THE VALUATION IMPACT OF GEOGRAPHIC DIVERSIFICATION:

AN EMPIRICAL EXAMINATION FOR GERMAN FIRMS BETWEEN 1990 TO 2006

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1. INTRODUCTION

The value of geographic diversification has been subject in a number of empirical studies. However, despite the substantial number of studies, the results are quite contradictory up to now. Whereas some authors find that geographic diversification increases value, others come to the opposite conclusion, i. e. that geographic diversification destroys value and others find that geographic diversification leads to increased value if certain conditions are fulfilled and does not increase value or even reduces value in the absence of these conditions. A common element of all these studies is that they are all based on samples consisting of US-MNCs.

In this paper we analyze the value impact of geographic diversification for German companies. Given the size of the US market, geographic diversification of US companies may indeed be differently evaluated than the geographic diversification of companies from a small country where effects such as economies of scale may not be sufficiently realized on a national scale. Hence, we replicate the empirical research undertaken by US-researchers for German companies.

This contribution is organized as follows. In the following section we will present a short review of the theoretical and empirical literature concerning the effect of geographic diversification on value. Afterwards we will describe the methodology employed and the sample on which our analysis is based. In the following section we present the empirical findings and discuss the results. In the final section we summarize our findings.

2. THEORY AND LITERATURE REVIEW

With regard to explaining the relationship between geographic diversification and shareholder value, different theories are presented in the literature.

According to the theory of uncomplete capital markets geographically diversified firms can be considered as a diversification vehicle for their shareholders. 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 geographically diversified firm investors reap the benefits of international diversification without having to diversify their capital across several countries. In this case geographically diversified firms are in charge of a diversification advantage compared to their investors and hence, geographic diversification is viewed by investors as something valuable (Errunza/Senbet, 1981, 1984).

According to location theory, geographically diversified firms are able to combine and exploit the advantages of different locations. They should therefore possess an advantage compared to their national competitors (Kogut, 1985).

The proponents of internalization theory argue, that geographic diversification is valuable, if the geographically diversified firm is in charge of certain firm-specific intangible assets (monopolistic advantages), which should be internally exploited and can be capitalized on foreign markets. These firm-specific intangible assets enable these firms to compete successfully against national competitors, who usually have better knowledge about the local environment (Hymer, 1976; Morck/Yeung, 1991).

On the other hand, proponents of agency theory argue, that geographic diversification is more in the interests of management 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 geographic diversification on firm risk, it is not in the interest of shareholders. This argument has been adopted by theorists using option pricing arguments. Doukas/Kan (2006) argue, that internationalization leads to a wealth transfer from stockholders to bondholders.

Summarizing extant research concerning the effect of geographic diversification on shareholder value proves to be rather difficult due to the fact that the concept of value employed in previous studies often proves to be surprisingly vague. In many studies the concepts of shareholder value and firm value are treated as equivalent concepts, or at least it is implicitly assumed that their response to internationalization are positively correlated (Mishra/Gobeli, 1998; Morck/Yeung, 1991). Morck/Yeung (1991) analyze the effect of geographic diversification on Tobin’s Q, where Q is defined as the “market value of the firm (V) divided by the replacement costs of its tangible assets (T)“ (p. 171). However, interpreting their findings, the authors argue about the effect of geographic diversification on „shareholder wealth“ (p. 178). Hence, in a number of studies, the interpretations of empirical results appear to be dubious as the authors exclude potential wealth transfers between stockholders and bondholders induced by internationalization. Surprisingly, it took 25 years from the publication of Errunza/Senbet (1981) on to the point where the idea of wealth transfers between stockholders and bondholders as a consequence of internationalization was introduced by Doukas/Kan (2006).

Nevertheless, a number of previous studies include findings, which might be substantial in order to evaluate the effect of geographic diversification on shareholder value due to the operationalization of Tobin’s Q, which is usually employed. Tobin’s Q is defined as the “market value of the firm divided by the replacement costs of its tangible assets” (Morck/Yeung, 1991, p. 171). While the replacement costs of the firm’s tangible assets are usually estimated by the book values of equity and debt, the market value of the firm consists of the market value of equity plus the market value of debt. Due to lack of information on the market value of debt, however, extant studies usually use the book (!) value of debt as a proxy for its market value. But, if Tobin’s Q is estimated this way, it can not capture any changes in the market value of debt. The focus of Tobin’s Q, operationalized in this way, remains only on the change in the market value of equity, i. e. shareholder value:

The empirical-based discussion on the value of geographic diversification has been significantly stimulated by the contributions of Errunza/Senbet (1981, 1984). The authors find that geographic diversification increases value, albeit the effect on value weakens due to the increasing liberalization of international capital markets. Hence, the authors argue to have found empirical evidence on the validity of the uncomplete capital market theory. This theory is again tested by Morck/Yeung (1991), who interpret their findings as a proof that capital markets are sufficiently integrated, so that the geographic diversification of firms is not a value in itself. A number of researchers such as Markides/Ittner (1994), Markides/Oyon (1998), Christophe (1997), Mishra/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 uncomplete capital markets theory must be considered as dubious (Eckert/Engelhard, 2008).

