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RESEARCH NOTES AND COMMENTARIES

THE PERFORMANCE IMPLICATIONS OF INTRA- AND INTER-REGIONAL GEOGRAPHIC DIVERSIFICATION

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Engaging the debate regarding the appropriate level of geographic diversification for multinational enterprises (MNEs), we examine a critical, yet unresolved, question: How is performance impacted by the MNE's level of intra- and inter-regional diversification versus the total level of geographic diversification? Using data from 123 U.S.-based MNEs over a seven-year period and leveraging both sales-based and subsidiary-based measures for diversification, we find that performance increases at an increasingly higher rate as firms concentrate more heavily on intra-regional diversification. Regarding inter-regional diversification and total geographic diversification, we find inverted-U relationships to exist between firm performance and the level of geographic diversification. Different from recent research on multinationality, our robustness checks indicate no evidence of a sigmoidal relationship between the degree of regional diversification and performance. Copyright © 2010 John Wiley & Sons, Ltd.

INTRODUCTION

At the intersection of strategic management and international business there exists a significant debate regarding the appropriate level of geographic diversification (Contractor, 2007; Goerzen and Beamish, 2003; Hennart, 2007; Lee and Chung, 2007; Tallman and Li, 1996), which has specific implications for how multinational enterprises (MNEs) internationalize (Peng, 2009; Tallman and Yip, 2009). While differing perspectives have been supported by empirical evidence (Glaum and Oesterle, 2007; Hitt *et al*., 2006; Tallman and Yip, 2009), the debate has generated more questions than concrete answers, necessitating more research on the limits to international expansion (Contractor, 2007: 16).[1]

One side of the debate emphasizes a geographic diversification strategy that is closer to home,

Keywords: geographic diversification; multinational enterprise strategy; regionalization; multinationality performance; MNE; geographic spread
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[1] There exist a plethora of studies examining multinationality and performance. For recent reviews, see Contractor (2007), Glaum and Oesterle (2007), Hennart (2007), Hitt *et al*. (2006), Lee and Chung (2007), Peng (2009), Rugman (2005), Rugman and Verbeke (2007), Ruigrok and Wagner (2003), and Tallman and Yip (2009).

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based on the principle that coordination costs associated with managing across more geographic locations can be minimized. This occurs by obtaining (1) more tacit benefits that occur with accumulated learning within the same geographic region, and (2) more efficiency benefits that occur with the likelihood of having greater managerial control on the costs associated with cross-border activities (Delios and Beamish, 1999; Johanson and Vahlne, 1977).

Recent research has shown evidence of more concentrated regional activity versus a broader multinational spread (Hejazi, 2007; Rugman, 2005). For instance, Rugman and Verbeke (2004) point out that the largest MNEs are not globally diversified in terms of their international sales and tend to draw disproportionately more sales from their home regions through *intra*-regional diversification. Further, Rugman and Verbeke (2007) propose a *liability of inter-regional foreignness* based on the negative returns found from greater *inter*-regional diversification.

Within internationalization research, there exist several justifications for the varying strategies that lead to an MNE's geographical spread (Tallman and Yip, 2009). The distinction of intra- versus inter-regional geographic diversification within the regionalization perspective presents a contrast to more classical arguments that contend that performance outcomes are bound by the levels of international diversification (Kim, Hwang, and Burgers, 1988; Morck and Yeung, 1991). More recent literature has emphasized how performance varies nonlinearly with respect to the various levels of inter-regional diversification (e.g., such as squared relationships according to Gomes and Ramaswamy, 1999; Hitt, Hoskisson, and Kim, 1997; or in cubic/sigmoidal terms per Contractor, Kundu, and Hsu, 2003; Lu and Beamish, 2004; Ruigrok, Amann, and Wagner, 2007). On the other hand, a strategy based on intra-regionalization may offer a more modern depiction of MNE geographic diversification (Contractor, 2007). Thus, there exists room to extend theory on how MNEs leverage geographic diversification strategies to realize greater performance. This paper seeks to address this gap by proposing and testing hypotheses that focus on a key research question: does the level of intra- and inter-regional diversification versus total diversification impact MNE performance?

HYPOTHESES

Although there exists a solid theoretical foundation on the extent to which MNEs should diversify geographically, the empirical results are quite mixed (Glaum and Oesterle, 2007; Hitt *et al*., 2006). This has opened the opportunity to consider why specific geographic regions experience more frequent MNE activity, given (1) the observation of more concentrated regional MNE strategies (Ohmae, 1985; Rugman and Verbeke, 2004), and (2) the recognition that MNEs leverage strategies that are based on spatial proximity within a region for more readily accessible access to specific resources (Nachum, Zaheer, and Gross, 2008).

A regional diversification strategy allows an MNE to more readily build, integrate, and reconfigure different resources and capabilities that are located in different geographically close countries and distribute the accumulated costs of learning elsewhere within the region (Goerzen and Beamish, 2003; Qian *et al*., 2008). Due to the relatively close geographic distances, MNEs focusing on markets within their home region are more likely to have greater access to country-specific advantages (CSAs) such as knowledge about local institutions, markets, and entry modes (Carney, Gedajlovic, and Yang, 2009; Dunning and Lundan, 2008; Peng, Bhagat, and Chang, 2010; Peng and Khoury). Thus, a higher performance level may be realized from access to these CSAs (Rugman, 2005; Rugman and Verbeke, 2004).

