

Nonlinear Internalization Effects – The Relationship between firms' Multinationality and their Performance

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Abstract

The internationalization theory has provided many theoretical arguments that explain the nature of the relationship between firm internationality and its performance. For more than 30 years, researchers have tried to investigate this relationship, concluding in different results. Academics that studied the benefits or disadvantages found that the relationship has a linear nature, either positive or negative. However, the studies were based on isolated examination. Some researchers identified this gap and tried to take into account both the benefits and the disadvantages of internationalization and they discovered that the nature of the relationship could have a curvilinear shape. Now, some recent academic work has shown that this relation can have a more complex shape. They developed a so called “three-stage-theory” suggesting that the relationship is “S-shaped” (sigmoid). Based on those inconsistent findings, the first aim of this paper is to test the link between multinationality and the firm’s performances. Data on 4.054 European firms over 9 years (1998-2006) shows that there is an inverted S-shaped relationship between multinationality and firm performance.

Further, the internalization theory proposes that the main reason why firms are engaged in foreign direct investments is that they can internalize markets for some intangible assets, which in turn should lead to higher returns. To support the internalization theory, some researchers in the M-P-Literature tested the mediating role of research and development as well as advertising expenses (or intensity) on the link between internationalization and performance and found mainly positive effects. In this work I verify these results showing that interaction term of internationality and both the marketing and R&D expenses to sales are negatively associated with the firm’s performance. The second important aim that is reached by the paper is to assume and to test non-linear internalization effects, as the title of this paper suggests. Based on the data described above the results show that there is a U-shaped relationship for both marketing and R&D. Hence, it opens a new perspective on the internalization effects of multinationality.

In terms of managerial or international implications the result presented in this paper suggests that the nature of the multinationality-performance relationship is a complex one. Especially the high internationalized firms confront a complexity problem through increased international network. To manage such large activities, a proactive management should be applied to minimize the complexity and further the coordination costs to improve the firm’s financial performance. Finally, to achieve higher returns or to maximize performance by exploitation of (international) market imperfections by using intangible assets a firm must, depending on their internalization level, choose an optimal employment of such assets where the benefits of such exploitation are greater than the costs.

Introduction

During the last fifty years, international trade has become more and more important. National firms have continuously increased their cross-border activities. Such multinational companies (MNC's) that follow an internationalization strategy are, compared to their national counterparts, bigger and achieve better financial performance (Dunning, 1973). It seems that in the times of globalization, where the world markets are dynamic, complex and competitive, multinationality is a critical factor in corporate strategy that can be treated as a sustainable competitive advantage (Porter, 1990) that leads to higher returns. A certain number of researchers tried to investigate the value of multinationality applying a simple statistical multiple regression to analyze the influence of international expansion on firm's performance.

Discussion and hypothesis

Benefits and costs of international diversification

In international diversification literature there are many theoretical approaches that describe the benefits of being multinational. However, there are also some arguments that outline the costs of cross-border activities. The main advantages of geographic diversification accrue by:

- 1) The possibility to realize economic scale and to amortize the investment's costs over a greater number of countries, where a multinational company is involved (Hitt, Hoskisson, Kim, 1997),
- 2) The opportunity to respond to changes in the economic situation between countries, so called operational flexibility (Kogut, 1985), as well as the exploitation in the differences on the markets for input and output factors (e. g. access to cheaper labor or better technology, tax avoidance) (Hennart, 1982),
- 3) The possibility to learn from previous foreign activities or increased international experience (Contractor, Kundu, Hsu, C. 2003),
- 4) The opportunity to internalize firms-specific assets as a response to market imperfections (Buckley & Casson, 1976, Blomström, Kokko, Zejan, 2000).

On the other hand, there are some costs associated with business activities that are conducted by multinational firms:

- 1) "The costs of doing business abroad" (Zaheer, 1995, p. 342), also known as liabilities of foreignness¹ (Hymer, 1976),
- 2) Increased complexity and coordination costs through the growing worldwide network (Hitt, Hoskisson, Kim, 1997, Lu & Beamish, 2004).

