, we interpret our results as empirical support for the relevance of organizational learning for the impact of multinationality on performance. European firms often start internationalization by investing in psychologically close neighbour-countries. These first steps in being a multinational seem to be relatively easy to handle, given the economic and political integration of the European Union. Therefore, drawbacks regarding multinationality may emanate not until multinationality has reached a further stage, where the firm is present in a number of countries, some of them psychologically more distant. It is at this stage, that the European MNCs have to go through painful processes of learning how to manage their multinational networks and how to exploit the knowledge accumulated in their subsidiaries located in different countries. Yet, after having passed this stage, armed with the capabilities to manage their multinational networks and exploit the advantages of being a multinational, further multinationality proves to be fruitful for European MNCs.

In order to simultaneously capture the moderating effects of intangible assets and economies of scale on the relationship between multinationality and performance, we introduced three interaction variables into our models, namely multinationality x capital expenditures per sales, multinationality x research and development spending per sales and multinationality x selling, general and administrative expenses per sales.

More specifically:

$$ROA = Const. + \beta_1 \times MN + \beta_2 \times RDS + \beta_3 \times SAS + \beta_4 \times CETS + \beta_5 \times TDTA + \beta_6 \times LnTA + \beta_7 \times DummyISeg + \beta_8 \times MN \times CETS + \beta_9 \times MN \times SAS + \beta_{10} \times MN \times RDS + \varepsilon$$

$$LnQ = Const. + \beta_1 \times MN + \beta_2 \times RDS + \beta_3 \times SAS + \beta_4 \times CETS + \beta_5 \times TDTA + \beta_6 \times LnTA + \beta_7 \times EBITs + \beta_8 \times DummyISeg + \beta_9 \times MN \times CETS + \beta_{10} \times MN \times SAS + \beta_{11} \times MN \times RDS + \varepsilon$$

$$ROA = Const. + \beta_1 \times MN + \beta_2 \times MN^2 + \beta_3 \times RDS + \beta_4 \times SAS + \beta_5 \times CETS + \beta_6 \times TDTA + \beta_7 \times LnTA + \beta_8 \times DummyISeg + \beta_9 \times MN \times CETS + \beta_{10} \times MN \times SAS + \beta_{11} \times MN \times RDS + \varepsilon$$

$$\begin{aligned} \text{Ln}Q = & \text{Const.} + \beta_1 \times \text{MN} + \beta_2 \times \text{MN}^2 + \beta_3 \times \text{RDS} + \beta_4 \times \text{SAS} + \beta_5 \times \text{CETS} + \beta_6 \times \text{TDTA} + \\ & \beta_7 \times \text{LnTA} + \beta_8 \times \text{EBITS} + \beta_9 \times \text{DummyISeg} + \beta_{10} \times \text{MN} \times \text{CETS} + \beta_{11} \times \text{MN} \times \text{SAS} + \\ & \beta_{12} \times \text{MN} \times \text{RDS} + \varepsilon \end{aligned}$$

$$\begin{aligned} \text{ROA} = & \text{Const.} + \beta_1 \times \text{MN} + \beta_2 \times \text{MN}^2 + \beta_3 \times \text{MN}^3 + \beta_4 \times \text{RDS} + \beta_5 \times \text{SAS} + \beta_6 \times \text{CETS} + \beta_7 \times \text{TDTA} + \\ & \beta_8 \times \text{LnTA} + \beta_9 \times \text{DummyISeg} + \beta_{10} \times \text{MN} \times \text{CETS} + \beta_{11} \times \text{MN} \times \text{SAS} + \beta_{12} \times \text{MN} \times \text{RDS} + \varepsilon \end{aligned}$$

$$\begin{aligned} \text{Ln}Q = & \text{Const.} + \beta_1 \times \text{MN} + \beta_2 \times \text{MN}^2 + \beta_2 \times \text{MN}^3 + \beta_4 \times \text{RDS} + \beta_5 \times \text{SAS} + \beta_6 \times \text{CETS} + \beta_7 \times \text{TDTA} \\ & + \beta_8 \times \text{LnTA} + \beta_9 \times \text{EBITS} + \beta_{10} \times \text{DummyISeg} + \beta_{11} \times \text{MN} \times \text{CETS} + \beta_{12} \times \text{MN} \times \text{SAS} + \\ & \beta_{13} \times \text{MN} \times \text{RDS} + \varepsilon \end{aligned}$$

