IS THERE A GENERAL INFLUENCE OF MULTINATIONALITY ON THE PERFORMANCE OF INTERNATIONAL BUSINESS?

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Abstract

Different theoretical arguments, diverse measurement techniques, and distinct empirical settings have prevented the convergence of empirical findings on the relationship between multinationality and performance so far. This paper develops an information cost model to integrate those factors of multinationality that influence the performance of international business in any type of firm. The panel analysis of 3247 German investors of all industry sectors, sizes, and levels of multinationality supports the S-shaped relationship that is predicted by the model. Analyses of different subsamples show that the relationship is stable and also applies to different types of foreign subsidiaries. Changes in multinationality do not seem to affect the performance of international business.

INTRODUCTION

In spite of the relevance to managers who have to decide on international investments and divestments, management research has not come to a clear answer about the performance impact of a firm's multinationality yet. At the leading conferences in the area of international management there is a growing skepticism about the theoretical rationale of such a relationship. Hennart (2007) argues that neither the risk reduction by internationalization nor the increased profitability of internationalizing firms due to scale economies, flexibility, or learning effects could be based on transaction cost and internalization theory. Contractor (2007) replies that it may be too early to conclude that a general multinationality-performance relationship does not exist and highlights the explanatory power of positive and negative factors of internationalization on a firm's success.

Empirical research on the multinationality-performance relationship has produced highly inconsistent results (Annavarjula and Beldona, 2000; Hitt et al., 2006; Li, 2007). Studies reveal both positive (Kim, Hwang, and Burgers, 1993) and negative linear (Denis, Denis, and Yost, 2002) as well as insignificant (Tallman and Li, 1996), both U-shaped (Li, 2001) and inverted U-shaped squared (Hitt, Hoskisson, and Kim, 1997), and both S-shaped (Riahi-Belkaoui, 1998) and inverted S-shaped cubic relationships (Chiang and Yu, 2005). It is unlikely that this heterogeneity is caused by different ways of measurement only. Later studies try to build on and improve earlier studies' choices and measurements of multinationality and performance but still do not present corresponding findings (Allen and Pantzalis, 1996; Contractor, Kundu, and Hsu, 2003; Qian et al., 2008). Verbeke, Li, and Goerzen (2009) argue that theoretical shortcomings

(eclecticism) could be causal for the contradicting results. They suggest that researchers should "attach more importance to the underlying content of their key constructs than to methodological convenience geared toward establishing statistically significant effects describing alleged linkages between multinationality and performance". In their opinion the search for a general, stable relationship between multinationality and performance will be without success. Therefore, they call upon future research to concentrate on specific empirical environments in which theoretically grounded relationships may be found.

The recent literature shows some progress towards this goal. Several studies demonstrate that firms from small home countries benefit from their first internationalization steps (Chiang and Yu, 2005; Elango and Sethi, 2007; Ruigrok, Amann, and Wagner, 2007). Studies on service firms assert that, in this sector, extraordinarily high liabilities of foreignness lead to a negative performance effect in the early phase of internationalization (Capar and Kotabe, 2003; Contractor, Kundu, and Hsu, 2003). The knowledge intensity of firms appears to influence the performance effect of internationalization (Lu and Beamish, 2004; Berry, 2006). As capital markets appreciate the internationalization of firms with regard to flexibility and risk diversification, listed companies seem to profit by going international in terms of higher market values (Riahi-Belkaoui, 1999; Dastidar, 2009; Lee and Makhija, 2009). In large firms, economies of scale, market power, and resource access show a positive whereas coordination costs, difficulties of transferring intangible assets, and environmental complexity show a negative effect on firm performance (Li, 2001; Goerzen and Beamish, 2003; Kumar, 2009).

Following the directions of Verbeke, Li, and Goerzen (2009) will enable more profound insights into the details and facets of internationalization. The integration of findings from specific empirical environments, however, will remain difficult if they are based on strong yet

incompatible theoretical arguments. The benefit of identifying new distinctive features of internationalizing firms notwithstanding, this paper tries to make a contribution beyond those studies and, if possible, filter out the theoretical and empirical essence of a general, stable multinationality-performance relationship. To this end, it is necessary to build a theoretical model that centers the performance effects of internationalization which all firms have in common. This paper proposes the theory of information costs by Casson (1999) as it decomposes multinational corporations (MNCs) and their international market partners into abstract entities that sell and buy goods and entities which intermediate between them. Consistent with this universal organizational view, the study considers multinationality as the spread of foreign direct investment across host countries and the performance of international business as the profitability of the proprietary units located abroad. For an adequate range of observations in the empirical analysis, the study requires a sample of a great variety of internationalizing firms. The results shall be generalizable and open to complements drawn from studies that are specific to distinct empirical settings.

The paper is structured as follows. We revisit Casson's theory of information costs and build an information cost model that allows for deriving hypotheses on the impact of the spread of a firm's foreign direct investment over the economically relevant countries on the joint success of its international business, as well as the effect of changes in this configuration. The third section explains the empirical methods used to test the hypotheses including the data sources and the measurements. The fourth section presents the results of the multinationality-performance relationship from the full sample and observes their stability across subsamples of firms of different industrial sectors and sizes. The results section will also check the robustness of the results for selections of pure sales and non-sales subsidiaries. For more compatibility with other

research in this field, we reinterpret the spread of foreign direct investment as an enriched variant of the common NOC (number of host countries) measure of internationalization and challenge the assumption of learning and adjustment effects by the data. The fifth section discusses the benefits and concerns of the findings with respect to management implications and future research.

AN INFORMATION COST MODEL OF MULTINATIONALITY

Casson's concept of information costs

In the information cost view of Casson (1999), the MNC is an intermediator between international buying and sales markets. Intermediation causes information costs in terms of transaction costs of screening market partners for competence and integrity and negotiating contracts. Furthermore, intermediation involves information costs associated with collecting and processing information for output and investment decisions, e. g., the costs incurred in appraising investments, planning experiments and searching for new production locations. The concept of information costs is therefore more comprehensive than the transaction cost view. However, it prescinds from legal impediments to the enforcement of contracts.

The amount of information processing necessary to make buying and sales markets is massive and persistent. It is costly to explore the future opportunities of international business and, in particular, latent demand. Information is also required in the long run since supply and demand are of volatile quantity and evolving quality. The complexity of the information to process rises by the number of (potential) market partners. Besides buying and sales markets, information costs arise from intermediating in technology and labor markets.

A predominant property of an MNC's structure is whether it internalizes the intermediation between international markets or not. Efficiency does not only relate to the transaction cost of supervision but to the information cost of decision-making in general so the question of hierarchical control is of secondary importance to the logic of information costs and is not strictly bound to the decision of internalization. Consequently, information costs are affected by both the boundaries of the firm and its internal structure.