Taking advantage of the potential benefits that can be drawn from home region similarities and spatial proximities, intra-regional diversification may also reduce the managerial costs of coordination, transportation, communication, distribution, and knowledge-sharing across different countries (Grant, 1987). Likewise, cost economies and efficiency benefits may be more likely achieved through an intra-regional strategy.

For instance, efficiency benefits can be derived from (1) similarity to the home country's market settings (Ruigrok and Wagner, 2003), (2) CSAs of the host country that complement the MNE's capabilities (Rugman, 2005), (3) complementarities between both host and home country resource environments (Dunning, 1993; Dunning and Lundan, 2008), and/or (4) compatibilities between MNE strategy and the characteristics of the host country's markets (Tallman, 1992). In sum, MNEs pursing an intra-regional diversification strategy

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are more likely to enhance performance from the opportunities to accumulate benefits from learning at a reduced cost and also from the efficiency benefits associated with greater scale economies. Thus, the return on diversifying intra-regionally may exceed the cost of capital for expansion. Specifically:

Hypothesis 1 (H1): Greater intra-regional diversification will be positively correlated with MNE performance.

MNEs often geographically diversify abroad in order to capitalize on capabilities and markets that are not as easily accessible within their home country (Contractor *et al*., 2003; Lu and Beamish, 2004; Wan and Hoskisson, 2003). This enables opportunities to gain competitive advantages (Kim *et al*., 1988), which can enhance their overall international competitiveness (Hitt *et al*., 1997). Given that countries/regions differ in their munificence and ongoing resource vitality (Wan and Hoskisson, 2003), the implementation of an inter-regional diversification strategy may allow an MNE to more flexibly build, integrate, or reconfigure different international resources and capabilities, while also exposing the firm to more expansive learning opportunities (Goerzen and Beamish, 2003; Lee and Makhija, 2009).

Similarly, MNEs can increase their strategic flexibility through gaining access to an expanded multinational network (Kogut, 1985; Lee and Makhija, 2009), which can also enable greater coordination control and increased operational efficiency. Through increasing the level of inter-regional diversification, economies may be gained through accumulating more generalized knowledge drawn from internationalization and applying this knowledge within similar host country environments. However, with broader levels of inter-regional diversification, there may exist limits to capitalizing on the sunk cost invested in knowledge that may be more *universally valuable* to all international entries. This scenario may prompt more country- and region-specific investments in learning. Thus, with higher levels of inter-regional investment, more location-specific investments may be necessary, which presents a more costly but potentially higher risk strategy for the MNE. This concept draws a parallel to previous research that has uncovered the curvilinear signatures that accompany higher levels of multinationality (for example, captured by the inverted 'U' signatures in Gomes and Ramaswamy, 1999; Hitt *et al*.,1997, or represented by the middle section of the S-curve per Contractor *et al*., 2003; Lu and Beamish, 2004; Ruigrok *et al*., 2007). Therefore:

Hypothesis 2 (H2): There is an inverted 'U' shape relationship between the degree of inter-regional diversification and performance, such that the highest levels of performance are positively correlated with more moderate levels of inter-regional diversification.

As a means to continuously capture the performance benefits in geographical diversification, MNEs may be compelled to engage in increased inter-regional diversification. However, by engaging in greater levels of diversification, there lie extensive challenges as to how to optimally distribute the firm's resources, such as between the potentially less costly investments in continued intra-regional investment versus increased inter-regional investment (Contractor, 2007).

As an MNE increases its commitment to both intra- and inter-regional markets, the number of internal transactions increases, which may overburden operational costs and negatively impact performance (Fang *et al*., 2007). Likewise, the degree of commitment a firm has to a specific region and how this compares to investments in other regions directly impacts performance. For instance, such risks may be tied to country-specific economic factors such as currency volatility or deteriorating fiscal institutions (Qian, 2000). This suggests that the MNE's overall performance is more tightly connected to risks and exposure that result from a region's collective and interconnected markets (Carney *et al*., 2009; Peng *et al*., 2010). Consequently, a threshold of total geographic diversification (that is, combined intra- and inter-regional geographic diversification) may be reached before experiencing diminishing returns (Gomes and Ramaswamy, 1999; Luo and Peng, 1999). Thus, we argue that a more moderate level of total geographic diversification, relative to comparatively higher and lower levels, may yield proportionately better performance. Specifically:

Hypothesis 3 (H3): There is an inverted 'U' shape relationship between the degree of total

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geographic diversification and performance, such that the highest levels of performance are positively correlated with more moderate levels of total geographic diversification.