The first of these interaction terms is used to test whether the effect of multinationality on performance depends on the ability of the MNC to realize economies of scale, the second and the third are used to test whether the impact of multinationality on performance depends on intangible assets related to R&D, resp. marketing and management. [We also included an additional interaction term composed of multinationality and leverage in our model for Tobin's Q in order to test the contingent-claims-hypothesis (Doukas & Kan 2006). This term did not prove to be significant, nor did it lead to substantial changes regarding the significance of other regression coefficients or the explanatory power of the respective models. Therefore we excluded this term from the models reported here].

Concerning ROA the interaction term of multinationality and capital expenditures per sales is negative and weakly significant, no matter what proxy we use for multinationality. If we refer to Tobin's Q as the dependent variable, the interaction term of multinationality and capital expenditures per sales is not significant for FSTS, but for FATA it is positive and significant at the one-percent-level. Referring again to the FATA-model, we might conclude that capital expenditures at first lead to a decrease in profitability, but that investors consider capital investments as a valuable strategy for (European) MNCs as these companies are better able to reap economies of scale in the long run.

Concerning the interaction term of multinationality and selling, general and administrative expenses per sales our findings are not as clear as regarding multinationality's interaction with capital expenditures. If we proxy multinationality by FSTS, we find a significantly positive effect on ROA, but a significantly negative effect on Tobin's Q. Using FATA as indicator of multinationality, we also find a significant positive effect on ROA, but no effect on Tobin's Q. Our findings regarding this are contrary to Kotabe et al. (2002) who uncover a negative influence of the interaction term of multinationality measured by the ratio of foreign income to total income and marketing capabilities on ROA and indicate that intangible assets with regard to marketing and management seem to have a positive effect on accounting-based profitability, but not on value.

On the contrary, for the interaction term of multinationality and research and development spending per sales we find no significant effect on ROA if FATA is used as proxy for multinationality, but a significant positive impact on Tobin's Q. If FSTS is used as indicator of multinationality, the effect on ROA is significantly negative with

no significant effect on Tobin's Q. As FATA appears to be the more adequate proxy of multinationality and the FATA-models appear to have much higher explanatory power, we conclude that investors perceive multinationality to be a valuable strategy especially if the multinational firm is in charge of intangible assets related to R&D.

However, most remarkably seems to be the fact that the introduction of the interaction terms reduces the direct effect of multinationality on performance throughout the different models employed. When considering ROA, the significance of the various coefficients of multinationality (linear, squared and cubic) is attenuated. In the case of Tobin's Q the S-shaped effect totally disappears. We may interpret this in a way that the effect of organizational learning is dominated by intangible assets and/or economies of scale. Even though firms may be able to gain necessary skills and competences during the process of internationalization, without a sufficient resource base multinationality can not become a valuable strategy from the viewpoint of investors.

## LIMITATIONS

As this paper is part of an ongoing research, we have to concede that it may suffer from several limitations. First, the individual firm-year-observation data sets on MNCs from Continental European countries gained from our database are often uncomplete. Therefore, we experienced a severe loss of data problem, which might undermine the representativeness of our findings. Second, we measure Tobin's Q in the conventional way, common in contemporary M-V-research. In order to gain data on firm values in the corresponding studies the book value of debt is used as a proxy for its market value. Whether this proxy is adequate is an open debate (Doukas & Kan 2006, Glaser & Müller 2009). The recent criticism concerning the use of the book value of debt as a proxy for its market value given, we think conventional operationalization of Tobin's Q should be more considered as an indicator of shareholder value than an indicator of market value. Third, due to insufficient data on the international structure of European MNCs we were not able to analyze in detail the effects of different geographical configurations of MNCs. Although the findings of Christophe and Pfeiffer (2002) raise serious doubts about the value relevance of investor information about the detailed geographical structure of the MNC, recent findings from Berry (2006) indicate the opposite. We think it would be worthwhile to analyze the effect of the geographical configuration in more detail. Fourth, our sample consists exclusively of listed firms from France, Germany and Italy. However, listed firms represent only a small fraction of the economies of those countries. Our findings can therefore not be considered as representative for all kinds of MNCs from these countries. Fifth, we did not explicitly control for exchange rate changes. Exchange rate changes may be captured by year dummies for the firm-year-observations which happen to be after the introduction of the Euro. Furthermore, given the fixed exchange rate regime, which had been installed before the introduction of the Euro, changes between the exchange rates of these countries before the introduction of the Euro should generally not induce severe effects. Nevertheless, we are planning to check this in a more advanced model. Sixth, we employed ordinary least square estimates. Scatter plots were used to check for heteroscedasticity and did not indicate severe problems. Furthermore, we checked for autocorrelation using the Durbin-Watson-test. The corresponding results did not indicate autocorrelation problems. However, the model is not free from