Link between multinationality and firm performance

For more than 30 years, researchers have tried to investigate the relationship between a firm's multinationality and their performance. Some of them considered only the benefits or the costs of international diversification. As a result they found that the relationship between multinationality and performance is positive (e. g. Grant, Jammine, Thomas 1988, Delios & Beamish, 1999, Contractor et. al., 2007, Eckert, Dittfeld, Mucche, Rässler, 2008), where a firm's performance increases with greater international diversification or even negatively (e.

g. Click & Harrison, 2000, Kotabe, Srinivasan, Aulakh, 2002, Christophe & Lee, 2005, Kim & Mathur, 2008), which is characterized by a decline in performance due to the disadvantages of international expansion. Later investigations that considered the advantages and disadvantages of cross-border activities simultaneously showed that the M-P relationship is either U- (e. g. Ruigrok & Wagner, 2003, Thomas, 2006), where there is an initial decline in firm's performance followed by an increase in returns or inverted U-shaped (e. g. Ruigrok, Amann, Wagner, 2007, Krist, 2009), that suggests that in the initial stages of international diversification the benefits outweigh the costs up to a certain level, after which the disadvantages seems to be stronger than the advantages of being multinational. Recently some studies found that the link between a firm's multinationality and its performance is more complex, and so a so called "A three-stage theory of international expansion" was developed (Contractor et al., 2003). Many academic works supported this framework, in which they found either an S-shaped (e. g. Contractor et al., 2003, Lu & Beamish, 2004) or an inverted S-shaped relationship (e. g. Ruigrok et al., 2007). According to the recent empirical evidence, I assume that the relationship between multinationality and performance is a complex one, in such a way that it takes an S-shaped form. To be more precise, I predict that in initial internationalization stages there will be a negative relationship due to the costs of geographic diversification, such as liabilities of foreignness that outweigh the benefits of international expansion. In the second stage (mid-internationalization) it is possible to realize all the advantages of being multinational like scale economics or learning from previous experience that leads to costs reduction from liabilities of foreignness. In this case the link between multinationality and a firm's performance should have a positive slope. Through a growing international network, governance becomes more complex and expensive. This is associated with higher complexity and coordination costs that are greater than any benefits that an international company could realize. Therefore I predict that:

Hypothesis 1: The relationship between multinationality and firm performance is S-shaped, with performance decline at low levels of internationalization, performance increase at medium internationalized firms, followed by performance decline for high levels of international expansion.

Internalization theory

The internalization theory developed by Buckley and Casson (1976) tries to answer the question, why do multinational enterprises exist. The important conclusion that the authors made was that an international expansion takes place when a company can generate higher returns by internalizing markets for intangible assets² (Morck & Yeung, 1991). Firms that invest more in these resources achieve greater performance from being multinational (Lu & Beamish, 2004). According to some authors such intangible assets are information intensive (Lu & Beamish, (2004) and have characteristics of public goods (Morck & Yeung, 1991). That means that an efficient use of these assets is possible, if the markets for such resources are internalized by the firm. Hence, the intangible assets are a mediator that moderates the influence of multinationality on firm performance (Lu & Beamish, 2004). In this context the exploitation of (international) market imperfections for intangible assets should lead to better performance or higher returns (Morck & Yeung, 1991, Eckert et al. 2008). Thus,

Hypothesis 2: The positive impact of multinationality is greater, the larger the extent of intangible assets that a multinational company possesses.

Nonlinear internalization effects?