A rational decision maker will access information only if the expected benefit exceeds the cost. Information cost economics rest upon the assumption that all information required for decision-making is in principle available but sometimes only at prohibitive cost of observation, memory, communication, or processing. The benefit of information is that it resolves uncertainty. Information is only valuable to the extent to which it would change a decision. Consequently, an MNC economizing on information costs will relinquish part of the international business that may be possible and choose an organizational structure that concentrates on the most important and accessible information.

Multinationality and the information costs of international business

We start from Casson's framework to build an information cost model of the MNC and analyze the multinationality-performance relationship. An MNC may intermediate between different kinds of markets in a multiplicity of countries. The basic element of the information cost model of multinationality is an entity that can play the role of intermediating between four types of markets within a country: the supplier, the buyer, the technology, and the labor market. Foreign affiliates of different types keep distinct relationships with these markets. Sales and service

subsidiaries focus the buyer market, production subsidiaries may also center the supplier market, R&D subsidiaries address the technology market, and all sorts of subsidiaries tap into the local labor market.

Foreign direct investment shall be regarded as the consequence of the MNC's decision to internalize the role of international market intermediation (left part of Figure 1). The MNC may leave the international intermediation to other firms and serve the relevant markets by technology transfer or exports mainly from the home country. On the contrary, it may fully internalize the international market intermediation and establish subsidiaries comprising the entire value chain in a multiplicity of countries. Or it may do anything in between, e. g., build up a wide-spread network of sales and service subsidiaries abroad, place production subsidiaries in selected foreign locations, and keep the R&D activities mostly centralized in the home country. Locating business activities of any fashion abroad requires committing foreign direct investment. In the information cost model, multinationality shall denote the spread of an MNC's foreign direct investment over the economically relevant countries, regardless of what types of subsidiaries are concerned and what industries they belong to. Lorenz curves can be used to visualize the concentration of investment over a set of host countries among all economically relevant countries (right part of Figure 1).

Insert Figure 1 about here

The choice of internalizing the role of international market intermediation and locating it in a host country is a strategic decision and has various implications for the information costs

involved. If an MNC decides to serve a foreign country by a sales subsidiary instead of exporting or a proprietary service unit instead of a contractor, its access to information about the local sales market will improve. Establishing a production site in a foreign country simplifies the interface to local suppliers with respect to product specification, labor skill and quality control. Having an R&D unit in place strengthens the contact to foreign knowledge that would be otherwise available across country borders at high or even prohibitive cost. Intermediating between any types of international markets by an internal entity located abroad saves a significant amount of effort to understand the local market partners. Therefore, a wider spread of foreign direct investment will be associated with a reduction of information costs arising at the boundaries of the firm and an avoidance of opportunity costs from neglecting foreign markets (external information costs) as shown by the dashed line in Figure 2. All costs are scaled downwards in this drawing.

Insert Figure 2 about here

The ease of external market intermediation by spreading foreign direct investment over multiple host countries comes at the cost of decision and coordination problems inside the MNC, either in the shape of effective information costs or as opportunity costs of omitted observation, memory, communication, or information processing. The internal information cost will, in general, rise when the spread of foreign direct investment increases; its slope depends on the structures and processes that are established to intermediate between international markets. In the moment by which the firm decides to go international, it features a purely national structure. Entering new

countries, it will fist hesitate switching to an international structure and including the foreign

subsidiaries in the hierarchical reporting scheme and value chain as long as it perceives the costs

of switching, in limited time horizon, higher than the efficiency gains of an integrated structure.

The transitions from one to another organizational structure in the process of internationalization

were investigated by numerous studies (Stopford and Wells, 1972; Habib and Victor, 1991; Wolf

and Egelhoff, 2002). A rising spread of foreign direct investment aggravates the problems caused

by the inappropriate coordination mechanisms. Hence, more multinationality will be associated

with a sharp increase in internal information costs until the MNC triggers a reorganization to

incorporate the international business by foreign sales and service, production, or R&D facilities

into its formerly national functions or divisions (thin solid line "before reorganization" in Figure

2). As soon as the MNC has installed an adequate international structure, additional spread of

foreign direct investment will first effectuate a moderate increase in internal information costs.

Later, by the multidimensional growth of complexity inside the firm, it will increase

progressively (thin solid line "after reorganization").

The thick solid line at the bottom of Figure 2 indicates the total of the external and internal

information costs. By a rising spread of foreign direct investment, the total information cost is

first driven by the internal information cost that overcompensates for the decreasing external

information cost. After the reorganization, the internal information cost increases more slowly

and allows the savings in external information cost give the total information cost a falling slope

(inverted in Figure 2). The slope finally turns positive when the spread of foreign direct

investment is at high levels since the internal information cost increases exponentially.

Mirroring the total information cost that is scaled downwards in Figure 2, the relationship

between the spread of foreign direct investment and the performance of international business

reveals an S-shape as drawn by the upper thick, solid line. The level of performance may depend on the volume of the MNC's international operations as compared to its national operations and be higher or lower than indicated by the solid thick S-curve. More foreign activities create more value but also cause more information costs. From an information cost perspective, it is not clear which effect countervails the other and whether the volume of foreign operations, on balance, has a positive or negative effect on the performance of international business. Prior empirical evidence of the performance effect of the volume of foreign operations, as measured by the ratio of foreign and total sales, is ambiguous (Riahi-Belkaoui, 1999; Geringer, Tallman, and Olsen 2000; Li, 2001). Nevertheless its influence needs to be controlled for when regarding the effect of the spread of foreign direct investment.

> *Hypothesis 1a. At a given volume of foreign operations, the spread of a firm's foreign direct investment over the economically relevant countries has a cubic influence on the performance of international business: At low levels of spread, the performance decreases by an increasing spread. At medium levels of spread, it increases. At high levels, it decreases.*

The spread of an MNC's foreign direct investment over the economically relevant countries has a meaning in theoretical terms but is difficult to interpret intuitively as a number. A related understanding of multinationality would be the number of countries the MNC has entered by foreign direct investment, provided that the foreign direct investment is not concentrated in a few of those countries and negligible in the others. Previous studies found S-shaped relationships using the number of foreign countries combined with other measures of internationalization such as the volume of foreign operations (Contractor, Kundu, and Hsu, 2003; Lu and Beamish, 2004; Thomas and Eden, 2004). From an information cost point of view, we expect that

Hypothesis 1b. At a given volume of foreign operations, the distribution of a firm's foreign direct investment over the countries it has already entered makes a cubic influence of the number of countries on the performance of international business effective: At low country counts, the performance decreases by a rising number of countries moderated by the spread. At medium levels of country counts, it increases. At high levels, it decreases.