multicollinearity. We therefore have to check our findings using more robust regression estimation methods.

## CONCLUSION AND IMPLICATIONS FOR FURTHER RESEARCH

We analyzed the impact of multinationality on performance for a sample of firms stemming from Continental European countries, namely France, Germany, and Italy. By employing different measures of performance, namely ROA and Tobin's Q, and different proxies for multinationality, we tested several theories on the relationship between multinationality and performance. In accordance with recent research we were able to show that there is a non-linear effect of multinationality on performance which might be due to processes of organizational learning. Yet, unlike Lu and Beamish (2004) and in accordance with Ruigrok et al. (2007) we found that in the case of the firms analyzed, the S-shaped curve between multinationality and performance was inverted (i.e. vertical) in a way that a first stage of multinationality is accompanied by increasing performance, while in a second stage multinationality implies a performance decline possibly due to processes of consolidation and organizational learning, while in a third stage increasing multinationality is again accompanied by increasing performance. Due to the different findings from Lu and Beamish (2004) for Japanese firms, and the results of Ruigrok et al. (2007) for Swiss firms and our own findings for a sample of European firms we argue that there might be a rather strong country-of-origin-effect influencing the shape of the non-linear function between multinationality and performance. Our findings may therefore be interpreted as a plea to test the cross-country generalizability of the relationship between multinationality and performance and look for country-specific influences regarding this. This seems especially important with regard to the research field, where the influence of multinationality on value is examined as up to now almost all research efforts in this field have been concentrated on multinationals from the USA.

Furthermore, in line with previous studies, our findings support arguments from the intangible asset theory and industrial organization theory: the effect multinationality exerts on performance obviously depends to a large extent on the existence of firm specific intangible assets (especially related to R&D) and/or the potential to reap economies of scale through internationalization. Especially with regard to its effect on value, multinationality seems to be worthless without. For further research it seems recommendable to differentiate between research intensive industries and non-research intensive industries as well as between capital intensive industries and non-capital intensive industries as our results seem to indicate that there might be severe differences according to the multinationality-performance logic between different industries.

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<sup>i</sup> Due to significant differences between the corporate governance system of the UK and the corporate governance systems of France, Germany and Italy, which might bias our results, we excluded the UK from our analysis and concentrated our analysis on France, Germany and Italy as typical representatives of the Continental European group.

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Variable	Abbreviation
Tobin' s Q	TQ
Return On Assets	ROA
Foreign Assets / Total Assets	FATA
Foreign Sales / Total Sales	FSTS
Capital Expenditures / Net Sales or Revenues	CETS
Selling, General & Administrative Expenses / Sales	SAS
Expenditures for Research & Development / Sales	RDS
Total Debt / Total Assets	TDTA
Earnings Before Interest and Taxes / Sales	EBITS
Total Assets	TA
Industrial Diversification (Firm being active in more than one SIC-sector on the 2-digit level)	DummyISeg

