

Testing the Link Between Multinationality and the Return on Foreign Assets

Alina Kudina, Alan M. Rugman & George S. Yip

Abstract: A large and robust empirical literature demonstrates that there is a strong relationship between the performance of a multinational enterprise (MNE) and its degree of multinationality. We develop a new metric to capture the return on foreign assets (ROFA), which we use as an alternative metric to return on total assets (ROTA) as a dependent variable representing performance. We find a significant S-shaped relation between ROFA and the degree of multinationality across a large set of UK firms.

INTRODUCTION

The empirical research on the performance of multinational enterprises (MNEs) is more difficult than that of analyzing the performance of purely domestic firms because MNEs, by definition, operate across different countries and regions. MNEs have wholly owned subsidiaries in foreign countries, and they also export from their home country. Thus, it is difficult to disentangle the impact on overall corporate performance due to the foreign activities of the MNE compared to its purely domestic activities. The theoretical problems have been compounded by lack of good data on the performance of foreign subsidiaries. However, for the last ten years or so, most of the world's largest 500 firms have been reporting the return on foreign assets (ROFA). Yet to date, few, if any, studies have used ROFA as a performance metric. We introduce ROFA as a new performance metric for the

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dependent variable in a study relating multinationality to performance. We relate ROFA to the empirical literature in this field and test ROFA against the traditional measure of overall corporate performance, namely the return on total assets (ROTA). Finally, we contrast the use of ROFA and ROTA as dependent variables and conclude that the new information on the relationship between multinationality and foreign performance is an important advance in this area of empirical research.

The empirical literature related to the link between degree of multinationality and performance is based on a comparison of the benefits and costs of internationalization (multinationality). Benefits of multinationality arise from exploitation of firm-specific (especially intangible) assets, scale and scope economies, exploitation of overseas resources, increasing market power, etc. The costs of multinationality arise due to the liabilities of newness and foreignness, transaction and coordination costs, diseconomies of scale, information processing demands, etc. Expanding into dissimilar markets increases environmental uncertainty, which further raises the costs of hierarchical governance. (This literature is formally discussed in the next section).

In this large empirical literature on multinationality and performance, the traditional dependent variable is the return on total assets (ROTA). This represents the performance of the MNE as a whole, where return on home assets (ROHA) can now be distinguished from return on foreign assets (ROFA). While ROTA is a weighted sum of returns at home and abroad, in practice, data limitations and firm-specific heterogeneity makes it rare for this sum to hold. From this, it is apparent that ROTA is not a precise measure of the return on foreign assets (i.e., the performance of the foreign subsidiaries of the MNE) since it includes the component representing return on home assets. Yet much of the entire literature on multinationality and performance suffers from this bias, as discussed in the next section. (We also discuss other dependent variables such as Tobin's q and return on sales).

This paradox is largely explained by the data available to measure the performance of MNEs. Until recently, data on ROFA (and thus on ROHA) have not been available. Several years ago the first studies on ROFA were reported in the *Templeton Global Performance Index* (Gestrin et al. 2001). At that time only 200 of the world's 500 largest firms reported ROFA; now twice as many do so. In this paper we take advantage of the new data on ROFA and substitute it for ROTA as the dependent variable in the basic equation that tests the impact of multinationality on performance.

We link this work to recent research that has developed a cubic S-curve fit for this relation (Contractor, Kundu, and Hsu 2003). In phase 1 of the S-curve

paradigm, it is argued that there is a U-curve relation, as going abroad incurs a liability of foreignness. In phase 2, there is a linear positive relation as the firm-level benefits of multinationality (due to the FSAs of the MNE) lead to greater returns. In the third phase, there is an inverted U-relation, possibly due to the limited ability of most MNEs to exploit their FSAs outside of their home region. This last phase of the S-curve is fully consistent with the findings that the majority of the world's largest 500 firms average 80% of their sales in their home region (Rugman 2005; Rugman and Verbeke 2004, 2007; Contractor 2007). In other words, the S-curve shape is first determined by the (national) liability of foreignness and second by the liability of inter-regional foreignness.