The external and internal information costs shown in Figure 2 signify the steady state of multinationality when the interfaces with external market partners and coordination mechanisms inside the MNC have been established. As soon as the internationalizing firm enters an additional host country, the construction of new interfaces with foreign buying, sales, technology, and labor markets will delay the savings in external information costs (Vermeulen and Barkema, 2002). At the same time, the installation of mechanisms to control the new foreign subsidiaries will temporarily cause added internal information costs (Hutzschenreuter and Voll, 2008). Contractor (2007) and empirical studies on the relationship between multinationality and performance (Li, 2001; Contractor, Kundu, and Hsu, 2003) build on a liability of foreignness argument to justify the first negative slope of a U- or S-shape, which seizes a similar point. However, their view assumes that all firms with a limited number of host countries have started their process of internationalization a short while ago. To include those firms which have served few host countries for a long time and to account for adjustment effects in more internationalized firms, we analytically split up the dimensions of time and multinationality as indicated by the arrows in the upper S-curve of Figure 2 and suggest a recent change in the number of host countries having a diminishing effect on performance.

Hypothesis 2. A recent increase in the number of host countries has a negative influence on the performance of international business.

EMPIRICAL METHODS

Data

Several studies call upon future research on the multinationality-performance relationship to employ longitudinal data with time series, preferably starting at the beginning of a firm's internationalization process (Contractor, 2007; Glaum and Oesterle, 2007; Verbeke and Brugman, 2009). Long time series require tracking strategic re-orientations and other major changes of the firms under observation, which is difficult in large data sets. Suitable econometric techniques allow for isolating the influence of multinationality from other factors driving performance in time series that are shorter (Wooldridge, 2003).

German firms including those owned by foreigners are obliged to report their foreign direct investment above an exemption limit (balance sheet total > €3 mill.) to the Central Bank of Germany. The yearly reports that are recorded in the MiDi database comprise balance sheets, the imputable stock of foreign direct investment, and other characteristics of the investment objects as well as figures that describe the size, legal form, and origin of the parent firm and the ultimate owner (Lipponer, 2008). All variables that are relevant to the study are available from 2002 on. We close the data set with definite figures of 2005 and preliminary figures of 2006. We excluded investors that could not be observed for at least two years in a sequence and investment objects with zero employees or sales. We further eliminated outliers with returns on equity below -1000 % and above 1000 % and end up with 12499 observations (firm years). As some firms entered and others left the database in that period, the panel is unbalanced. The average observation period of the 3247 panel objects is 3.8 years (minimum 2, maximum 5 years).

The panel includes internationalized firms of all industries (Table 1) and sizes: 6 % have total sales less than €10 mill., 28 % more than €10 mill. and less than €100 mill., 34 % more than €100 mill. and less than €1 bill., 19 % more than €1 bill. and less than €10 bill., and 13 % above €10 bill. For the measure of multinationality, we consider foreign direct investments in the economically relevant countries only, i. e., those countries which (including Germany) account for 99 % of the world's gross domestic product (GDP). Table 2 presents a breakdown of the joint foreign direct investment of all sample firms spread over those 80 countries in the year 2006. The figures of Angola and Uzbekistan refer to less than three investors and are therefore concealed.

Insert Table 1 about here

Insert Table 2 about here

Measures

Dependent variable

Studies on the multinationality-performance relationship rely on different measures of performance. Among the accounting-based figures, the return on equity and the return on assets are most common. The return on sales appears adequate to capture the success of service firms (Capar and Kotabe, 2003; Contractor, Kundu, and Hsu, 2003). For listed firms, it is possible and, as it is a forward looking indicator of corporate success, useful to measure performance by a figure based on the company's stock price (Denis, Denis, and Yost, 2002; Goerzen and Beamish, 2003; Kumar, 2009). As the present study includes all types of firms it needs to use a measure of performance that meets a general investment perspective. Investors usually judge profitability by the money earned relative to the money spent on the investment object. This view is best reflected by a measure based on the return on equity.

A correct assessment of the impact of multinationality and performance should isolate the effects of international activities from those of the MNC's home country activities (Verbeke and Brugman, 2009). Especially for firms that mainly operate in the home market, measuring the overall performance could be misleading. Since the study is directed to the entire spectrum of firm internationalization it leaves the firm's success in the home country aside and considers the performance of its international business only. As a distinctive feature from previous research, it measures the *performance* of international business by the joint return on equity of an MNC's foreign subsidiaries.

Independent variables

In the literature there is a great variety of measuring the construct multinationality. Fisch and Oesterle (2003) distinguish unidimensional and multidimensional measures from measures of spread. Multidimensional measures such as the "degree of internationalization" index devised by Sullivan (1994) try to overcome the typical weakness of unidimensional measures that they miss out on observing various aspects of multinationality: The ratio of foreign and total sales of a supplier firm located close but across the country border to its major customer may be high whereas the number of host countries is very limited. However, the aggregation of diverse measurements of multinationality in a common index figure causes logical problems if the individual measures have different units, e. g., if a foreign member in the top-management team can arithmetically compensate for zero foreign direct investment. Recent studies tend to employ spread measures of international diversification (Goerzen and Beamish, 2003; Chang and Wang, 2007; Qian et al., 2008). Such measures appropriately combine the volume of international operations with the information of how many markets an MNC serves and to what degree the international activities are concentrated in a few of them. In a perspective of information costs, it is convenient to separate the spread from the volume of foreign operations since the first has a clear influence on the external and internal information costs whereas the latter does not. To measure multinationality, the study considers the spread of a firm's foreign direct investment (*FDIspread*) over the 80 economically relevant countries which, including the sample firms' home country Germany, account for 99 % of the world GDP. This means that, for a high multinationality value, an MNC is not supposed to spread its activities over all countries in the world. Using the foreign direct investment definition by the German Central Bank (attributable shares in the registered capital minus owing contributions, capital and surplus reserves, profit or

loss brought forward, net profit or loss minus deficits uncovered by equity, loans from the investor and those from associated companies) we calculate the spread by an inverted Gini coefficient, which is derived from the Lorenz curve (Figure 1).

In order to make the results comparable to previous empirical findings the study will also investigate the effect of a derivative of the *FDIspread* measure on performance. In addition to separating the volume of international operations from its spread, we further decompose the spread over the economically relevant countries into the range of countries among them that were actually entered (number of countries, *NOC*) and the distribution of foreign direct investment over those countries (*FDIdistrEC*). For the interaction terms, we center the variables around zero.

The multinationality-performance relationship may have a dynamic side since, according to the information cost model, part of the negative performance effects are likely to be of a temporary nature and some positive ones become effective with a delay. After splitting up the dimensions of multinationality and time it is necessary to introduce a measure that captures a change in multinationality. The information cost effect of entering or leaving host countries should be most pronounced in the first moment. The measure therefore picks up the change in the number of host countries as compared to the previous year (*dNOC*).