Table 1: Overview on variables employed the study

Sector / Country	M 1-6 Obs.	M 1-6 %	M 7-12 Obs.	M 7-12 %	M 13-18 Obs.	M 13-18 %	M 19-24 Obs.	M 19-24 %
Oil&Gas	37	3,2	34	3,2	83	3,1	74	3,0
Basic Materials	85	7,4	78	7,4	257	9,7	225	9,2
Industrials	260	22,7	245	23,1	694	26,1	654	26,9
Consumer Goods	229	20,0	225	21,2	515	19,3	510	20,9
Health Care	156	13,6	141	13,3	289	10,9	263	10,8
Consumer Services	40	3,5	36	3,4	88	3,3	76	3,1
Telecommunication	11	1,0	11	1,0	55	2,1	52	2,1
Utilities	34	3,0	35	3,3	82	3,1	83	3,4
Technology	271	23,6	242	22,8	549	20,6	467	19,2
Unspecified	23	2,0	14	1,3	51	1,9	31	1,3
Germany	775	67,6	716	67,5	1532	57,5	1380	56,7
France	297	25,9	272	25,6	705	26,5	627	25,7
Italy	74	6,5	73	6,9	426	16,0	428	17,6
Σ	1146	100,0	1061	100,0	2663	100,0	2435	100,0

Table 2: Composition of the model groups by sectors and countries

	Mean	S.D.	1	2	3	4	5	6	7	8
1. ROA	1,909	15,643	1,000							
2. FATA	34,169	24,302	,187 ***	1,000						
3. CETS	6,272	7,753	-,139 ***	-,035	1,000					
4. SAS	25,431	23,182	-,455 ***	-,136 ***	,264 ***	1,000				
5. RDS	9,693	29,831	-,353 ***	-,159 ***	,192 ***	,450 ***	1,000			
6. TDTA	19,231	17,236	-,041 .	,224 ***	,075 **	-,124 ***	-,067 *	1,000		
7. InTA	13,752	2,553	,266 ***	,313 ***	,070 **	-,310 ***	-,188 ***	,264 ***	1,000	
8. Dummylseg	0,606	0,489	,058 *	,054 *	,025	-,163 ***	-,167 ***	,101 ***	,234 ***	1,000

Table 3: Summary statistics and correlation matrix for models 1-6 (N=1146)

	Mean	S.D.	1	2	3	4	5	6	7	8	9
1. InTQ	0,382	0,615	1,000								
2. FATA	34,480	24,151	,023	1,000							
3. CETS	5,911	6,170	,030	-,046	1,000						
4. SAS	24,464	20,011	,199 ***	-,118 ***	,097 **	1,000					
5. RDS	8,522	27,546	,130 ***	-,132 ***	,217 ***	,478 ***	1,000				
6. TDTA	19,184	15,980	-,178	,265 ***	,131 ***	-,155 ***	-,137 ***	1,000			
7. EBITs	0,004	0,045	-,010	,164 ***	-,252 ***	-,608 ***	-,733 ***	,103 ***	1,000		
8. InTA	13,855	2,516	-,149 ***	,315 ***	,163 ***	-,304 ***	-,151 ***	,303 ***	,243 ***	1,000	
9. Dummylseg	0,621	0,485	-,139 ***	,044 .	,048 .	-,131 ***	-,152 ***	,118 ***	,060 *	,219 ***	1,000

Table 4: Summary statistics and correlation matrix for models 7-12 (N=1061)

	Mean	S.D.	1	2	3	4	5	6	7	8
1. ROA	1,234	16,220	1,000							
2. FSTS	53,450	25,695	,103 ***	1,000						
3. CETS	8,068	33,517	-,097 ***	-,043 *	1,000					
4. SAS	25,839	43,664	-,272 ***	-,023	,518 ***	1,000				
5. RDS	8,586	23,675	-,320 ***	-,059 **	,125 ***	,277 ***	1,000			
6. TDTA	20,326	16,743	-,010	,090 ***	-,007	-,108 ***	-,112 ***	1,000		
7. InTA	13,640	2,418	,233 ***	,151 ***	-,010	-,182 ***	-,212 ***	,241 ***	1,000	
8. Dummylseg	0,588	0,492	,080 ***	,023	-,044 *	-,126 ***	-,156 ***	,080 ***	,214 ***	1,000