Furthermore, researchers have analyzed whether the valuation impact of geographic diversification depends on the existence of firm-specific intangible assets. Morck/Yeung (1991) can be seen as the pioneering contribution regarding this question. The authors use research and development spending as a measure of firm specific intangible assets regarding research and development capabilities and advertising expenditures as a proxy for firm-specific intangible assets with regard to marketing skills and consumer goodwill. The essence of their empirical results is, that the existence of firm-specific intangible assets is crucial if internationalization is expected to create value. The contributions of Markides/Ittner (1994), Markides/Oyon (1998), Christophe (1997) and Mishra/Gobeli (1998), who adopt the research design of Morck/Yeung to some extent, find supporting evidence.

Moreover, Morck/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 geographic diversification 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/Ittner (1994) resp. Markides/Oyon (1998) who concentrate on the valuation effect of foreign acquisitions, examine the impact of location advantages, however without being able to deliver significant results. A number of event studies, which analyze the effect that the announcement of a foreign acquisition exerts on the share price, find that acquisitions from developing countries realize significant higher share price reactions (Doukas/Travlos, 1988; Doukas, 1995; Kiymaz, 2004; Doukas/Kan, 2006): a finding that is perfectly in line with the assumption that geographic diversification inceases value due to the fact that geographically diversified firms are able to combine the location advantages of different locations. This assumption is further supported by Pantzalis (2001), who comes to the conclusion that having the ability to combine the advantages of different locations increases value, albeit only if the firm is in charge of firm-specific intangible assets that can be exploited abroad.

Recent research, however, leaves a sceptical impression: Click/Harrison (2000) find a negative valuation impact of geographic diversification on Tobin’s Q in the range of 8.6 to 17.1 percent. This finding is supported by the results of Denis/Denis/Yost (2002). Referring to these findings Doukas/Kan (2006) argue that internationalization leads to a wealth transfer from stockholders to bondholders. According to the contingent claims-hypotheses, internationalization, in general leads to a decrease in shareholder value, except for those firms where leverage is very low.

Overall, we have to concede, that all the findings reported here have been gained by analyzing samples consisting exclusively or almost exclusively of US-companies. These companies have a very large home market. Certain advantages, which other firms may only realize by going abroad, may be realized by US-companies by exploiting the potential of their home market. Hence, we may assume that the valuation of geographic diversification might differ according to the size of the home market of the geographically diversified firm. Therefore, to analyze the valuation impact of geographic diversification in the case of companies from a much smaller market, e. g. Germany, might contribute to increase our knowledge on the effect that geographic diversification exerts on shareholder value.

3. SAMPLE AND METHODOLOGY

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

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

Furthermore, in order to gain more insight, Return on equity (ROE) and Return on assets (ROA) were used as additional proxies for firm performance. In Table 1 an overview on the variables employed in this study is given.

See Table 1

Geographic diversification was measured using the ratio of foreign sales to total sales and the ratio of foreign assets to total assets. In order to proxy for industrial diversification we classified 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.

Our sample consists of listed German corporations. As the period of analysis we select the time interval stretching from 1990 to 2006. Capital markt data were obtained from Thomson Financial Datastream, accounting data were retrieved from Worldscope. We included all German corporations which were listed at least for some years for our period of analysis. Thus, we reached a total number of 1607 corporations.

This sample given, we first had to neutralize certain extreme values following the 3-Sigma-rule. After this procedure we were left with a sample of 13.130 firm-year-observations. However, not for all of these 13.130 firm-year-observations information was available for all variables considered. Therefore, the actual number of valid data for each analysis is different. An overview on the availability of information is given in table 2.

See Table 2

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4. EMPIRICAL RESULTS

4.1 Descriptive Statistics

Table 2 reports the descriptive statistics for our sample. The companies included in this study have on average a Tobin's Q of 2.082 (median value:1.272). Their return on equity on average is –16.6 percent (median value: 7.3) and their return on assets on average is 0.7 (median value: 3.3).

Concerning geographic diversification, the firms in our sample have an average foreign sales ratio of 44.8 percent (median value: 32.7) and a foreign asset ratio of 16.6 percent (median value: 0). The distribution of companies concerning industries is presented in table 3. The largest subgroup of our sample consists of firms from the manufacturing sector, followed by financial services. Companies from the telecommunication sector can be considered as the smallest subgroup.

With regard to industrial diversification we find that most companies where information about industrial diversification is given, are reporting only operations in one 2-digit-SIC category (table 4). If we compare, however, between industrially diversified and non-industrially diversified firms we find that the majority of firms where information is available is industrially diversified (table 5).

See Tables 3,4,5

4.2 On the influence of geographic and industrial diversification on shareholder value

4.2.1 Univariate and Bivariate Analysis

In a first step of analysis, we examined the difference in Tobin's Q between geographically diversified firms and geographically non-diversified firms. Geographically diversified firms were defined as firms, where the foreign asset ratio (FATA) resp. the foreign sales ratio (FSTS) amounts to more than 10 percent and geographically non-diversified firms were defined as firms where the foreign asset ratio (FATA) resp. the foreign sales ratio (FSTS) is not more than 10 percent. We find that geographically non-diversified firms on average have a significantly higher Tobin's Q, irrespective of what kind of proxy is uesd for geographical diversification. However, differences in return on equity and return on assets are not significant.