Using data on the UK MNEs over several years, we find that with ROFA there is a significant S-curve relation. Also with ROTA, there is a significant S-curve fit. However, both ROTA and ROFA fail to show a quadratic fit. We also find that with ROFA, there is a greater explanatory power in the independent variables representing multinationality and FSAs. We interpret these results to suggest that research should now work with the ROFA variable as it can more precisely measure the performance of foreign subsidiaries. Logically, it also allows ROHA to be evaluated so that domestic performance can also be segmented from total performance.

THE RELEVANCE OF ROFA TO THE EMPIRICAL LITERATURE

There is a growing recognition of the significance of subsidiaries' roles and strategies in the network of a modern multinational enterprise. The roles of subsidiaries are regarded to be developing with the maturity of an MNE (Malnight 1994, 1996). The research in this area is based on the sequential view of foreign investment, whereby the initial investment leads to waves of additional, typically higher-quality investments (Kogut 1983, Chang 1995, 1996). The literature shows that developments in the subsidiary roles can be either driven by headquarter initiative or by the initiative from the subsidiary managers (Malnight 1996; Birkinshaw 1997). The more successful the operations of a particular subsidiary, the more likely the headquarters will allocate more resources to its operations and support its growth. Consequently, as a firm's international operations can be seen as a sum of operations of the network of its subsidiaries, the performance of MNE international operations can also be regarded as aggregate performance of its foreign subsidiaries. Therefore, it is possible to focus on the performance of foreign subsidiaries directly (ROFA) in order to make inferences about the performance of an MNE's international strategy rather than on an MNE's overall performance (ROTA) (see Birkinshaw and Morrison 1995; Birkinshaw and Hood 1998; Venaik, Midgey, and Devinney 2005).

Of course, subsidiary performance can be skewed by certain factors, such as tax-optimizing behavior of MNEs. For these purposes, companies can use tax-haven subsidiaries, foreign sales corporations, and transfer pricing – just to name a few common sources of income distortion. Furthermore, an MNE can pursue different goals other than short-term foreign profit maximization; and in this situation, the performance of foreign subsidiaries might not be the best indicator of the overall success of the MNE international strategy. Notwithstanding these problems, the ROFA data on performance of foreign subsidiaries seems to be the most accurate source available for analyzing performance of MNE foreign operations directly.

In the existing body of literature, the analysis of overall MNE performance is measured normally by either accounting measures, such as return on total assets (ROTA) or return on total sales, revenue growth, or financial indicators, like Tobin's q . The econometric analysis of the factors affecting MNE performance has been mainly concerned with studying the impact of multinationality, product diversity, firm size, and industry structure (Rumelt 1974; Rugman 1979, 1983; Dunning 1985; Grant 1987; Haar 1989; Geringer, Beamish, and daCosta 1989; Datta, Rajagopalan, and Rasheed 1991; Vachani 1991; Ramaswamy 1992; Haveman 1993; Kim, Hwang, and Burgers 1993; Olusoga 1993; Sullivan 1994a; Hitt, Hoskisson, Johnson, and Moesel 1996; Tallman and Li 1996; Hitt, Hoskisson, and Kim 1997; Barkema and Vermeulen 1998; Gomes and Ramaswamy 1999; Luo and Peng 1999; Lu and Beamish 2001; Contractor et al. 2003; Lu and Beamish 2004). In this body of research, firm size, degree of product and geographic diversity, and industry structure are found to have a significant effect on the overall (e.g., ROTA) performance of MNEs. However, there is still no full agreement on the relationship between some factors, like the degree of multinationality and performance. It is likely that the use of the data on overall performance of MNEs to analyze the impact of international operations is a key reason for these conflicting results.