METHODOLOGY

Sample

Our sample consists of 123 U.S.-based manufacturing MNEs from the *Fortune* Global 500 with data collected for the seven-year period of 1999–2005 (inclusive), resulting in a sample size of 861 firm-years. Data are collected from the firms' 10-K filings, *Moody's Industrial Manuals*, Mergent Online, and the annual World Bank's *World Development Report* (World Bank, 2006). Consistent with Delios and Beamish (1999), all firms in our sample have at least 10 percent of total sales derived from foreign operations and possess operations in at least six countries.[2] Due to potential differences in cultural norms, MNEs from certain countries may be more willing to expand geographically than MNEs from other countries. Therefore, controlling for the nationality of our MNEs—in this case, all are headquartered in the United States—allows us to remove the potential impact of the nationality differences of the MNEs' home countries.

Variables

Performance

Following previous literature on geographic diversification (Hitt *et al*., 1997; Kim *et al*., 1988), we use return on assets (ROA) at the corporate level as our performance measure.

Geographic diversification. Several measures for international diversification activity and regional classification have been operationalized in previous research (Hitt *et al*., 2006), such as the use of foreign sales-based measures (Geringer, Tallman, and Olsen, 2000; Grant, 1987; Hitt *et al*., 1997; Rugman, 2005), subsidiary-based measures (Kim *et al*., 1988; Qian *et al*., 2008; Tallman and Li, 1996), or composite indices constructed from multiple measures (Contractor *et al*. 2003; Gomes and Ramaswamy, 1999; Lu and Beamish, 2004). Thus, as a means to address issues related to robustness, sensitivity, and the ability to draw more specific implications of our findings for an operationalized diversification measure, we adopt *both* sales-based and subsidiary-based measures to test our research questions.

With a regional classification consistent with Hitt *et al*. (1997) and Wiersema and Bowen (2008), we employ measures based on both international sales and subsidiary presence, which draws regional boundaries according to four regions (1) Africa, (2) Asia and Pacific, (3) Europe, and (4) the Americas. Total geographic diversification (TOTAL) consists of intra-regional (INTRA) and inter-regional (INTER) dimensions (TOTAL = INTRA + INTER). The variables used to test each of the three hypotheses (H1, H2, and H3, labeled as INTRA, INTER, and TOTAL, respectively) use both unique measures of geographic diversification based on sales and subsidiary presence.

INTRA captures geographic diversification across countries within a region, and INTER captures diversification across different regions. Both calculations are based on entropy measures. Following Geringer *et al*. (2000), Hitt *et al*. (1997), and Rugman (2005), the measure of INTRA and INTER is based on the foreign firm's presence within a region, which we respectively capture with both sales and subsidiary diversification measures.[3] The entropy measure for INTRA results from two steps. We first consider the sales and subsidiaries within each region ($INTRA_a$), and then the sales or subsidiaries in all regions by adding each of them ($INTRA_j$):

$$INTRA_a = \sum_{i \in a} P_{ia}^{a} ln(1/P_{ia}^{a})$$

[2] Using U.S.-based MNEs from the *Fortune* Global 500 list allows for greater availability of data in specifying our empirical models. All firms are members of the list during the sample time frame. Some firms are eliminated due to incomplete access to all the variables considered, or due to being in nonmanufacturing industries, given the marked differences that nonmanufacturing MNEs face in terms of competitive environments, R&D expenditures, possession of resources, scope of operations, growth strategies, and degrees of internationalization (Dunning, 1993). A total of 13 industries are represented in the sample.

[3] The incorporation of a measure based on sales data aligns our work with mainstream research on multinationality and performance (Rugman, 2005). Our theoretical arguments are underpinned by research on how firms leverage regional strategies to minimize coordination costs and strategize resource commitments, which is more closely captured with a subsidiary-based measure.

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Here, INTRA_a equals the sales or subsidiaries within the a^{th} global market region and p_{ia}^{a} is defined as the proportion of sales or the number of subsidiaries in the i^{th} country to the total sales or total subsidiaries of the a^{th} global market region.

Assume that there are altogether j regions. Let INTRA_j be the weighted average of INTRA_{aj} ($a \in j$), the weight being previously defined p_{aj}^{j}. INTRA_j then can be written as:

$$INTRA_j = \sum_{a=1}^{j} p_{aj}^{j} \times INTRA_{aj}$$

The entropy measure of INTER is defined as:

$$INTER = \sum_{i=1}^{m} P^i ln(1/P^i).$$

Here, m is the number of regions in which a firm derives sales or has subsidiaries, and P^i is the proportion of the i^{th} region to a firm's total sales or total number of subsidiaries in all regions.

Control variables: Following previous research (Delios and Beamish, 1999; Hitt *et al*., 1997; Tallman and Li, 1996), we control for various firm-, region-, and industry-specific variables. (1) Firm size is measured using the natural logarithm of sales revenues (millions of U.S. dollars). (2) Research and development (R&D) intensity is measured using the annual R&D expenditure divided by total sales. (3) We compute an average of the firm's annual expenditures on advertising and divide it by the average sales revenue to derive advertising intensity. (4) We measure firm leverage by calculating the ratio of a firm's long-term debt to its total assets. (5) Product scope is measured based on the entropy measure of product diversification.[4] (6) Regional macroeconomic indicators reflect location-specific advantages of a regional market. The definition and sources of regional macroeconomic indicators are derived from the World Bank's *World Development Report* (World Bank, 2006). Six regional macroeconomic variables are used as time-varying, annual measures: gross domestic product (GDP) growth, GDP per capita, export growth, domestic investment, private consumption, and inflation.