There are many empirical studies that examine the moderating influence of intangible assets on the M-P relationship. The best way to operationalize the construct "intangible

assets” are the two most commonly used measurements: R&D intensity and advertising intensity (Lu & Beamish, 2004), that express respective expenses in percentage to sales. The internalization theory predicts that multinational firms can achieve abnormal returns when applying its intangible assets in several host countries. It can be therefore predicted that multinationality will have a positive effect on firm performance in the presence of such assets. Indeed many academics found in their empirical investigations such influence (e. g. Morck & Yeung, 1991, Lu & Beamish, 2004, Riahi-Belkaoui, 2004, Chari, Devaraj, David, 2009, Gande, Schenzler, Senbet, 2009). However, there are also studies, where researchers discovered that the interaction term between multinationality and the indicator for intangible assets has a negative effect (e. g. Kotabe et al., 2002, Krist, 2009, Oh, 2010, Rugman & Oh, 2010)³. These inconsistent findings suggest that the interaction between multinationality and intangible assets on the one side and firm performance on the other side could have a nonlinear term. In other words, it is possible that there is a threshold for the effects of intangible assets on the multinationality-performance relationship.

Building up R&D capabilities requires high investments. At low levels of international diversification it is not possible to spread these costs over a greater number of countries. In this case the opportunity to realize scale economics is not given and the internalization effects tend to have a negative effect. However, through increased multinationality, an international firm can achieve economies of scale through spreading the costs over a greater number of host markets that in turn eventuate in better performance (positive slope). Therefore,

Hypothesis 3: The link between performance and the interaction term of internationality and R&D intensity has a U-shaped form.

Marketing expenses are usually used to increase brand awareness. Brand awareness in turn can lead to better firm performance. However, there also seems to be a threshold, where the benefits are equal the costs of internalizing these intangible assets. From this point a firm’s performance declines, resulting in a negative slope, where the costs of internalizing and managing of such assets are greater than the profits. Thus,

Hypothesis 4: The link between performance and the interaction term of internationality and marketing intensity has an inverted U-shaped form.

Procedures for collecting data

In many empirical studies mostly American (large) companies were examined. This methodology can lead to a distortion of the findings, because of the size of the U.S. market (Eckert et al., 2008). To counteract this effect, European companies were used to test the hypothesis described above. The sample includes firms from all industries (without firms from financial sector with the ICB-Code that begins with 8000) from the following countries: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden. The period for the analysis was from 1998 till 2006. To compile the full sample, corporate information was obtained from the financial database “Datastream Advance”. Furthermore, the sample was purged of inconclusive values, e. g. negative values for R&D or marketing intensity or event values for the multinationality indicator that are larger than 100%. After these procedures the sample resulted in 4.054 listed european companies.

Variables

The dependent variable in this study was the corporate accounting-based financial performance measured with Return on Assets (ROA), computed as the ratio of net income to firm's total assets. For the measure of the firm's internationalization, I used the two common indicators: the ratio of foreign sales to total sales and the ratio of foreign assets to total assets. To analyze the internationalization effects, there are two superior measures of intangible assets in the multinationality literature: R&D intensity and advertising intensity (Lu & Beamish, 2004). R&D intensity was operationalized as the ratio of R&D expenses to sales. Unfortunately due to the data availability it was not possible to obtain advertising intensity as the advertising expenses expressed as a percent of sales. In this case I used another possible indicator for the marketing capabilities, the variable SAS (Selling, General & Administrative Expenses to Sales) like Eckert et. al (2008) did in their empirical research. I also used several additional control variables to control some effects that might affect performance. To control e. g. the firm-size effect I included the variable "Total Assets" (TA). Other control variables used in the analysis were EBIT (Earnings before Interests and Taxes) and TDTA (Total Debt to Total Assets).