Exhibit 1 summarizes most of the research in the field according to the performance measure used. It shows that the accounting measures, return on assets (ROTA), or return on sales (ROS) are the most frequently studied performance measures. Two recent studies include ROFA as a dependent variable, but in ways not consistent with this paper. First, Rugman, Kudina, and Yip (2007) include ROFA as a dependent variable but use a regional measure of multinationality (instead of the ratio of foreign to total sales - F/T) as the leading independent variable. The main focus is on the explanatory power of the regional variable, not on ROFA. Second, Rugman, Yip, and Jayaratne (2007) use ROFA in a restricted sample of 32 UK MNEs. They find a simple linear fit between F/T and ROFA, which advances on Grant's conclusions

(1987). In a related paper Yip, Rugman, and Kudina (2006) use industry-level classifications and not the firm-level analysis of this paper. In an appendix, the F/T variable is applied to explain return on sales, rather than ROTA (used here).

The empirical research in the area has developed from a simple view of a linear relationship between the degree of a firm's multinationality to a more advanced S-shaped (cubic) relation, having studied a quadratic link in the interim. The proponents of the linear relation point to the intrinsically profit-driven nature of international expansion. Companies with the largest inter-

EXHIBIT 1 The Literature on Performance Metrics

Performance metric	Author(s) and year
Return on total assets (ROTA)	Buckley, Dunning, and Pearce (1977); Buckley, Dunning, and Pearce (1984); Kumar (1984); Grant (1987); Grant et al. (1988); Daniels and Bracker (1989); Geringer et al. (1989); Jung (1991); ¹ Sullivan (1994a,b); Ramaswamy (1995); Hitt et al. (1997); Gomes and Ramaswamy (1999); Contractor et al. (2003); Ruigrok and Wagner (2003); Lu and Beamish (2004).
Return on sales (ROS)	Vernon (1971); Kumar (1984); Grant (1987); Grant et al. (1988); Daniels and Bracker (1989); Geringer et al. (1989); Sullivan (1994a,b); Ramaswamy (1995); Gomes and Ramaswamy (1999); ² Capar and Kotabe (2003); Contractor et al. (2003); Ruigrok and Wagner (2003); Yip et al. (2006).
Return on equity (ROE)	Grant (1987); Grant et al. (1988); Qian (1997); Han et al. (1998).
Market performance (Tobin's q, stock return, market value, excess market value, excess return, risk-adjusted return, total risk, debt-to-equity ratio, beta)	Brewer (1981); Errunza and Senbet (1981); Kim and Lyn (1986); Michel and Shaked (1986); Collins (1990); Morck and Yeung (1991); Doukas and Lang (2003).
Sales growth	Siddharthan and Lall (1982); Grant (1987).
Return on foreign assets (ROFA)	Rugman, Kudina, and Yip (2007); Rugman, Yip, and Jayaratne (2007).

national exposure are expected to enjoy higher profitability as shown by Vernon (1971), Dunning (1985), Grant (1987), Grant, Jammine, and Thomas (1988), Han, Lee, and Suk (1998), among others. Nevertheless, contrary to theoretical predictions, some scholars find evidence in support of the contrary proposition (Brewer 1981, Siddharthan and Lall 1982, Collins 1990). The cost of the liability of foreignness outweighs the firm-specific advantages (FSAs) of the MNE. The costs of doing business abroad arise since multinationality is complex and difficult to measure (Roth 1992). Escalating geographic dispersion increases transaction costs and managerial information-processing demands. Government regulations, trade laws, foreign exchange fluctuations, etc., add complexity to the task of managing a widely diversified MNE (Sundaram and Black 1992). Further difficulties arise from trade barriers, high logistics costs, and cultural diversity (Kogut 1985).