Finally, we control for industry effects in two ways. We incorporate industry dummies to represent each firm's primary two-digit industry (Hitt *et al*. 1997).[5] We also create the variable 'industry group' to show more broadly how the foreign presence of a firm's associated industry may impact performance, where the industry group variable equals the industry's total foreign assets weighted according to the industry's total assets.

RESULTS

Table 1 presents descriptive statistics. The low intercorrelations and low variance inflation factors (VIF) (maximum VIF equals 1.26 and 1.21 for the sales-based and subsidiary-based measures, respectively) suggest that multicolinearity is not a significant concern.

In pooling time-series and cross-sectional data, we address autocorrelation and heteroskedasticity diagnostics by conducting the Durbin-Watson and White's tests. These diagnostics indicate that there is little concern for both issues.[6] Therefore, the structure of our data satisfies the assumptions for ordinary least squares (OLS) regression analysis.

Tables 2 and 3 each present five models to test our hypotheses, where the sales-based measure is operationalized in Table 2 and the subsidiary-based measure is used in Table 3. The respective model results in Tables 2 and 3 can be compared to one another to better understand how these unique variables impact performance. We find general consistency in the respective significance, signs, and magnitudes for each measure. Model 1 is the basic model that includes the effects of all of the control variables, and Models 2, 3, and 4 test the three hypotheses (H1, H2, and H3) using

[4] Product diversification consists of both related and unrelated components. Related product diversification is the weighted sum of the shares of each product segment in a firm's sales in a given industry. Unrelated product diversification is the weighted sum of the shares of each industry of total sales.

[5] There are 13 two-digit industry groups based on the Standard Industrial Classification (SIC) code, including beverage; chemical; food; paper and wood products; electrical machinery; industrial and farm; office equipment (with computers); metal products; measurement, scientific, and photographic equipment; motor vehicles; non-electrical machinery; pharmaceuticals; and textiles.

[6] With respect to autocorrelation, the DW statistic = 2.04 and 2.07 for the sales- and subsidiary-based measures, respectively. With respect to heteroskedasticity, $R^2 = 0.095$ (df = 170) for 123 firms, yielding test statistics of 11.69 for the sales-based measure, and $R^2 = 0.091$ (df = 170), 11.19 for the subsidiary-based measure, which are both less than 79.08, the critical value of χ^2 (at $p < 0.05$).

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Table 1. Means, standard deviations, and correlations

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Profitability (ROA)	3.923	1.108															
2. Firm size	0.763	3.192	0.023														
3. Foreign sales	0.283	0.126	0.076*	0.012													
4. R&D intensity	7.238	3.707	0.093**	0.037	0.057*												
5. Advertising intensity	5.207	4.685	0.040	0.029	0.044	0.013											
6. Firm leverage	0.318	0.204	0.012	0.006	0.016	0.022	0.009										
7. Product scope	1.082	0.743	0.042	0.047	0.035	0.020	0.014	0.022									
8. Regional GDP growth	0.047	0.025	0.089**	0.009	0.061*	0.024	0.039	0.018	0.025								
9. Regional GDP per capita	1.53	3.18	0.039	0.006	0.045	0.018	0.031	0.012	0.036	0.026							
10. Regional export growth	0.092	0.050	0.093**	0.008	0.033	0.024	0.038	0.011	0.022	0.044	0.031						
11. Regional domestic investment	0.073	0.026	0.064*	0.006	0.029	0.011	0.031	0.003	0.014	0.063*	0.026	0.036					
12. Regional private consumption	0.064	0.038	0.075*	0.017	0.042	0.026	0.038	0.003	0.016	0.063*	0.057*	0.019	0.022				
13. Regional inflation	0.041	0.029	−0.055*	0.004	0.042	0.009	0.013	0.007	0.018	0.028	0.014	0.035	−0.039	0.043			
14a. Total geographic diversification (sales)	2.540	0.081	0.081**	0.037	0.063*	0.076*	0.032	0.023	0.028	0.073*	0.057*	0.055*	0.059*	0.060*	−0.038		
14b. Total geographic diversification (subsidiary)	2.725	0.076	0.082**	0.035	0.061*	0.074*	0.033	0.021	0.027	0.072*	0.056*	0.053*	0.057*	0.058*	0.035		
15a. Intra-regional diversification (sales)	1.595	0.046	0.077*	0.027	0.066*	0.067*	0.024	0.020	0.018	0.073**	0.056*	0.058*	0.064*	0.079**	0.036	0.082**	
15b. Intra-regional diversification (subsidiary)	1.680	0.038	0.092**	0.030	0.071*	0.069*	0.037	0.021	0.021	0.010***	0.058*	0.060*	0.063*	0.080**	0.035	0.086**	
16a. Inter-regional diversification (sales)	0.945	0.064	0.044	0.050	0.075*	0.085**	0.041	0.031	0.038	0.077**	0.064*	0.055*	0.054*	0.059*	0.043	0.080**	−0.073**
16b. Inter-regional diversification (subsidiary)	1.045	0.057	0.042	0.049	0.076*	0.084**	0.039	0.033	0.037	0.077**	0.066*	0.056*	0.055*	0.061*	0.044	0.081**	−0.075*