Modeling

To verify the hypothesis I used following multiple regression:

$$ROA_{it} = \alpha + \beta_1 TA_{it} + \beta_2 EBIT_{it} + \beta_3 TDTA_{it} + \beta_4 RDS_{it} + \beta_5 SAS_{it} + \beta_6 INT_{it} + \beta_7 INT_{it}^2 + \beta_8 INT_{it}^3 + \beta_9 INT_{it} * RDS_{it} + \beta_{10} INT_{it} * RDS_{it}^2 + \beta_{11} INT_{it} * SAS_{it} + \beta_{12} INT_{it} * SAS_{it}^2 + \varepsilon$$

with:

α – Intercept,

β_i – regression coefficients,

ROA – Return on Assets

TA – Total Assets

EBIT – Earnings before Interests and Taxes,

TDTA – Total Debt to Total Assets

RDS – R&D expenses to sales,

SAS – Selling, General & Administrative Expenses to Sales,

INT – indicator for firm's level of internationalization (either Foreign Sales to Total Sales or Foreign Assets to Total Assets).

Results

Table 1 provides simple descriptive statistics as well as the correlations coefficients. Variables ROA, TDTA, RDS, SAS, FSTS and FATA are expressed in percentages values, variables TA and EBIT in euro. The mean of the dependent variable ROA in the sample is -3,3%. R&D expenses to sales (RDS) as well as marketing expenses to sales (SAS) are quite big: 280% and 314% of the value of firm's total assets. Interestingly, the investigated companies are strong multinational as measure by foreign sales to total sales. Their average level of multinationality is 44%. If the extent of geographic expansion was measured by the ratio of foreign assets to total assets, the firm's multinationality is lower (almost 27%) as in the case of FSTS.

The ordinary least squares (OLS) regression in the Tables 2 and 3 shows the estimated coefficients for the parameters of equation that was presented in the modeling section. In both Tables I used different variables to measure the firm's level of multinationality.

Table 1 Descriptive statistics and correlations

Variables	mean	s.d.	1	2	3	4	5	6	7	8
ROA	-3,30	34,31	1							
TA	5.357.628,33	20.031.574,77	0,073**	1						
EBIT	400.522,81	1.920.190,79	0,108**	0,621**	1					
TDTA	21,46	48,93	-0,127**	0,014	-0,003	1				
RDS	280,33	6.791,02	-0,055**	-0,011	-0,009	-0,008	1			
SAS	313,76	5.950,26	-0,072**	-0,013	-0,010	-0,014	0,900**	1		
FSTS	44,04	32,43	0,172**	0,152**	0,126**	0,039*	-0,046**	-0,054**	1	
FATA	26,64	26,06	0,177**	0,163**	0,126**	0,045**	-0,039*	-0,042**	0,684**	1

**correlations are significant at the .01 level (two-tailed tests).

* correlations are significant at the .05 level (two-tailed tests).

Table 2 contains variable FSTS, Table 3 the variable FATA as a measurement of firm's degree of multinationality. Models 1.1 and 2.1 are the basic models, where only the control variables were included with ROA as the dependent variable. In these models only EBIT had a significant, positive impact on ROA, whereas both marketing expenses (SAS) as well as leverage ratio (TDTA) had a significant, negative influence on firm's performance. Hypothesis 1 was generally tested in models 1.4 and 2.4, where a linear (FSTS or FATA), quadratic (FSTS2 or FATA2) as well as a cubic (FSTS3 or FATA3) term of multinationality was simultaneously applied. Through the addition of the linear, quadratic and cubic term the fit of the model was significantly improved, as shown in the values of adjusted R². The results in models 1.4 and 2.4, where different measurements for the degree of multinationality were used, shows that there is an inverted s-shaped relationship between the firm's level of multinationality and financial performance, with the initial performance increase, followed by performance decline at medium levels of internationalization and again an increase in the firm's performance for high levels of international expansion. Hence, hypothesis 1 couldn't be supported.