Therefore, the hypothesis of a non-linear (quadratic) relation between the degree of multinationality and performance has been put forward and supported by Geringer et al. 1989, Hitt et al. 1996, Hitt et al. 1997, Gomes and Ramaswamy 1999, and others. Moderate levels of multinationality could provide multiple benefits to organizations, such as economies of scale and scope, economies of common governance, easier access to financial resources, and the possibility of exploiting differences in factor markets. At the same time, excessive transaction and managerial costs could outweigh the benefits of further international expansion that may have a negative impact on MNE performance after some point. In this literature, several studies have found a U-shaped relation (Qian 1997; Capar and Kotabe 2003; Ruigrok and Wagner 2003,). Conversely, an inverted U-shape has been found by Daniels and Bracker 1989; Geringer et al. 1989; Sullivan 1994a, 1994b; Ramaswamy 1995; Hitt et al. 1996; Gomes and Ramaswamy 1999. Partly due to the conflicting evidence of a U-shaped or inverted U-shaped relationship, more recently several studies have theorized and tested a horizontal S-shaped relation.

The most notable of these is by Contractor et al. (2003) and Lu and Beamish (2004), who, in a sense, effectively reconcile the conflicting findings in the earlier literature in a three-stage S-shaped relation. In stage 1, the curve has a negative slope over low values of multinationality, whereas the curve changes its slope to positive in stage 2, which is considerably lengthier than stage 1. Finally, in stage 3 the curve has a negative slope again, yet over a shorter range than in stage 2.

According to Contractor et al. (2003), there is a theoretical rationale for each of these stages. In stage 1 the MNE has expanded abroad, but it still suffers from liability of foreignness; and therefore, a low degree of multinationality has a negative impact on performance. However, in accordance with the

Uppsala School of Internationalization (Johansson and Vahlne 1977), which argues that an MNE experiences positive learning effects when expanding into neighboring countries, the MNE moves rapidly to stage 2. In this stage, there is a lengthy positive range in which additional degrees of international expansion yield better performance for the MNE. Finally, in stage 3, at a late stage of multinationality, the benefits of expansion into foreign markets become exhausted (the economies of scale and benefits of brand expansion both dry up) and the performance effect becomes negative. This is a short stage because it is highly unlikely that MNEs will increase foreign operations in the face of falling performance. This stage is consistent with liability of inter-regional foreignness (Contractor 2007; Rugman and Verbeke 2007).

Lu and Beamish (2004) use different theoretical lenses to develop and test an S-curve hypothesis for a multinationality and performance relation. They posit that geographic diversification brings the benefits of exploitation and exploration to an MNE. The exploitation benefits take the form of economies of scale and scope, reduction of investment risks through revenue diversification, and an increase in market power. The exploration benefits come from realization of the host country's location-specific advantages and unique resource endowments. The authors specifically stress the exploration benefits of the use of intangible assets (FSAs) using an organizational learning perspective. Based on the logic of Barkema and Vermeulen (1998) and Zahra, Ireland, and Hitt (2000), they hypothesize that a firm's network of subsidiaries can help by enhancing its knowledge base, capabilities, and competitiveness through experiential learning. Consequently, they theorize and report a positive moderating effect of intangible assets, such as technology and advertising advantages, on the performance gains attributable to geographical diversification.

On the cost side of international expansion, Lu and Beamish (2004) refer mostly to the liabilities of foreignness and newness, and governance and coordination costs, which have different (and frequently opposite) impacts on the firm's performance at various stages of international expansion. Integrating the above-mentioned benefits and costs of multinationality into one model, the authors put forward a hypothesis of an S-shaped relation between the degree of multinationality and performance. They subsequently verify it using a large set of Japanese firms over a 12-year period.

THE EMPIRICAL STUDY OF U.K. FIRMS

In our study we use the Osiris database provided by Bureau van Dijk, which contains annual report data on 30,000 public companies (and 8,000 unlisted and delisted companies) worldwide. The Osiris database is similar to Com-

pustat as it reports data for individual companies and for business/geographic segments. The main appealing feature of Osiris is the availability of profitability data for geographic segments (whereas Compustat shows revenues and assets only).

We focus our analysis on British companies only for the following reasons: 1) since we are studying a single country, we do not have to control for a home country effect; 2) we could not include a very large number of companies because many firms do not report foreign sales so we need to go to individual company's balance sheets to download geographic segment data; and 3) this study is funded by the UK Social Research Council, hence the UK is a natural choice.