Notes: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

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Table 2. Regression on ROA using *sales*-based diversification measures

	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	0.1123***	0.1097***	0.1109***	0.1083***	0.1069***
	(0.0343)	(0.0330)	(0.0337)	(0.0323)	(0.0316)
Firm size	0.0396	0.0363	0.0381	0.0347	0.0328
	(0.0304)	(0.0288)	(0.0297)	(0.0280)	(0.0269)
Firm leverage	0.0248	0.0216	0.0233	0.0197	0.0179
	(0.0213)	(0.0197)	(0.0205)	(0.0185)	(0.0169)
R&D intensity	0.1064***	0.1038***	0.1047***	0.1021***	0.1002***
	(0.0351)	(0.0338)	(0.0343)	(0.0325)	(0.0317)
Advertising intensity	0.0528	0.0501	0.0514	0.0486	0.0472
	(0.0377)	(0.0364)	(0.0370)	(0.0358)	(0.0348)
Product scope	0.0458	0.043	0.0443	0.0416	0.0401
	(0.0342)	(0.0329)	(0.0337)	(0.0322)	(0.0311)
Regional GDP growth	0.0995***	0.0969***	0.0983***	0.0956***	0.0939***
	(0.0334)	(0.0318)	(0.0326)	(0.0309)	(0.0301)
Regional GDP per capita	0.0467	0.0440	0.0454	0.0425	0.0409
	(0.0353)	(0.0341)	(0.0348)	(0.0335)	(0.0329)
Regional export growth	0.0743*	0.0715*	0.0729*	0.0700*	0.0684*
	(0.0394)	(0.0379)	(0.0387)	(0.0372)	(0.0366)
Regional (domestic) investment	0.0651*	0.0626*	0.0639*	0.0615*	0.0602*
	(0.0356)	(0.0338)	(0.0345)	(0.0331)	(0.0323)
Regional private consumption	0.0858**	0.0831**	0.0845**	0.0817**	0.0804**
	(0.0383)	(0.0369)	(0.0377)	(0.0362)	(0.0356)
Regional inflation	−0.0639*	−0.0612*	−0.0625*	−0.0598*	−0.0583*
	(0.0352)	(0.0340)	(0.0347)	(0.0334)	(0.0327)
Industry group	0.0618*	0.0587*	0.0602*	0.0572*	0.0555*
	(0.0344)	(0.0327)	(0.0335)	(0.0320)	(0.0309)
Intra-regional diversification (INTRA, H1)		0.1035***			0.1016***
		(0.0336)			(0.0324)
Intra-regional diversification squared (H1)		0.0755*			0.0738*
		(0.0408)			(0.0401)
Inter-regional diversification (INTER, H2)			0.0674*		0.0659*
			(0.0377)		(0.0369)
Inter-regional diversification squared (H2)			−0.1071***		−0.1053***
			(0.0354)		(0.0345)
Total geographic diversification (TOTAL, H3)				0.0819**	0.0808**
				(0.0372)	(0.0364)
Total geographic diversification squared (H3)				−0.0846**	−0.0832**
				(0.0306)	(0.0372)
Intra-regional diversification cubic		0.023			0.0211
		(0.0198)			(0.0189)
Inter-regional diversification cubic			−0.0396		−0.0380
			(0.0306)		(0.0298)
Total geographic diversification cubic				−0.0145	−0.0128
				(0.0147)	(0.0133)
Industry effects	Yes	Yes	Yes	Yes	Yes
Number of observations	861	861	861	861	861
R^2	0.312	0.387	0.399	0.414	0.533
Adjusted R^2	0.244	0.307	0.321	0.338	0.441
F-statistic	4.157***	4.503***	4.735***	5.039***	5.489***

Notes: Standard errors are in parentheses. * $p < .10$; ** $p < .05$; *** $p < .01$.

intra-regional, inter-regional, and total geographic diversification, respectively, as the key explanatory variables. Finally, Model 5 comprises all of the model variables.

For Models 2, 3, and 4 in Tables 2 and 3, we incorporate the linear, quadratic, and cubic terms for each respective diversification variable. Model 2, which tests H1, indicates that both

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Table 3. Regression on ROA using *subsidiary*-based diversification measures