See Tables 6 and 7 about here

A closer look at the data revealed that the significant difference in Tobin's Q between geographically diversified firms and geographically non-diversified firms seems to be influenced by geographically non-diversified firms from the financial services sector. We therefore excluded these firms in a second step. For the remaining sample, we tested again for differences between geographically diversified firms and geographically non-diversified firms. But, even when the differences seem to shrink, they are still existent to a certain extent: when employing the foreign asset ratio as a proxy for geographical diversification we find that geographically diversified firms have a significant lower tobin's Q compared to geographically non-diversified firms. On the other side, however these firms exhibit a higher return on assets compared to geographically non-diversified firms. If we use the foreign sales ratio the indicator of geographic diversification, differences measured by Tobin's Q, return on equity and return on sales are no longer significant.

See Tables 8 and 9

Referring to Bodnar/Tang/Weintrop (1997) we simultaneously take account of geographic and industrial diversification. Employing the sample, which excludes the firms from the financial services sector, we first compare between geographically diversified firms and geographically non-diversified firms, which are industrially non-diversified (table 10 and 11). Surprisingly, the differences regarding Tobin's Q, return on equity and return on assets are no longer significant irrespective of the proxy for geographic diversification.

See Tables 10 and 11

Next, we compare between geographically diversified firms and geographically non-diversified firms, which are industrially diversified (table 12). Employing FATA as the proxy for geographic diversification we find significant differences with regard to Tobin's Q as well as with regard to return on equity and return on assets. Geographically diversified firms exhibit on the one hand, on average a significantly smaller Tobin's Q, however, on the other hand, a higher return on equity as well as a higher return on assets. Measuring geographic diversification by FSTS, the significance of the difference between the average Tobin's Q of geographically diversified firms and geographically non-diversified firms disappears. Neverthless, weak statistical difference concering return on equity and return on assets remains. Geographically non-diversified fims on average have a smaller return on equity and a smaller return on assets compared to geographically diversified firms (table 13).

See Tables 12 and 13

Furthermore, we examined the effect industrial diversification exerts on non-geographically diversified firms (table 14). Geographic diversification was measured by the foreign sales ratio. No significant differences can be found concerning Tobin's Q, return on equity and return on sales.

See Table 14

Then we analyzed the effect of industrial diversification concentrating on geographically diversified firms (table 15). In this case, we find significant differences with regard to Tobin's Q, which indicate that industrial diversification is interpreted as a value destruction activity when accompanied by geographic diversification. Geographically diversified firms, which are not industrially diversified on average have a higher Tobin's Q than geographically diversified firms, which are also industrially diversified.

See table 15

Summarizing, the results up to now indicate, that diversification is considered as a liability by the capital market when both modes of diversification are used simultaneously. In the case of industrially non-diversified companies no significant differences between geographically diversified firms and geographically non-diversified firms can be found. In the case of geographically non-diversified firms no significant differences between industrially diversified firms and industrially non-diversified firms can be found. However, for industrially diversified firms we find significant differences between geographically diversified firms and geographically non-diversified firms. And for geographically diversified firms we find significant differences between industrially diversified firms and industrially non-diversified firms, which seem to indicate that simultaneous industrial and geographic diversification is considered by the capital market as inefficient.

4.2.2 Multivariate Analysis

In the next section several multivariate regression models were testet in order to gain insight on the impact of geographic diversification on shareholder value. As control variables we considered leverage, profitability, size, industry, 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/Harrison (2000), Denis/Denis/Yost (2002), Mishra/Gobeli (1998), Morck/Yeung (1991). In most of these studies a significant negative relationsship between leverage and shareholder value was found. As a proxy for size we used total assets (TA). Concerning the effect of firm size extant research reports contradictory results (Click/Harrison, 2000; Christophe, 1997). Referring to Bodnar/Tang/Weintrop (1997) and Denis/Denis/Yost (2002) who discovered a significant positive relationship between profitability and shareholder value, we included profitability as a control variable in our regression model measuring profitability by the ratio of EBIT per sales. We took account of a firm’s industry by employing industry dummies (Click/Harrison, 2000; Morck/Yeung 1991). Additionally, Bodnar/Tang/Weintrop (1997) and Denis/Denis/Yost (2002) take account of a firm’s capital intensity. We interpret capital intensity as a proxy for economies of scale. This control variable is measured by capital expenditures per sales. Bodnar/Tang/Weintrop (1997) as well as Denis/Denis/Yost (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 firm specific 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), which was introduced by Morck/Yeung (1991). A significant positive effect of this variable on shareholder value has been confirmed by the studies of Bodnar/Tang/Weintrop (1997), Christophe (1997), Denis/Denis/Yost (2002), Markides/Oyon (1998), Mishra/Gobeli (1998). Firm-specific intangible assets concerning marketing capabilities and consumer goodwill were considered by Bodnar/Tang/Weintrop (1997), Christophe (1997), Denis/Denis/Yost (2002), Markides/Ittner (1994), Markides/Oyon, but mostly did not prove to be as significant as research and development per sales. 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 regarding marketing capailities as well as specific organizational and managerial skills. Other firm-specific intangible assets were assumed to be proxied by the ratio of intangible assets, which are explicitly shown in a company’s annual statement, to total assets (TIAA).