As the database contains 1,884 public UK companies (basically covering all British public companies), we look for ways to further decrease the number of companies in the study. We decide to select the British companies that rank in the top 100 companies of their industries worldwide (based on the Dow Jones Global Segmentation Industry Classification scheme, another beneficial feature offered by Osiris database, which uses 89 industry classifications). Most large firms are included in one study although in several industries there are fewer than 100 firms. We are not testing the small, 'born global' companies in this paper. The advantage of the Dow Jones system is that it is designed to achieve the best fit for the world's existing companies (whereas the standard SIC classification has been numerous criticized for its poor matching of the activities of diversified companies since it was designed with industries, not companies, in mind).

As MNEs have been shown to internationalize incrementally, we cover a ten-year period (1993-2003) in our analysis. We collect data for four years (2003, 2001, 1998, and 1993). Since the internationalization process is gradual and incremental, the fact that we check four data points out of ten is deemed sufficient for our purposes. The intervals between the years are not equal as fewer companies reported geographic segment data in the past. Hence, it is sensible to give more weight to the later years.

Naturally, only the British companies that report geographical segment data are included. Companies that report foreign revenue data but did not disclose foreign profits or assets are excluded from the sample. Consequently, the sample contains companies that report revenues, profits, and assets by region. The companies that report the necessary data for only one of the years under consideration are also excluded from the study. The final (unbalanced) panel contains data for 209 firms over four years, with the total

number of observations coming to 501. It is obvious that the panel comprises a significant amount of missing data because many companies show segment data for only two out of four years (or show segment profits for two years only).

Dependent Variable

The major distinctive feature of this study is that it introduces a new measure of performance, ROFA. There are various indicators of performance used in the literature and our goal is to choose the most suitable indicator for this study. Neither market (e.g., Tobin's *q* or stock market returns) nor operational (e.g., market share) indicators are applicable performance measures for the performance of foreign operations. Therefore, we are left with accounting measures mostly, such as return on foreign assets or sales. We choose to work with an asset-based measure, ROFA, as it is a better indicator of an MNE's involvement in foreign operations. In line with previous research (Gestrin et al. 2001; Rugman, Yip, and Jayaratne 2007), we calculate the return on foreign assets (ROFA) as a ratio of foreign profits to foreign assets of an MNE.

Independent Variables

The key independent variable in this study is the extent of multinationality, which is calculated as a ratio of foreign revenues to total revenues (F/T) following the earlier classical work by Stopford and Wells (1972), Grant et al. (1988), Geringer et al. (1989), Tallman and Li (1996), and others. We note that this measure includes not only subsidiaries' sales overseas but also a company's exports, which is appropriate since the firm can achieve multinationality through exports as well as foreign production. A number of various other measures of the degree of multinationality have been employed by other authors, such as the ratio of foreign to total assets (Ramaswamy 1992), the ratio of employees in foreign locations to total employees (Kim et al. 1993), number of overseas offices, or plants (Ramaswamy 1992; Lu and Beamish 2004), or multidimensional constructs (Sullivan 1994b; Contractor et al. 2003).

A previous finding (Rumelt 1991), relates most of companies' performance variance to business-level effects, followed by industry effects, and only a small fraction explained by firm effects, entirely justifies inclusion of industry and time elements into the analysis. Consequently, we include a number of variables to neutralize firm-level (Rumelt 1991), industry-level (Schmalensee 1985), and time (cyclical) effects (Li 2005).