Table 5: Summary statistics and correlation matrix for models 13-18 (N=2633)

	Mean	S.D.	1	2	3	4	5	6	7	8	9
1. InTQ	0,393	0,815	1,000								
2. FSTS	53,846	25,622	,013	1,000							
3. CETS	7,172	15,101	,044 *	-,003	1,000						
4. SAS	25,007	41,806	,067 ***	-,002	,534 ***	1,000					
5. RDS	7,756	21,924	,082 ***	-,076 ***	,204 ***	,276 ***	1,000				
6. TDTA	20,522	15,979	-,115 ***	,098 ***	,024	-,111 ***	-,162 ***	1,000			
7. EBITs	-0,014	0,582	-,025	,059 **	-,535 ***	-,763 ***	-,529 ***	,103 ***	1,000		
8. InTA	13,723	2,389	-,157 ***	,143 ***	,015	-,177 ***	-,188 ***	,249 ***	,195 ***	1,000	
9. Dummylseg	0,605	0,489	-,091 ***	,030 .	-,057 **	-,112 ***	-,150 ***	,080 ***	,099 ***	,208 ***	1,000

Table 6: Summary statistics and correlation matrix for models 19-24 (N=2435)

DV	ROA						lnTQ					
Models	Linear	Linear	Squared	Squared	Cubic	Cubic	Linear	Linear	Squared	Squared	Cubic	Cubic
Variables	1	2	3	4	5	6	7	8	9	10	11	12
FATA	6,104 **	-4,163	5,866	-5,869	39,346 ***	24,585 *	0,267 **	-0,195	0,428 .	-0,030	1,370 **	0,588
FATA <sup>2</sup>	-----	-----	0,287	2,046	-96,963 ***	-81,955 **	-----	-----	-0,193	-0,212	-2,890 *	-1,866
FATA <sup>3</sup>	-----	-----	-----	-----	71,370 ***	61,632 **	-----	-----	-----	-----	1,958 *	1,212
CETS	-0,007	0,111	-0,007	0,111	-0,012	0,135	0,006 .	-0,004	0,006 *	-0,004	0,006 .	-0,004
SAS	-0,216 ***	-0,322 ***	-0,216 ***	-0,322 ***	-0,216 ***	-0,317 ***	0,007 ***	0,006 ***	0,007 ***	0,006 ***	0,006 ***	0,006 ***
RDS	-0,097 ***	-0,075 ***	-0,097 ***	-0,075 ***	-0,091 ***	-0,072 ***	0,005 ***	0,004 ***	0,005 ***	0,004 ***	0,005 ***	0,004 ***
TDTA	-0,161 ***	-0,152 ***	-0,161 ***	-0,152 ***	-0,160 ***	-0,152 ***	-0,005 ***	-0,004 **	-0,005 ***	-0,004 **	-0,005 ***	-0,004 **
EBITS	-----	-----	-----	-----	-----	-----	0,454 ***	0,400 ***	0,452 ***	0,395 ***	0,437 ***	0,395 ***
lnTA	0,734 ***	0,746 ***	0,737 ***	0,765 ***	0,743 ***	0,766 ***	-0,029 **	-0,030 **	-0,030 ***	-0,031 **	-0,030 **	-0,031 **
Dummy Iseg	-1,963 *	-1,753 .	-1,959 *	-1,719 *	-2,045 *	-1,831 *	-0,038	-0,016	-0,041	-0,019	-0,044	-0,022
FATA* CETS	-----	-0,004 .	-----	-0,004 .	-----	-0,005 *	-----	3,180e-4 **	-----	3,278e-4 **	-----	2,962e-4 **
FATA* SAS	-----	0,005 ***	-----	0,005 ***	-----	0,005 ***	-----	3,304e-5	-----	3,740e-5	-----	2,432e-5
FATA* RDS	-----	1,633e-4	-----	1,943e-4	-----	3,626e-5	-----	3,116e-4 ***	-----	3,049e-4 ***	-----	3,086e-4 ***
Constant	1,244	3,427	1,235	3,367	-0,901	1,205	-0,012	0,107	-0,012	0,110	-0,065	0,251
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1146	1146	1146	1146	1146	1146	1061	1061	1061	1061	1061	1061
F-Statistic	17,703	17,831	17,151	17,325	17,247	17,272	9,055	9,637	8,799	9,390	8,753	9,208
Adj. R <sup>2</sup>	0,318	0,340	0,318	0,339	0,325	0,345	0,200	0,227	0,200	0,227	0,204	0,227