Summarizing, we tested the following regression model:

$$LnQ = Konst. + \sum_{i=1}^{n-1} \gamma_i \times BD_i + \beta_1 \times MN + \beta_2 \times RDS + \beta_3 \times SAS + \beta_4 \times TIAA + \beta_5 \times CETS + \beta_6 \times TDTA + \beta_7 \times TA + \beta_8 \times EBITS + \beta_9 \times DummyISeg + \varepsilon$$

We estimate ordinary least squares regressions of the log of Tobin’s Q. The results of this model are presented in table 16 (M1 and M2). We find a significant negative relationship between leverage and shareholder value. This result is consistent with the findings of Christophe (1997), Click/Harrison (2000), Denis/Denis/Yost (2002) and Mishra/Gobeli (1998). Size also appears to be significantly negative. Furthermore, corresponding to

Bodnar/Tang/Weintrop (1997) and Denis/Denis/Yost (2002) profitability and capital intensity exert a significant positive effect on shareholder value.

See table 16

Additionally, we find a significant positive effect of RDS on shareholder value, which corresponds to the findings of Bodnar/Tang/Weintrop (1997), Christophe (1997), Denis/Denis/Yost (2002), Markides/Oyon (1998), Mishra/Gobeli (1998) and Morck/Yeung (1991). Contrary to most previous studies, the effect of SAS on shareholder value proves to be as strong as the effect of RDS. When employing the foreign asset ratio as proxy for geographic diversification, SAS has a much higher significance and the regression coefficient is nearls as twice as high as the regression coefficient of RDS. The regression coefficient of TIAA is neither significant in M1 nor in M2.

Moreover, the effect of industrial diversification is weakened in the regression model compared to univariate analysis. When using FATA as proxy for geographic diversification, industrial diversification comes still out significant and with a negative sign. However, when geographic diversification is measured by FSTS, industrial diversification is no longer significant.

Regarding the influence of geographic diversification, we have to concede that the effect of geographic diversification heavily depends on the measure employed. On the one hand, FSTS as a measure of geograhical diversification of sales proves to be not significant, while on the other hand, FATA – a measure of geographic diversification of assets - comes out significant with a positive sign. This difference regarding the significance of different proxies for geographic diversification is contradictory to the results of Click/Harrison (2000), who found an “asset channel of value destruction” in the case of geographic diversification. On the grounds of their empirical findings they argued, that while geographic expansion of sales beyond the borders of the home country can be considered as a value creating activity, if it is not accompanied by geographic diversification of assets and that the allocation of assets abroad has to be considered as a value destroying activity, as the investments abroad do not reach the same level of return as do investments at home.

The positive effect of FATA on shareholder value is on the one hand consistent with the findings of Bodnar/Tang/Weintrop (1997) and on the other hand contradictory to the results of Click/Harrison (2000) and Denis/Denis/Yost (2002), who argue that geographic diversification leads to a value discount. This result is especially remarkable, as it stands in contradiction to the findings generated by our univariate and bivariate analysis. Obviously, geographic diversification seems to be a classical case of Simpson’s paradox (Simpson, 1951). Therefore, our findings also show that univariate as well as bivariate comparisons of the value effect of geographic diversification can not be considered as valid and may lead to false conclusions.

Furthermore remarkable seems to be that in the model where we use FSTS as a proxy for geographic diversification, we realize an r^2 of hardly 6 percent. However, when substituting FSTS by FATA, r^2 jumps to nearly 15 percent. This finding reveals the the value relevance of different measures of geographic diversification varies and that for German firms the geographic distribution of assets seems to be of special importance for Tobin’s Q.

Next, the relationship between geographic diversification and shareholder value is going to be analyzed more closely. Especially, we want to analyze whether the valuation effect of geographic diversification depends on whether the geographically diversified firm is in charge of firm-specific intangible assets or has the potential to realize certain eceonomies of scale through being geographically diversified. Therefore, referring to Morck/Yeung (1991) we developed another regression model, where the effect of geographic diversification is split up into several components. We propose that the regression coefficient of geographic diversification β_1 can be considered as:

$$\beta_1 = a_0 + \alpha_1 \times RDS + \alpha_2 \times SAS + \alpha_3 \times TIAA + \alpha_4 \times CETS$$

which leads to the following regression model:

$$LnQ = Konst. + \sum_{i=1}^{n-1} \gamma_i \times BD_i + \alpha_0 \times MN + \alpha_1 \times MN \times RDS + \alpha_2 \times MN \times SAS + \alpha_3 \times MN \times TIAA +$$
$$\alpha_4 \times MN \times CETS + \beta_2 \times RDS + \beta_3 \times SAS + \beta_4 \times TIAA + \beta_5 \times CETS + \beta_6 \times TDTA + \beta_7 \times TA +$$
$$\beta_8 \times EBITS + \beta_9 \times DummyISeg + \varepsilon$$

The significance of the regression coefficients of the different components of geographic diversification allows us to draw conclusions on the value relevance of certain preconditions of corporate geographic diversification. The regression coefficient α_0 has to be interpreted as the effect of geographic diversification which is independent of firm-specific intangible assets or certain potentials for eceonomies of scale. However, this residual factor should be considered as hard to interpret as it may capture different effects. Morck/Yeung (1991) interpret the non-significance of this regression coefficient in a way that this would refute the empirical validity of the uncomplete capital markets theory. However, we do not agree with this interpretation. In order to draw valid conclusions on the empirical validity of the uncomplete capital markets theory, it would be necessary to differentiate between firms, which are active in countries, whose capital markets are highly integrated with the home capital market of the geographically diversified firm and firms which are active in countries, whose capital markets are insufficiently integrated with the home capital market of the geographically diversified firm. Due to the fact that neither we had nor Morck/Yeung (1991) seemed to have access to the necessary data to analyze the value relevance of the uncomplete capital markets theory we have to concede that this topic has to remain unsolved and thus has to be left as a topic for future research.