Table 2 Results of regression analysis for model 1*

	Model 1.1	Model 1.2	Model 1.3	Model 1.4	Model 1.5	Model 1.6	Model 1.7	Model 1.8
1. Intercept	-0,247	-7,797**	-12,324**	-13,804**	-13,884**	-13,810**	-13,858**	-13,898**
2.TA	0,016	-0,005	-0,009	-0,008	-0,009	-0,012	-0,010	-0,012
3.EBIT	0,098**	0,090**	0,093**	0,093**	0,093**	0,092**	0,092**	0,092**
4.TDTA	-0,133**	-0,146**	-0,150**	-0,149**	-0,149**	-0,150**	-0,150**	-0,151**
5.RDS	0,055	0,054	0,054	0,053	0,063†	0,051	0,043	0,050
6.SAS	-0,123**	-0,113**	-0,107**	-0,105**	-0,111**	-0,097**	-0,089*	-0,096**
7.FSTS		0,172**	0,600**	1,055**	1,074**	1,063**	1,088**	1,125**
8.FSTS ²			-0,448**	-1,661**	-1,717**	-1,666**	-1,747**	-1,846**
9. FSTS ³				0,792**	0,837**	0,804**	0,860**	0,934**
10.FSTS*RDS					-0,070**	-0,526**		
11. FSTS*RDS ²						0,471**		
12. FSTS*SAS							-0,102**	-0,305**
13. FSTS*SAS ²								0,217**
Adjusted R ²	0,034	0,062	0,079	0,083	0,088	0,102	0,093	0,099
F-Value	27,711**	43,175**	48,366**	44,508**	42,033**	44,692**	44,803**	43,210**

*Internationality measured by FSTS

dependent variable: ROA.

The regression coefficients are standardized values.

†p < 0,10

* p < 0,05

** p < 0,01

Table 3: Results of regression analysis for model 2*

	Model 2.1	Model 2.2	Model 2.3	Model 2.4	Model 2.5	Model 2.6	Model 2.7	Model 2.8
1. Intercept	-0,247	-5,986**	-9,959**	-12,186**	-12,263**	-12,428**	-12,228**	-12,246**
2.TA	0,016	-0,012	-0,018	-0,016	-0,017	-0,018	-0,017	-0,018
3.EBIT	0,098**	0,092**	0,087**	0,090**	0,090**	0,090**	0,090**	0,090**
4.TDTA	-0,133**	-0,157**	-0,163**	-0,160**	-0,156**	-0,148**	-0,160**	-0,160**
5.RDS	0,055	0,057	0,057	0,056	0,045	0,043	0,039	0,040
6.SAS	-0,123**	-0,118**	-0,113**	-0,110**	-0,094**	-0,092*	-0,089*	-0,090*
7.FATA		0,186**	0,565**	1,054**	1,058**	1,058**	1,062**	1,074**
8.FATA ²			-0,399**	-1,707**	-1,713**	-1,709**	-1,720**	-1,747**
9. FATA ³				0,868**	0,870**	0,868**	0,876**	0,900**
10.FATA*RDS					-0,058**	-0,190**		
11. FATA*RDS ²						0,138**		
12. FATA*SAS							-0,055**	-0,183**
13. FATA*SAS ²								0,138**
Adjusted R ²	0,034	0,062	0,079	0,083	0,088	0,102	0,093	0,099
F-Value	27,711**	43,175**	48,366**	44,508**	42,033**	44,692**	44,803**	43,210**

*Internationality measured by FATA

dependent variable: ROA.

The regression coefficients are standardized values.

†p < 0,10

* p < 0,05

** p < 0,01

The exploitation of (international) market imperfections for intangible assets should lead to better performance or higher returns as outlined in the discussion section. Thus, to test hypothesis 2, an interaction term between the internalization variable and the indicator for intangible assets was built. The results for research and development intensity (model 1.5 and 2.5) show that there is a significant, negative impact for the interaction term between multinationality (measured as FSTS or FATA) and RDS on a firm's financial performance. The same result can be observed for the marketing intensity (model 1.7 and 2.7), where the coefficient for the interaction also has a significant, negative value. Hence, hypothesis 2 was not supported.