Control variables

The information cost model separates the spread of foreign direct investment from the volume of foreign operations. According to Hypotheses 1a and 1b, the spread of foreign direct investment is a model variable whereas the volume of foreign operations is a control. To mirror the

countervailing effects of creating value and incurring information costs by a high volume of

foreign operations, we measure it both by the ratio of foreign and total sales (*FSTS*) and the ratio

of foreign and total employees (*FETE*).

The performance of international business will depend on the market growth in the host

countries. The variable *GDPgrowth* controls for the change of the aggregate GDP of the

individual MNC's host countries as compared to the previous year. Other host country

characteristics such as the cultural distance to the home country are not explicitly measured as

they have diverse effects in different industries and value-added steps. Gomez-Mejia and Palich

(1997) find no significant influence of country culture on firm performance regardless of the

cultural diversity measure used. Cross-sectional studies need to account for effects of company

size, international experience, product diversification, R&D intensity, or financial structure by

separate control variables. We use econometric panel techniques that control for those and

further, unobserved effects on the firm level. Time dummies absorb overall effects of the related

year.

RESULTS

Spread of Foreign Direct Investment

The descriptive statistics of the full panel embracing 3247 MNCs are presented in Table 3. Due

to confidentiality regulations of the German Central Bank, the maximum and minimum values

refer to the three highest and three lowest observations. All of the variables show a reasonable

variance and, except of *FSTS* and *FETE*, weak pairwise correlations. The variance inflation

factors (VIF) of *FDIspread* and *GDPgrowth* are very low, indicating little problems of

multicollinearity. The VIFs of the strongly correlated variables *FSTS* and *FETE* are still moderate.

Insert Table 3 about here

We use panel models with time dummies to estimate the coefficients. The regressions in Table 4 include the linear, squared, and cubic term of *FDIspread* in a stepwise manner. According to the Hausman (1978) test, a random effects regression is applicable to the full Model 4 but it is not to the reduced Models 1-3 so we employ a linear panel regression (absorbing indicators) that accounts for constant effects on the object level by a dummy variable for each object. Differing from fixed effects regressions, the share of the variance explained includes those dummy variables.

Model 1 is the base model and comprises the control variables only. The *GDPgrowth* in the whole of the countries entered by the investor has a clear positive effect on *performance*. The volume of foreign operations as mirrored by *FSTS* and *FETE* reveals an ambiguous impact on the performance of international business: The share of foreign sales has a positive whereas the share of foreign employees has a negative influence, which may be explained by the fact that more foreign activities create more value but, when they are carried out by more foreign employees, cause more information cost.

Insert Table 4 about here

As Model 2 shows, a firm's *FDIspread* is not significantly associated with the *performance* of its foreign subsidiaries. It seems that, on average, multinationality does not have an effect on performance. However, as soon as the quadratic (Model 3) and the cubic term (Model 4) are added, the linear term becomes significant. The coefficients of the higher order terms are significant, too. The findings support *Hypothesis 1a* that the relationship between multinationality and performance is S-shaped. At low levels of the spread of foreign direct investment, additional spread effectuates a lower performance. At medium levels of spread, it leads to higher performance. At high levels of spread, the effect turns negative again. The overall model fit is satisfactory whereas the R^2 contributed by the multinationality variables is modest. Nevertheless, the results suggest that there is a general relationship between multinationality and performance in firms of all industries and sizes. To check whether it is stable, we ran estimations for distinct subsamples.

Due to the tests devised by Hausman (1978) and Breusch and Pagan (1980), random effects are applicable to all models of the subsamples as they are to the complete Model 5 concerning the full sample. Table 5 shows the GLS regression results for firms in the agriculture and manufacturing (Model 6), service and trade (Model 7), and financial (Model 8) sector. The numbers of objects reported in Table 5 differ from those in Table 1 as some of the firms changed

their main industry or disappeared during the observation period. Across all subsamples, the absolute values of the coefficients differ while their signs stay the same, indicating that the multinationality-performance relationship is industry-specific but always S-shaped.

Insert Table 5 about here

Models 9 and 10 show the results of firms with different sizes. In firms with more than 1000 employees, we observe the general cubic relationship. Firms with less than 1000 employees feature a U-shaped relationship of multinationality and performance; their spread of foreign direct investment does not reach high levels. At last, we compare the findings from selections of different kinds of subsidiaries. The data allow for a distinction of sales and non-sales subsidiaries. Dropping either all non-sales subsidiaries (Model 11) or all sales subsidiaries (Model 12) for the calculation of *FDIspread*, the signs of the linear, squared, and cubic coefficients stay the same. The S-shaped relationship appears to be stable.

Range and Distribution of Foreign Direct Investment

Many precedent studies use the number of host countries as a measure of multinationality or part of it. In a second analysis of the data, we decompose the spread of foreign direct investment into the number of the entered countries (*NOC*) and the distribution of foreign direct investment over those countries (*FDIdistrEC*). By including the variable *dNOC*, which indicates the change in the

number of host countries in comparison to the previous year, we lose the observations of firms

that are in the full panel for two years only. Table 6 reveals the modified descriptive statistics.

Insert Table 6 about here

Similar to the regressions concerning *FDIspread*, random effects estimations are inapplicable to

some of the models. Table 7 reports the results of linear panel regressions (absorbing indicators)

with time dummies. Model 13 shows that *NOC* has no significant effect on the performance of

international business. Neither the squared (Model 15) nor the cubic term (Model 17) of the

unidimensional measure *NOC* is significant. However, the interaction with *FDIdistrEC* lets *NOC*

and its higher order terms become significant (Model 18). The data support *Hypothesis 1b* that

the distribution of foreign direct investment over the entered countries makes a cubic influence

of the number of host countries on the performance of international business effective. The S-

shaped relationship between multinationality and performance appears robust against a

decomposition of the multinationality construct.

Insert Table 7 about here

Deviating from previous work, the information cost model allows for an explicit test of effects

that originate from entering or leaving host countries. *Hypothesis 2* predicts that a recent increase

in the number of host countries has a negative influence on the performance of international business. Adding *dNOC* to Model 18 in Table 8 shows no evidence of such an effect (Model 19). Neither do the interactions of *dNOC* with the linear (Model 20) and higher order variables (Models 21 and 22), which represent opposing performance effects at different levels of multinationality, produce significant results. It seems that the temporary performance impact of (de-) internationalization steps is limited.