If we use FATA as a measure of geographic diversification (Table 16, M3) the control variables RDS, SAS, TDTA and EBITS remain significant. What is not significant any more is the regression coeffcient of geographic diversification independent of firm-specific intangible assets or certain potentials for eceonomies of scale. Also capital intensity is no longer significant. On the other hand, the regression coefficients of the interaction products of geographic diversification with RDS, SAS, TIAA and CETS come out significant. Especially remarkable seems to be the interaction product of geographic diversification and capital expenditures per sales: the regression coefficient of this component proves to be highly significant, indicating that in the case of German companies investors value geographic diversification if it offers the chance to realize economies of scale. This finding tends to support the hypotheses that the evaluation of the geographic diversification of the firm by investors may differ depending on the size of the home market.

Furthermore, the findings of our study confirm the results of Markides/Oyon (1998), Morck/Yeung (1991) and Mishra/Gobeli (1998), that geographic diversification can be considered as value creating if the firm is in charge of firm-specific intangible assets regarding research and development or advertising. Our findings may furthermore indicate that firm-specific intangible assets regarding certain management skills may also be considered as necessary preconditions for geographic diversification to create value. The significant negative effect of FATA-TIAA might be explained by the significant influence that the "goodwill" from acquisitions has on the amount of intangible assets which are shown in an acquirer's balance sheet statement. Given the difficulties associated with the integration of acquisitions and the fact that the higher the price of the acquisition, the higher the goodwill and hence TIAA, the negative sign of FATA-TIAA might be explained as a consequence of the specifics of acquisitions. Therefore, TIAA might simply be judged as an insufficient proxy for intangible assets.

On the whole, however, by introducing the interaction products regarding firm-specific intangible assets and potentials for economies of scale, r^2 has increased to almost 20 percent.

Using FSTS as a measure of geographic diversification, r^2 is remarkable lower (table 16, M4). Therefore, in the case of German firms, the distribution of assets seems to bear much more value relevance than the geographic distribution of sales. Regarding the control variables employed, no remarkable differences compared to M3 can be found. However, in this regression model the coefficient of geographic diversification independent of firm-specific intangible assets or certain potentials for eceonomies of scale is positive and significant at the 5-percent-level. Contrary to M3 FSTS-RDS as well as FSTS-TIAA are no longer significant. On the other hand FSTS-SAS as well as FSTS-CETS are highly significant. Therefore, the positive effect of the potential for eceonomies of scale as a precondition for geographic diversification is confirmed. The significant negative effect of FSTS-SAS is hard to interpret.

Regardless whether FSTS or FATA is used as a proxy for geographic diversification, industrial diversification is no longer significant. Our results are therefore in contrast to the findings of Bodnar/Tang/Weintrop (1997), who find a significant negative effect of industrial diversification and plead for taking account of both forms of corporate diversification when analyzing the effect of one mode of diversification. Our findings indicate that industrial diversification has no significant effect on shareholder value.

Finally, taking account of the findings of Doukas/Kan (2006), we analyze the effect, leverage has on the relationship between geographic diversification and shareholder value. Doukas/Kan (2006) argue that internationalization is accompanied by a wealth transfer from stockholders to creditors. However, if debt as a share of a firm's total capital is rather low, the wealth transfer is rather marginal and internationalization can be considered as neutral concerning its impact on the wealth of stockholders. To test this relationship, we implemented another interaction term into our model, FATA-TDTA resp. TSTS-TDTA. The resulting regression model is

$$LnQ = Konst. + \sum_{i=1}^{n-1} \gamma_i \times BD_i + \alpha_0 \times INT + \alpha_1 \times INT \times RDS + \alpha_2 \times INT \times SAS + \alpha_3 \times INT \times TIAA +$$
$$\alpha_4 \times INT \times CETS + \alpha_5 \times INT \times TDTA + \beta_2 \times RDS + \beta_3 \times SAS + \beta_4 \times TIAA + \beta_5 \times CETS +$$
$$\beta_6 \times TDTA + \beta_7 \times TA + \beta_8 \times EBITS + \beta_9 \times DummyISeg + \varepsilon$$

We would expect α_5 to come out with a negative sign: The higher the leverage, the larger the decrease of Tobin's Q as a consequence of internationalization. However, as table 16 M5 and M6 show, the introduction of this component does not lead to an improvement of r^2. Using FATA as a measure of geographic diversification, the regression coefficient of the interaction product of geographic diversification with leverage proves to be not significant. When FSTS is employed, the regression coefficient is significant, but not with the expected sign. We, therefore have to concede, that our findings are not able to confirm the proposals of Doukas/Kan (2006) concerning the impact of leverage on the relationship between geographic diversification and shareholder value.