I verify hypotheses 3 and 4 using models 1.6 (2.6) and 1.8 (2.8), in which a quadratic term for both research and development and marketing intensity was added for the interaction term between multinationality and the firm's intangible assets. It is important that all four presented models are highly significant. The results show a u-shaped relationship for the interaction between multinationality and both RDS and SAS, with a performance decline for lower levels of exploitation of firm's intangible assets, followed by an increase in performance for higher levels. In this case hypothesis 3 was strongly supported, whereas hypothesis 4, which predicted an inverted u-shaped relationship, wasn't confirmed.

To illustrate the results for nonlinear internalization effects as well as the sigmoid relationship between multinationality and firm performance a three-dimensional figure was drawn. Figure 1 shows the relationships for FSTS and RDS and Figure 2 for FATA and SAS. Both figures show the inverted S-shaped relationship between multinationality and firm performance that is positive at low stages of internationalization, negative at medium and once again positive at high degrees of multinationality. It can also be observed in both figures that the moderating effect of a firm's intangible assets has a nonlinear impact (u-shaped). However, the strongest impact of nonlinear internalization effects seems to appear, if we take FSTS to measure the degree of multinationality and RDS for firm's intangible resources (Figure 1).

Figure 1: Effects of RDS on the relationship between FSTS and ROA

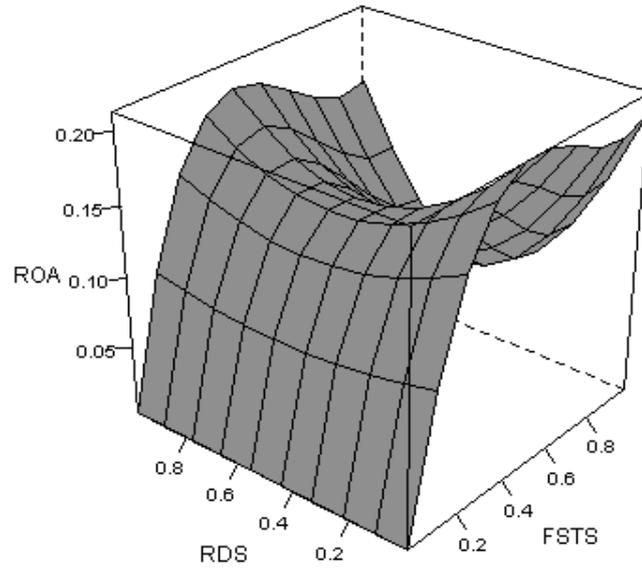
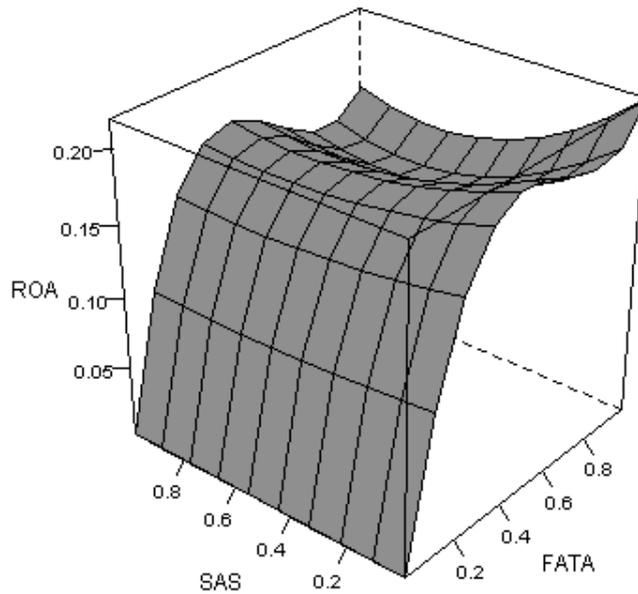


Figure 2: Effects of SAS on the relationship between FATA and ROA



Especially for high levels of internalization we can observe the strongest impact. For example, if a company is up to 50% multinational and spends e. g. about 50% their whole sales for research and development, there is about 10% decline in ROA. Ironically, a firm can achieve higher returns without the exploitation of (international) market imperfections for intangible assets. Furthermore, a company that exploits such assets can achieve better

performance spending almost the whole their sales for research and development or marketing activities. For the further interpretation of these results see the next sections.