Insert Table 8 about here

DISCUSSION

The goal of the study was to filter out the theoretical and empirical essence of a general, stable multinationality-performance relationship. The empirical findings suggest that this relationship exists and is S-shaped, starting from a negative impact of multinationality on performance, changing into a positive influence at higher levels of multinationality, and turning back negative for firms that operate nearly on a global scale. Apart from studies that brought forward different shapes, the results support the findings of a rising number of studies with a cubic approach. However, those studies present S-curves in samples of firms with unique properties such as service firms (Contractor, Kundu, and Hsu, 2003) or large manufacturing firms (Thomas and Eden, 2004). The present study uses a sample of all kinds of firms and shows that the S-shaped relationship is stable in the full sample and across all subsamples referring to different industry

sectors. It is also stable when only sales or non-sales subsidiaries are counted as indicators of multinationality. Choosing a German sample should not seriously bias the results since Germany is neither a very small home country such as Switzerland (Ruigrok, Amann, and Wagner, 2007) nor a very large one like the United States (Riahi-Belkaoui, 1998). Furthermore, the sample includes those German investors that are, by themselves, held by foreigners. In empirical terms, the S-shaped multinationality-performance relationship appears to be general and stable.

In order to account for the dissimilarity of the analyzed firms, the study uses advanced measures of multinationality and performance. The spread of foreign direct investment ensures that the subsidiaries in a given number of countries are correctly weighted. No logical problems occur as they do in index measures that try to integrate different dimensions of multinationality. The volume of foreign operations is separated from its spread. Economies of scale effects in large firms are controlled for but not subject to the analysis since size and multinationality do not have a clear, symmetric relationship (Hennart, 2007). The performance measure captures the performance of international business rather than the overall corporate performance as most of the internationalized firms (still) have their dominant business in the home market. In particular, it strengthens the direction of causality between multinationality and performance for these firms. Using the return on equity as a yardstick of performance meets the interests of investors from diverse industries and copes with different types of subsidiaries. Other performance measures may be more adequate to certain firms but are less appropriate to the whole range of firms.

The theoretical contribution of the study is abandoning the eclectic approaches of previous work and proposing a model that integrates the most relevant arguments of a general multinationality-performance relationship by an information cost perspective. Casson's theory is open to firms of

all sectors. It combines elements of the theory of transaction costs, the market-based, and the

resource-based view of the firm. Considering internal vs. external information costs allows for

differentiating the performance effects that arise at different levels of multinationality. In

particular, the model offers an alternative reason for the negative influence of performance at

low multinationality. Previous studies hold a lack of experience responsible for the limited

success of early internationalization steps (Capar and Kotabe, 2003; Ruigrok and Wagner, 2003).

They seem to assume that internationalization is a continuous process that continues at a similar

speed in all companies. Our panel reaches back to 1996 and shows that many traditional firms

have been active in a limited number of host countries for many years. They are likely to be

more experienced in international business than those firms that are young and enter multiple

host countries per year. The time dimension needs to be uncoupled from the multinationality

dimension. Concerning the multinationality dimension, the information cost model suggests that

the inappropriate organization structures of little internationalized firms effectuate the first

negative slope of the multinationality-performance relationship. Regarding the time dimension, it

predicts that (de-) internationalization steps have temporary effects that may occur at any level of

multinationality. This prediction was not supported by the data, raising doubts on the established

explanation for the early negative effect of multinationality. The information cost argumentation

in the rising segment of the S-curve is related to earlier studies' reasoning of foreign resource

access (Delios and Beamish, 1999; Gomes and Ramaswamy, 1999), the second falling segment

is compatible with coordination cost explanations (Hitt, Hoskisson, and Kim, 1997; Elango and

Sethi, 2007).

Apart from the fact that uniform measures of multinationality and performance have problems to

capture the characteristics of all firms, leading to a small R^2 in the empirical results, the study

has several limitations. The return on equity is calculated from the balance sheets reported to the German Central Bank. Investors use different accounting standards and apply the same standards in different ways so the performance measure is maybe biased. Furthermore, it is only robust to rent shifting among the foreign subsidiaries whereas it is not to profits that are dislocated from the home country abroad and vice versa. The multinationality measure treats all foreign activities the same way. Depending on the point of view, foreign direct investment in production subsidiaries, service affiliates or research units may be regarded as a stronger mode of multinationality than just placing sales offices abroad. The most important drawback of the multinationality construct, both in theoretical and in empirical terms, is that it ignores the interactions between the subsidiaries spread over various countries. In firms that operate in diverse and rather independent country markets, additional spread of foreign direct investment will impact less on the internal information costs and thereby performance than in firms with internationally integrated value chains. The data used by this study are not rich enough to track the interdependencies of a firm's foreign affiliates. The study also lacks empirical evidence of the information cost effects of inappropriate organizational structures.

The relationship of multinationality and performance is relevant to all managers making foreign direct investment decisions. In order to leave the first decreasing segment of the S-curve and benefit from multinationality early, managers should not hesitate to trigger a reorganization and integrate the international business into the national structures and processes. The costs of changing to the new organizational structure may be earned back quickly by the efficiency gains in communication and coordination. If so, further internationalization is likely to be rewarded by higher profits. Managers of more internationalized firms, however, may consider additional foreign market entries carefully since the S-curve suggests a negative contribution of high

multinationality. As the study seeks to analyze the multinationality-performance relationship in all kinds of firms rather than in an individual firm, the managerial implications are generic. It is difficult to tell the position on the S-curve unless the firm's internal and external information costs are known.

Following Verbeke, Li, and Goerzen (2009), international management research should further investigate the performance impact of multinationality in different empirical environments. However, rather than developing new theories that fit distinct samples, future research may start from a common theoretical ground, possibly from the theory of information costs. Specifying the information costs of firms with different strategies, organizational structures, sizes, and from particular industries will improve the empirical model fit considerably. Interchanging experiences from different observations by the theoretical link of information costs will accelerate the development of the field. In parallel, it is necessary to keep in mind the difference between the performance in accounting measures and the performance in capital market perceptions, which may also be affected by information costs.