5. CONCLUSION

In our sample, which consists of listed German firms during the time span from 1990 to 2006, geographically non-diversified firms on average have a higher Tobin's Q compared to geographically diversified firms. This relationship remains stable even after controlling for industrial diversification. However, in our multivariate regression model, the impact proves to be quite different. Concerning its impact on shareholder value, geographic diversification proves to be positive. Obviously, the relationship between geographic diversification and shareholder value seems to be a classical example of Simpson's paradox. Hence, bivariate analysis of the effects of geographic diversification on shareholder value must be considered as inappropriate (Michel/Shaked, 1986).

In our multivariate regression model, if geographic diversification is measured by the ratio of foreign assets, we find a positive effect of geographic diversification on shareholder value. We find that the effect of geographic diversification on shareholder value depends on the existence of firm-specific intangible assets especially those related to research and development abilities. Hence, our findings contribute to the results of Morck/Yeung (1991), Mishra/Gobeli (1998), Christophe (1997), Markides/Ittner (1994) and Markides/Oyon (1998). Furthermore, our findings tend to support the view that the valuation effect of mulinationality depends on the potential to realize eceonomies of scale. We found no support for the contingent claims hypotheses of Doukas/Kan (2006).

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Variable	**Abbreviation**
Tobin' s Q	TQ
Return On Equity	ROE
Return On Assets	ROA
Foreign Sales / Total Sales	FSTS
Foreign Assets / Total Assets	FATA
Measure for Geographic Diversification (either FSTS or FATA)	MN
Industry Dummy	BDi
Expenditures for Research & Development / Sales	RDS
Selling, General & Adminis-trative Expenses / Sales	SAS
Other Intangible Assets	TIAA
Capital Expenditures / Net Sales or Revenues	CETS
Total Debt / Total Assets	TDTA
Total Assets	TA
Earnings Before Interest and Taxes / Sales	EBITS
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

		TQ	ROE	ROA	FATA	FSTS	TDTA	TA	RDS	SAS	TIAA
N	Valid	9582	10507	10755	2942	6184	11671	11790	2491	4745	11610
	Missing	3548	2623	2375	10188	6946	1459	1340	10639	8385	1520
Mean		2.082	-16.913	-.666	16.598	44.771	48.058	6269539.159	14.036	52.138	.079
Median		1.272	7.250	3.310	.000	32.710	15.960	93944.500	3.700	16.690	.014
Percentile	25	1.027	-3.030	.120	.000	.030	1.630	24557.500	1.270	9.380	.002
	75	1.807	15.870	6.770	27.238	58.808	35.050	450957.000	8.510	28.600	.090

Table 2: Descriptive statistics

Industry	Frequency	Percent
Oil & Gas	142	1.1
Basic Materials	702	5.3
Industrials	3043	23.2
Consumer Goods	2221	16.9
Health Care	664	5.1
Consumer Services	1343	10.2
Telecommunications	136	1.0
Utilities	334	2.5
Financials	2467	18.8
Technology	1938	14.8
Others	140	1.1
Gesamt	13130	100.0

Table 3: Distribution of sample according to industry

Number of business segments		Frequency	Percent
Valid	NA	3427	26.1
	1	4713	35.9
	2	2965	22.6
	3	1400	10.7
	4	483	3.7
	5	96	.7
	6	33	.3
	7	13	.1
	Total	13130	100.0

Table 4: Degree of industrial diversification

The number of business segments of each firm is measured using the SIC-classification system at the 2-digit level (NA means “not available”).

		Häufigkeit	Prozent
Valid	0	4713	35.9
	1	4990	38.0
	NA	3427	26.1
	Total	13130	100.0

Table 5: Industrial diversification measured by DummyISeg

“0“ means that a firm has activities only in one segment (measured according to the SIC-classification system at the 2-digit-level), “1” means that a firm has activities in more than one segment (measured according to teh SIC-classification system at the 2-digit-level, NA means “not available”)

	DummyFATA	N	Mean	Standard deviation	Standard error of mean	T-Test, significance
TQ	0	1622	2.078	2.258	.056	.000
	1	1070	1.631	1.584	.048	
ROE	0	1671	-4.614	135.462	3.314	.359
	1	1103	-.752	86.202	2.596	
ROA	0	1716	2.188	19.708	.476	.407
	1	1121	2.749	13.845	.414	

Table 6: Comparison of geographically diversified and geographically non-diversified firms (measured by FATA; total sample, DummyFATA=0 if the ratio of foreign assets to total assets does not excced 10 percent; DummyFATA=1, if the ratio of foreign assets to total assets excceds 10 percent)

	DummyFSTS	N	Mean	Standard deviation	Standard error of mean	T-Test, significance
TQ	0	1760	2.135	2.864	.068	.052
	1	3834	1.842	6.022	.097	
ROE	0	1804	-2.935	128.967	3.036	.841
	1	4021	-2.202	128.837	2.032	
ROA	0	1842	2.436	17.987	.419	.698
	1	4113	2.266	14.341	.224	