	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	0.1183***	0.1152***	0.1167***	0.1135***	0.1116***
	(0.0359)	(0.0341)	(0.0348)	(0.0335)	(0.0326)
Firm size	0.0356	0.0314	0.0342	0.0297	0.0282
	(0.0287)	(0.0267)	(0.0275)	(0.0260)	(0.0252)
Firm leverage	0.0183	0.0152	0.0167	0.0138	0.0122
	(0.0163)	(0.0135)	(0.0148)	(0.0123)	(0.0106)
R&D intensity	0.1129***	0.1097***	0.1114***	0.1082***	0.1065***
	(0.0367)	(0.0356)	(0.0361)	(0.0350)	(0.0343)
Advertising intensity	0.0459	0.0430	0.0445	0.0416	0.0403
	(0.0330)	(0.0315)	(0.0324)	(0.0307)	(0.0300)
Product scope	0.0375	0.0348	0.0361	0.0333	0.0316
	(0.0297)	(0.0279)	(0.0288)	(0.0270)	(0.0259)
Regional GDP growth	0.1027***	0.1000***	0.1013***	0.0985***	0.0971***
	(0.0344)	(0.0336)	(0.0339)	(0.0329)	(0.0325)
Regional GDP per capita	0.0514	0.0487	0.0501	0.0472	0.0455
	(0.0360)	(0.0346)	(0.0354)	(0.0340)	(0.0327)
Regional export growth	0.0797*	0.0768*	0.0782*	0.0752*	0.0737*
	(0.0419)	(0.0408)	(0.0413)	(0.0401)	(0.0394)
Regional (domestic) investment	0.0717*	0.0690*	0.0702*	0.0676*	0.0661*
	(0.0382)	(0.0371)	(0.0377)	(0.0364)	(0.0358)
Regional private consumption	0.0917**	0.0892**	0.0905**	0.0878**	0.0865**
	(0.0398)	(0.0390)	(0.0395)	(0.0386)	(0.0381)
Regional inflation	−0.0673*	−0.0644*	−0.0658*	−0.0629*	−0.0613*
	(0.0366)	(0.0353)	(0.0360)	(0.0343)	(0.0337)
Industry group	0.0649*	0.0622*	0.0636*	0.0607*	0.0592*
	(0.0357)	(0.0345)	(0.0351)	(0.0338)	(0.0334)
Intra-regional diversification (INTRA, H1)		0.0903**			0.0886**
		(0.0393)			(0.0388)
Intra-regional diversification squared (H1)		0.0785*			0.0770*
		(0.0411)			(0.0405)
Inter-regional diversification (INTER, H2)			0.0756*		0.0739*
			(0.0402)		(0.0397)
Inter-regional diversification squared (H2)			−0.1126***		−0.1108***
			(0.0369)		(0.0361)
Total geographic diversification (TOTAL, H3)				0.0839**	0.0823**
				(0.0379)	(0.0370)
Total geographic diversification squared (H3)				−0.0887**	−0.0874**
				(0.0385)	(0.0376)
Intra-regional diversification cubic		0.0256			0.0242
		(0.0211)			(0.0202)
Intra-regional diversification cubic			−0.0435		−0.0417
			(0.0318)		(0.0303)
Total geographic diversification cubic				−0.0186	−0.0169
				(0.0157)	(0.0143)
Industry effects	Yes	Yes	Yes	Yes	Yes
Number of observations	861	861	861	861	861
R^2	0.309	0.384	0.396	0.406	0.519
Adjusted R^2	0.241	0.229	0.317	0.329	0.424
F-statistic	4.099***	4.446***	4.676***	4.875***	5.189***

Notes: Standard errors are in parentheses. * $p < .10$; ** $p < .05$; *** $p < .01$.

coefficients are positive and significant, but the level of significance is higher for the linear variable ($INTRA_{sales} = 0.1035$, $p < 0.01$; $INTRA_{sub} = 0.0903$, $p < 0.05$) than for the quadratic variable ($INTRA^2_{sales} = 0.0755$, $p < 0.10$; $INTRA^2_{sub} = 0.0785$, $p < 0.10$). Thus, the results fully support H1, indicating that MNEs are more likely to improve their performance if they significantly

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increase their levels of intra-regional diversification.

We find weak support for H2, which is tested in Model 3, under specific levels of diversification. Here, the coefficient of the linear inter-regional diversification variable is positive and weakly significant ($INTER_{sales} = 0.0674$, $p < 0.10$; $INTER_{sub} = 0.0756$, $p < 0.10$), yet the quadratic variable is negative and highly significant ($INTER^2{}_{sales} = -0.1071$, $p < 0.01$; $INTER^2{}_{sub} = -0.1126$, $p < 0.01$). This suggests that with lower levels of inter-regional diversification, there is a positive return to the firm. Thus, the inverted 'U' effect found is consistent with H2, where after a certain threshold of increasing diversification, the positive return declines. From Model 3 in Tables 2 and 3, we estimate the optimal ROA point to be 0.267 for $INTER_{sales}$ (max ROA = 0.121) and 0.287 for $INTER_{sub}$ (max ROA = 0.128).

H3, which is tested in Model 4, predicts that the profitability of a firm's total geographic diversification strategy will be less for both lower and higher levels of diversification, and higher for more moderate levels of diversification. In Model 4, the linear term of the variable is positive and significant ($TOTAL_{sales} = 0.0819$, $p < 0.05$; $TOTAL_{sub} = 0.0839$, $p < 0.05$), and the squared term variable is negative and significant ($TOTAL^2{}_{sales} = -0.0846$, $p < 0.05$; $TOTAL^2{}_{sub} = -0.0887$, $p < 0.05$). Showing support for H3, Model 4 similarly indicates an inverted 'U' relationship between the degree of total regional diversification and performance. More precisely, profitability escalates until the index of total regional diversification reaches 0.436 using $TOTAL_{sales}$ (max ROA = 0.127) and 0.418 using $TOTAL_{sub}$, (max ROA = 0.132) from which it is difficult to further improve ROA, and firms are more likely to see a decline in their return beyond this point. Model 5 incorporates all variables. We find that the signs and significance levels of our key variables to be consistent with those found in the other models for both sales- and subsidiary-based measures.[7] The adjusted R^2 values for the five models range from 0.244 (F = 4.157) to 0.441 (F = 5.489) in Table 2 and 0.241 (F = 4.099) to 0.424 (F = 5.189) in Table 3.