Conclusions

This empirical investigation examined the link between a firm's level of multinationality and financial performance, as measured by Return on Assets (ROA). As shown in Figures 1 and 2 as well as in Tables 2 and 3, the nature of this relationship seems to be nonlinear, in such way that an inverted S-shaped form was observed. Although the predicted hypothesis 1 was not supported, the empirical findings are also of importance. At low as well as at high levels of international diversification, there was a positive link between a firm's multinationality and financial performance, while at medium stages of internalization a negative relationship was found.

The findings also do not support the classical internalization theory that predicts that multinational companies can increase their performance by exploitation of market imperfections for intangible assets. The results show the opposite effects: the moderating role of intangible resources measured as Research and Development Expenses to Sales and Selling, General and Administrative Expenses to Sales have seemed to have a negative effect on the relationship between multinationality and performance. Hence, the empirical results shown in this study do not support the findings of prior research (e.g. Morck & Yeung, 1991, Lu & Beamish, 2004).

Another aim of this paper was to show that the internalization effects can be nonlinear. Through building a quadratic term for the indicator for intangible assets and through interacting with the multinationality variable I found out that for both R&D intensity and marketing intensity the relationship between this interaction and firm financial performance has a u-shaped form. This means that at low levels of the adapting of intangible assets in international markets there is a performance decline. However, through the broader use of such resources an increase in a firm's financial performance appears. The contribution of these empirical findings for the literature is that it opens a completely new perspective on the role of intangible assets in the multinational-performance relationship.

This investigation like many other empirical studies has several limitations. Firstly, the sample is based only on listed European companies. Future research could also consider a sample with small and medium enterprises to see, if the results are differing from the findings in this paper. Secondly, through building the quadratic or even cubic terms in the regression the problem of multicollinearity appears. This has the consequence that the regression does not match the so called BLUE characteristics that in the end leads to a distortion of the regression coefficients. Moreover, the most notable limitation in the study was the lack of a time-lag for the effects of intangible assets on dependent variable such as Return on Assets. Research and Development Expenses as well as Selling, General and Administrative Expenses have a direct effect on this financial measure of performance in such a way that they influence negatively its value. Further research should add a time lag for the effects of intangible assets to avoid this impact and to discover a clear effect of such resources.

International and managerial implications

One important managerial or international implication is that the relationship between international expansion and firm performance is of a complex nature. The inverted s-shaped form indicates that at the beginning of the internationalization firms can realize all benefits of being multinational. As the international network of value chain activities gets bigger a complexity problem arises. The managers should prepare themselves to manage such large

networks so that the complexity and coordination costs can be minimized. In such complex international structures is the flow of information, as well as communication, the critical factor. In this context an efficient management system should be applied to make the communication within the network easier. If such proactive management will exist, further international expansion will be associated with an improvement in firm financial performance.

In the case of exploitation of intangible assets, like technological know-how, production and managerial or marketing skills, patents, brands and goodwill, I found that such assets can reduce a firm's performance. However, there seems to be a threshold, where further exploitation of intangible resources is associated with an increase in financial performance of a firm. As seen in Figures 1 and 2, if a company achieves negative results from international use of intangible assets, it is possible to improve it by broader exploitation. In such case the large investment costs either in R&D or marketing capabilities can be spread over a larger number of host countries, which means that the benefits outweigh the costs of exploiting the market imperfections for intangible assets.

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Footnotes

¹ Entering new markets, a multinational firm confronts many challenges that arise e. g. from economics, language, culture or law differences between the home and host country.

² Like technological know-how, production and managerial or marketing skills, patents, brands, goodwill.

³ Especially for R&D intensity there were significant negative values.

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