Table 7: Comparison of geographically diversified and geographically non-diversified firms (measured by FSTS; total sample, DummyFSTS=0 if the ratio of foreign sales to total sales does not excced 10 percent; DummyFSTS=1, if the ratio of foreign sales to total sales excceds 10 percent)

	DummyFATA	N	Mean	Standard deviation	Standard error of mean	T-Test, significance
TQ	0	1150	1.781	1.329	.039	.042
	1	1022	1.653	1.612	.050	
ROE	0	1195	-9.690	150.617	4.357	.120
	1	1048	-1.708	88.054	2.720	
ROA	0	1232	1.200	21.455	.611	.054
	1	1068	2.646	14.114	.432	

Table 8: Comparison of geographically diversified and geographically non-diversified firms (measured by FATA; sample without firms from the financial services sector, DummyFATA=0 if the ratio of foreign assets to total assets does not excced 10 percent; DummyFATA=1, if the ratio of foreign assets to total assets excceds 10 percent)

	DummyFSTS	N	Mean	Standard deviation	Standard error of mean	T-Test, significance
TQ	0	1208	1.927	2.579	.074	.734
	1	3666	1.865	6.155	.102	
ROE	0	1245	-7.647	145.643	4.128	.252
	1	3852	-2.333	131.099	2.112	
ROA	0	1281	1.687	19.578	.547	.333
	1	3946	2.263	14.513	.231	

Table 9: Comparison of geographically diversified and geographically non-diversified firms (measured by FSTS; sample without firms from the financial services sector, DummyFSTS=0 if the ratio of foreign sales to total sales does not excced 10 percent; DummyFSTS=1, if the ratio of foreign sales to total sales excceds 10 percent)

	DummyFATA	N	Mean	Standard deviation	Standard error of mean	T-Test, significance
TQ	0	487	1.768	1.370	.062	.530
	1	281	1.845	1.787	.107	
ROE	0	511	-4.863	95.062	4.205	.959
	1	285	-5.178	57.243	3.391	
ROA	0	522	1.231	22.501	.985	.916
	1	290	1.390	16.6164	.976	

Table 10: Comparison of geographically diversified and geographically non-diversified firms (measured by FATA; sample without firms from the financial services sector, only industrially non-diversified firms, DummyFATA=0 if the ratio of foreign assets to total assets does not excced 10 percent; DummyFATA=1, if the ratio of foreign assets to total assets excceds 10 percent)

	DummyFSTS	N	Mean	Standard deviation	Standard error of mean	T-Test, significance
TQ	0	497	1.951	3.635	.163	.114
	1	1153	1.680	1.825	.054	
ROE	0	512	-2.419	86.557	3.825	.916
	1	1218	-3.251	170.523	4.886	
ROA	0	523	1.971	20.826	.911	.816
	1	1244	1.759	15.802	.448	

Abb. 11: Comparison of geographically diversified and geographically non-diversified firms (measured by FSTS; sample without firms from the financial services sector, only industrially non-diversified firms, DummyFSTS=0 if the ratio of foreign sales to total sales does not excced 10 percent; DummyFSTS=1, if the ratio of foreign sales to total sales excceds 10 percent)

	DummyFATA	N	Mean	Standard deviation	Standard error of mean	T-Test, significance)
TQ	0	503	1.680	1.028	.0459	.005
	1	725	1.500	1.150	.0427	
ROE	0	524	-18.752	205.569	8.980	.059
	1	745	-.453	98.150	3.596	
ROA	0	536	.752	21.373	.923	.023
	1	760	3.119	13.029	.473	

Table 12: Comparison of geographically diversified and geographically non-diversified firms (measured by FATA; sample without firms from the financial services sector, only industrially diversified firms, DummyFATA=0 if the ratio of foreign assets to total assets does not excced 10 percent; DummyFATA=1, if the ratio of foreign assets to total assets excceds 10 percent)

	DummyFSTS	N	Mean	Standard deviation	Standard error of mean	T-Test, significance
TQ	0	528	1.811	1.198	.052	.965
	1	2265	1.824	6.418	.135	
ROE	0	546	-16.551	201.547	8.625	.084
	1	2351	-1.093	111.102	2.291	
ROA	0	559	1.259	19.457	.823	.073
	1	2411	2.797	11.598	.236	

Table 13: Comparison of geographically diversified and geographically non-diversified firms (measured by FSTS; sample without firms from the financial services sector, only industrially diversified firms, DummyFSTS=0 if the ratio of foreign sales to total sales does not excced 10 percent; DummyFSTS=1, if the ratio of foreign sales to total sales excceds 10 percent)

	DummyISeg	N	Mean	Standard deviation	Standard error of mean	T-Test, significance
TQ	0	487	1.768	1.370	.062	.253
	1	503	1.680	1.028	.046	
ROE	0	511	-4.863	95.062	4.205	.162
	1	524	-18.752	205.569	8.980	
ROA	0	522	1.231	22.501	.985	.723
	1	536	.752	21.373	.923	

Table 14: Comparison of industrially diversified and industrially non-diversified firms (sample without firms from the financial services sector, only geographically non-diversified firms, geographical diversification measured by FATA, geographically non-diversified firms are firms, where FATA does not exceed 10 percent, DummyISeg = 0 if firms report only one business segment at the 2-digit standard industrial classification (SIC) code level, DummyISeg = 1 if firms report more than one business segment at the 2-digit standard industrial classification (SIC) code level).