In addition to industry effects, we control for other factors. We control for a size effect (measured by the natural logarithm of a company's total revenues) as this has been shown to have a strong effect on profitability (Chang and Thomas 1989; Hitt et al. 1996; Gomes and Ramaswamy 1999). Second, we control for industry effects by incorporating a measure of average industry profitability, following the works of Datta et al. (1991), Tallman and Li (1996), and Stimpert and Duhaime (1997). We use an average return on assets by all public companies in the world in a given Dow Jones industry sector (according to Osiris database) as a corresponding control variable. And finally, we control for a year (cyclicality) effect by including a set of dummy variables (Cowley 1988; Mascarenhas and Aaker 1989; Li 2005). Data availability precluded us from including more control variables (e.g., R&D and advertising intensity). Yet these four control variables are the major ones that have often been used in existing studies (Gomes and Ramaswamy 1999; Capar and Kotabe 2003; Contractor et al. 2003; among others).

Table 1 reports summary statistics and correlations for the variables used in the analysis. The highest correlation coefficient of 32% is found between ROFA and ROTA, which is still relatively low, indicating that home operations have a very sizable impact on ROTA. Correlations between other variables are very low, which supports our subsequent econometric analysis.

Estimation Methods

Since the time series is short in our panel, estimating individual cross-section (or so called fixed) effects does not seem appropriate. Therefore, we employ a feasible generalized least squares (FGLS) estimator to conduct our analysis. Feasible GLS allows relaxation of the homoskedasticity assumption and assumes that residuals are cross-section heteroskedastic (i.e., their variance differs among observations), yet contemporaneously uncorrelated.

TABLE 1 Means, Standard Deviations, and Correlations (N=501)

	Mean	Std. Dev.	ROFA	ROTA	FT	TR	ROTAW
Return on Foreign Assets (ROFA), %	18.755	29.815	1.000				
Return on Total Assets (ROTA), %	3.453	10.064	0.317	1.000			
Foreign/Total Sales (F/T), %	48.032	28.684	0.020	-0.080	1.000		
Total Revenues (TR)	4.352	7.746	-0.034	0.048	0.012	1.000	
Industry Return on Total Assets (World) ROTAW, %	1.473	4.561	0.048	0.182	-0.112	0.100	1.000

In this way, we assign greater weight to observations coming from populations with smaller variability than to observations coming from populations with greater variability (by downweighting estimated coefficients with an estimate of the cross-section residual standard deviation). We employ White heteroskedasticity consistent covariances to obtain estimates that are robust to general heteroskedasticity. This form of heteroskedasticity is more general than the cross-section heteroskedasticity addressed by GLS since it allows for variances within a cross section that differs across time. Also, as our data set contains a large number of omitted variables, the pooled FGLS is an appropriate estimation technique since it automatically corrects for the missing variables.

RESULTS AND DISCUSSION

We report results of our regression analysis in Table 2. We find an S-shaped relation between the degree of multinationality and performance of foreign operations (ROFA). As can be seen from Figure 2, which depicts the relation at mean values of independent variables, ROFA declines until about 20% of F/T, then it starts growing until very high levels of F/T of about 80%, after which it starts declining again. Firm size and industry profitability (our controls) are significant with expected signs; and the model has satisfactory explanatory power with adjusted R-squared of 72.7% (see specification 2, Table 2). Notably, this model has a significantly higher R-squared than a similar quadratic specification (specification 1, Table 2), which has R-squared of 35.1% only. Therefore, the explanatory power of the cubic model is considerably higher than that of a quadratic specification. Although R-squared is a less accurate goodness of fit measure for GLS as compared to OLS (Blomquist 1980), the reported change is sizeable enough to overcome concerns over its precision. Furthermore, the F-statistics also show a considerable increase from 39.5 (quadratic) to 167 in the cubic model.

We have also replicated the analysis using the traditional indicator of overall performance of MNEs – return on total assets (ROTA) – as a dependent variable (see specifications 3 and 4, Table 2). In this way, we can make direct comparisons among regressions with different dependent variables across the functional forms. We find that models with ROTA have lower explanatory power than models with ROFA. This is not surprising as many more factors affect the overall performance of an MNE in addition to the degree of multinationality. Furthermore, although we find a cubic fit for ROTA, in the quadratic specification both F/T terms are insignificant. This confirms recent findings by Contractor et al. (2003) and Lu and Beamish (2004) that there is an S-shaped relation between ROTA and F/T.