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FIGURES AND TABLES

FIGURE 1

International Market Intermediation by Foreign Direct Investment
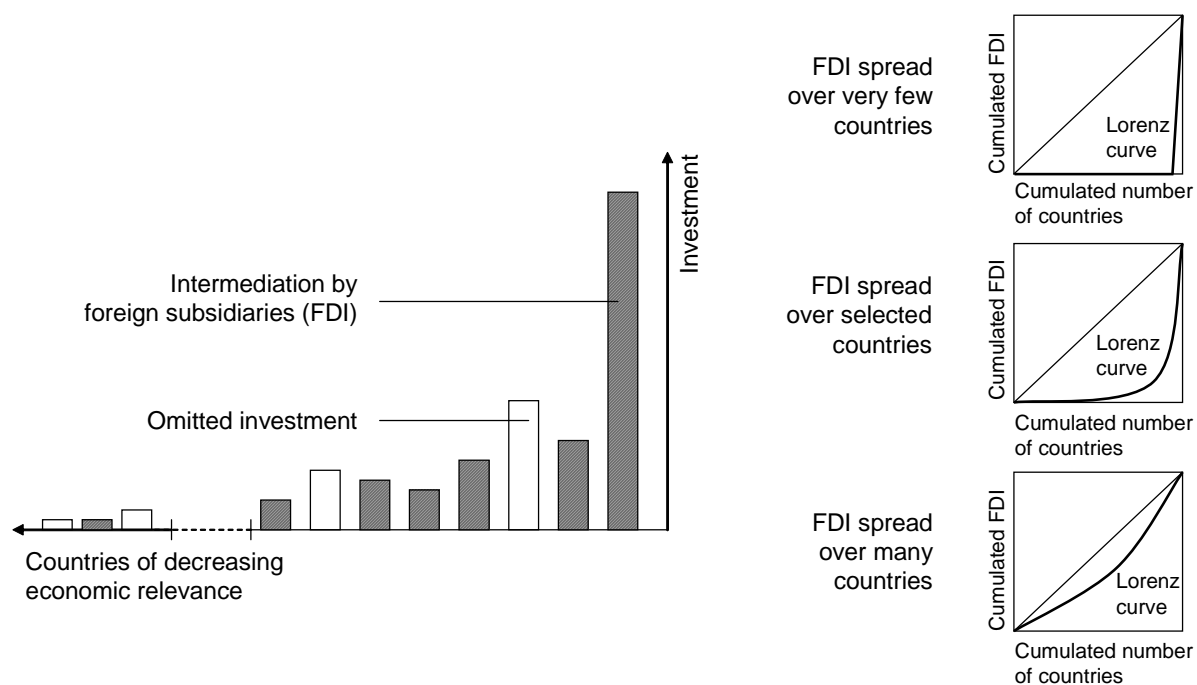
FIGURE 2

Information Cost and Performance of International Business as Functions of the

Spread of Foreign Direct Investment

TABLE 1

Industries of the sample firms (2006)

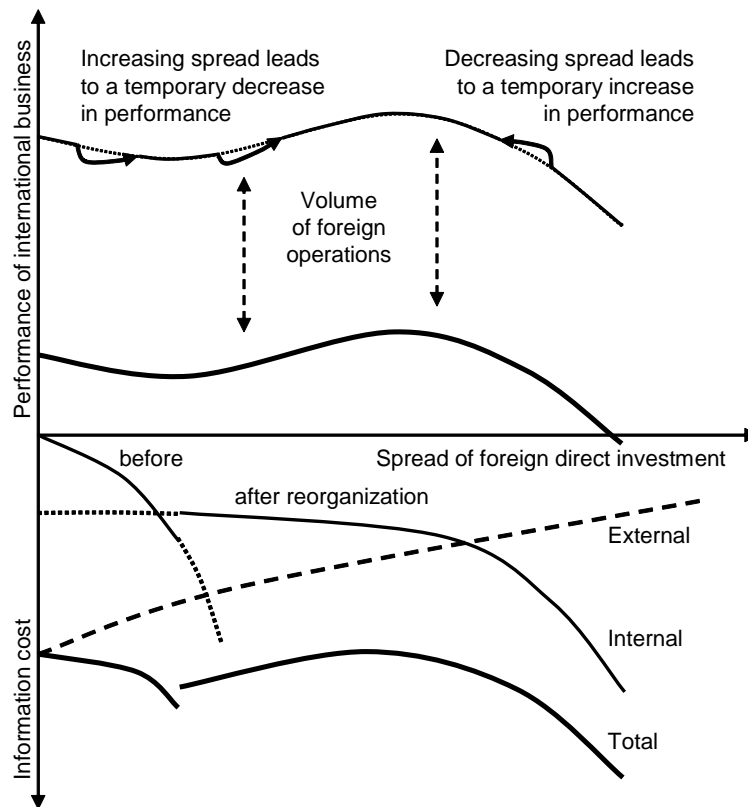| Industry	Firms
Agriculture, hunting and related service activities	9
Forestry, logging and related service activities	< 3
Fishing, operation of fish hatcheries and fish farms; service activities incidental to fishing	< 3
Mining of coal and lignite, extraction of peat	4
Extraction of crude petroleum and natural gas, service activities incidental to oil and gas extraction	7
Mining and quarrying, other mining	14
Food products and beverages	116
Tobacco products	< 3
Textiles	62
Textile products	30
Leather and leather products	15
Wood and wood products	17
Pulp, paper and paper products	34
Publishing, printing and reproduction of recorded media	58
Coke, refined petroleum products and nuclear fuel	11
Chemicals and chemical products	231
Rubber and plastic products	170
Other non-metallic mineral products	74
Basic metals	80
Metal products	209
Machinery and equipment	419
Office machinery and computers	13
Electrical machinery and apparatus	132
Radio, television and communication equipment and apparatus	50
Medical, precision and optical instruments, watches and clocks	127
Motor vehicles, trailers and semi-trailers	133
Other transport equipment	20
Furniture	39
Recycling	8
Electricity, gas, steam and hot water supply	37
Collection, purification and distribution of water	< 3
Construction sector	55
Sale, repair of motor vehicles; retail sale of automotive fuel	21
Wholesale trade and commission trade (except of motor vehicles and motorcycles)	435
Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods	89
Hotels and restaurants	6
Land transport; transport via pipelines	50
Water transport	14
Air transport	6
Supporting and auxiliary transport activities; activities of travel agencies	39
Mail and telecommunications	19
Housing enterprises	8
Other real estate activities	18
Renting of machinery and equipment without operator and of personal and household goods	22
Computer and related activities	46
Research and development	10
Other business activities	146
Other credit institutions	53
Other financial intermediaries	7
Investment funds	< 3
Insurance and pension funding, except compulsory social security	61
Activities auxiliary to financial intermediation	16

TABLE 2

Spread of Foreign Direct Investment by Sample Firms over the Economically Relevant

Countries, accounting for 99% of the World GDP, without Germany (2006)