To further evaluate and compare the effects exerted by these three geographic diversification measures (INTRA, INTER, and TOTAL), we graph the estimated relationships. Using the actual range of data from our sample for each respective measure of diversification and the mean values for all other variables in each equation, Figures 1 and 2 show the estimated relationships between performance and the level of regional diversification

[7] Several control variables, including R&D intensity and specific regional macroeconomic indicators are statistically different from zero. For parsimony, the industry effects represented by the 12 dummy variables are not included, however, five industries (beverage; electrical machinery; measurement, scientific, and photographic equipment; office equipment; and pharmaceuticals) have regression coefficients that are significant at the percent level.

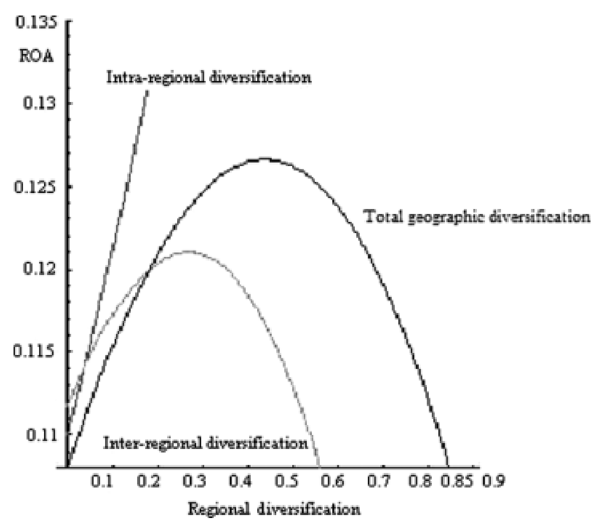

Figure 1. Sales-based geographic diversification versus ROA performance

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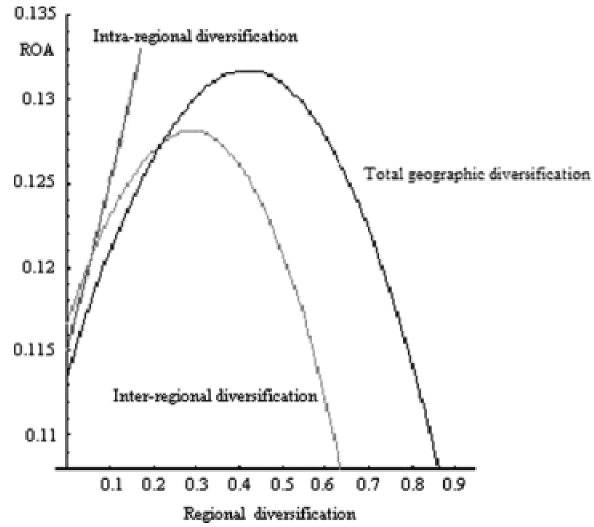

Figure 2. Subsidiary-based geographic diversification versus ROA performance

according to both sales- (Figure 1) and subsidiary-based (Figure 2) measures, as estimated by Models 2, 3, and 4, respectively.[8]

Figures 1 and 2 suggest that performance increases are more likely to occur with increasing intra-regional diversification and MNEs that favor this strategy over a more evenly distributed inter-regional strategy will benefit from greater return. However, at extremely low levels of sales- and subsidiary-based diversification (less than 0.05), the difference in ROA is negligible for these two strategies. Beyond the unique outcomes revealed by the respective intra- or inter-regional diversification measures, the TOTAL geographic diversification measure indicates how a more 'balanced' diversification strategy can maximize ROA.

Our results indicate a nonlinear relationship between geographic diversification and performance. Thus, as a robustness check, we also perform tests for the existence of a sigmoid function (S-curve). Two different tests are conducted. First, using the cubic terms of each of the respective diversification variables, we test for the presence of an S-curve signature. As shown in Tables 2 and 3, all of the coefficients of the cubic terms for INTRA, INTER, and TOTAL are insignificant.[9] In a second test for an S-curve signature, we separate our observations into two samples based on the median value of diversification, and then graph and compare the unique estimates of the upper and lower samples, where an inverted 'U' with a separate 'U' would indicate a potential S-curve signature. Using this approach, we find that both the lower and upper estimates show inverted 'U' relationships for inter-regional and total regional diversification, with all signs and levels of significance closely corresponding to that found for the coefficients in Tables 2 and 3. Thus, through both tests, we do not detect a sigmoidal relationship.