TABLE 2 Degree of Multinationality and Performance, UK Companies

Dependent Variable	Label	Return on Foreign Assets (ROFA)		Return on Total Assets (ROTA)	
		S1	S2	S3	S4
Independent Variables					
Foreign/Total Sales	F/T	0.127** (0.037)	-0.361*** (0.000)	-0.014 (0.270)	0.049* (0.081)
Foreign/Total Sales ²	(F/T) ²	-0.001 (0.209)	0.011*** (0.000)	-0.00008 (0.551)	-0.002*** (0.009)
Foreign/Total Sales ³	(F/T) ³		-0.00007*** (0.000)		0.00001*** (0.009)
Total Revenues (log)	Log(TR)	0.704*** (0.000)	0.454** (0.035)	0.404*** (0.000)	0.401*** (0.000)
Industry Return on Total Assets (World)	ROTAW	0.358*** (0.000)	0.354*** (0.000)	0.171*** (0.000)	0.163*** (0.000)
D ₁₉₉₈	D1	0.016 (0.451)	1.056 (0.426)	-0.663** (0.046)	-0.708** (0.027)
D ₂₀₀₁	D2	-3.007** (0.041)	-1.862 (0.126)	-3.354*** (0.000)	-3.433*** (0.000)
D ₂₀₀₃	D3	-2.909*** (0.004)	-3.647*** (0.002)	-2.970*** (0.000)	-3.029*** (0.000)
Constant Term	C	13.821*** (0.000)	17.681*** (0.000)	6.626*** (0.000)	6.301*** (0.000)
Adjusted R-Squared	Adj. R ²	0.351	0.727	0.247	0.251
F-Statistics	F-stat	39.478***	167.000***	29.591***	35.978***
Number of observations		501	501	501	501

Interestingly, although we report an S-shaped relation for both ROTA and ROFA, the curves have different shapes over the plausible range of F/T values. If we plot the corresponding curves at the mean values of independent variables, we find that the ROFA curve has a sigmoid shape with all 3 stages present at the values of F/T from 1 to 100% (Figure 1). At the same time, the ROTA curve (Figure 2) is mostly declining over the range under consideration (with a short upward-sloped part at low values of F/T). Hence, we find an overall negative relationship between multinationality and total performance, whereas it is overall positive for the performance of foreign operations. An obvious explanation for this difference is the inclusion of home operations in the overall performance of MNE. As home operations can have a sizeable impact on the MNE's overall performance, ROTA is not

FIGURE 1. Multinationality and Performance (ROFA): Cubic Fit (S2)