Country	Share of World GDP	FDI by sample firms [€1,000]
Algeria	0.24%	13,837
Angola	0.08%	*Confidential*
Argentina	0.47%	1,192,048
Australia	1.47%	5,221,876
Austria	0.69%	19,850,463
Azerbaijan	0.04%	11,892
Bangladesh	0.15%	23,803
Belarus	0.08%	41,904
Belgium	0.84%	6,869,015
Brazil	2.21%	5,507,801
Bulgaria	0.07%	768,182
Canada	2.53%	6,097,517
Chile	0.27%	741,488
China	6.08%	7,703,776
Colombia	0.29%	592,558
Costa Rica	0.05%	63,584
Croatia	0.09%	1,419,124
Cyprus	0.04%	93,139
Czech Republic	0.29%	12,951,134
Denmark	0.58%	3,047,255
Dominican Republic	0.07%	31,978
Ecuador	0.08%	120,992
Egypt	0.23%	374,444
El Salvador	0.04%	68,903
Finland	0.46%	1,840,642
France	4.77%	30,073,772
Greece	0.65%	1,537,418
Guatemala	0.06%	98,512
Hungary	0.23%	11,250,792
India	2.08%	2,060,455
Indonesia	0.73%	1,577,336
Iran	0.48%	74,634
Ireland	0.41%	9,670,362
Israel	0.31%	178,463
Italy	3.88%	24,867,398
Japan	9.37%	9,523,501
Kazakhstan	0.15%	92,457
Kenya	0.05%	74,172
Korea, Rep.	1.86%	5,849,832
Latvia	0.04%	166,966
Lebanon	0.05%	18,864
Libya	0.11%	332,444
Lithuania	0.07%	283,383
Luxembourg	0.07%	805,858
Malaysia	0.34%	1,976,548
Mexico	1.71%	7,390,897
Morocco	0.14%	214,138
Netherlands	1.46%	18,934,424
New Zealand	0.24%	364,126
Nigeria	0.27%	211,152
Norway	0.70%	1,593,867
Pakistan	0.27%	264,725
Peru	0.19%	95,037
Philippines	0.28%	537,673
Poland	0.73%	9,871,900
Portugal	0.39%	4,423,221
Romania	0.26%	1,862,607
Russian Federation	2.09%	3,460,081
Saudi Arabia	0.73%	183,388
Serbia	0.07%	243,662
Singapore	0.29%	5,224,880
Slovak Republic	0.12%	3,539,598
Slovenia	0.08%	400,549
South Africa	0.53%	2,956,114
Spain	2.57%	18,709,891
Sri Lanka	0.06%	96,864
Sudan	0.07%	0
Sweden	0.82%	10,292,949
Switzerland	0.88%	12,329,832
Syria	0.07%	0
Thailand	0.42%	1,262,834
Tunisia	0.06%	181,062
Turkey	1.15%	2,531,293
Ukraine	0.23%	482,690
United Kingdom	5.08%	47,791,845
United States	27.05%	150,917,290
Uruguay	0.04%	61,013
Uzbekistan	0.04%	*Confidential*
Venezuela	0.39%	364,735
Vietnam	0.13%	120,109
Total	92.76%	482,078,866

TABLE 3

Descriptive Statistics (Spread of Foreign Direct Investment)

	Variable	Obs	Mean	StdDev	Min	Max	*1*	*2*	*3*	*4*	VIF
	performance	12499	0.186	0.673	-8.174	9.800					
1	*FDIspread*	12499	0.025	0.024	0.013	0.265	1.000				1.04
2	*FSTS*	12499	0.195	0.203	1.36E-05	0.998	0.156	1.000			2.77
3	*FETE*	12499	0.214	0.246	4.44E-06	0.999	0.051	0.786	1.000		2.73
4	*GDPgrowth*	12499	0.122	0.071	-0.620	0.503	0.014	-0.012	0.093	1.000	1.03

TABLE 4

Linear Panel Regression (Absorbing Indicators) of the Multinationality-Performance

Relationship using the Spread of Foreign Direct Investment over the Economically Relevant

Countries

performance	Model 1	Model 2	Model 3	Model 4
$FDIspread^3$				-185.59**
				(74.058)
$FDIspread^2$			14.817**	77.511***
			(7.2795)	(26.055)
$FDIspread$		-0.5848	-2.8440**	-7.5369***
		(0.7422)	(1.3352)	(2.2997)
$FSTS$	0.2371**	0.2431**	0.2505***	0.2594***
	(0.0956)	(0.0959)	(0.0959)	(0.0960)
$FETE$	-0.2331***	-0.2309***	-0.2227***	-0.2169**
	(0.0853)	(0.0853)	(0.0854)	(0.0854)
$GDPgrowth$	0.3112***	0.3117***	0.3118***	0.3099***
	(0.1154)	(0.1154)	(0.1153)	(0.1153)
F	3.95***	3.53***	3.60***	3.87***
R^2	0.5583	0.5584	0.5586	0.5589
Adjusted R^2	0.4029	0.4029	0.4031	0.4034
Objects	3247	3247	3247	3247

Estimation with time dummies; *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$; Standard errors in parentheses

TABLE 5

Random Effects (GLS) Regression of the Multinationality-Performance Relationship using the Spread of Foreign Direct Investment over the Economically Relevant Countries across Subsamples

performance	Model 5 Full sample	Model 6 Manu-facturing, Agriculture	Model 7 Service and trade	Model 8 Financial	Model 9 Employees <1000	Model 10 Employees ≥1000	Model 11 Sales subsidiaries	Model 12 Non-sales subsidiaries
$FDIspread^3$	-147.33** (56.87)	-142.33* (79.874)	-206.43* (118.61)	-798.95* (476.29)	-1492.2 (1114.8)	-88.549* (49.006)	-298.35* (179.11)	-143.07* (75.201)
$FDIspread^2$	59.621*** (18.581)	51.767** (23.165)	87.533** (43.171)	235.89* (141.77)	316.30* (182.62)	36.310** (16.732)	90.826** (42.789)	61.014** (25.724)
$FDIspread$	-6.0356*** (1.4768)	-4.8126*** (1.7248)	-9.0067*** (3.4222)	-16.058* (9.0418)	-18.910** (7.6575)	-3.6207** (1.4472)	-7.1993*** (2.7196)	-6.3276*** (1.9528)
$FSTS$	0.2311*** (0.0633)	0.2313*** (0.0749)	0.2276* (0.1201)	0.8735*** (0.3027)	0.2890*** (0.0877)	0.2033 (0.1248)	0.1008 (0.0983)	0.2343*** (0.0793)
$FETE$	-0.1289** (0.0528)	-0.0961 (0.0640)	-0.1875* (0.0959)	-0.2086 (0.3600)	-0.1183* (0.0711)	-0.2246* (0.1266)	-0.0925 (0.0900)	-0.0991 (0.0645)
$GDPgrowth$	0.3889*** (0.1025)	0.3806*** (0.1075)	0.3843 (0.2490)	0.1558 (0.5741)	0.2972 (0.1831)	0.4038*** (0.1145)	0.4910*** (0.1669)	0.3530*** (0.1111)
Chi^2	58.49***	42.90***	24.26***	17.09*	38.84***	39.38***	22.73**	51.90***
R^2 within	0.0037	0.0043	0.0059	0.0747	0.0071	0.0048	0.0031	0.0053
R^2 between	0.0082	0.0079	0.0109	0.0155	0.0076	0.0110	0.0079	0.0071
R^2 overall	0.0054	0.0049	0.0075	0.0085	0.0062	0.0069	0.0043	0.0059
Objects	3247	2205	933	141	1516	1781	1473	2400