	DummyISeg	N	Mean	Standard deviation	Standard error of mean	T-Test, significance
TQ	0	281	1.8453789	1.78730008	.10662138	.003
	1	725	1.4998584	1.15046130	.04272706	
ROE	0	285	-5.177965	57.2432898	3.3907998	.445
	1	745	-.453248	98.1504415	3.5959539	
ROA	0	290	1.390483	16.6162764	.9757413	.112
	1	760	3.118987	13.0294949	.4726295	

Table 15: Comparison of industrially diversified and industrially non-diversified firms (sample without firms from the financial services sector, only geographically diversified firms, geographical diversification measured by FATA, geographically diversified firms are firms, where FATA exceeds 10 percent, DummyISeg = 0 if firms report only one business segment at the 2-digit standard industrial classification (SIC) code level, DummyISeg = 1 if firms report more than one business segment at the 2-digit standard industrial classification (SIC) code level).

Regression model	M1	M2	M3	M4	M5	M6
Independent Variables						
Intercept	3.596 e-01 (6.043) ***	4.719 e-01 (8.507) ***	3.566e-01 (5.157) ***	3.902e-01 (5.964) ***	3.702e-01 (5.179) ***	4.326e-01 (6.173) ***
DummyISeg	-8.170 e-02 (-2.055) *	-7.410 e-03 (-0.216)	-5.062e-02 (-1.304)	-7.548e-03 (-0.224)	-4.893e-02 (-1.258)	-8.174e-03 (-0.243)
FATA	2.180 e-03 (2.836) **	---------------	-1.581e-03 (-1.030)	--------------	-2.218e-03 (-1.265)	-------------
FSTS	--------------	9.538 e-04 (1.511)	--------------	1.996e-03 (2.211) *	-------------	1.014e-03 (0.943)
RDS	2.823 e-03 (3.605) ***	2.613 e-03 (3.358) ***	2.761e-03 (3.540) ***	1.869e-03 (2.263) *	2.663e-03 (3.365) ***	1.722e-03 (2.074) *
SAS	5.427 e-03 (5.688) ***	1.568 e-03 (2.833) **	3.159e-03 (2.609) **	4.719e-03 (5.463) ***	3.071e-03 (2.525) *	4.655e-03 (5.389) ***
TIAA	-2.048 e-01 (-1.505)	-1.546 e-01 (-1.267)	2.309e-01 (1.063)	-5.410e-02 (-0.231)	2.615e-01 (1.183)	3.385e-03 (0.014)
CETS	1.106 e-02 (4.234) ***	1.860 e-03 (3.710) ***	2.804e-04 (0.080)	8.739e-04 (1.705) .	5.912e-04 (0.167)	8.835e-04 (1.724) .
TDTA	-5.351 e-03 (-4.701) ***	-4.011 e-03 (-3.972) ***	-4.468e-03 (-3.894) ***	-4.302e-03 (-4.285) ***	-5.728e-03 (-2.827) **	-7.491e-03 (-3.490) ***
TA	-1.522 e-09 (-2.119) *	-1.999 e-09 (-2.750) **	-1.811e-09 (-2.567) *	-2.719e-09 (-3.747) ***	-1.799e-09 (-2.549) *	-2.881e-09 (-3.938) ***
EBITS	3.327 e-01 (5.947) ***	1.635 e-01 (3.337) ***	2.451e-01 (3.938) ***	2.239e-01 (4.337) ***	2.430e-01 (3.900) ***	2.239e-01 (4.340) ***
FATA*RDS	--------------	--------------	1.908e-04 (2.343) *	----------------	2.123e-04 (2.460) *	-------------
FATA*SAS	--------------	--------------	1.116e-04 (2.422) *	--------------	1.129e-04 (2.449) *	-------------
FATA*TIAA	--------------	--------------	-1.197e-02 (-2.580) *	--------------	-1.263e-02 (-2.674) **	-------------
FATA*CETS	--------------	--------------	3.652e-04 (3.829) ***	--------------	3.530e-04 (3.649) ***	-------------
FATA*TDTA	--------------	--------------	--------------	--------------	3.479e-05 (0.754)	-------------
FSTS*RDS	--------------	--------------	--------------	-4.873e-06 (-0.206)	--------------	3.984e-06 (0.164)
FSTS*SAS	--------------	--------------	--------------	-6.490e-05 (-6.959) ***	--------------	-6.395e-05 (-6.849) ***
FSTS*TIAA	--------------	--------------	--------------	-1.760e-03 (-0.432)	--------------	-2.845e-03 (-0.690)
FSTS*CETS	--------------	--------------	--------------	1.531e-04 (5.945) ***	--------------	1.531e-04 (5.950) ***
FSTS*TDTA	-------------	-------------	-------------	-------------	-------------	6.301e-05 (1.680) .
N	716	1314	716	1314	716	1314
Adj. R^2	0.1484	0.0597	0.1997	0.09264	0.1992	0.09392

Table 16: Multivariate Regression (T-values in parantheses, '***', '**', '*' and '.' denote significance at the 0.001, 0.01, 0.05, and 0.1 level, respectively)