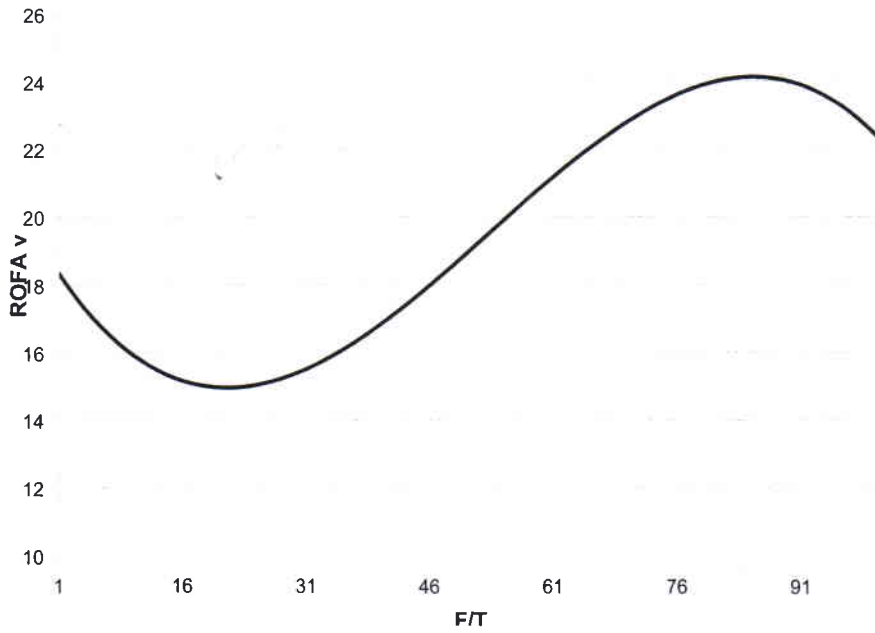
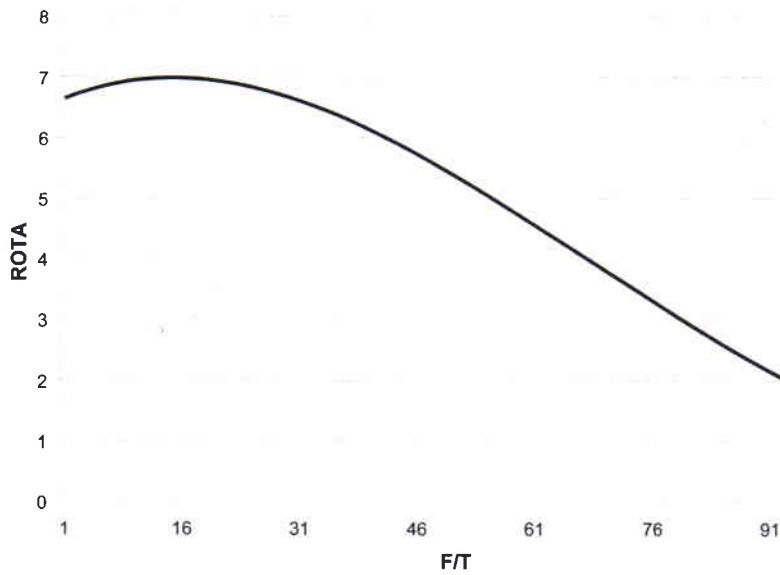


FIGURE 2. Multinationality and Performance (ROTA): Cubic Fit (S4)



a precise enough measure for the analysis of performance of foreign operations of the MNE. Furthermore, large coordination and transaction costs which affect ROTA but may not have a similar impact on ROFA are also partially responsible for a differential impact on ROFA as compared to ROTA.

[Insert Figures 1 and 2 here]

This test is, of course, subject to certain limitations. There could be inconsistencies in the accounting performance measures among firms in the sample. This can occur as a firm is allowed to choose from multiple ways to allocate fixed costs over periods, in accordance with generally accepted accounting principles. We also use a data set of the UK companies only; hence, our findings are potentially subject to a home-country bias. Furthermore, we have to sacrifice the frequency of the data (year) points covered in our panel data set for the length of the period we cover (10 years). Moreover, the choice of control variables is guided by previous analysis and data availability. And finally, the presence of a significant number of omitted variables may cause some concerns, despite being addressed as best we could, in the econometric method adopted here.

CONCLUSIONS

This paper reports a new test and modified analysis of the relationship between multinationality and performance. Previous research in the area has analyzed the impact of the degree of multinationality on the return on total assets (ROTA) or other measures of the overall performance of an MNE. In this study, we segment the foreign from the overall performance of multinationals. Based on this segmentation, we explore the impact of international strategy on a new performance indicator – return on foreign assets (ROFA).

Our empirical findings show strong support for an S-shaped relationship between the degree of multinationality and our new variable, ROFA. Our basic model is shown to be reliable as the tests using the traditional ROTA variable confirm previous results, but without the additional insight provided by ROFA. Overall, this paper offers an important extension to the analysis of the relationship between multinationality and performance. We use a new performance measure (ROFA) in our empirical analysis and this offers new insights into the segmented performance of foreign subsidiaries.

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FOOTNOTES

1 (After-tax net income)/Total assets

2 Cost of sales/Total sales