Table 7: Multivariate Regression (T-values in parantheses, '\*\*\*', '\*\*', '\*' and '.' denote significance at the 0.001, 0.01, 0.05, and 0.1 level, respectively)  
Industry Dummies and Year Dummies are estimated but are not reported here.

DV	ROA						lnTQ					
Models	Linear	Linear	Squared	Squared	Cubic	Cubic	Linear	Linear	Squared	Squared	Cubic	Cubic
Variables	13	14	15	16	17	18	19	20	21	22	23	24
FSTS	3,643 **	1,764	3,132	1,988	11,078	8,689	0,090	0,117	-0,095	-0,078	0,180	0,229
FSTS <sup>2</sup>	-----	-----	0,513	-0,225	-17,451	-15,281	-----	-----	0,185	0,194	-0,433	-0,488
FSTS <sup>3</sup>	-----	-----	-----	-----	11,014	9,230	-----	-----	-----	-----	0,376	0,415
CETS	0,024 *	0,085 ***	0,024 *	0,085 ***	0,024 *	0,085 ***	0,002 .	0,001	0,002 .	0,000	0,002 .	0,000
SAS	-0,073 ***	-0,219 ***	-0,073 ***	-0,219 ***	-0,073 ***	-0,218 ***	0,002 **	0,004 **	0,002 **	0,004 **	0,002 **	0,004 **
RDS	-0,166 ***	-0,063 **	-0,166 ***	-0,063 **	-0,165 ***	-0,062 **	0,003 **	0,002	0,003 **	0,002	0,003 **	0,002
TDTA	-0,118 ***	-0,119 ***	-0,118 ***	-0,199 ***	-0,119 ***	-0,121 ***	-0,004 **	-0,003 **	-0,003 **	-0,003 **	-0,004 **	-0,003 **
EBITS	-----	-----	-----	-----	-----	-----	0,211 ***	0,211 ***	0,211 ***	0,211 ***	0,211 ***	0,211 ***
lnTA	0,898 ***	0,777 ***	0,900 ***	0,776 ***	0,899 ***	0,775 ***	-0,048 ***	-0,047 ***	-0,047 ***	-0,045 ***	-0,047 ***	-0,046 ***
Dummy Iseg	-0,959	-0,999 .	-0,957	-1,000 .	-0,957	-1,000 .	-0,048	-0,048	-0,047	-0,047	-0,047	-0,047
FSTS* CETS	-----	-8,259e-4 *	-----	-8,264e-4 *	-----	-8,183e-4 *	-----	3,249e-5	-----	3,495e-5	-----	3,526e-5
FSTS* SAS	-----	0,002 ***	-----	0,002 ***	-----	0,002 ***	-----	-3,137e-5 *	-----	-3,173e-5 *	-----	-3,246e-5 *
FSTS* RDS	-----	-0,002 ***	-----	-0,002 ***	-----	-0,002 ***	-----	3,208e-5	-----	3,220e-5	-----	3,142e-5
Constant	-2,924	0,474	-2,866	0,488	-3,593	-0,182	0,042	0,173	0,064	0,017	0,037	0,165
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	2663	2663	2663	2663	2663	2663	2435	2435	2435	2435	2435	2435
F-Statistic	22,800	23,699	22,102	23,032	21,513	22,448	10,263	9,571	9,983	9,335	9,718	9,112
Adj. R <sup>2</sup>	0,208	0,230	0,207	0,230	0,208	0,230	0,112	0,113	0,111	0,112	0,111	0,112

Table 8: Multivariate Regression (T-values in parantheses, '\*\*\*', '\*\*', '\*' and '.' denote significance at the 0.001, 0.01, 0.05, and 0.1 level, respectively)  
Industry Dummies and Year Dummies are estimated but are not reported here.