Further, we conduct a separate robustness check that uses an alternative measure for regional classification, where we adopt a regional classification that follows Rugman (2005) and Rugman and Verbeke (2004, 2007), which classifies every country according to the Triad regions of Asia Pacific (including Japan), North America, and the European Union. All results (not shown, but available upon request) are consistent with the findings presented in Tables 2 and 3.

[8] The corresponding range of our data varies for each geographic diversification measure.

[9] The respective models are also tested without the cubic terms included. The relative magnitudes and significance levels of all coefficients are consistent between the inclusion and omission of this variable, however the adjusted R^2 values are slightly higher for the models shown in Table 2. Thus, we opt to report the models that include cubic terms. As a further robustness check, the diversification values corresponding to the maximum ROAs in the estimated equations in Models 3 and 4 from both tables are also considered without the cubic terms included; all values are within 10 percent of those calculated from the results shown in Tables 2 and 3.

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DISCUSSION

In our view, three contributions emerge. First, increasing the level of geographic diversification, both in terms of sales or subsidiary presence within the home region, does allow MNEs to realize superior performance. The pursuit of intra-regional diversification may occur to capitalize on the coordination and learning benefits that MNEs can leverage in their multinational strategies. This finding contributes to our understanding of MNE strategic behavior by supporting the prevalence of regionalized market strategies among U.S.-based firms and the distinctively higher returns that are associated with intra-regional diversification (Rugman and Verbeke, 2004, 2007).

Second, in contrast to the linear effect exerted by intra-regional diversification, there is an inverted 'U' shaped relationship between the level of inter-regional diversification and firm performance, both in terms of sales and subsidiary presence. Inter-regional diversification may yield a positive return to the MNE when the level of such diversification is low to moderate. However, the relationship between inter-regional diversification and performance becomes negative at higher levels of diversification and ROA substantially declines. Although this finding is supportive of previous MNE research that has found a curvilinear limitation to the relationship between multinationality and performance (Contractor, 2007; Contractor *et al*., 2003; Lu and Beamish, 2004), we do not observe a sigmoidal relationship with a regionalization framework.

Third, in operationalizing the combined total geographic diversification as the key explanatory variable, we find support for the inverted 'U' shaped relationship in terms of sales and subsidiary presence, which shows that MNEs that are more heavily invested inter-regionally can benefit from diversifying more within their home region. In other words, pursuing a more moderate path of total geographic diversification may result in higher potential returns.

Overall, our findings suggest the limits of multinationality exist at low to moderate levels of geographic diversification, but do not support the S-curve signature identified in recent research (Contractor, 2007; Contractor *et al*., 2003; Lu and Beamish, 2004). Perhaps, an explanation for this difference in our findings lies in the research context, as our sample is a cross-section of U.S.-based manufacturing MNEs as opposed to service MNEs (Contractor *et al*., 2003) or Japan-based MNEs (Lu and Beamish, 2004). Further, the lack of support for the S-curve may also be explained by differing diversification measures, since multicomponent composite indices are used as the diversification measure in Contractor *et al*. (2003) and Lu and Beamish (2004). Future research may account for this discrepancy with a sample that is both multinational and multisectoral.

Our study has various limitations that may inspire future research. First, we have not tested the stability of the relationship between geographic diversification and performance in a time-series analysis. This research design may allow for other strategies to become apparent, such as how organizations learn from prior experiences and react in subsequent diversification moves (Luo and Peng, 1999). Second, while we focus on four different definitions of a geographic region, future research may use different measures to define regions in terms of geographic, cultural, and institutional distances. Our regional designations may be a coarse proxy for (mainly geographic) regions, and it is probable that a certain intra-regional variance remains. Third, since this study is based on large U.S.-based MNEs, the generalizability of our findings may be limited.[10] Fourth, the motives for different types of MNE investment, such as manufacturing versus R&D, are different (Kuemmerle, 1999). Unfortunately, our data do not allow us to differentiate these types.

The practical insights uncovered by this work indicate that greater return may be realized through a geographic diversification strategy that is more concentrated in regional home markets. Firms that contain their level of inter-regional diversification within a moderate range may also realize positive returns, but such returns are inferior to an intra-regional diversification strategy. We also uncover nonlinear relationships within the geographic diversification-performance relationship. However, based on our results, we find the relationship to be an inverted 'U' signature for both inter-regional and total regional diversification, not an S-curve signature.

[10] Interestingly, for MNE R&D investment, Kuemmerle (1999: 18), sampling U.S., European, and Japanese firms, finds that 'Japanese firms are similar to Western firms in terms of actual investment decisions made.'

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CONCLUSION

In addressing a call for further research on how MNE performance is impacted by the pursuit of 'national versus regional versus global strategies' (Tallman and Yip, 2009: 335), this work weighs in on the multinationality debate to highlight that the return on intra-regional diversification outweighs the return on inter-regional diversification, and the benefits to pursuing both are limited. Grounded in what may be a more contemporary view of MNE geographic diversification (Peng, 2009; Rugman and Verbeke, 2004, 2007), we uncover the performance implications of regionalized diversification strategies, which presents a contrast to previous multinationality research. In conclusion, this work extends established frameworks on geographic diversification by gaining clarity on how intra- and inter-regional diversification strategies face unique performance limits.

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