Estimation with time dummies; *** p < 0.01; ** p < 0.05; * p < 0.1; Standard errors in parentheses

TABLE 6

Descriptive Statistics (Range and Distribution of Foreign Direct Investment)

	Variable	Obs	Mean	StdDev	Min	Max	1	2	3	4	5	6	VIF
	performance	12045	0.179	0.650	-8.174	9.800							
1	*dNOC*	12045	-0.571	1.514	-33.333	5.333	1.000						1.13
2	*FDIdistrEC*	12045	0.827	0.215	0.114	1	0.283	1.000					1.75
3	*NOC*	12045	3.324	5.219	1	68.333	-0.314	-0.645	1.000				1.79
4	*FSTS*	12045	0.196	0.202	1.76E-05	0.998	0.020	-0.131	0.149	1.000			2.80
5	*FETE*	12045	0.214	0.245	4.44E-06	0.999	0.053	-0.031	0.046	0.787	1.000		2.75
6	*GDPgrowth*	12045	0.122	0.070	-0.620	0.503	0.020	-0.012	0.018	-0.009	0.094	1.000	1.03

TABLE 7

Linear Panel Regression (Absorbing Indicators) of the Multinationality-Performance Relationship Using the Range and Distribution of Foreign Direct Investment over the Entered Countries

performance	Model 13	Model 14	Model 15	Model 16	Model 17	Model 18
NOC^3X FDIdistrEC						-0.0001** (3.98E-05)
NOC^3					-1.81E-07 (7.99E-06)	-2.89E-05* (1.61E-05)
NOC^2X FDIdistrEC				0.0017** (0.0008)	0.0017* (0.0009)	0.0066** (0.0026)
NOC^2			4.79E-06 (0.0001)	0.0006* (0.0003)	0.0006 (0.0007)	0.0023** (0.0011)
NOCX FDIdistrEC		-0.0235 (0.0151)	-0.0233 (0.0165)	-0.0589** (0.0241)	-0.0585** (0.0286)	-0.1031*** (0.0359)
FDIdistrEC		-0.0894 (0.1575)	-0.0881 (0.1621)	0.0526 (0.1764)	0.0527 (0.1764)	0.0707 (0.1766)
NOC	-0.0021 (0.0042)	-0.0049 (0.0058)	-0.0051 (0.0076)	-0.0158* (0.0093)	-0.0160 (0.0131)	-0.0333** (0.0156)
FSTS	0.1975** (0.0990)	0.2173** (0.0993)	0.2173** (0.0993)	0.2240** (0.0993)	0.2241** (0.0993)	0.2299** (0.0993)
FETE	-0.2127** (0.0878)	-0.2043** (0.0878)	-0.2043** (0.0878)	-0.1984** (0.0879)	-0.1983** (0.0879)	-0.1946** (0.0879)
GDPgrowth	0.3184*** (0.1182)	0.3217*** (0.1181)	0.3216*** (0.1182)	0.3244*** (0.1182)	0.3243*** (0.1182)	0.3233*** (0.1181)
F	3.20***	3.21***	2.92***	3.02***	2.79***	2.89***
R^2	0.5254	0.5258	0.5258	0.5260	0.5260	0.5262
Adjusted R^2	0.3588	0.3592	0.3591	0.3593	0.3592	0.3595
Objects	3122	3122	3122	3122	3122	3122

Estimation with time dummies; *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$; Standard errors in parentheses

TABLE 8

Linear Panel Regression (Absorbing Indicators) of Temporary Effects in the

Multinationality-Performance Relationship Using the Range and Distribution of Foreign

Direct Investment over the Entered Countries

performance	Model 18	Model 19	Model 20	Model 21	Model 22
$dNOCXNOC^3X$ $FDIdistrEC$					-1.04E-06 (6.72E-06)
$dNOCXNOC^2X$ $FDIdistrEC$				-0.0001 (0.0001)	2.97E-06 (0.0005)
$dNOCXNOCX$ $FDIdistrEC$			0.0021 (0.0017)	0.0055 (0.0048)	0.0040 (0.0107)
$dNOC$		0.0020 (0.0060)	0.0052 (0.0065)	0.0066 (0.0068)	0.0062 (0.0073)
NOC^3X $FDIdistrEC$	-0.0001** (3.98E-05)	-0.0001** (4.00E-05)	-0.0001** (4.00E-05)	-0.0001** (4.11E-05)	-0.0001** (4.40E-05)
NOC^3	-2.89E-05* (1.61E-05)	-2.91E-05* (1.61E-05)	2.80E-05* (1.61E-05)	2.99E-05* (1.63E-05)	-2.99E-05* (1.63E-05)
NOC^2X $FDIdistrEC$	0.0066** (0.0026)	0.0066** (0.0026)	0.0068*** (0.0026)	0.0070*** (0.0026)	0.0071*** (0.0027)
NOC^2	0.0023** (0.0011)	0.0023** (0.0011)	0.0023** (0.0011)	0.0024** (0.0011)	0.0024** (0.0011)
$NOCX$ $FDIdistrEC$	-0.1031*** (0.0359)	-0.1044*** (0.0361)	-0.1042*** (0.0361)	-0.1037*** (0.0361)	-0.1049*** (0.0369)
$FDIdistrEC$	0.0707 (0.1766)	0.0711 (0.1766)	0.1312 (0.1834)	0.1033 (0.1871)	0.1052 (0.1875)
NOC	-0.0333** (0.0156)	-0.0338** (0.0157)	-0.0345** (0.0157)	-0.0357** (0.0158)	-0.0355** (0.0158)
$FSTS$	0.2299** (0.0993)	0.2293** (0.0994)	0.2281** (0.0994)	0.2287** (0.0994)	0.2291** (0.0994)
$FETE$	-0.1946** (0.0879)	-0.1939** (0.0879)	-0.1938** (0.0879)	-0.1942** (0.0879)	-0.1941** (0.0879)
$GDPgrowth$	0.3233*** (0.1181)	0.3236*** (0.1182)	0.3219*** (0.1182)	0.3214*** (0.1182)	0.3215*** (0.1182)
F	2.89***	2.70***	2.63***	2.51***	2.37***
R^2	0.5262	0.5262	0.5263	0.5263	0.5263
Adjusted R^2	0.3595	0.3594	0.3594	0.3594	0.3595
Objects	3122	3122	3122	3122	3122

Estimation with time dummies; *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$; Standard errors in parentheses